

Faculty of Economics and Business

Capital Structure and Firm Performance: Moderating Effect of Economic Conditions, Monetary Policy, and Stock Market Volatility

Jerry Arickson Anak Kuta

Doctor of Business Adminstration
2025

Capital Structure and Firm Performance: Moderating Effect of Economic Conditions, Monetary Policy, and Stock Market Volatility

Jerry Arickson Anak Kuta

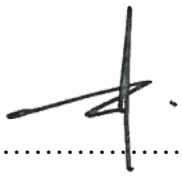
A dissertation submitted

In fulfillment of the requirements for the degree of Doctor of Business Administration

Faculty of Economics and Business
UNIVERSITI MALAYSIA SARAWAK
2025

DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The dissertation has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



……

Signature

Name: JERRY ARICKSON ANAK KUTA

Matric No.: 21040050

Faculty of Economics and Business

Universiti Malaysia Sarawak

Date: 3 September 2025

ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to everyone who has contributed, directly or indirectly, to the completion of this study.

I am especially grateful to my supervisor, Professor Dr. Mohamad Bin Jais, for his invaluable guidance, insights, and encouragement throughout this research journey. His expertise and dedication have been instrumental in shaping this study.

My sincere appreciation also goes to the faculty and staff of the Centre for Graduate Studies for their continuous support and assistance during my time at Universiti Malaysia Sarawak. I am also thankful to the management of Universiti Malaysia Sarawak for providing the necessary resources and a conducive environment to pursue my studies.

I would like to extend my deepest thanks to my family for their unwavering support, patience, and understanding, which have been a constant source of motivation and strength.

Additionally, I am grateful to all those who have helped me in various capacities, whether through feedback, encouragement, or assistance with the practical aspects of this study. Your support has been invaluable.

Thank you all.

ABSTRACT

The relationship between capital structure and firm performance has received considerable attention, particularly in emerging markets like Malaysia. However, most existing studies either rely on outdated data, focus on specific industries, or overlook the influence of macroeconomic conditions. This study addresses these limitations by incorporating Gross Domestic Product (GDP) growth, the Overnight Policy Rate (OPR), and stock market volatility (VOL) as moderating variables to assess their role in the capital structure–performance relationship. Using data from 719 non-financial firms listed on Bursa Malaysia from 2012 to 2022, this study applies both static and dynamic panel regression techniques. Firm performance is measured using Return on Assets (ROA), while debt is assessed through total, long-term, and short-term debt ratios to assets. The two-step system Generalized Method of Moments (sys-GMM) model is employed to address statistical issues including multicollinearity, heteroscedasticity, autocorrelation, endogeneity, and dynamic panel bias. Results reveal a significant negative relationship between debt levels and firm performance, supporting the trade-off theory. However, GDP, OPR, and VOL do not significantly moderate this relationship, suggesting that internal firm factors may exert a greater influence than macroeconomic conditions. This finding has several implications. For managers, Managers must practice careful debt management in uncertain times. Policymakers should prioritize strengthening firm resilience over relying only on macro tools. Investors can expect more stable returns from less-leveraged firms, making capital structure a key factor in investment decisions.

Keywords: Capital Structure, Firm Performance, Macroeconomic Factors, Bursa Malaysia, System Generalized Method of Moments

Struktur Modal dan Prestasi Firma: Kesan Moderasi Keadaan Ekonomi, Dasar Kewangan dan Volatiliti Pasaran Saham

ABSTRAK

Hubungan antara struktur modal dan prestasi firma telah menerima banyak perhatian, khususnya dalam pasaran membangun seperti Malaysia. Namun begitu, kebanyakan kajian terdahulu bergantung kepada data yang sudah lapuk, tertumpu kepada industri tertentu, atau mengabaikan pengaruh keadaan makroekonomi. Kajian ini menangani kelemahan tersebut dengan memasukkan pertumbuhan Keluaran Dalam Negara Kasar (GDP), Kadar Dasar Semalaman (OPR), dan volatiliti pasaran saham (VOL) sebagai pemboleh ubah pemoderasi untuk menilai peranannya dalam hubungan antara struktur modal dan prestasi firma. Menggunakan data daripada 719 firma bukan kewangan yang tersenarai di Bursa Malaysia dari tahun 2012 hingga 2022, kajian ini menggunakan kaedah regresi panel statik dan dinamik. Prestasi firma diukur melalui pulangan atas aset (ROA), manakala hutang dinilai melalui nisbah hutang keseluruhan, jangka panjang, dan jangka pendek terhadap aset. Model dua langkah Sistem Kaedah Umum Saat (system-GMM) digunakan untuk menangani isu statistik seperti multikolineariti, heteroskedastisiti, autokorelasi, endogeniti, dan bias panel dinamik. Keputusan menunjukkan hubungan negatif yang signifikan antara tahap hutang dan prestasi firma, menyokong teori trade-off. Walau bagaimanapun, GDP, OPR, dan VOL tidak memoderasi hubungan ini secara signifikan, yang boleh memberi maksud bahawa faktor dalaman firma mungkin mempunyai pengaruh yang lebih besar berbanding faktor ekonomi luar. Penemuan ini memberi beberapa implikasi. Pengurus perlu mengamalkan pengurusan hutang yang berhemah dalam tempoh ketidaktentuan ekonomi. harus mengutamakan pengukuhan daya tahan firma berbanding hanya bergantung kepada alat dasar makroekonomi. Pelabur boleh menjangkakan pulangan yang lebih stabil daripada firma yang kurang berhutang, menjadikan struktur modal sebagai faktor penting dalam keputusan pelaburan.

Kata kunci: *Struktur Modal, Prestasi Firma, Faktor Makroekonomi, Bursa Malaysia, Sistem Kaedah Umum Saat (System-GMM)*

TABLE OF CONTENTS

		Page
DECLARATION		i
ACKNOWLEDGEMENT		ii
ABSTRACT		iii
ABSTRAK		iv
TABLE OF CONTENTS		v
LIST OF TABLES		xvi
LIST OF FIGURES		xix
LIST OF ABBREVIATIONS		xx
CHAPTER 1: INTRODUCTION		1
1.0	Introduction	1
1.1	Background of the Study	1
1.1.1	Significant Events Over the Decade	6
1.1.2	Malaysia's Economic Landscape	9
1.1.3	The Role of Bank Negara Malaysia	11
1.1.4	The Dynamics of Bursa Malaysia	15

1.2	Problem Statement	19
1.3	Research Objectives	20
1.3.1	Specific Objectives	21
1.4	Research Questions	21
1.5	Summary of Problem Statement, Research Objectives and Questions	22
1.6	Research Gap	23
1.6.1	Summary of Research Gap	25
1.7	Significance of the Study	27
1.8	Organisation of the Study	29
1.9	Chapter Summary	31
CHAPTER 2: LITERATURE REVIEW		32
2.0	Introduction	32
2.1	Discussion on Dependent Variables (Firm Performance)	32
2.2	Discussion on Independent Variables (Capital Structure)	36
2.3	Discussion on Moderating Variables (Macroeconomic Factors)	38
2.3.1	Economic Conditions	39
2.3.2	Monetary Policy	42

2.3.3	Stock Market Volatility	45
2.4	Discussion on Underpinning Theories	48
2.4.1	Modigliani-Miller (MM) Theorem	49
2.4.2	Trade-off Theory	51
2.4.3	Pecking Order Theory	55
2.4.4	Agency Theory	58
2.4.5	Market Timing Theory	61
2.5	Empirical Studies on Capital Structure and Firm Performance	64
2.5.1	Capital Structure and Firm Performance in Developed Countries	65
2.5.2	Capital Structure and Firm Performance in Developing Countries	68
2.5.3	Capital Structure and Firm Performance in Malaysia	72
2.6	Summary of Literatures	76
2.7	Conceptual Framework	78
2.8	Hypotheses Development	80
2.8.1	Capital Structure and Firm Performance	81
2.8.2	Moderating Effect of Economic Conditions	82
2.8.3	Moderating Effect of Monetary Policy	83

2.8.4 Moderating Effect of Market Volatility 83

2.8.5 Hypotheses Model 84

2.9 Chapter Summary 86

CHAPTER 3: RESEARCH METHODOLOGY 87

3.0 Introduction 87

3.1 Research Approach 87

3.2 Data Collection Methods 89

3.3 Population of the Study 90

3.3.1 Population and Census Design 91

3.3.2 Time Frame 93

3.4 Variables and Measurement 95

3.4.1 Dependent Variables 95

3.4.2 Independent Variables 98

3.4.3 Moderating Variables 100

3.4.3.1 Annual Gross Domestic Product Growth Rate (GDP) 101

3.4.3.2 Overnight Policy Rate (OPR) 101

3.4.3.2 Stock Market Volatility (VOL) 102

3.4.4 Control Variables 103

3.4.5 Summary of Variables and Measurement 105

3.5 Data Analysis Methods 106

3.5.1 Panel Data 106

3.5.2 Descriptive Analysis 108

3.5.3 Multiple Regression Analysis 109

3.5.4 Static Panel Data Analysis 111

3.5.5 Dynamic Panel Data Analysis 112

3.6 Static Panel Data Analysis 113

3.6.1 Pooled Ordinary Least Squares (OLS) 113

3.6.2 Random Effects (RE) Model 114

3.6.3 Fixed Effects (FE) Model 115

3.6.4 Generalized Least Squares (GLS) 116

3.6.5 Panel Corrected Standard Errors (PCSE) 116

3.6.6 Two-Stage Least Squares (2SLS) 117

3.6.7 Diagnostic Tests for Static Panel Data Analysis 119

3.6.7.1 Variance Inflation Factor (VIF) 119

3.6.7.2 Breusch-Pagan Lagrange Multiplier (LM) Test for Random Effects 121

3.6.7.3 F-Test for Fixed Effects 122

3.6.7.4 Hausman Test 123

3.6.7.5 Breusch-Pagan Test for Heteroscedasticity 125

3.6.7.6 Modified Wald Test 126

3.6.7.7 Inoue and Solo (2006) Lagrange Multiplier (LM) Tests for Serial Correlation 128

3.6.7.8 Durbin-Wu-Hausman (DWH) Test 129

3.6.7.9 Tests of Overidentifying Restrictions 131

3.7 Dynamic Panel Data Analysis 133

3.7.1 Difference Generalized Method of Moments (Diff-GMM) 133

3.7.2 System Generalized Method of Moments (Sys-GMM) 135

3.7.3 Diagnostic Tests for Dynamic Panel Data Analysis 137

3.7.3.1 Arellano-Bond Test for Autocorrelation 137

3.7.3.2 Sargan / Hansen Test of Overidentifying Restrictions 139

3.8 Model Specification 141

3.8.1 Static Model 142

3.8.2 Dynamic Model 145

3.9 Chapter Summary 146

CHAPTER 4: EMPIRICAL RESULTS 148

4.0 Introduction 148

4.1 Panel Data Structure 149

4.2 Descriptive Analysis 152

4.3 Pearson Correlation Matrix Analysis 154

4.4 Variance Inflation Factor (VIF) 156

4.5 Pooled Ordinary Least Squares (OLS) Regression Analysis 158

4.6 Breusch and Pagan Lagrangian Multiplier (LM) Test for Random Effects 161

4.6.1 Random Effects (RE) Model Regression Analysis 162

4.7 F-Test for Fixed Effects 167

4.7.1 Fixed Effects (FE) Model Regression Analysis 168

4.8 Hausman Test 171

4.9 Addressing Heteroscedasticity and Autocorrelation 173

4.9.1 Breusch-Pagan Test for Heteroscedasticity 174

4.9.2 Modified Wald Test for Groupwise Heteroskedasticity 175

4.9.3 Inoue and Solo (2006) Lagrange Multiplier (LM) Tests for Autocorrelation 176

4.9.4 Corrective Measures and Advanced Estimation Techniques 177

4.10 FE Model Regression Analysis with Robust and Clustered Standard Errors 178

4.10.1 FE Models Comparison 182

4.11 Generalized Least Squares (GLS) Regression Analysis 184

4.12 Panel Corrected Standard Errors (PCSE) Model Regression 189

4.13 Addressing Endogeneity 194

4.13.1 Durbin-Wu-Hausman (DWH) Test 195

4.14 Two-Stage Least Squares (2SLS) Model Regression 198

4.14.1 First-Stage Regression Summary Statistics 203

4.14.2 Tests of Overidentifying Restrictions 204

4.15 Addressing Dynamic Panel Bias 205

4.16 Difference Generalized Method of Moments (diff-GMM) Regression Analysis 206

4.16.1 Arellano-Bond Test for Autocorrelation 210

4.16.2 Application of Sargan / Hansen Tests of Overidentifying Restrictions in GMM 211

4.16.3 Hansen Test of Overidentifying Restrictions 212

4.16.4 Discussion on the Results - Two-Step diff-GMM 213

4.17 System Generalized Method of Moments (Sys-GMM) Regression Analysis 216

4.17.1 Arellano-Bond Test for Autocorrelation 222

4.17.2 Hansen Test of Overidentifying Restrictions 223

4.17.3 GMM Models Comparison 224

4.18 Model Validation Procedure 227

4.19 Robustness Checks 231

4.19.1 Conclusion from Robustness Checks 237

4.20 Hypotheses Testing 239

4.20.1 Capital Structure and Firm Performance 239

4.20.2 Moderating Effect of Economic Conditions 241

4.20.3 Moderating Effect of Monetary Policy 242

4.20.4 Moderating Effect of Market Volatility 243

4.20.5 Hypotheses Testing Summary 244

4.21 Chapter Summary 245

CHAPTER 5: DISCUSSIONS AND CONCLUSION 248

5.0 Introduction 248

5.1 Discussion on the Results 248

5.1.1 Capital Structure and Firm Performance 249

5.1.2 Moderating and Direct Effects of Economic Conditions 252

5.1.3 Moderating and Direct Effects of Monetary Policy 254

5.1.4 Moderating and Direct Effects of Market Volatility 257

5.1.5 Inconsistencies in the Results for GDP, OPR and VOL 260

5.1.6 Firm-Specific Factors Effects 263

5.1.7 Past Performance Effects 265

5.2 Addressing Problem Statement, Research Objectives, and Research Questions 267

5.3 Implications of the Study 270

5.3.1 Theoretical Implications 270

5.3.2 Policy Implications 271

5.3.3 Managerial Implications 272

5.3.4 Implications for Investors 273

5.4 Limitations of the Study 274

5.4.1 Data Limitations 274

5.4.2 Methodological Limitations 275

5.4.3 Focus on Moderating Variables 276

5.4.4 Time Frame Considerations 277

5.5 Recommendations for Future Research 278

5.5.1 Exploration of Small and Medium Enterprises (SMEs) 278

5.5.2 Analysis of the ACE and LEAP Markets 278

5.5.3 Broader Examination of Macroeconomic Moderators 279

5.5.4 Exploring Firm-Specific Factors 279

5.5.5 Investigating the Impact of Economic Shocks and Recovery Patterns 279

5.5.6 Impact of Technological Advancements and Market Innovations 280

5.5.7 Exploring the Potential of AI in Financial Decision-Making 280

5.5.8 Detailed Examination of the Role of OPR and VOL 281

5.6 Conclusion 281

REFERENCES 283

APPENDICES 330

LIST OF TABLES

		Page
Table 1.1	Historical Changes in OPR by BNM, 2012-2023	13
Table 1.2	Summary of Problem Statement, Research Objectives and Questions	22
Table 1.3	Summary of Research Gap	26
Table 2.1	Summary of Literature	77
Table 3.1	Summary of Variables and Measurement	105
Table 4.1	Descriptive Analysis	152
Table 4.2	Pearson Correlation Matrix Analysis	154
Table 4.3	Initial VIF Analysis	157
Table 4.4	Separate VIF Analysis for Each Model	157
Table 4.5	Results from Pooled OLS Regression	159
Table 4.6	Results from Breusch and Pagan LM Test for Random Effects	161
Table 4.7	Results from RE Regression	165
Table 4.8	Results from F-Test for Fixed Effects	167
Table 4.9	Results from FE Regression	169
Table 4.10	Results from Hausman Test	172

Table 4.11 Results from Breusch-Pagan Test for Heteroscedasticity 174

Table 4.12 Results from Modified Wald Test for Groupwise Heteroskedasticity 175

Table 4.13 Results from Inoue and Solo (2006) LM Test for Autocorrelation 176

Table 4.14 Results from FE Regression (with Robust and Clustered Standard Errors) 180

Table 4.15 Results from GLS Regression 186

Table 4.16 Results from PCSE Regression 191

Table 4.17 Second-Stage Regression Results from DWH Test 197

Table 4.18 Results from 2SLS Regression 200

Table 4.19 Results from First-Stage Regression Summary Statistics 203

Table 4.20 Results from Two-Step Diff-GMM Regression 209

Table 4.21 Results from Arellano-Bond Test - Two-Step diff-GMM 210

Table 4.22 Results from Hansen Test - Two-Step diff-GMM 213

Table 4.23 Results from Two-Step Sys-GMM Regression 219

Table 4.24 Results from Arellano-Bond Test - Two-Step Sys-GMM 222

Table 4.25 Results from Hansen Test - Two-Step Sys-GMM 223

Table 4.26 Robustness Checks - TDA Model 233

Table 4.27 Robustness Checks - LDA Model 234

Table 4.28 Robustness Checks - SDA Model 235

Table 4.29 Hypotheses Testing Summary 245

LIST OF FIGURES

Page

Figure 1.1	GDP of Malaysia from 2012 to 2022	11
Figure 1.2	Volatility Analysis for FTSE Bursa Malaysia KLCI Index	18
Figure 2.1	Conceptual Framework	80
Figure 2.2	Proposed Hypotheses Model	84
Figure 4.1	First-Stage Regression Results for DWH Test using Stata 18.0 (TDA)	195
Figure 4.2	First-Stage Regression Results for DWH Test using Stata 18.0 (LDA)	196
Figure 4.3	First-Stage Regression Results for DWH Test using Stata 18.0 (SDA)	196

LIST OF ABBREVIATIONS

1MDB	1Malaysia Development Berhad
2SLS	Two-Stage Least Squares
ACE	Access, Certainty, Efficiency
AI	Artificial Intelligence
AR(1)	First-Order Autocorrelation
AR(2)	Second-Order Autocorrelation
ASEAN	Association of Southeast Asian Nations
BBC	British Broadcasting Corporation
BN	Barisan Nasional
BNM	Bank Negara Malaysia
BIST	Borsa İstanbul
BUMN20	Badan Usaha Milik Negara 20 Index
CNN	Cable News Network
diff-GMM	Difference Generalized Method of Moments
DWH Test	Durbin-Wu-Hausman Test
EFFORT	Endowment Fund for the Rehabilitation of Tigray
EPS	Earnings Per Share
ESG	Environmental and Social Governance

EU	European Union
EVA	Economic Value Added
FDI	Foreign Direct Investment
FE	Fixed Effects
FTSE	Financial Times Stock Exchange
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
GLS	Generalized Least Squares
GST	Goods and Services Tax
IDX	Indonesia Stock Exchange
IFRS	International Financial Reporting Standards
IPO	Initial Public Offering
IV	Instrumental Variable
KLCI	Kuala Lumpur Composite Index
LDA	Long-Term Debts to Assets
LEAP	Leading Entrepreneur Accelerator Platform
LIQ	Liquidity
LM	Lagrange Multiplier
LQ45	Stock Market Index for the Indonesia Stock Exchange

MENA	Middle East and North Africa
MESDAQ	Malaysian Exchange of Securities Dealing and Automated Quotation
MM Theorem	Modigliani-Miller Theorem
NASDAQ	National Association of Securities Dealers Automatic Quotation System
NEP	New Economic Policy
NYSE	New York Stock Exchange
NYU	New York University
OLS	Ordinary Least Squares
OPR	Overnight Policy Rate
PCSE	Panel Corrected Standard Errors
PENJANA	Pelan Jana Semula Ekonomi Negara
PH	Pakatan Harapan
PLCs	Public Listed Companies
PN	Perikatan Nasional
PN17	Practice Note 17
R&D	Research and Development
RE	Random Effects
ROA	Return on Assets

ROE	Return on Equities
ROS	Return on Sales
SAARC	South Asian Association for Regional Cooperation
SDA	Short-Term Debts to Assets
SMEs	Small and Medium Enterprises
SST	Sales and Services Tax
sys-GMM	System Generalized Method of Moments
SZE	Firm Size
TAN	Tangibility
TDA	Total Debts to Assets
US	United States
VIF	Variance Inflation Factor
VOL	Stock Market Volatility
WARISAN	Parti Warisan

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter sets the stage for the study by providing a comprehensive overview of the research context and its significance. It begins with the background of the study, highlighting significant events over the past decade that have influenced the economic and financial landscape of Malaysia. The chapter then explores Malaysia's economic landscape, discussing key economic indicators and trends. The role of BNM, the country's central bank, is examined in terms of its impact on monetary policy and financial stability. The dynamics of Bursa Malaysia, the main stock exchange, are also analysed to understand the capital market's structure and functioning. Following this, the problem statement outlines the necessity of the study. The research objectives and specific objectives are then presented, followed by the research questions that guide the inquiry. The chapter also discusses the significance of the study, emphasizing its contributions to academic literature and practical applications. Finally, the organization of the study outlines the structure of the subsequent chapters.

1.1 Background of the Study

The foundation for modern academic thinking on capital structure was first proposed by Franco Modigliani and Merton H. Miller in two key phases: initially in 1958 and later expanded upon in 1963. These foundational works led to the development of subsequent theories, such as the trade-off theory, pecking order theory, agency theory, and the more recent market timing theory. These theories suggest several factors that might influence

firms' capital structure decisions, reflecting the complexity and multi-dimensional nature of financial management within firms. Each theory provides insights into how companies prioritize their sources of financing—from internal funds to equity and debt—based on factors like financial slack, asset structure, profitability, and market conditions.

In Malaysia, the relevance of capital structure decisions has gained increasing attention due to the nation's shifting economic environment. The impact of external shocks such as the COVID-19 pandemic, coupled with domestic political instability, has added complexity to corporate financial management. These factors not only influence the macroeconomic landscape but also introduce risks that firms must navigate when structuring their capital to support growth and stability.

Political instability, for instance, has far-reaching economic consequences that indirectly affect firm-level financing decisions. It hampers GDP growth by discouraging both domestic and foreign investment, triggering policy uncertainty, and reducing consumer confidence. Frequent changes in governance or fiscal policy can disrupt long-term business planning, while currency fluctuations and deteriorating credit ratings raise borrowing costs. These conditions create an uncertain operating environment for firms, compelling them to reassess their capital structure strategies. Empirical studies by Khan et al. (2023a), Mirza et al. (2023), and Abdelhameed and Rashdan (2021) confirm that political turbulence significantly disrupts economic performance, further emphasizing its indirect influence on corporate financing.

Among macroeconomic indicators, GDP growth is particularly significant in shaping capital structure decisions. A growing economy often encourages firms to leverage debt to finance expansion, supported by improved earnings and lower default risk. This positive

outlook may also enhance stock market performance, making equity financing more attractive. Conversely, during downturns, firms may reduce leverage to preserve financial flexibility. The influence of GDP growth also varies by industry, with consumer-facing sectors like retail responding more directly due to their dependence on household spending.

When the COVID-19 pandemic hit globally, it influenced key economic performance indicators like the unemployment rate and GDP (Mustaffa et al., 2021), which in turn affected corporate capital structures. Furthermore, policies such as stay-at-home orders and workplace closures, alongside debt or contract relief for households, have been shown to influence both economic activity and stock market performance (Keh and Tan, 2021). Such policy measures not only affected immediate economic conditions but also have long-term implications for corporate financing and capital structure decisions. Additionally, a study by Othman and Tai (2022) indicates that there is a co-integration relationship between government spending, tax revenue, and per capita income, with government spending having a long-run positive impact and tax revenue exhibiting a long-run negative impact on economic indicators. The practical and policy implication of the results is that fiscal instruments play a significant role, primarily in alleviating the economic impact of the COVID-19 pandemic in the long run.

Moreover, the COVID-19 pandemic's impact on borrowing costs in Malaysia can be evaluated through the lens of broader economic impacts caused by the pandemic. Mustaffa et al. (2021) also explored the broad economic repercussions of COVID-19 on key Malaysian economic indicators, which can significantly influence monetary policy decisions, including adjustments to the OPR. The OPR is an overnight interest rate set by BNM used for monetary policy direction. The study by Mustaffa et al. (2021) highlighted

how these economic shifts demanded responsive policy measures, potentially impacting the OPR to stabilize the economy and manage inflation.

Adjustments in the OPR by BNM may influence corporate capital structure decisions by affecting the cost and attractiveness of debt financing. If the OPR is lowered, it could reduce borrowing costs, potentially making debt a more appealing option for financing operations and expansions, which might lead companies to increase their debt levels. Conversely, an increase in the OPR might raise borrowing costs, which could heighten financial risk and prompt firms to reduce leverage or shift towards equity financing and the use of retained earnings. These changes could also create opportunities for refinancing existing debt at more favourable rates, thereby impacting investment decisions, cash flows, and overall profitability.

A study by Ahmad et al. (2022a) noted that the pandemic increased credit risk in the Malaysian banking system due to loan repayment failures and lower economic performance, leading to rising outstanding loans and systemic problems. In response, BNM implemented several measures, notably an automatic moratorium on all loans, both principal and interest (excluding credit card balances), for individuals and SMEs aimed at mitigating financial stress (International Monetary Fund, 2021). However, a study by Rizvi et al. (2021) revealed that there was no evidence of the effectiveness of such policy for the Malaysian stock market. The COVID-19 pandemic has notably intensified stock market fluctuations, pushing firms to reevaluate their risk profiles and adjust their capital structures.

This trend is documented in the real estate market since the presence of volatility in residential property market prices helps investors generate substantial profit while also causing fear among investors, as high volatility implies a high return with a high risk

(Suleiman et al., 2023). In the context of capital structure, this may cause firms to shift from equity to more stable debt financing to buffer against unpredictable market movements. The oil and gas industry, for example, shows how sector-specific factors, such as earnings volatility, play a crucial role in shaping the capital structure, modifying the traditional relationships between asset tangibility and leverage (Marimuthu et al., 2023). Additionally, a study by Rowland et al. (2023) highlighted the influence of non-pharmaceutical interventions during the pandemic on the Malaysian stock market, revealing that such policies not only affected market returns but also led to increased volatility.

Stock market volatility may influence corporate capital structure decisions by affecting when and how companies opt for debt or equity financing. High volatility could deter firms from issuing equity due to fluctuating share prices and the increased cost of equity, as higher investor risk perceptions might demand greater returns. As a result, companies may prefer debt financing, which offers predictable interest costs, though this choice carries its own risks, especially if a declining stock price weakens a firm's balance sheet and impacts its ability to service or refinance debt. Volatility might also prompt firms to adopt more conservative investment approaches, potentially accumulating cash reserves instead of pursuing expansions, which could alter their financing needs. Moreover, investor confidence may wane during volatile periods, affecting a firm's ability to raise capital through both equity and debt as market perceptions shift. Overall, market volatility could shape strategic financial decisions, balancing the use of debt and equity in response to economic and market signals.

This complex and dynamic environment highlights the imperative for Malaysian firms to remain agile in their capital structure strategies, adapting continuously to the

evolving economic and political landscapes to enhance their financial performance. As economic conditions shift, particularly in response to disruptions like the COVID-19 pandemic that have significantly influenced monetary policies and stock market volatility, it is crucial for firms to refine their financial strategies. Such adaptation is essential not only for maintaining relevance but also for optimizing performance in an increasingly unpredictable global market.

1.1.1 Significant Events Over the Decade

Over the past decade, Malaysia experienced a series of significant political, social, and economic events that reflected its dynamic and often turbulent landscape. These developments not only shaped the nation's internal dynamics but also its role on the global stage.

In 2012, Malaysia witnessed critical moments such as the acquittal of opposition leader Anwar Ibrahim from charges of sodomy. This event was followed by violent incidents that highlighted the country's political tensions (Bloomberg, 2012). The same year, the Bersih 3.0 rally pushed for electoral reforms, emphasizing widespread public demand for a transparent voting process (Smeltzer and Paré, 2015). Additionally, the Security Offences (Special Measures) Act 2012 replaced the controversial Internal Security Act of 1960. This act aimed to offer more safeguards against abuse while maintaining national security (Dhanapal and Sabaruddin, 2015). Amid these domestic challenges, the global economic backdrop was marked by a continued recovery from the global financial crisis, influencing economic policies and market conditions worldwide, including in Malaysia.

The following year, 2013, was marked by the Lahad Datu standoff when armed militants from the southern Philippines claimed territory in Sabah, leading to a military

response (CNN, 2013). The general elections that year saw the ruling coalition, Barisan Nasional, retain power despite losing the popular vote, stirring allegations of electoral discrepancies (Weiss, 2013).

In 2014, Malaysia was thrust into the international spotlight with two aviation disasters involving Malaysia Airlines: the mysterious disappearance of Flight MH370 and the downing of Flight MH17, both of which had profound implications for the nation (BBC News, 2014).

The political landscape saw further upheaval in 2015 with the imprisonment of Anwar Ibrahim (Malay Mail, 2015). The introduction of the GST on April 1, 2015, marked a significant tax reform aimed at enhancing government revenues (Sanusi et al., 2015). This coincided with a global drop in oil prices that impacted Malaysia's economy (US Energy Information Administration, 2016).

The year 2016 was dominated by the 1Malaysia Development Berhad (1MDB) scandal, implicating high-level officials, including then-Prime Minister Najib Razak, in financial misappropriations (Jones, 2020). The assassination of Kim Jong-nam at Kuala Lumpur International Airport led to a diplomatic row with North Korea (Al Jazeera, 2017).

A major political shift occurred in 2018 when the general election resulted in the first change of government since independence. PH, led by Mahathir Mohamad, defeated BN (Nadzri, 2018). The new government abolished the GST in September and reintroduced the SST (Saidi and Harun, 2020). During this time, Malaysian industries began feeling the effects of the escalating US-China trade war (Cheng, 2020).

The years 2019 and 2020 were dominated by the COVID-19 pandemic, which brought significant health, political, and economic challenges. The pandemic prompted government lockdowns and economic stimulus measures (Amirah, 2022; Keh and Tan, 2021). Political instability continued with an unexpected change in government in February 2020, when Mahathir Mohamad resigned and was succeeded by Muhyiddin Yassin (Ostwald, 2020).

The period of 2021-2022 remained turbulent with continued political instability and ongoing challenges from the COVID-19 pandemic. The resignation of Muhyiddin Yassin in August 2021 led to the appointment of Ismail Sabri Yaakob as the new Prime Minister (Chin, 2023b). During these years, the government focused on economic recovery efforts in sectors like tourism, manufacturing, and retail (Amirah, 2022). Additionally, global tensions such as the Russia-Ukraine conflict began affecting Malaysia's economy (Anand, 2022).

In November 2022, the 15th Malaysian general election resulted in a hung parliament where none of the party coalitions reached a majority to form the government. PH won 82 seats, followed by 74 seats from PN and 30 seats from BN. On November 24, Anwar Ibrahim was appointed as the tenth Prime Minister after being decided by the Rulers Conference in Istana Negara. He would lead the country with a unity government that consists of PH, BN, GPS, WARISAN, and other independents (Chin, 2023a).

These events had profound implications on Malaysia’s societal structure, governance, international relations, and national psyche, reflecting a period of significant transformation and challenges.

1.1.2 Malaysia's Economic Landscape

Since its independence, Malaysia has undergone profound economic transformations, significantly influenced by globalization. Initially dependent on primary commodities such as tin and rubber, the nation strategically shifted towards manufacturing and services, catalysing socio-economic development. Lee (2021) discussed how this transition not only facilitated early poverty reduction and reduced inequality but also introduced challenges such as an over-reliance on low-skilled foreign labour, which could potentially undermine economic competitiveness.

After independence, Malaysia focused on diversifying its economy, with an emphasis on agriculture and primary industries. Malarvizhi and Chitra (2020) noted that this strategic shift aimed to strengthen the nation's economic foundation by enhancing agricultural exports, which were vital in the early stages of development. Furthermore, Ibrahim (2022) emphasized that early economic policies played a pivotal role in creating an environment conducive to the growth of these sectors, setting the stage for further economic modernization and industrialization.

The introduction of the NEP in 1971 marked a critical juncture in Malaysia’s economic narrative. Rasiah and Krishnan (2020) explained that the NEP was designed to restructure the economy, accelerate growth, and alleviate ethnic disparities by increasing Bumiputera participation in the economy. This policy represented a strategic pivot from an agrarian base to one centred on manufacturing and services, with the aim of achieving industrialized nation status by 1990.

In recent years, global economic trends and internal policy shifts have continued to shape Malaysia’s economic trajectory. Parveez et al. (2021) highlighted how the COVID-19

pandemic in 2020 brought unprecedented challenges; however, initiatives like Pelan Jana Semula Ekonomi Negara (PENJANA) were instrumental in mitigating the economic impacts.

Globalization has facilitated Malaysia's transition to a manufacturing-driven economy and its deeper integration into the international trade system. Crowley (2020) pointed out that while this integration has been beneficial in many aspects, it has also made the economy vulnerable to global shocks and revealed vulnerabilities stemming from an over-dependence on foreign labour, especially in the plantation sector where labour shortages have highlighted the pressing need for mechanization and labour policy reforms.

Moreover, Halizam et al. (2021) discussed how the dynamics of FDI have played a critical role in shaping Malaysia's economic landscape. Fluctuations in FDI, influenced by global economic conditions and domestic policies, have had significant impacts, necessitating continuous refinements in governmental strategies to enhance Malaysia's attractiveness to international investors.

Figure 1.1 illustrates the economic trajectory of Malaysia over the past decade, using data adapted from the World Bank. It highlights the fluctuations in GDP in current US dollars and the corresponding annual growth rates. Initially, the GDP shows a consistent increase from US$314.44 billion in 2012 to a peak of US$338.07 billion in 2014, reflecting a phase of robust economic growth driven by strong exports and internal market strengthening. However, the subsequent years up to 2017 show a slight decline and plateauing around US$300 billion, indicating a period of economic adjustment influenced by external factors such as global oil prices and internal factors like fiscal policies and market saturation.

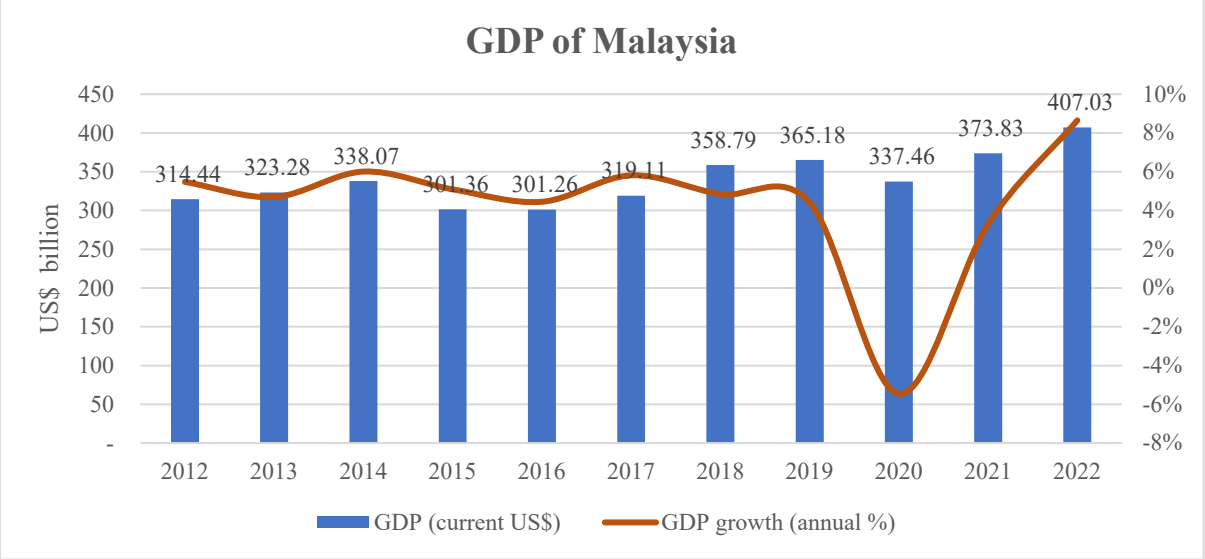


Figure 1.1: GDP of Malaysia from 2012 to 2022

A notable decline is observed in 2020, where the GDP dropped to US$337.46 billion, coupled with a significant dip in the growth rate to nearly -6%. This sharp downturn can be attributed to the global economic impact of the COVID-19 pandemic, which disrupted trade flows, tourism, and domestic consumption.

The recovery phase post-2020 is remarkable, with the GDP rebounding to US$407.03 billion by 2022 and the growth rate soaring back to about 9%, showcasing the effectiveness of economic recovery strategies like PENJANA and the resilience of the Malaysian economy in adapting to post-pandemic conditions.

1.1.3 The Role of Bank Negara Malaysia

BNM, the central bank of Malaysia, plays an essential role in shaping the nation's economic landscape. Established to manage Malaysia's monetary policy and financial stability, BNM focuses on maintaining price stability and preserving the value of the currency. Isa et al. (2022) highlighted BNM's effectiveness in controlling inflation and

stimulating economic growth, emphasizing its critical function in macroeconomic stabilization.

Furthermore, BNM regulates the financial sector, ensuring the stability and soundness of financial institutions. This includes overseeing liquidity and capital adequacy to promote a stable financial environment, essential for protecting depositor interests (Basri, 2020). BNM's regulatory measures have significantly influenced the market structure and competitive dynamics within the banking industry, fostering a robust financial landscape.

In addition to conventional banking, BNM has been instrumental in developing Malaysia's Islamic banking sector. Naysary et al. (2020) discussed how BNM introduced frameworks to enhance Shariah compliance and governance, demonstrating a commitment to integrating ethical standards in financial practices.

The evolution of digital finance also marks a significant area of BNM's involvement. Mohsin et al. (2022) noted BNM's support for fintech and digital banking innovations, ensuring that advancements in financial services coexist with consumer protection and overall financial stability.

BNM's monetary policies have evolved significantly, adapting to the dynamic needs of Malaysia's economy and global financial shifts. Basa et al. (2020) explained that the increasing sophistication of the financial sector has somewhat complicated the transmission of monetary policies, especially in terms of their impact on output and inflation. This indicates a need for policy recalibration in response to financial sector developments.

The bank's response to global economic conditions, particularly oil price fluctuations, exemplifies its proactive approach. Shangle and Solaymani (2020) reported that BNM effectively used both expansionary and contractionary monetary policies to mitigate

the impacts of oil price volatility on the economy. This reflects a detailed approach to monetary policy, contingent on external economic conditions.

Furthermore, the effectiveness of Malaysia's monetary transmission mechanism is crucial for managing inflation and promoting economic growth. Viphindrartin et al. (2020) found that the exchange rate and credit channels in Malaysia are particularly influential, with monetary policy adjustments significantly affecting inflation and economic growth.

A key tool for BNM in influencing the country's economic activity is the OPR. Ho and Karagedikli (2021) demonstrated that changes in the OPR are significant predictors of long-term government and corporate bond yields, highlighting its broad impact across financial markets. A study by Harun et al. (2023) showed that even in the Islamic banking sector, which operates under different principles from conventional banking, the OPR continues to influence financing decisions. Changes in the OPR affect Islamic commercial property financing, indicating its pervasive impact across different segments of the financial sector.

Table 1.1: Historical Changes in OPR by BNM, 2012-2023

Date	Change in OPR (%)	New OPR Level (%)
1 January, 2012	0.00	3.00
10 July, 2014	0.25	3.25
13 July, 2016	-0.25	3.00
25 January, 2018	0.25	3.25
7 May, 2019	-0.25	3.00
22 January, 2020	-0.25	2.75
3 March, 2020	-0.25	2.50

Table 1.1 continued

Date	Change in OPR (%)	New OPR Level (%)
5 May, 2020	-0.50	2.00
7 July, 2020	-0.25	1.75
11 May, 2022	0.25	2.00
6 July, 2022	0.25	2.25
8 September, 2022	0.25	2.50
3 November, 2022	0.25	2.75
3 May, 2023	0.25	3.00

Note: https://www.bnm.gov.my/monetary-stability/opr-decisions

Adjustments to the OPR have been significant predictors of long-term government and corporate bond yields, as evidenced by the historical changes in the OPR outlined in Table 1.1. Over the period from 2012 to 2022, the OPR was adjusted several times in response to various economic conditions. After maintaining a steady rate of 3.00% from 2012, a series of cuts began in 2020, reflecting the bank's response to the economic downturn caused by the COVID-19 pandemic, with the rate eventually being lowered to 1.75%. However, as recovery ensued, gradual increments were made, stabilizing the OPR back to 2.75% by the end of 2022. As of 3 May 2023, the OPR was increased by 0.25%, bringing it to 3.00%, where it has been maintained since. These adjustments reflect BNM's proactive and responsive monetary policy approach.

1.1.4 The Dynamics of Bursa Malaysia

Established in 1964 and formerly known as the KLSE, Bursa Malaysia was rebranded in 2004 and has since played a pivotal role in Malaysia's financial sector (Chong, 2021). It offers a comprehensive suite of trading services, including equities, derivatives, and bonds, catering to a diverse audience of both national and international investors. This diversity highlights its key role in capital fundraising for businesses and providing a robust platform for the trading of securities.

The Main Market is the primary platform of Bursa Malaysia for established companies to raise capital and trade shares. It underwent significant restructuring in 2009 when the former Main and Second Boards were unified to form the current Main Market. This consolidation aimed to streamline regulations and enhance the efficiency of Malaysia's capital markets. The ACE Market, which succeeded the MESDAQ Market, was established in 1997 to cater to technology-based companies and high-growth industries. In 2009, alongside the unification of the Main and Second Boards, MESDAQ was rebranded as the ACE Market to provide a more accessible and efficient platform for emerging companies to secure funding and gain market visibility without the stringent profit track record requirements of the Main Market. The LEAP Market, introduced in 2017, facilitates SMEs in accessing capital markets. It offers a simplified and cost-effective avenue for SMEs to raise funds from sophisticated investors, operating under less stringent regulatory requirements compared to the Main and ACE Markets. The LEAP Market reflects Bursa Malaysia's commitment to supporting the growth and development of SMEs, recognizing their vital role in the Malaysian economy.

The evolution of Bursa Malaysia reflects the broader transformation of Malaysia's economy from an agricultural base to one that is significantly diversified, featuring robust manufacturing and services sectors. Chong (2021) reported that by mid-2020, Bursa Malaysia's market capitalization had reached US$ 369.06 billion, highlighting its substantial impact on both national and global financial markets.

The exchange has been at the forefront of embracing financial technology innovations, including peer-to-peer lending and crowdfunding, to align with changing investor demographics and the broader digital transformation of financial services. Chong (2021) noted that this adaptability has been crucial in maintaining Bursa Malaysia's relevance and competitive edge in the rapidly evolving global financial landscape.

The equities market at Bursa Malaysia is crucial for the corporate sector in raising equity capital, offering a variety of equity products that attract global investors. Additionally, as Chong (2021) pointed out, the Malaysian bonds market is one of the most active in Asia, featuring a substantial corporate bond market that represents over 50% of the country's GDP. This facilitates efficient financing across various economic sectors and solidifies Malaysia’s position as a leader in Islamic finance, particularly noted for its thriving sukuk market.

The derivatives market includes futures and options on indices, individual stocks, and commodities, providing necessary tools for risk management and speculative opportunities for both local and international traders. Chong (2021) emphasized that the development of financial technology and alternative funding mechanisms such as peer-to-peer lending and crowdfunding has been fully embraced by Malaysian regulatory authorities, enhancing the dynamism of the capital market.

Additionally, Bursa Malaysia offers a variety of investment opportunities, including equities, derivatives, and Islamic finance products like sukuk. This diversification not only attracts a broad investor base but also contributes to the financial system's resilience, offering various avenues to manage risks and enhance returns. Chong (2021) emphasized that the inclusion of Islamic finance products also positions Malaysia as a global hub for Islamic finance, fostering financial inclusivity and catering to a unique market segment.

Danila et al. (2021) emphasized the importance of understanding market volatility for investors, highlighting that it serves as an indicator of the risk involved in the market. High volatility typically suggests increased risk, which can lead to higher returns, fundamentally influencing investment strategies, particularly in risk assessment and management. It is crucial for investors and fund managers to consider these volatility metrics to tailor their investment portfolios effectively, potentially employing hedging strategies to mitigate the adverse effects on their investments.

Moreover, the stability of the Malaysian market and investor sentiment are influenced by a variety of factors, including economic indicators, global financial conditions, and domestic political stability. Behavioural dynamics also play a crucial role in shaping market trends. Investor sentiment, often swayed by news and rumours, can drive market fluctuations beyond what fundamental indicators would suggest. The behaviour of noise traders, reacting impulsively to such information, significantly contributes to market volatility, as noted by Danila et al. (2021).

Additionally, market volatility in Malaysia is meticulously monitored due to its substantial impact on investment decisions and overall economic stability. The use of models such as the GARCH family helps in understanding the persistence and clustering of volatility

in financial markets. Jefrie et al. (2020) noted that these analytical tools have shown that Malaysian markets, including Bursa Malaysia, exhibit volatility clustering, characterized by significant variations over time, often triggered by economic or geopolitical events. This pattern highlights the need for robust risk management strategies to navigate the complexities of the financial landscape effectively.

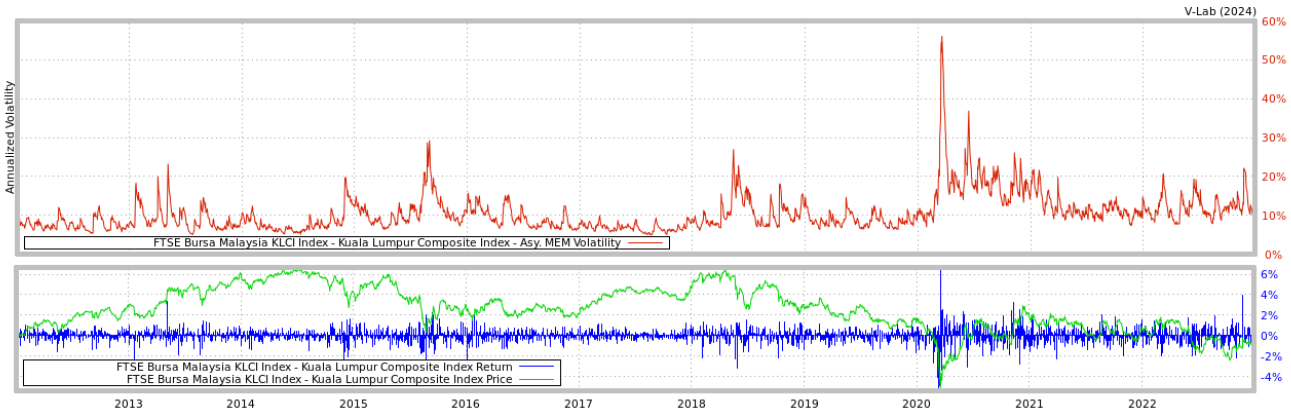


Figure 1.2: Volatility Analysis for FTSE Bursa Malaysia KLCI Index

Figure 1.2 presents a volatility analysis of the FTSE Bursa Malaysia KLCI Index from 1 January 2012 to 31 December 2022, using an Asymmetric GARCH model from the Volatility Laboratory of the NYU Stern Volatility and Risk Institute (2024). The upper part of the graph shows the annualized volatility of the index, which captures the intensity of price fluctuations over time. Significant spikes in volatility can be observed, particularly around 2020, likely reflecting market responses to global and local economic shocks, such as the COVID-19 pandemic.

The lower part of the graph displays the index price alongside its returns. The index price line (in green) shows the overall trend of the market, while the return line (in blue) shows the day-to-day percentage changes in the index price. Notably, there are periods of increased market returns corresponding to lower volatility phases and vice versa.

In examining the dynamic market conditions of Bursa Malaysia, it is crucial to consider the volatility trends as depicted in Figure 1.2. The detailed analysis using the GARCH model helps in understanding the intricate dynamics of market volatility and its impacts on the financial landscape. Such analysis is instrumental in understanding the risk factors associated with investment in Bursa Malaysia and highlights the importance of robust risk management strategies to navigate through such volatile periods.

1.2 Problem Statement

Over the past decade, Malaysia has experienced significant political, economic, and social events that have added complexity to firms' financial decision-making processes. Amidst this dynamic environment, optimizing capital structure to enhance firm performance has become increasingly challenging. While foundational theories of capital structure, such as those introduced by Modigliani and Miller, and expanded by trade-off, pecking order, agency, and market timing theories, offer valuable frameworks, their applicability within Malaysia's evolving context remains insufficiently explored.

Events such as the Lahad Datu standoff, the 1MDB scandal, and persistent political instability have contributed to an uncertain business climate. These disruptions have implications beyond governance, indirectly affecting firm-level decisions by constraining GDP growth, deterring investment, and undermining policy consistency. As GDP is a key indicator of economic performance, its fluctuations are likely to influence corporate financing behaviour. For instance, robust economic growth tends to increase earnings and reduce the cost of borrowing, encouraging higher leverage. Conversely, downturns such as the 6% GDP contraction during the COVID-19 pandemic may force firms to adopt more conservative financing strategies.

Monetary policy, particularly changes in the OPR set by BNM, is another external force that may shapes capital structure decisions. During economic contractions, OPR reductions can lower borrowing costs and stimulate debt financing. However, interest rate hikes during periods of inflation recovery could deter firms from incurring additional debt, leading to shifts toward equity or internal financing.

Additionally, stock market volatility may present further complications. Sudden fluctuations in share prices, especially during crisis periods like the COVID-19 pandemic, can affect investor sentiment and increase the cost of equity. This uncertainty may discourage firms from issuing equity, prompting a preference for debt financing despite associated risks. The presence of such volatility forces firms to reevaluate their capital structures to ensure financial resilience.

Given these factors, there is a need to understand how capital structure decisions influence firm performance in Malaysia, especially under varying economic conditions, monetary policy shifts, and stock market dynamics. Despite a growing body of global literature, limited empirical evidence exists on how these moderating variables interact with capital structure in the Malaysian context. This study seeks to fill this gap by empirically examining the relationship between capital structure and firm performance in Malaysia, and determining whether this relationship is moderated by changes in GDP, the OPR, and VOL.

1.3 Research Objectives

The main objective of this study is to examine the relationship between capital structure and the financial performance of companies listed on Bursa Malaysia from 2012 to 2022, considering the moderating effects of economic conditions, monetary policy changes, and stock market volatility.

1.3.1 Specific Objectives

The specific objectives are as follows:

i. To examine the relationship between capital structure, as indicated by debt ratios, and firm performance among companies listed on Bursa Malaysia from 2012 to 2022.
ii. To examine whether economic conditions, as indicated by Malaysia's annual GDP growth rate, moderate the relationship between capital structure and firm performance.
iii. To examine whether monetary policy changes, as indicated by the year-end OPR set by BNM, moderate the relationship between capital structure and firm performance.
iv. To examine whether stock market volatility, as indicated by the annual standard deviation of daily stock volatilities on Bursa Malaysia, moderates the relationship between capital structure and firm performance.

1.4 Research Questions

To address the research objectives, the following research questions are formulated:

i. Is there a significant relationship between capital structure, as indicated by debt ratios, and the performance of companies listed on Bursa Malaysia from 2012 to 2022?
ii. Do economic conditions, as indicated by Malaysia's annual GDP growth rate, moderate the relationship between capital structure and firm performance?
iii. Do monetary policy changes, as indicated by the OPR by BNM at the end of the year, moderate the relationship between capital structure and firm performance?

iv. Does stock market volatility, as indicated by the annual standard deviation of daily stock volatilities on Bursa Malaysia, moderate the relationship between capital structure and firm performance?

1.5 Summary of Problem Statement, Research Objectives and Questions

To ensure clarity and coherence in the research design, it is essential to establish a logical connection between the identified research problem, the formulated objectives, and the research questions. Table 1.2 presents a structured summary that demonstrates how the research objectives and questions are derived directly from the core issues outlined in the problem statement.

Table 1.2: Summary of Problem Statement, Research Objectives and Questions

Problem Statement	Malaysia's evolving political and economic landscape, marked by instability, monetary shifts, and market volatility, challenges firms in optimizing capital structure. While foundational theories offer guidance, their relevance in this context remains uncertain. Limited empirical evidence exists on how GDP growth, monetary policy, and market volatility influence the link between capital structure and firm performance in Malaysia.
Research Objective	To examine the relationship between capital structure and the financial performance of companies listed on Bursa Malaysia from 2012 to 2022, considering the moderating effects of economic conditions, monetary policy changes, and stock market volatility.
Specific Research Objectives	**Research Questions**
RO1: To examine the relationship between capital structure, as indicated by debt ratios, and firm performance.	RQ1: Is there a significant relationship between capital structure, as indicated by debt ratios, and the performance of companies listed on Bursa Malaysia?

Table 1.2 continued

RO2: To examine whether economic conditions, as indicated by Malaysia's annual GDP growth rate, moderate the relationship.	RQ2: Do economic conditions, as indicated by Malaysia's annual GDP growth rate, moderate the relationship between capital structure and firm performance?
RO3: To examine whether monetary policy changes, as indicated by the year-end OPR set by BNM, moderate the relationship.	RQ3: Do monetary policy changes, as indicated by the OPR by BNM at the end of the year, moderate the relationship between capital structure and firm performance?
RO4: To examine whether stock market volatility, as indicated by the annual standard deviation of daily stock volatilities, moderates the relationship.	RQ4: Does stock market volatility, as indicated by the annual standard deviation of daily stock volatilities on Bursa Malaysia, moderate the relationship between capital structure and firm performance?

Note: Author (2025)

1.6 Research Gap

Despite extensive research on the relationship between capital structure and firm performance in Malaysia, significant gaps remain in the existing literature. This study's novelty lies in incorporating macroeconomic factors such as GDP, OPR, and VOL as moderating variables. This approach provides a comprehensive analysis of the Malaysian context from 2012 to 2022, offering unique insights into how broader economic conditions influence the relationship between capital structure and firm performance. Additionally, employing both static and dynamic panel data analysis further enhances the study's robustness.

Older studies in the Malaysian context, such as those by Salim and Yadav (2012), Ahmad et al. (2012), Foo et al. (2015), Hamid et al. (2015), Tan and Hamid (2016), Wan Daud et al. (2016), Hashim and Hassan (2017), Jayiddin et al. (2017), and Vaicondam and Ramakrishnan (2017), may no longer be relevant to the current economic landscape. These studies did not account for the moderating effects of macroeconomic factors, and their findings might be outdated given the significant economic changes over the past decade.

Salam and Shourkashti (2019) explored the linear and inverted U-shaped relationship between capital structure and firm performance in an emerging market, including the impact of the financial crisis. However, their study does not account for the effects of macroeconomic factors, and their data range from 2005 to 2016 may limit the applicability of their findings to the current economic landscape. Similarly, Ayaz et al. (2021) examined the leverage-performance relationship through the lenses of trade-off theory and agency cost theory, using FE and two-step sys-GMM models. Nevertheless, they did not consider macroeconomic factors, and their study period of 2005 to 2016 might render their results less relevant for current analysis.

Shaari and Kamarudin (2024) investigated the impact of capital structure during the COVID-19 pandemic, highlighting the distinction between long-term and total debts. While their study is timely, it lacks the inclusion of macroeconomic factors and only covers a short period from 2018 to 2021, focusing primarily on static panel data analysis. Similarly, Mohammad et al. (2019) and Sahari et al. (2019) examined capital structure's impact on firm performance within specific industries or time frames, without incorporating broader economic conditions or dynamic analysis methods.

Other studies within the Malaysian context, such as those by Zaidi et al. (2019), Mohammad and Bujang (2020), Ramlan et al. (2020), En and Malek (2021), and Foong et al. (2021), have also restricted their analyses to specific sectors or limited time periods, using static panel data analysis without considering macroeconomic factors. These limitations constrain the generalizability of their findings and overlook the potential moderating effects of broader economic variables.

Moreover, studies like those by Rohaizan et al. (2021), Tan et al. (2021), Lim and Naysary (2022), and Chen and Marsidi (2023) have similarly focused on particular industries or narrow time spans within Malaysia, employing static panel data methods without incorporating macroeconomic factors. This sector-specific and static approach limits the scope of their conclusions and fails to account for the dynamic interactions between capital structure and firm performance under varying economic conditions.

By incorporating macroeconomic factors as moderating variables and utilizing a more extended and recent dataset from 2012 to 2022, this study not only addresses these gaps but also introduces a novel approach that sets it apart. Adopting both static and dynamic panel data analysis methods provides a detailed and comprehensive understanding of the relationship between capital structure and firm performance in Malaysia. This approach not only addresses the limitations of previous studies but also offers valuable insights into how economic conditions influence this critical relationship, thereby making a significant and original contribution to the existing body of knowledge.

1.6.1 Summary of Research Gap

A review of prior studies reveals several limitations in the existing literature on capital structure and firm performance in Malaysia. Many earlier works either rely on

outdated data, focus on specific industries, or omit the influence of macroeconomic factors. Furthermore, most studies adopt static panel analysis without considering dynamic interactions or the moderating effects of variables such as GDP, OPR, and market volatility. The table below summarizes the key gaps identified in past research and highlights how this study addresses them through a more comprehensive scope, updated dataset, and robust methodological approach.

Table 1.3: Summary of Research Gap

Research Gap	Study	Current Study's Contribution
Exclusion of Macroeconomic Factors as Moderators	Salim and Yadav (2012), Ahmad et al. (2012), Foo et al. (2015), Hamid et al. (2015), Tan and Hamid (2016), Wan Daud et al. (2016), Hashim and Hassan (2017), Jayiddin et al. (2017), Vaicondam and Ramakrishnan (2017), Salam and Shourkashti (2019), Ayaz et al. (2021), Shaari and Kamarudin (2024), Mohammad et al. (2019), Sahari et al. (2019), Zaidi et al. (2019), Mohammad and Bujang (2020), Ramlan et al. (2020), En and Malek (2021), Foong et al. (2021), Rohaizan et al. (2021), Tan et al. (2021), Lim and Naysary (2022), Chen and Marsidi (2023)	Integrates GDP, OPR, and VOL as moderating variables to reflect current economic conditions
Outdated Data and Findings that May Not Reflect Current Economic Conditions	Salim and Yadav (2012), Ahmad et al. (2012), Foo et al. (2015), Hamid et al. (2015), Tan and Hamid (2016), Wan Daud et al. (2016), Hashim and Hassan (2017), Jayiddin et al. (2017), Vaicondam and Ramakrishnan (2017)	Uses an extended period from 2012-2022 for a more relevant analysis

Table 1.3 continued

Limited Timeframes that Exclude Recent Economic Changes (post-2016)	Salam and Shourkashti (2019), Ayaz et al. (2021), Shaari and Kamarudin (2024), Mohammad et al. (2019), Sahari et al. (2019), Zaidi et al. (2019), Mohammad and Bujang (2020), Ramlan et al. (2020), En and Malek (2021), Foong et al. (2021), Rohaizan et al. (2021), Tan et al. (2021), Lim and Naysary (2022), Chen and Marsidi (2023)	Uses an extended period from 2012-2022 for a more relevant analysis
Short Time Periods in Recent Studies Lacking Longitudinal Perspective	Shaari and Kamarudin (2024), Rohaizan et al. (2021), Lim and Naysary (2022), Chen and Marsidi (2023)	
Sector-Specific Analyses Limiting Generalizability	Mohammad et al. (2019), Sahari et al. (2019), Zaidi et al. (2019), Mohammad and Bujang (2020), Ramlan et al. (2020), En and Malek (2021), Foong et al. (2021), Rohaizan et al. (2021), Tan et al. (2021), Lim and Naysary (2022), Chen and Marsidi (2023)	Analyzes a broad dataset across multiple sectors, enhancing generalizability
Focus on Static Panel Data Analysis without Dynamic Approaches	Most studies listed, including Zaidi et al. (2019), Mohammad and Bujang (2020), Ramlan et al. (2020), En and Malek (2021), Foong et al. (2021), Rohaizan et al. (2021), Tan et al. (2021), Lim and Naysary (2022), Chen and Marsidi (2023)	Employs both static and dynamic panel data analysis, capturing dynamic relationships

Note: Author's compilation (2025)

1.7 Significance of the Study

This study provides a meaningful contribution to the literature on capital structure and firm performance by integrating macroeconomic variables—specifically GDP growth, monetary policy, and stock market volatility—as potential moderating influences. In contrast

to many earlier Malaysian studies that focused on sector-specific samples or relied primarily on static models, this research adopts both static and dynamic panel data approaches over a decade-long period (2012–2022). This comprehensive framework enhances methodological robustness and reflects a more realistic representation of financial decision-making in a dynamic economic environment.

From an academic standpoint, this study re-examines traditional financial theories such as the trade-off theory within the context of an emerging market, offering insights into their applicability when external shocks and policy interventions are taken into account. The inclusion of macroeconomic moderators acknowledges the evolving nature of business environments, where firm performance is shaped not only by internal financial strategies but also by broader economic conditions.

For corporate practitioners, the study aims to provide a practical reference for evaluating capital structure strategies in light of changing monetary policy, economic growth trends, and market volatility. Understanding how external forces might interact with internal financing decisions can help firms better align their capital structure with business objectives and economic cycles.

The study also holds relevance for policymakers. By assessing the potential interplay between firm-level financial decisions and macroeconomic variables, this research seeks to inform future policy development that supports corporate financial stability and resilience in the face of uncertainty. A clearer understanding of these dynamics may contribute to more targeted regulatory frameworks and financial support mechanisms.

Additionally, investors and financial analysts may benefit from this study's integrated approach to capital structure assessment. By considering both firm-specific and

macroeconomic dimensions, stakeholders can develop more informed evaluations of corporate financial health and investment risk, especially in the context of emerging markets like Malaysia.

Overall, this study fills a notable gap in Malaysian capital structure research by combining theory, real-world economic context, and advanced econometric techniques. Its contributions are intended to support a wide spectrum of stakeholders—including scholars, policymakers, business leaders, and investors—in making better-informed decisions grounded in a more holistic view of financial dynamics.

1.8 Organisation of the Study

The organization of this study is structured into five chapters, each addressing a distinct aspect of the research process and findings.

Chapter 1 introduces the study by providing a comprehensive overview of the research context. This chapter begins with the background of the study, which includes significant events over the past decade that have shaped Malaysia's economic landscape, the role of BNM, and the dynamics of Bursa Malaysia. The problem statement is then articulated, highlighting the need for this research. Following this, the research objectives and specific objectives are outlined, accompanied by the research questions that guide the inquiry. This chapter also establishes the research gap by reviewing past studies thus identifying limitations in existing literature and how this study addresses these limitations. The chapter also discusses the significance of the study, emphasizing its contributions to both academic literature and practical applications.

Chapter 2 presents a structured review of literature related to capital structure and firm performance. It begins with discussions on the dependent variable (firm performance), independent variable (capital structure), and moderating variables (macroeconomic factors: GDP growth, monetary policy, and market volatility). The chapter then outlines key financial theories, including the MM theorem, trade-off theory, pecking order theory, agency theory, and market timing theory. Empirical studies from developed, developing, and Malaysian contexts are reviewed to establish the research background. The chapter concludes with the development of the conceptual framework and hypotheses that guide this study.

Chapter 3 outlines the research methodology used in this study. This chapter details the research approach, data collection methods, and the population of the study. It also defines the variables and their measurements. The chapter explains the data analysis methods employed, including both static and dynamic panel data analysis. Furthermore, it discusses the diagnostic tests conducted, and the model specifications used for the analysis.

Chapter 4 presents the empirical results obtained from the study. It begins with an overview of the panel data structure and provides a descriptive analysis of the data. The chapter then details the various regression analyses conducted, including pooled OLS, RE, FE, GLS, and 2SLS. The results of diagnostic tests for heteroscedasticity, autocorrelation, and endogeneity are discussed, followed by the application of dynamic panel data methods such as diff-GMM and sys-GMM. The chapter concludes with the model validation procedures, robustness checks and testing of the hypotheses.

Chapter 5 discusses the results in the context of the research objectives and questions. This chapter provides an in-depth discussion of the relationship between capital structure and firm performance, including the moderating effects of economic conditions, monetary

policy, and market volatility. The chapter also addresses any inconsistencies found in the results and discusses the implications of the findings for theory, policy, management, and investors. The study's limitations are acknowledged, and recommendations for future research are provided before the study is concluded.

1.9 Chapter Summary

This chapter provided an overview of the study's context and significance, focusing on the evolution of capital structure theories and their relevance to Malaysia. It discussed key economic and political events in Malaysia, the role of BNM in monetary policy and financial stability, and the dynamics of Bursa Malaysia, particularly regarding market volatility. The problem statement emphasized the challenges Malaysian firms face in optimizing capital structure in a dynamic economic environment. The research objectives and questions were outlined, aiming to explore the relationship between capital structure and firm performance, with a focus on macroeconomic, monetary policy, and stock market volatility as moderating factors. This chapter also establishes the research gap by reviewing past studies and identifying their key limitations. It then explains how this study addresses these limitations. The chapter also highlighted the study's contributions to academic literature, corporate managers, policymakers, and investors. The next chapter will review the existing literature on capital structure and firm performance, establishing the theoretical framework for the study.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter reviews the literature underpinning the study's focus on capital structure and firm performance, with emphasis on how macroeconomic variables moderate this relationship in Malaysia. It begins by defining firm performance and justifying the use of ROA as the main metric.

The discussion then covers capital structure proxies—TDA, LDA, and SDA—and their theoretical and empirical significance. It further examines the moderating roles of GDP, OPR, and VOL, each aligned with relevant financial theories to explain their influence on financing decisions.

Key theoretical models—MM theorem, trade-off, pecking order, agency, and market timing—are reviewed to frame the study conceptually. Empirical findings from both international and Malaysian contexts are then synthesised to identify key insights and research gaps.

The chapter concludes by presenting the study's conceptual framework and hypotheses model, establishing the basis for subsequent empirical analysis.

2.1 Discussion on Dependent Variables (Firm Performance)

Firm performance is typically assessed using either accounting-based ratios, which reflect internal operational efficiency, or market-based ratios, which capture investor expectations and perceived firm value. Each class of indicators serves a distinct analytical

purpose in capital structure research, and their statistical behaviour can influence the identification of leverage effects.

Previous studies have employed up to 56 different performance indicators in financial analysis, with profitability metrics being the most common due to their ability to enable cross-firm comparisons (Keter et al., 2023). Profit margin, ROA, and ROE remain the most frequently used indicators (Akpa et al., 2021; Saniye et al., 2023). Phil et al. (2021) confirmed profitability as the most effective indicator of firm performance.

ROA and ROE provide complementary insights into firm health. According to Nithin (2023), analysing both metrics offers a broader understanding of productivity and value creation. However, performance comparisons must consider industry-specific characteristics. For example, Daputra et al. (2024) found that Indonesian healthcare firms had a higher average ROA (1.93%) than transportation and logistics firms (0.56%), indicating superior asset utilization. In contrast, the latter recorded higher ROE (14.46%) than healthcare firms (3.52%), reflecting better returns on shareholder equity. These findings stress the importance of interpreting performance measures within sectoral norms.

While more complex metrics like EVA account for capital costs and offer value-based perspectives, ROA remains relevant due to its simplicity and effectiveness. Madina et al. (2022) compared ROA and EVA among BUMN20 firms in Indonesia and concluded that, while EVA gives a deeper assessment of value creation, ROA is still a valuable benchmark for operational efficiency.

ROA is also often evaluated alongside market-based measures. Kramarić et al. (2021), using panel data on Croatian firms, found that firm size positively affected ROA but negatively impacted Tobin's Q. This suggests that while ROA captures internal efficiency,

Tobin's Q may reflect market sentiment and external valuation biases. Buallay (2021) similarly showed that ROA is shaped by internal variables such as asset utilization and Sharia governance, whereas Tobin's Q responds more to market perceptions and corporate governance structures.

Market-based measures also tend to react more to external governance-related factors. Al-ahdal et al. (2023) found that ownership structure and audit committee presence influenced Tobin's Q more significantly than ROA. In sustainability contexts, Nurannisa and Bandi (2024) showed that ESG scores had a notable effect on ROA, but not on Tobin's Q, positioning ROA as a more immediate reflection of sustainability practices. Likewise, Pranita et al. (2023) observed that related-party transactions negatively impacted ROA, while Tobin's Q remained unaffected—again demonstrating the divergence in what these metrics capture.

Beyond profitability, ROA also serves as a strategic indicator of resilience. Yu (2024), studying renewable energy firms during supply chain disruptions, found that ROA declined in firms lacking adaptive strategies. Firms with prior investments in R&D and market development were better able to sustain profitability, emphasizing ROA's role as a measure of both operational efficiency and strategic resource deployment.

In Malaysia, ROA is frequently employed in capital structure studies across sectors. En and Malek (2021) applied ROA to analyse the effects of debt structures in the technology industry, noting that short-term debt negatively affected performance. Foong et al. (2021) used ROA to explore debt and growth interactions in plantation firms, while Tan et al. (2021) assessed profitability dynamics in the property sector. These studies demonstrate ROA's consistency in measuring asset-driven profitability across industries.

From a methodological perspective, ROA presents fewer distortions compared to ROE, which is mechanically influenced by capital structure via its equity denominator. It also avoids the volatility and sentiment sensitivity inherent in market-based measures like Tobin's Q. This stability makes ROA well-suited for evaluating internal efficiency in empirical models.

Recent innovations in predictive analytics further reinforce ROA's value. Son and Duong (2024) applied a random forest algorithm to forecast ROA using data from Vietnamese firms between 2012 and 2022. Their model, tested on 2023 data, achieved an R^2 of 0.9762 and an error rate below 1%, demonstrating the metric's suitability for high-accuracy financial forecasting.

ROA also responds to macro-level influences. Anggraeni and Syarief (2024) studied Indonesian state-owned banks and found that non-performing loans and inflation significantly impacted ROA, both individually and jointly. This confirms that ROA reflects internal efficiency while remaining sensitive to economic conditions, reinforcing its suitability for studies considering both firm-level and macroeconomic factors.

Given these empirical findings and methodological advantages, ROA is selected as the sole performance metric in this study. Its widespread use in academic research, lower susceptibility to capital structure bias, and clarity in measuring asset profitability make it a reliable and consistent indicator. While no single measure is universally superior, ROA provides a balanced and empirically supported foundation for analysing the impact of capital structure on firm performance (Keter et al., 2023).

2.2 Discussion on Independent Variables (Capital Structure)

Capital structure is a fundamental concept in corporate finance, referring to the composition of a firm's financing, typically expressed as the mix of debt and equity used to fund operations and growth. Despite its significance, there remains no universal agreement on its precise definition. However, one of the most widely accepted proxies is TDA, calculated as total liabilities divided by total assets. This ratio serves as a direct measure of leverage and provides insight into the extent to which a firm relies on debt to finance its asset base (Ayaz et al., 2021).

TDA is commonly used in empirical studies due to its simplicity and ability to signal financial risk. It directly reflects the proportion of a firm's resources financed through borrowings, making it an intuitive indicator of potential financial stress (Ulfah and Nurzianti, 2023). High TDA values are often associated with increased vulnerability to distress, and this measure has been employed in various studies that explore bankruptcy prediction and risk modeling (Limajatini et al., 2022). TDA also integrates easily into multi-variable regression models as a control or explanatory variable alongside financial performance metrics such as ROA, ROE, and asset turnover, making it highly versatile in empirical research (Ambrose and Inuwa, 2024).

In addition to TDA, this study includes LDA and SDA to disaggregate leverage into more specific components. LDA focuses on the proportion of a firm's assets financed through long-term obligations, typically linked to strategic investments and long-term financing decisions. SDA, on the other hand, captures short-term borrowing and liquidity-related financing used for operational purposes. This disaggregation allows for a more detailed examination of the distinct effects of each leverage component.

The decision to treat TDA, LDA, and SDA as separate variables is grounded in both theoretical and empirical justification. Each captures a different dimension of leverage: TDA provides an overall picture of financial leverage, LDA reflects long-term solvency and capital investment strategies, while SDA indicates liquidity risk and short-term financial management (En and Malek, 2021). Several studies have confirmed that these dimensions can affect firm performance in contrasting ways. For instance, while TDA may be positively associated with ROE due to the leverage effect, both LDA and SDA are often negatively linked with ROA or ROE, especially in capital-constrained environments such as the Malaysian technology sector or the Indian pharmaceutical industry (En and Malek, 2021; Tanwar, 2024).

The separation of these proxies is further supported by Ansca (2021), who conducted a multi-sector analysis in Indonesia to assess firm performance before, during, and after the 2008 financial crisis. By applying TDA, LDA, and SDA separately, the study revealed that each ratio behaved differently across economic periods, with varying effects on firm outcomes. This finding reinforces the importance of examining each component independently, especially when analysing financial behaviour under different macroeconomic conditions.

Furthermore, separating these leverage proxies enables more effective policy-making and risk management. For example, a study on Nigerian banks found that SDA had a significantly negative effect on performance, while TDA exhibited a positive relationship. This distinction allows managers and investors to better identify which type of debt requires intervention, such as reducing reliance on short-term borrowing to avoid liquidity crises (Wilson, 2022). It also reflects the diversity of financing strategies across industries, where firms in asset-heavy sectors may favour long-term debt, whereas firms with limited collateral

or faster operating cycles may depend more on short-term debt (Zhang et al., 2022; Ahmad et al., 2022b).

Methodologically, modelling TDA, LDA, and SDA separately improves the statistical accuracy of empirical analyses. It helps mitigate multicollinearity among explanatory variables and reduces the risk of endogeneity, especially when combined with advanced techniques such as instrumental variable (IV) regressions or system-GMM estimators. A recent study by Okanda et al. (2025) confirmed that treating leverage components separately provided more robust estimates and clearer identification of causal relationships in capital structure models.

In light of these considerations, this study adopts TDA, LDA, and SDA as the core independent variables representing capital structure. This approach provides a comprehensive yet detailed framework to analyse how different financing strategies impact firm performance, particularly under varying macroeconomic conditions in the Malaysian context.

2.3 Discussion on Moderating Variables (Macroeconomic Factors)

Macroeconomic factors have a crucial role in shaping the financial strategies and capital structure decisions of firms. These factors, including economic conditions, monetary policy, and market volatility, influence both the availability and cost of capital, as well as the risks associated with different financing options. Understanding the impact of these macroeconomic variables is essential for firms seeking to optimize their capital structure and enhance financial performance, particularly in fluctuating economic landscapes. Earlier research has indicated that these factors significantly affect firms' financial decisions, and this study examines how they operate in the Malaysian context. By exploring these

dimensions, the study provides a comprehensive understanding of the external influences that drive firms' financial strategies, offering valuable insights into the dynamic relationship between macroeconomic environments and corporate finance.

2.3.1 Economic Conditions

Economic conditions are a central determinant of capital structure decisions, influencing how firms balance debt and equity under varying macroeconomic environments. Factors such as GDP growth, inflation, credit availability, and economic stability shape the financial strategies firms employ to manage cost, risk, and performance. In times of economic expansion, firms often experience higher profitability and improved cash flows, making debt financing more attractive and accessible. Investor confidence and favourable lending terms typically lead to increased borrowing, as firms capitalize on low-interest environments to finance growth. Alter and Elekdag (2020) emphasized that in emerging markets, global financial conditions influence leverage by affecting local interest rates and relaxing borrowing constraints, thus encouraging firms to take on more debt during periods of economic growth.

Conversely, during recessions or periods of economic instability, firms are more cautious with leverage. Reduced earnings, greater financial risk, and tighter credit conditions often push firms to rely more on retained earnings or equity. Heresi and Powell (2023) found that economic crises worsen debt-overhang problems, discouraging investment and forcing highly leveraged firms to scale back. Their study demonstrated that even after economic recovery, firms that entered the downturn with excessive leverage experienced prolonged low investment, highlighting the need to reduce debt burdens in unstable times. Mullick (2023) also observed that navigating between debt and equity to achieve an optimal capital

structure is critical in mitigating financial risk and protecting shareholder value, particularly when economic conditions fluctuate.

Empirical research consistently supports the responsiveness of capital structure decisions to macroeconomic variables. Julkid and Lau (2020), studying Malaysian listed firms between 2009 and 2018, showed that profitability, liquidity, and GDP had significant negative associations with debt ratios, while firm size, asset tangibility, interest rate levels, and stock market development were positively associated. This implies that during periods of stronger economic growth, while firms have higher internal funds, they are also more willing to take on debt when supported by large size or tangible asset bases. Their findings align with the broader view that Malaysian firms adjust leverage based on both firm-level metrics and macroeconomic signals.

Similar patterns emerge in other countries. Fatima and Yasmin (2022) found that in Bangladesh, capital structure decisions are heavily influenced by macro-level developments such as GDP growth, infrastructure expansion, and financial sector reforms. The optimal mix of debt and equity was shown to vary with changes in the external environment, reinforcing the view that economic conditions play a guiding role. In Portugal, Neves et al. (2020) discovered that large firms were more affected by economic intervention programs compared to smaller counterparts, indicating that exposure to economic policies also influences financing choices. In the MENA region, Khan et al. (2023b) found that GDP and inflation positively influenced leverage, but noted that institutional factors such as political stability and government effectiveness also significantly shaped capital structure behaviour, suggesting an interplay between macroeconomic and governance environments.

The relationship between macroeconomic performance and capital structure also extends to firm outcomes. Curry and Fikri (2022), studying Indonesian food and beverage firms, showed that GDP moderated the relationship between capital structure and firm performance. Their results suggest that during periods of economic growth, firms with better-aligned capital structures achieved stronger financial performance. This further supports the view that economic conditions not only influence how firms finance themselves but also how those decisions affect operational success.

In the Malaysian context, these findings are particularly relevant given the economic volatility of the past decade, driven by political changes, currency swings, and the COVID-19 pandemic. These disruptions prompted many firms to reassess their leverage strategies, shifting between debt and equity as they navigated uncertain financial terrain. Julkid and Lau's (2020) evidence illustrates that Malaysian firms respond dynamically to these shifts, reinforcing the view that capital structure decisions are closely tied to external conditions.

The studies discussed collectively support the theoretical premise of the market timing theory, which suggests that firms adjust their capital structure to exploit favourable economic conditions and mitigate exposure during downturns. Firms tend to issue more debt during periods of growth when capital is cheaper and future returns are more predictable, while turning to equity or internal reserves during recessions to avoid heightened risk. This behaviour is observable across various regions and sectors, with empirical support from both developed and developing economies.

Economic conditions remain a crucial explanatory factor in capital structure research. By examining how firms respond to macroeconomic shifts, a more comprehensive understanding emerges regarding why capital structure varies across time and context. For

Malaysian firms, whose operating environments are shaped by both domestic cycles and global financial movements, this understanding is essential to inform future financial policy and strategy decisions.

2.3.2 Monetary Policy

Monetary policy plays a pivotal role in shaping firms' capital structure decisions by influencing the cost and accessibility of credit in the economy. Implemented by central banks, monetary policy instruments such as interest rates, reserve requirements, and open market operations directly affect firms' financing environments. In Malaysia, the OPR, set by BNM, serves as a benchmark for lending rates across financial institutions and is a key variable that firms consider when deciding between debt and equity financing. When interest rates are lowered, borrowing becomes more attractive due to reduced financing costs, prompting firms to increase their reliance on debt. Conversely, an increase in interest rates raises the cost of borrowing, discouraging leverage and shifting firms towards internal funding or equity issuance.

This relationship has been consistently documented in empirical research. Ayala and Blazsek (2020), examining firms in the S&P 500, found that companies tend to increase their debt-to-capital ratios during periods of declining interest rates and reduce them when borrowing costs rise. The pattern illustrates how interest rate movements prompt firms to time their capital structure adjustments to optimize financing costs, in line with the predictions of the pecking order and trade-off theories.

In the Malaysian context, interest rate fluctuations have had a significant influence on capital structure decisions. Saif-Alyousfi et al. (2020) provided evidence that interest rates are a key determinant of debt levels among Malaysian firms. Their findings align with

the view that lower interest rates, particularly during periods of economic stress, create incentives for firms to increase their leverage. For instance, during the COVID-19 pandemic, BNM implemented a series of OPR cuts to support the economy. These policy actions were intended to stimulate credit access and lower debt servicing costs, encouraging firms to borrow more in response to declining revenues and uncertain business conditions.

The influence of monetary policy on capital structure has also been observed in other economies, offering valuable comparative insights. Wan (2022) studied Chinese firms and showed that looser monetary policy and expansionary fiscal interventions accelerated leverage adjustments, with firms actively increasing debt levels during favourable policy periods. Similarly, Wang and Zhou (2022) found that in China's A-share listed companies, expansive monetary conditions encouraged more aggressive working capital financing strategies, thereby enhancing firm value. These findings suggest that firms are not only responsive to interest rate changes but also proactive in leveraging monetary environments to improve financial performance.

The effects of monetary policy, however, are not uniform across all financial instruments. Dewianawati et al. (2022), analysing Indonesian commercial banks, found that bank interest rates did not significantly affect the distribution of working capital loans. This suggests that short-term financing decisions may exhibit lower sensitivity to interest rate changes compared to long-term debt, reflecting the heterogeneity in how firms adjust specific components of their capital structure. Similarly, Hussain et al. (2020) demonstrated in Pakistan's sugar sector that larger firms responded differently to interest rate hikes compared to smaller firms, with firm size moderating the relationship between interest rates and leverage. Kausar and Sahi (2021) also reported that in the U.S., rising interest rates

suppressed bank lending growth, indirectly constraining firms' access to credit. These results highlight how monetary policy affects not only borrower behaviour but also lending behaviour within financial institutions, influencing the overall availability of debt financing in the market.

For Malaysian firms, understanding the implications of OPR adjustments is particularly important given the volatility of recent years. During downturns, such as the COVID-19 crisis, firms may have taken advantage of rate cuts to secure cheaper financing (Saif-Alyousfi et al., 2020). However, as rates begin to rise in response to recovery and inflationary pressures, firms are likely to face tighter credit conditions and higher borrowing costs. This shift makes internal financing more attractive, consistent with the pecking order theory, which suggests firms prefer retained earnings over external debt, and only turn to equity as a last resort (Wan, 2022; Wang and Zhou, 2022).

Notably, not all firms will respond identically to monetary policy changes. Firm characteristics such as size, sector, and financial flexibility play a mediating role. Larger firms with established credit histories may access favourable borrowing terms even in high-rate environments, while smaller firms may find themselves more constrained (Hussain et al., 2020). Additionally, the composition of capital needs—short-term versus long-term—can alter the sensitivity to interest rate movements. For instance, working capital loans may not respond as strongly to interest rate changes compared to long-term financing instruments (Dewianawati et al., 2022). These nuances suggest that while OPR serves as a general policy lever, its actual impact on corporate capital structure is filtered through a range of firm-level and financial system factors.

Overall, the body of empirical research affirms that monetary policy significantly influences capital structure decisions. As interest rates shift in response to economic cycles, firms must continually reassess their financing strategies to align with evolving conditions (Ayala and Blazsek, 2020; Kausar and Sahi, 2021). In the Malaysian context, the role of the OPR is central, with policy shifts by BNM having direct implications for corporate debt levels and financial behaviour (Saif-Alyousfi et al., 2020). The evidence supports theoretical frameworks like the pecking order and trade-off theories, emphasizing that interest rate environments are not merely background conditions but active determinants in shaping how firms fund their operations and growth (Wan, 2022).

2.3.3 Stock Market Volatility

Stock market volatility, defined as fluctuations in stock prices and returns over time, plays a significant role in shaping firms' capital structure decisions. These fluctuations create uncertainty in financial markets, affecting investor sentiment, perceived risk, and ultimately the cost and availability of capital. When volatility is high, firms may face increased risk premiums and reduced investor confidence, making both equity and debt financing more expensive or difficult to obtain. In such environments, firms tend to delay investment or rely more on internal funds, seeking to avoid the costs and risks associated with issuing new securities under unfavourable market conditions. For instance, a study of Chinese listed firms found that stock market volatility increases both total and short-term leverage while decreasing long-term leverage, as firms adjust their debt structure to favour bank loans over trade credit to manage cost and risk more effectively (Vuong et al., 2022). Similarly, in Pakistan, high earnings volatility was shown to significantly reduce firms' leverage, as creditor confidence declines during uncertain periods (Ilyas et al., 2021).

The impact of market volatility on capital structure is largely driven by its effect on the pricing and demand for financial instruments. Issuing equity during periods of high volatility often results in undervaluation, leading to potential dilution for existing shareholders. To avoid this, firms may prefer debt financing despite the higher interest rates that typically accompany elevated risk. Conversely, in low-volatility conditions, investor confidence improves, and firms can access equity or debt more easily and on better terms, encouraging external financing. These dynamics highlight the importance of market volatility as a determinant of financing strategy, particularly in environments where firms are highly sensitive to market signals.

Vuong et al. (2022) provide one of the few empirical investigations into the link between stock market volatility and capital structure in an emerging market. Using panel data from Chinese firms listed on the Shanghai Stock Exchange between 2008 and 2018, the study found that rising market volatility increases both total and short-term leverage but decreases long-term leverage. It also revealed a shift in the debt structure, where firms relied more heavily on bank loans and reduced their use of trade credit—an adjustment driven by the need for more stable and enforceable sources of funding during periods of uncertainty. These findings suggest that firms actively restructure their liabilities in response to changing market risk conditions.

The relevance of this behaviour is reinforced by similar patterns observed in other emerging markets. For instance, Ahmed and Hla (2018) examined firms in Pakistan and reported that increased stock return volatility led to a significant reduction in book and long-term market leverage, consistent with the notion that heightened volatility raises default risk and reduces the attractiveness of long-term debt. Interestingly, their findings also showed an

increase in total market leverage, indicating that some firms might still seek funding through short-term or alternative debt instruments despite rising volatility. These results complement Vuong et al.'s (2022) conclusions by demonstrating that volatility prompts not just a reduction in leverage but a reconfiguration of the debt structure in favour of instruments perceived as more flexible or less exposed to market fluctuations.

Volatility does not influence capital structure solely through stock market channels; operational uncertainty, particularly earnings volatility, plays a parallel and reinforcing role. While stock market volatility reflects fluctuations in share prices and investor sentiment—affecting firms' access to capital markets—earnings volatility pertains to internal financial instability, capturing the unpredictability of a firm's income stream. Although these are distinct dimensions, both forms of volatility contribute to heightened perceived risk, which directly affects the willingness of external parties to provide financing.

Ilyas et al. (2021) highlight this internal channel by demonstrating that earnings volatility has a significant negative effect on capital structure among non-financial firms in Pakistan. Their findings show that when firms exhibit volatile earnings, creditors become more cautious, reducing the availability or attractiveness of debt financing. This reduced lender confidence aligns with agency theory, which suggests that under conditions of high internal uncertainty, firms are more likely to avoid external financing—particularly debt—to minimize the risk of covenant breaches and creditor intervention. Managers may thus limit their exposure to financing contracts that invite external oversight, opting instead for more conservative capital structures.

This distinction is important, yet the two types of volatility are interconnected. In emerging markets, where market inefficiencies and external shocks are common,

fluctuations in earnings often correlate with broader market instability. Stock price volatility may amplify concerns about earnings reliability, just as unstable earnings can worsen perceptions of market risk. As a result, both forms of volatility—market-based and firm-specific—jointly influence financing decisions, especially in environments where external funding is already constrained.

Together, the findings from Vuong et al. (2022), Ahmed and Hla (2018), and Ilyas et al. (2021) suggest that firms facing dual pressures from capital market instability and internal financial volatility are likely to adopt more conservative or adaptive capital structure strategies. Whether by shortening debt maturities, reducing overall leverage, or favouring institutional loans over market-based financing, firms in such conditions tend to respond defensively to preserve liquidity and control.

2.4 Discussion on Underpinning Theories

The study of capital structure and firm performance has been developed on a foundation of seminal theories and contemporary perspectives that provide insights into the financial decisions made by firms. Starting with the MM theorem, which shows that capital structure is irrelevant under perfect market conditions, later work introduces real-world frictions and develops the trade-off, pecking order, agency, and market-timing theories. Together, these frameworks describe how firms balance internal funds, equity, and debt in light of financial flexibility, asset tangibility, profitability, tax considerations, agency costs, and prevailing market valuations. Grasping these perspectives clarifies the hierarchy of financing choices and the conditions that make each source preferable, providing a sound basis for empirical analysis of how financing decisions influence firm performance.

2.4.1 Modigliani-Miller (MM) Theorem

The MM theorem, introduced by Franco Modigliani and Merton H. Miller in 1958, is a seminal cornerstone of capital structure theory. Their initial proposition, often referred to as the capital structure irrelevance principle, suggested that in a perfect market—characterized by the absence of taxes, bankruptcy costs, and asymmetric information—the value of a firm is unaffected by its capital structure. This implied that a firm's financing decisions, whether through equity, debt, or a combination of both, do not influence its overall value. This groundbreaking theory fundamentally challenged the prevailing notions of corporate finance at the time by asserting that financing decisions do not impact firm value in an idealized world (Modigliani and Miller, 1958).

However, the assumptions underpinning the original MM theorem—perfect markets, no taxes, no bankruptcy costs, and no asymmetric information—are seldom met in the real world. Recognizing this, Modigliani and Miller revisited their theorem in 1963 to account for the effects of corporate taxes. In this revision, they introduced the concept of the tax shield, which arises because interest payments on debt are tax-deductible. This tax shield provides a tangible benefit to debt financing by effectively reducing the firm's taxable income and, consequently, its tax liability. The revised theorem thus suggested that in the presence of corporate taxes, the value of a leveraged firm (one that uses debt financing) is higher than that of an unleveraged firm (one that does not use debt) by the present value of the tax shield on debt (Modigliani and Miller, 1963).

This adjustment acknowledged that debt financing can enhance firm value due to tax benefits, but it also implicitly raised the issue of bankruptcy costs, which were not considered in their initial model. As firms increase their leverage to capitalize on the tax shield, they

simultaneously heighten their risk of financial distress and bankruptcy. Therefore, while the MM theorem highlighted the potential benefits of debt financing through tax shields, it also set the stage for further exploration into the trade-offs between the benefits and costs of debt, leading to the development of more comprehensive capital structure theories.

The trade-off theory builds directly on the MM theorem by incorporating the costs of financial distress and bankruptcy into the analysis of capital structure. It suggests that firms seek an optimal balance between the tax benefits of debt financing and the potential costs of financial distress. According to this theory, firms will increase leverage to the point where the marginal benefit of the tax shield equals the marginal cost of financial distress, resulting in an optimal capital structure that maximizes firm value.

The pecking order theory, proposed by Myers and Majluf (1984), also stems from the MM theorem by addressing the impact of asymmetric information on financing decisions. This theory suggests that firms prioritize their sources of financing according to a hierarchy: internal financing is preferred first, followed by debt, and equity is considered the last resort. The pecking order theory highlights the costs associated with adverse selection and the preference for financing methods that minimize these costs, deviating from the MM assumption of perfect information.

The agency theory, developed by Jensen and Meckling (1976), examines the conflicts of interest between managers and shareholders, which can influence capital structure decisions. The MM theorem's implications regarding the irrelevance of financing choices in a perfect market are reconsidered in light of agency costs. Agency theory suggests that debt can be used as a tool to mitigate agency problems by reducing the free cash flow available to managers, thus aligning their interests more closely with those of shareholders.

The market timing theory, introduced by Baker and Wurgler (2002), argues that firms time their financing decisions based on market conditions. This theory suggests that firms prefer to issue equity when market valuations are high and debt when market valuations are low. This behaviour suggests that firms capitalize on temporary market inefficiencies to optimize their capital structure, a concept that contrasts with the MM theorem's notion of market perfection.

These subsequent theories enrich the understanding of capital structure by addressing the complexities and imperfections of real-world markets that the MM theorem's initial assumptions did not account for. Together, they provide a comprehensive framework for analysing the factors that influence firms' financing decisions and their impact on firm performance. These theories form the underlying foundation for this study, as they offer varied perspectives on how capital structure can be optimized in the presence of market imperfections, asymmetric information, and agency costs.

2.4.2 Trade-off Theory

The trade-off theory of capital structure posits that firms make financing decisions by balancing the tax advantages of debt against the associated costs of financial distress, aiming to identify an optimal capital structure that maximizes firm value. This theory emerged as an extension of the MM theorem, incorporating real-world imperfections such as corporate taxes, bankruptcy costs, and agency conflicts. In essence, the theory suggests that while debt offers a tax shield through interest deductibility, it simultaneously increases the firm’s exposure to potential financial distress. As leverage rises, the marginal benefit of additional debt diminishes due to the increasing likelihood and cost of default, creating a trade-off that firms must manage.

This framework was formally developed by Kraus and Litzenberger (1973), who demonstrated that an optimal capital structure exists at the point where the marginal benefit of debt equals the marginal cost of financial distress. The theory has since evolved to include broader considerations such as agency costs, where managerial preferences may deviate from value-maximizing behaviour. For instance, Jensen and Meckling's (1976) agency theory argues that managers might avoid debt to escape creditor scrutiny and preserve discretionary control, even if debt would improve firm value. In contrast, the market timing theory proposed by Baker and Wurgler (2002) offers a behavioural perspective, suggesting that firms issue equity during periods of high market valuations and repurchase it when valuations are low, deviating from the static optimization logic of the trade-off approach.

Empirical investigations into the trade-off theory have yielded varied results, reflecting differences in firm characteristics, institutional settings, and sectoral dynamics. Ai et al. (2020) reviewed several longstanding empirical puzzles—such as why profitable firms often have low leverage—and argued that these patterns do not necessarily contradict trade-off logic but reflect contextual frictions and temporal adjustments. They reaffirmed the role of taxes and market conditions in shaping leverage behaviour, while also acknowledging challenges in establishing direct causal links. Abbana and Marimuthu (2023) contributed further by demonstrating that South African state-owned enterprises exhibit target capital structures and adjust toward these targets at a measurable speed, validating the theory's predictions even in public sector entities.

Sectoral applications have enriched the theory's practical relevance. Khoa and Thai (2021) examined real estate firms in Vietnam and found evidence that these firms actively adjust their leverage toward target structures based on profitability, tax incentives, and

growth opportunities. Similarly, Cahyo et al. (2023) explored capital structure determinants within Indonesia's consumer cyclical sector and confirmed the influence of firm-specific variables such as growth and size in shaping debt-equity decisions. These studies illustrate that the trade-off theory can accommodate heterogeneity in firm behaviour, provided that the contextual variables are carefully accounted for.

Recent research has also extended the theory into less traditional domains. Esghaier (2023) explored asymmetric capital structure adjustment behaviours among U.S. industrial firms, revealing a tendency for firms to act conservatively when increasing leverage—suggesting a behavioural overlay within the trade-off framework. Moreover, Rathnayake et al. (2021) incorporated liquidity into the analysis by identifying optimal cash levels that contribute to firm value maximization, proposing that liquidity management plays a parallel role to leverage decisions. In another extension, Kiliç and Sakalsız (2023) examined how ESG practices influence capital structure, suggesting that firms integrating sustainability into their operations may adopt more conservative leverage policies due to reputational and stakeholder considerations.

In the Malaysian context, several studies provide empirical support for the trade-off theory while also highlighting context-specific adaptations. Rahman et al. (2021) investigated the impact of the GST on the capital structure and performance of PLCs in Malaysia. Their findings indicate that firms leaned toward short-term debt due to its lower cost, aligning with the theory's view that firm's trade-off between tax benefits and financial risk. The introduction of GST influenced firms' cost structures, prompting adjustments in leverage to manage the new fiscal landscape. Similarly, Sahudin et al. (2020) examined Syariah-compliant property firms and found that firm efficiency, tangibility, and profitability

significantly influenced capital structure decisions—factors consistent with the trade-off theory's predictions regarding the determinants of optimal leverage.

These studies highlight the relevance of the trade-off theory in explaining capital structure behaviour in Malaysia, especially in light of tax reforms, sectoral characteristics, and firm-specific financial metrics. Malaysian firms appear to consider the balance between the tax advantages of debt and the risk of financial distress in a deliberate manner, albeit moderated by local economic, regulatory, and institutional factors. This is evident in sectors such as real estate and Syariah-compliant industries, where leverage decisions reflect a targeted approach consistent with static trade-off principles.

Nevertheless, the trade-off theory's application is not without complexity. The mixed empirical results across sectors and countries suggest that while the theory offers a strong conceptual foundation, its predictive accuracy depends heavily on context. Factors such as changing tax regimes, economic shocks, and behavioural preferences introduce deviations from the theoretical optimum. For Malaysian firms, these factors include policy shifts like GST implementation, varying access to capital markets, and the influence of firm-specific efficiency metrics, all of which shape the trade-off calculus in nuanced ways.

The trade-off theory continues to serve as a valuable framework for understanding capital structure decisions. For Malaysian firms, it offers an explanation for observed financing behaviour that accounts for the balancing act between tax benefits and financial risk. The available empirical evidence confirms that firms do not make financing decisions arbitrarily; rather, they adjust toward a leverage level that reflects their strategic, operational, and regulatory environments. However, the theory must be applied with a contextual lens,

recognizing that real-world decisions are shaped by a confluence of factors beyond the core tax–distress trade-off.

2.4.3 Pecking Order Theory

The pecking order theory offers an alternative view on capital structure decisions by emphasizing the sequence in which firms prefer to raise capital. Initially introduced by Donaldson (1961) and later formalized by Myers (1984) and Myers and Majluf (1984), the theory proposes that firms follow a hierarchical financing pattern: they prefer to use internal funds first, then external debt, and only issue new equity as a last resort. This ordering is not arbitrary but stems from the problems associated with asymmetric information—managers possess more information about the firm's value and prospects than external investors, which makes certain financing options riskier or more costly in terms of market perception.

At the heart of the theory is the notion that equity issuance sends adverse signals to the market. Because managers are assumed to issue equity when they believe the firm's shares are overvalued, doing so may lead investors to downgrade their valuation of the firm, causing the stock price to fall. To avoid this signalling cost, firms opt to retain earnings and use internal cash flows. When these are insufficient, debt becomes the next best option due to its relatively lower information sensitivity and tax-deductibility. However, firms remain cautious with debt accumulation due to the risk of financial distress, leading to a dynamic where internal financing is overwhelmingly preferred.

Empirical studies have produced varied levels of support for the pecking order theory. Chaklader and Padmapriya (2021), examining small- and mid-cap firms in India, confirmed that firms with surplus cash exhibit a strong preference for internal funding, mirroring the pecking order hierarchy. Similarly, Singh et al. (2021) observed that listed

SMEs in India systematically avoid equity and rely more heavily on internal funds and debt, reinforcing the theory's relevance in contexts with limited capital market access. Abdullazade (2020), in the U.S. context, also found that firms displayed a preference for debt over equity, particularly when information asymmetries were less pronounced, suggesting the theory's robustness in developed markets as well.

Yet, empirical evidence is not universally conclusive. Ben Said (2022) conducted a comparative study of French listed firms and found that while elements of the pecking order theory—such as the role of profitability and firm size—remained valid, capital structure decisions also reflected considerations consistent with the trade-off theory. This highlights the complexity of real-world financing behaviour, suggesting that firms may not strictly adhere to a single theoretical model but instead respond to a blend of internal preferences and external conditions.

Recent studies have also expanded the application of the theory into emerging domains such as sustainability. Kiliç and Sakalsız (2023) examined firms listed on the Borsa İstanbul (BIST) Sustainability Index and observed shifts in financing behaviour that reflect both pecking order and trade-off tendencies. Their analysis suggests that ESG-aligned firms may adjust their capital structure not only based on cost minimization and risk, but also in response to broader sustainability objectives, pointing to the evolution of capital structure theory in light of corporate responsibility trends.

In the Malaysian context, several studies offer empirical support for the pecking order theory, particularly within sector-specific frameworks. Sahudin et al. (2020), examining Shariah-compliant property firms, found that capital structure decisions were influenced by profitability, tangibility, and firm efficiency—factors that align with a

preference for internal funds over external financing. Basri et al. (2021) reached similar conclusions in their study of Shariah-compliant telecommunications and media firms, noting a negative relationship between profitability and leverage, which emphasizes the reluctance to raise debt when internal funds are available. Both studies affirm that Malaysian firms, particularly those operating within ethical financing frameworks, exhibit behaviours consistent with the pecking order theory.

However, financing decisions in Malaysia do not occur in isolation from macroeconomic forces. Monetary policy, especially through changes in the OPR set by BNM, plays a critical role in shaping borrowing behaviour. When the OPR rises, borrowing becomes more expensive, making debt financing less attractive and reinforcing the pecking order theory's central prediction that firms will rely more heavily on internal funding. Conversely, during periods of low interest rates, debt becomes relatively cheaper, and some firms may deviate from the strict pecking order by taking advantage of favourable credit conditions to support growth or liquidity needs.

This dynamic suggests that the pecking order theory remains valid but must be interpreted with sensitivity to changing economic conditions. In practice, firms adapt their financing strategies in response to fluctuations in the cost of capital while still generally adhering to the theory's core hierarchy. The influence of monetary policy thus acts as a moderating factor, shaping when and how firms transition from internal to external financing. This pattern has been observed in the wake of economic events such as the COVID-19 pandemic, where low-interest rate environments prompted a temporary uptick in debt financing among firms that typically prioritized internal resources.

The pecking order theory continues to provide a compelling framework for understanding capital structure decisions, particularly in settings where information asymmetry, signalling costs, and financial conservatism are prominent. Evidence from Malaysia indicates a broad adherence to the theory, though deviations may occur due to monetary policy shifts or sector-specific strategic considerations. Ultimately, the theory captures the cautious, pragmatic approach that many firms take toward financing decisions, especially in emerging markets where capital access is uneven and market perceptions are highly sensitive.

2.4.4 Agency Theory

Agency theory provides a foundational lens to understand the tensions that emerge between owners (principals) and managers (agents) within a firm. Originating from the seminal work of Jensen and Meckling (1976), the theory highlights how divergent goals and asymmetric information can lead managers to prioritize personal interests over shareholder value. These misalignments give rise to agency costs, which include monitoring expenditures by shareholders, bonding efforts by managers to assure alignment, and residual losses from decisions that stray from shareholder priorities.

In the context of capital structure, agency theory identifies two primary conflicts. The first exists between managers and shareholders, where managers may pursue non-value-maximizing activities such as empire building or excessive investment. Here, debt plays a disciplinary role by restricting managerial discretion through mandatory interest obligations, effectively reducing free cash flow available for such pursuits. The second conflict arises between shareholders and debt holders. Shareholders may prefer riskier projects to maximize their returns, potentially exposing debt holders to losses. To mitigate this, debt holders

respond by imposing higher interest rates or restrictive covenants, influencing the firm's financing structure.

Recent empirical studies reaffirm and expand the application of agency theory across different markets and contexts. Gborogen and Toluwa (2023), examining non-financial firms, confirmed that both short- and long-term debt significantly impact agency costs. Their findings support the argument that capital structure can be strategically adjusted to manage principal-agent conflicts. Similarly, Sdiq and Abdullah (2022) studied industrial firms in Iraq and found that agency costs act as a moderator in the relationship between capital structure and firm performance—strengthening the empirical validity of agency theory in explaining how financing choices shape corporate outcomes.

Other studies have sought to link agency theory with broader theoretical perspectives. Ichwanudin et al. (2023) integrated agency and trade-off theories in their analysis of LQ45 firms in Indonesia. Through path analysis, they demonstrated that debt positively influences profitability, which in turn boosts firm value and reduces financial distress. This chain of effects showcases how agency theory, when paired with trade-off theory, explains the strategic use of debt to enhance firm performance while maintaining managerial discipline.

In a Kenyan context, Mukoma et al. (2023) explored how retained earnings, equity, and long-term debt affect agency costs among listed commercial and service firms. Their study found these financing components significantly influenced agency costs, highlighting the need for careful capital structure management in emerging markets to minimize inefficiencies and improve performance.

Further evidence comes from Dian and Chicilia (2020), who examined Indonesian manufacturing firms to assess how capital structure, company size, and governance practices relate to performance, with agency costs as a mediating factor. Their results indicated that capital structure indirectly enhances firm performance via its impact on agency costs, emphasizing that managing these costs is essential for achieving financial efficiency.

In the Malaysian setting, the relevance of agency theory is subtly embedded within broader studies of capital structure determinants. Saif-Alyousfi et al. (2020) analysed 827 listed non-financial firms from 2008 to 2017 and found that firm-specific factors such as profitability, growth opportunities, liquidity, and cash flow volatility influence debt decisions. While supporting trade-off and pecking order theories, the study also indirectly supports agency theory by illustrating how capital structure serves to resolve principal-agent conflicts.

Likewise, Julkid and Lau (2020) assessed 612 listed firms from 2009 to 2018, finding that variables such as non-debt tax shields, firm size, and macroeconomic indicators shape debt ratios. Though not directly framed within agency theory, their findings highlight how capital structure choices are influenced by efforts to balance control, risk, and financial discipline.

An emerging dimension within agency theory is the role of stock market volatility. Although not the primary focus of the aforementioned Malaysian studies, the theoretical implications are clear. During periods of high market volatility, managerial behaviour may skew toward short-term gains to exploit price movements, possibly at the cost of long-term shareholder value. Agency theory suggests that debt acts as a corrective, imposing discipline and restricting opportunistic behaviour. However, volatility also raises the cost of borrowing,

as creditors perceive increased risk and respond with higher interest demands. This dual effect complicates the use of debt as a control mechanism. Firms must therefore weigh the benefits of managerial discipline against the financial burden of borrowing in turbulent markets, adapting their capital structure accordingly to maintain alignment between managerial decisions and shareholder interests.

Agency theory provides a rich explanation for how firms structure their financing to mitigate internal conflicts and enhance performance. While empirical findings vary by region and industry, the recurring theme is clear: capital structure is a strategic tool, not only for funding operations but also for shaping behaviour within the firm. The inclusion of agency considerations, particularly in volatile or emerging markets, adds necessary depth to any discussion on optimal capital structure.

2.4.5 Market Timing Theory

The market timing theory of capital structure offers a behavioural approach to understanding how firms make financing decisions. Developed by Baker and Wurgler (2002), the theory suggests that firms strategically adjust their capital structure in response to prevailing market conditions rather than maintaining a predetermined target leverage ratio. Managers are believed to issue equity when they perceive the firm's stock to be overvalued and turn to debt or repurchase equity when they believe the stock is undervalued. This behaviour allows firms to minimize their cost of capital and enhance shareholder value by capitalizing on favourable market timing opportunities.

Unlike the trade-off theory, which assumes that firms seek an optimal balance between tax shields and bankruptcy costs, or the pecking order theory, which prioritizes financing hierarchy due to information asymmetry, the market timing theory posits that

capital structure is primarily shaped by the cumulative outcomes of past attempts to time the market. When stock valuations are high and investor sentiment is strong, firms are more inclined to issue equity, resulting in lower leverage. Conversely, in weaker market conditions, firms tend to rely on debt or repurchase their shares, leading to higher leverage ratios.

Empirical support for market timing theory has been mixed but meaningful, particularly in short-term analyses. Dong et al. (2020) investigated initial public offerings in China and observed that firms reduced their leverage by issuing equity during market highs, consistent with the market timing hypothesis. Similarly, Mohajeri et al. (2021) found that firms listed on the Tehran Stock Exchange engaged in market timing by issuing equity during bullish market periods and reducing reliance on debt. These findings highlight the short-term impact of market timing on capital structure, although its long-term persistence remains debatable.

Further evidence of market timing behaviour has emerged from other regions. In Canada, Humta and Ghafourzay (2024) reported that market-to-book ratios significantly influenced firms' capital structure, reinforcing the relevance of market perceptions in financing decisions. Albahadly and Al-Hashemi (2024), studying firms listed on the Iraq Stock Exchange, confirmed that even in less mature capital markets, firms actively respond to perceived market opportunities when making financing choices. In Latin America, Vásquez Tejos and Pape Larre (2021) explored the overlap between market timing and pecking order behaviours, revealing that firms often use a blend of financing strategies, driven by both internal financial conditions and external market indicators. This blending of

theories highlights the complexity of capital structure decisions, particularly in emerging markets, where firms must adapt to volatile and fragmented financial environments.

The Malaysian context adds further depth to the discourse on market timing. Bougatef and Kassem (2023) analyzed 40 Shariah-compliant firms that went public between 2015 and 2018 and found that managers exhibited market timing behaviour by issuing equity during favourable market conditions. However, the effect was temporary, suggesting that while market timing influences capital structure decisions, its impact may dissipate over time as market conditions evolve. Saif-Alyousfi et al. (2020), in their study of 827 non-financial Malaysian firms, observed that profitability, growth opportunities, and liquidity negatively affected leverage, which aligns with the market timing view that firms prefer equity issuance when internal financial conditions are strong and market sentiment is positive. Julkid and Lau (2020), examining 612 listed firms over a ten-year period, identified significant links between stock market development and capital structure, implying that Malaysian firms are responsive to equity market conditions when adjusting their leverage.

These findings suggest that market timing plays a non-trivial role in shaping the capital structure of Malaysian firms. Managers appear to monitor market conditions and adjust financing strategies accordingly, especially during windows of favourable investor sentiment or economic growth. The strategic use of equity issuance during market peaks and reduced reliance on debt during downturns reflect an opportunistic approach to capital structure management. However, the observed effects are often short-lived, and firms may revert to more traditional financing behaviours once market conditions normalize.

Adding to this perspective, Curry and Fikri (2022) demonstrated that macroeconomic indicators such as GDP growth can moderate the relationship between capital structure and

firm performance. Their study, based on IDX-listed firms from 2013 to 2019, found that periods of strong economic growth enhance the positive impact of capital structure decisions on firm performance. This implies that market timing behaviours are not only driven by stock prices but also influenced by broader economic conditions, which may shape the strategic rationale behind financing decisions.

The market timing theory offers valuable insight into how firms adjust their capital structures in response to dynamic and often unpredictable market conditions. Empirical studies across various economies, including Malaysia, indicate that firms exploit favourable market windows to issue equity and manage leverage, reflecting an opportunistic financing strategy. However, the effects of market timing appear to be more pronounced in the short term and are moderated by macroeconomic trends and firm-specific characteristics. For Malaysian firms, especially those operating in Shariah-compliant or equity-sensitive sectors, the theory remains relevant, but its application is contingent upon both market sentiment and structural considerations within the domestic financial landscape. As such, while market timing theory enriches the capital structure literature, it should be viewed as part of a broader, context-dependent financing framework that integrates behavioural, institutional, and economic dimensions.

2.5 Empirical Studies on Capital Structure and Firm Performance

The relationship between capital structure and firm performance has long been a focal point of research in corporate finance, reflecting the critical role that financing decisions play in determining a firm's success. Empirical studies in this area have provided insights into how different capital structures—comprising varying levels of debt and equity—impact firm performance across diverse economic contexts and industries. The

analysis categorizes findings by developed countries, developing countries, and the specific context of Malaysia. Key themes and patterns have emerged, offering a foundational understanding of how capital structure decisions influence firm outcomes in different settings and informing the analysis of these dynamics within the Malaysian context.

2.5.1 Capital Structure and Firm Performance in Developed Countries

The relationship between capital structure and firm performance has been extensively studied in developed economies, offering a broad spectrum of insights across sectors and institutional settings. These studies provide valuable empirical evidence supporting and, at times, challenging classical theories such as the trade-off, pecking order, and agency cost theories. Across the board, findings emphasize the importance of strategic debt management, tax efficiency, and governance in shaping performance outcomes.

In the United States, Asaolu (2021) examined oil, gas, and manufacturing firms listed on the NYSE and NASDAQ between 2010 and 2019, finding that moderate debt use improved firm performance. However, beyond a certain threshold, excessive leverage eroded profitability—highlighting the trade-off between tax shields and financial distress. The study identified asset tangibility, interest payments, and non-debt tax shields as important factors influencing firm performance, reinforcing the practical relevance of the trade-off theory.

A similar trajectory is evident in the U.S. technology sector. Elewa (2021), using panel data from NASDAQ-listed firms between 2005 and 2018, observed significant relationships among capital structure, liquidity, financial performance, and stock prices. The study highlighted capital structure as a key determinant of firm valuation in the tech sector, where investor sentiment and intangible assets dominate. This supports the view that capital

structure decisions are interlinked with both operational and market-based performance indicators, especially in sectors driven by innovation and growth expectations.

In the energy sector, Georgakopoulos et al. (2022) examined large NYSE-listed firms and found that both capital structure and corporate governance significantly influenced firm profitability, while equity ownership had no notable effect. Their findings support the relevance of agency and pecking order theories, showing that governance structures play a crucial role in capital allocation decisions and their performance consequences.

Expanding the geographical scope, Amin and Çek (2023) studied firms in France and the UK from 2002 to 2021, applying the golden ratio concept to debt-equity structure. They found that a capital structure comprising 61.8% debt and 38.2% equity consistently yielded better financial performance. Deviations from this "optimal" ratio negatively impacted outcomes, suggesting the presence of a performance-sensitive equilibrium in capital structure. The study also noted improved financial results following IFRS adoption, indicating the role of regulatory alignment in enhancing transparency and capital efficiency.

In the European Union (EU), Krištofík and Medzihorský (2022) analysed non-financial firms across member states between 2011 and 2020. Their research revealed a steady increase in equity financing and a decline in credit reliance, reflecting a gradual shift in capital structure preferences. While their findings offered limited support for the market timing theory, they highlighted significant national differences in leverage behaviour, suggesting only partial convergence in capital structure practices across the EU bloc.

Germany's case presents a distinct pattern. Abdullah and Tursoy (2021) analysed data from 1993 to 2016 and found that German non-financial firms heavily relied on debt, with over 60% of total assets financed through borrowings. The study reported a positive

relationship between leverage and firm performance, largely attributed to tax benefits and the lower issuance costs of debt. However, the adoption of IFRS in 2005 led to improved firm performance while weakening the relationship between leverage and performance, suggesting that financial transparency may influence financing dynamics independently of traditional cost-benefit considerations.

Collectively, these studies emphasize several recurring themes. The sectoral context plays a significant role in moderating the impact of capital structure on firm performance. While manufacturing and energy firms benefit from tangible asset bases that support higher leverage, technology and service-oriented firms show greater sensitivity to market-based indicators and governance mechanisms. Macroeconomic factors and institutional reforms—such as the implementation of IFRS—also influence the effectiveness of capital structure strategies. Efficient tax shielding, adherence to optimal debt-equity ratios, and strong corporate governance consistently emerge as key factors enhancing performance in developed markets.

Despite the valuable insights these studies offer, their findings are often shaped by contextual constraints. Many are sector-specific, which limits their generalizability, and most reflect conditions during periods of relative economic stability. The dynamic nature of financial markets, shifting regulatory environments, and evolving business models mean that these relationships are not static. This underlines the importance of interpreting findings within their respective temporal and institutional contexts.

For emerging economies like Malaysia, the experiences of developed countries offer foundational lessons. The evidence supports the core of the trade-off theory—that leveraging debt can enhance firm performance up to a point, after which financial risk begins to erode

returns. Studies by Asaolu (2021) and Elewa (2021) highlight this balance, emphasizing that while debt can act as a growth catalyst, over-leveraging carries substantial downside. Georgakopoulos et al. (2022) illustrate how effective corporate governance strengthens the capital structure–performance link, while Amin and Çek (2023) demonstrate the strategic importance of maintaining optimal capital ratios. Abdullah and Tursoy's (2021) findings in Germany further reinforce the relevance of institutional context, suggesting that regulatory frameworks can shift the effectiveness of financing strategies.

Ultimately, the relationship between capital structure and firm performance in developed economies is both informative and nuanced. These studies reveal that while the theoretical foundations remain relevant, practical applications must account for economic maturity, sector dynamics, and governance quality. For policymakers and researchers in Malaysia, these insights provide a valuable basis for comparing capital structure behaviour, interpreting empirical results, and identifying conditions under which financing decisions most strongly influence firm performance.

2.5.2 Capital Structure and Firm Performance in Developing Countries

While the relationship between capital structure and firm performance has been widely examined in developed economies, the dynamics in developing countries present additional layers of complexity. Factors such as institutional quality, market development, economic volatility, and sectoral diversity all influence how firms approach financing decisions. Consequently, the applicability of traditional capital structure theories, particularly the trade-off theory, often requires contextual adaptation to capture the diverse realities of emerging markets.

Toader et al. (2022) explored this complexity by examining listed firms in Romania, Bulgaria, and Hungary. Using panel data from 1996 to 2020, the study found that profitability and liquidity were negatively correlated with leverage, reflecting a cautious approach to debt in the face of financial distress risks. Interestingly, macroeconomic variables such as GDP growth and inflation produced mixed results, while institutional quality indicators—such as rule of law and control of corruption—emerged as significant influences on capital structure. These findings highlight the role of institutional frameworks in shaping firm-level financial strategies in transitional economies.

In Sub-Saharan Africa, the relevance of long-term debt in performance outcomes has been noted. Evbayiro-Osagie and Enadeghe (2022) examined non-financial firms across nine years and found that long-term debt to equity and total debt metrics positively influenced return on assets (ROA). However, an excessive reliance on total debt to equity produced negative effects, suggesting that while leverage can improve performance, it must be managed carefully to avoid eroding returns. The study emphasizes the strategic role of long-term debt as a tool for value creation when employed judiciously.

Mansour et al. (2021) provided similar insights in the context of Jordan, where total debt to total assets had a positive and significant impact on market share among non-financial listed firms. These findings suggest that, despite the risks associated with leverage, optimizing capital structure can enhance competitive position. Further analysis by Mansour et al. (2023) demonstrated that firm size moderated this relationship, with larger firms more effectively utilizing debt to increase market presence. These results highlight how scale can influence capital structure decisions and outcomes in developing markets.

The energy sector provides further evidence of sector-specific dynamics in capital structure planning. Nga and Long (2021), examining 250 energy firms from 2010 to 2019, found that profitability and firm age negatively influenced leverage, while firm growth and state ownership were positively associated with debt use. These findings suggest that younger, rapidly expanding firms in capital-intensive sectors may require more debt to fund expansion, even if their profitability signals otherwise.

Similarly, sectoral distinctions emerged in the Indonesian pharmaceutical industry. Waryati and Ihsani (2023) found that capital structure had a negative effect on financial performance, while liquidity and firm size were positively correlated with performance. These results highlight the nuanced nature of financing strategies in sectors that prioritize stability, operational liquidity, and growth through internal funding.

From a regional capital market perspective, Nguyen et al. (2021) examined five ASEAN economies—Indonesia, Malaysia, the Philippines, Thailand, and Vietnam—to understand how stock market development influences capital structure. Their findings showed that increased stock market liquidity led to lower debt usage, reflecting a shift towards equity financing as capital markets matured. However, firm-specific characteristics such as size, asset tangibility, and growth opportunities continued to influence leverage decisions, suggesting that structural and institutional variables operate concurrently in shaping financial strategy.

A comparative synthesis of these studies reveals several key patterns. Across regions, profitability and liquidity consistently exhibit a negative relationship with leverage, supporting the trade-off theory's proposition that firms with strong internal cash flows prefer to avoid debt due to the risks of financial distress. This was particularly evident in the

findings of Toader et al. (2022) and Nga and Long (2021). At the same time, long-term debt appears beneficial in certain contexts, as highlighted by Evbayiro-Osagie and Enadeghe (2022), though its effectiveness is contingent on firm-specific factors and broader economic stability.

Firm size repeatedly emerges as a critical determinant of capital structure's impact on performance. Mansour et al. (2023) and Nguyen et al. (2021) both found that larger firms are better equipped to manage leverage and convert it into market advantages, likely due to better access to credit, lower borrowing costs, and more diversified operations. These advantages allow larger firms to apply trade-off principles more effectively, balancing debt benefits with associated risks.

Sector-specific factors also influence capital structure decisions. The capital-intensive nature of the energy sector encourages debt financing for growth (Nga and Long, 2021), whereas pharmaceutical firms prioritize liquidity and internal funding stability (Waryati and Ihsani, 2023). This highlights the importance of contextualizing capital structure analysis within industry-specific operational and regulatory conditions.

The findings from ASEAN countries also suggest that financial market development shapes capital structure preferences. As stock markets mature and become more liquid, firms shift towards equity-based financing, reducing reliance on debt (Nguyen et al., 2021). This behaviour reflects greater financing flexibility and a reduced dependence on traditional borrowing—especially important in regions with evolving financial ecosystems.

Taken together, the evidence from developing countries supports the core tenets of the trade-off theory while also exposing its limitations. The theory's applicability depends heavily on the institutional, macroeconomic, and sectoral environment. In contexts with

weak legal enforcement or underdeveloped financial markets, firms may avoid leverage despite potential tax benefits, prioritizing financial flexibility and stability. Conversely, in economies where debt markets are more accessible, long-term debt may become a strategic asset for growth, particularly among larger firms or those operating in capital-intensive sectors.

In the context of Malaysia, these insights are highly relevant. As an emerging economy with a moderately developed capital market and sectoral diversity, Malaysian firms likely face similar tensions between leveraging debt for growth and managing financial risk amid institutional and economic constraints. The importance of firm size, industry characteristics, macroeconomic conditions, and regulatory quality—all reflected in studies from other developing countries—offers a useful lens through which to interpret capital structure behaviour in the Malaysian setting.

2.5.3 Capital Structure and Firm Performance in Malaysia

Malaysia, as a rapidly developing economy with a diverse industrial landscape, presents a compelling setting for examining how capital structure decisions influence firm performance. Its economic foundation spans traditional sectors such as plantations and manufacturing, alongside high-growth industries like technology, healthcare, and financial services. Each of these sectors operates within unique financial, regulatory, and operational environments, leading to varying capital structure strategies and performance outcomes. As such, Malaysia offers valuable insights into the practical application of capital structure theories, particularly the trade-off theory, across heterogeneous business contexts.

Ayaz et al. (2021) conducted a comprehensive study involving 528 non-financial firms listed on Bursa Malaysia from 2005 to 2016. Employing both fixed-effects and two-

step system-GMM estimations, the study found a nonlinear relationship between leverage and firm performance—supporting the trade-off theory's premise that while debt enhances performance up to a certain threshold, excessive leverage becomes detrimental. Debt was shown to improve performance through the tax shield and the disciplining effect on managers, but once financial distress costs outweighed these benefits, the impact reversed. These findings also aligned with agency cost theory, emphasizing debt's role in mitigating managerial opportunism, yet reinforcing the importance of identifying an optimal leverage point.

The relevance of capital structure during economic shocks was demonstrated by Shaari and Kamarudin (2024), who examined Malaysian public firms from 2018 to 2021, covering the COVID-19 crisis. Their findings revealed that while total debt had a negative effect on firm performance, long-term debt was positively associated with better outcomes due to the liquidity stability it provided. The study highlights the importance of debt composition, especially in times of crisis, and underlines how external support mechanisms—such as government aid—can help cushion the adverse effects of financial leverage.

Sectoral studies in Malaysia offer further refinement to the understanding of how capital structure decisions affect firm performance. Mohammad and Bujang (2020) assessed the plantation, finance, and construction sectors from 2011 to 2015, revealing that capital structure preferences varied according to firm goals and sectoral dynamics. While construction and finance firms supported the pecking order theory by preferring internal funds and debt over equity, plantation firms aligned more closely with the trade-off theory due to the capital-intensive nature of their operations. This study affirms the need for sector-

specific financing strategies grounded in the underlying risk and asset characteristics of each industry.

Ramlan et al. (2020) analysed trading and services firms from 2008 to 2017 and found statistically significant links between capital structure and performance, suggesting that these firms actively adjust their leverage to navigate competitive pressures and fluctuating demand. Similarly, En and Malek (2021) examined software firms from 2012 to 2019 and noted that while total debt positively influenced return on equity (ROE), long- and short-term debt had negative effects. For return on assets (ROA), short-term debt was detrimental. These outcomes illustrate the challenges of debt management in high-volatility sectors such as technology, where misaligned debt maturity can exacerbate financial risk.

In the capital-intensive plantation sector, Foong et al. (2021) found that while total debt and firm growth significantly influenced ROA, long- and short-term debt had no significant effect. ROE was similarly unaffected by debt measures, reinforcing that growth potential—rather than leverage—drives performance. Meanwhile, Tan et al. (2021) observed positive but insignificant effects of debt on ROA in the property sector, while account payables negatively impacted profitability. Their study also noted a causal link where short-term debt levels were influenced by long-term debt planning, offering insights into debt structuring behaviour.

The healthcare sector presents yet another dynamic. Lim and Naysary (2022) found significant linear relationships between capital structure ratios and ROE—but not ROA—among Bursa Malaysia-listed healthcare firms from 2018 to 2020. The findings suggest that capital structure impacts market-based performance metrics more than asset-efficiency measures in regulated, R&D-intensive sectors. In manufacturing, Chen and Marsidi (2023)

reported that short- and long-term debts had significant positive effects on performance, while total assets and debt-to-equity ratio negatively impacted ROE. These findings emphasize that optimal debt structuring enhances firm performance when aligned with operational capacity and strategic direction.

In the context of Shariah-compliant firms, which operate under distinct financial principles, the capital structure–performance relationship exhibits unique features. Rohaizan et al. (2021) studied travel, leisure, and hospitality firms and found positive effects of asset tangibility and debt-to-equity ratio on ROA, though these did not significantly influence ROE. Long-term debt effects were largely insignificant. Complementing this, Rehan et al. (2023) compared 454 Shariah and non-Shariah firms from 2005 to 2021 and identified fixed assets and firm growth as core determinants of capital structure across both groups. For Shariah-compliant firms, additional factors such as current assets and non-debt tax shields also influenced leverage. These findings reflect the adaptability of the trade-off theory within Islamic financial frameworks, even when conventional debt instruments are limited.

Collectively, these studies confirm that capital structure decisions in Malaysia are not uniform across sectors or periods. Instead, they are shaped by firm-specific attributes, industry requirements, macroeconomic conditions, and regulatory environments. While the trade-off theory is not always the explicitly stated framework, its core logic—the balancing of tax benefits against financial distress costs—consistently underlies capital structure behaviour across Malaysian firms.

Ayaz et al. (2021) and Shaari and Kamarudin (2024) directly support the theory by illustrating how leverage initially enhances but ultimately harms performance beyond a threshold. Mohammad and Bujang (2020) and Foong et al. (2021) extend this by showing

that capital-intensive sectors require tailored financing strategies grounded in trade-off principles. Studies such as Ramlan et al. (2020), En and Malek (2021), and Chen and Marsidi (2023) emphasize the importance of adapting capital structure to sector volatility and operational realities. Even in Shariah-compliant settings, Rehan et al. (2023) and Rohaizan et al. (2021) demonstrate that firms weigh financing options to manage risks and maximize value within permissible bounds.

In summary, Malaysian empirical evidence supports the relevance and adaptability of the trade-off theory across diverse sectors and economic conditions. Firms must continuously calibrate their capital structure to strike a balance between risk, cost, and strategic opportunity—an approach that is especially critical in dynamic and multi-sectoral economies like Malaysia.

2.6 Summary of Literatures

This section recaps key findings from past studies. ROA is confirmed as a suitable measure of firm performance. Capital structure is best analysed using disaggregated debt ratios (TDA, LDA, SDA). Macroeconomic factors—GDP, OPR, and market volatility—moderate the capital structure–performance link. Theoretical grounding is drawn from MM, trade-off, pecking order, agency, and market timing theories. Empirical evidence from developed, developing, and Malaysian markets highlights the importance of firm size, sector, and debt maturity in shaping outcomes.

Table 2.1: Summary of Literature

Section	Theme	Key Points	Supporting Sources
2.1	Firm Performance (Dependent Variable)	ROA chosen for internal efficiency; more stable and interpretable than ROE or Tobin's Q; sector sensitivity matters; ROA reflects both operational health and macroeconomic shocks.	Keter et al. (2023); Akpa et al. (2021); Yu (2024); Madina et al. (2022); Kramarić et al. (2021); Nurannisa and Bandi (2024); Anggraeni and Syarief (2024)
2.2	Capital Structure (Independent Variables)	TDA = total leverage; LDA = strategic long-term debt; SDA = short-term operational debt. Each affects performance differently. Disaggregating leverage improves model accuracy and policy insights.	Ayaz et al. (2021); En and Malek (2021); Ansca (2021); Okanda et al. (2025); Wilson (2022)
2.3.1	Economic Conditions (Moderator)	GDP growth improves debt access and profitability; during recessions, firms reduce leverage to avoid distress; macro shocks influence structure-performance link.	Alter and Elekdag (2020); Heresi and Powell (2023); Julkid and Lau (2020); Fatima and Yasmin (2022); Curry and Fikri (2022)
2.3.2	Monetary Policy (Moderator)	Lower OPR = higher debt usage; rising OPR discourages leverage; firm size and debt type mediate effects; BNM policy directly affects Malaysian firms.	Saif-Alyousfi et al. (2020); Wan (2022); Wang and Zhou (2022); Dewianawati et al. (2022); Hussain et al. (2020)
2.3.3	Stock Market Volatility (Moderator)	High volatility deters external financing, shifts firms to internal funds; causes restructuring of debt maturity; both market and earnings volatility affect capital structure.	Vuong et al. (2022); Ahmed and Hla (2018); Ilyas et al. (2021)

Table 2.1 continued

Section	Theme	Key Points	Supporting Sources
2.4	Theoretical Framework	MM theorem (baseline irrelevance), Trade-off (optimal debt), Pecking Order (internal funds first), Agency (debt as control tool), Market Timing (opportunistic equity issuance).	Modigliani and Miller (1958, 1963); Myers and Majluf (1984); Jensen and Meckling (1976); Baker and Wurgler (2002)
2.5.1	Developed Markets Empirics	Moderate debt improves performance; IFRS adoption alters leverage-performance link; capital structure varies by sector and governance.	Asaolu (2021); Elewa (2021); Georgakopoulos et al. (2022); Amin and Çek (2023); Abdullah and Tursoy (2021)
2.5.2	Developing Markets Empirics	Liquidity and profitability typically reduce leverage; long-term debt beneficial when managed; firm size and sector critical.	Toader et al. (2022); Evbayiro-Osagie and Enadeghe (2022); Mansour et al. (2021); Nga and Long (2021); Nguyen et al. (2021)
2.5.3	Malaysia Empirics	ROA used widely; non-linear effects of leverage on performance; sector differences clear; COVID-19 shows short vs long-term debt impact; trade-off theory supported.	Ayaz et al. (2021); Shaari and Kamarudin (2024); En and Malek (2021); Foong et al. (2021); Rehan et al. (2023)

Note: Author's compilation (2025)

2.7 Conceptual Framework

Figure 2.1 presents the conceptual framework that guides this study. The framework is designed to examine the relationship between capital structure and firm performance, while accounting for the moderating effects of key macroeconomic variables and underpinned by relevant financial theories.

The independent variables are the capital structure proxies, namely TDA, LDA, and SDA. These variables represent the firm's leverage profile and serve as the core explanatory constructs in the model. The dependent variable is firm performance, measured by ROA, which reflects the efficiency with which firms utilize their assets to generate earnings.

The model incorporates three moderating variables: GDP, OPR, and VOL. These variables represent broader macroeconomic conditions that may influence the strength and direction of the relationship between capital structure and firm performance. GDP serves as a proxy for overall economic conditions and interacts with capital structure through the lens of market timing theory, where firms are more likely to issue equity during favourable economic cycles. The OPR, which reflects monetary policy, aligns with pecking order theory by influencing firms' preference for internal versus external financing as borrowing costs fluctuate. VOL is interpreted through agency theory, suggesting that under conditions of uncertainty, managerial risk aversion and control concerns may affect capital structure decisions, particularly the choice between debt and equity.

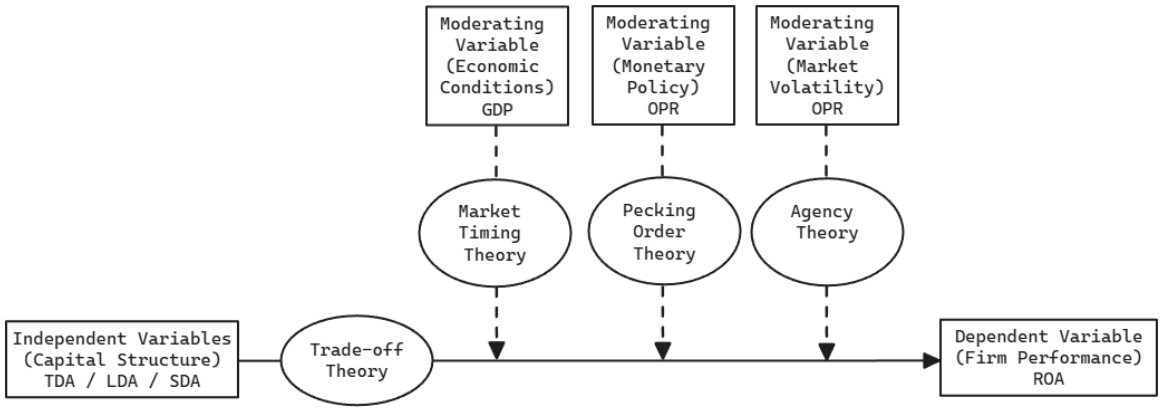
Trade-off theory forms the theoretical backbone of the framework, providing the direct link between capital structure and firm performance. It proposes that firms aim to strike a balance between the tax benefits of debt and the costs associated with financial distress, ultimately targeting an optimal leverage level that enhances performance. This direct relationship is represented by the solid line in the diagram, linking the independent variables (TDA, LDA, SDA) to the dependent variable (ROA).

The dashed arrows in the diagram reflect the moderating roles of GDP, OPR, and VOL, each mediated through its corresponding theoretical lens. These moderating variables

are expected to influence the degree to which capital structure affects firm performance under different macroeconomic conditions.

Control variables such as SZE, TAN, and LIQ are also included in the study to account for firm-specific characteristics that might impact performance. Although not shown in the diagram, these controls are integrated into the empirical model to ensure that the observed relationships between capital structure and firm performance are not confounded by internal firm dynamics.

This integrated framework enables a multi-theoretical interpretation of capital structure decisions under varying economic conditions. It offers a comprehensive approach to understanding how Malaysian listed firms strategically manage their financial structures to enhance performance in a complex and evolving economic environment.



Note: Author (2025)

Figure 2.1: Conceptual Framework

2.8 Hypotheses Development

The theoretical foundations and empirical evidence discussed earlier highlight the dynamic relationship between capital structure and firm performance. Specific hypotheses are developed to investigate this relationship within the context of Malaysian firms. These

hypotheses are formulated based on the influence of various external economic factors, such as economic conditions, monetary policy changes, and stock market volatility, on the relationship between capital structure and firm performance.

2.8.1 Capital Structure and Firm Performance

The trade-off theory provides a framework for understanding the relationship between capital structure and firm performance. This theory suggests that firms aim to balance the benefits and costs of debt and equity financing to achieve an optimal capital structure. The primary benefit of debt financing is the tax shield, which arises from the tax-deductibility of interest payments. Additionally, debt can mitigate agency costs by limiting the free cash flow available to managers, thereby reducing the likelihood of inefficient spending. However, the costs associated with debt financing include the risk of financial distress and bankruptcy, which increase as debt levels rise. Thus, according to the trade-off theory, there is an optimal level of debt that maximizes firm value by balancing these competing factors.

Empirical evidence supports the trade-off theory by demonstrating that excessive debt can negatively impact firm performance. Bedada (2020) investigated the effect of capital structure on the profitability of EFFORT manufacturing companies in Ethiopia. By analysing audited financial statements from eight manufacturing companies over ten years, Bedada (2020) found that TDA and LDA were significantly negatively related to ROA. Similarly, Linqing (2021) found that SDA, LDA, and TDA all had significantly negative effects on ROA, ROE, and EPS in Chinese listed real estate companies. Dat (2022) analysed food and beverage companies in Vietnam and reported similar findings. Hussein (2020), in the Egyptian context, noted that SDA had a significantly negative effect on ROA, ROE, and

EPS, while LDA negatively impacted ROA but positively influenced ROE. Although these findings point to a negative effect of debt on performance, the present study adopts a non-directional hypothesis formulation in line with its exploratory objective.

H1: There is a significant relationship between TDA and ROA.

H2: There is a significant relationship between LDA and ROA.

H3: There is a significant relationship between SDA and ROA.

2.8.2 Moderating Effect of Economic Conditions

The market timing theory provides a foundation for understanding how economic conditions, such as GDP, can moderate the relationship between capital structure and firm performance. This theory suggests that firms time their financing decisions based on prevailing market conditions to optimize their capital structure.

Empirical studies by Curry and Fikri (2022), Khan et al. (2023b), and Julkid and Lau (2020) provide evidence of GDP's role in shaping capital structure decisions. Curry and Fikri (2022) found that higher GDP levels positively moderated the relationship between capital structure and financial performance. Although the other studies did not directly test moderation, they affirm GDP's influence on leverage decisions.

H4: The relationship between TDA and ROA is significantly moderated by GDP.

H5: The relationship between LDA and ROA is significantly moderated by GDP.

H6: The relationship between SDA and ROA is significantly moderated by GDP.

2.8.3 Moderating Effect of Monetary Policy

The pecking order theory provides a theoretical basis for understanding how monetary policy can moderate the relationship between capital structure and firm performance. This theory suggests that firms prefer internal financing, then debt, and finally equity.

Studies by Hussain et al. (2020), Saif-Alyousfi et al. (2020), and Julkid and Lau (2020) emphasize the role of interest rates in shaping capital structure decisions. Although these studies use general interest rates rather than OPR, the OPR's direct influence on borrowing costs makes it a suitable proxy in this study.

H7: The relationship between TDA and ROA is significantly moderated by OPR.

H8: The relationship between LDA and ROA is significantly moderated by OPR.

H9: The relationship between SDA and ROA is significantly moderated by OPR.

2.8.4 Moderating Effect of Market Volatility

Agency theory provides a framework for understanding how market volatility can moderate the relationship between capital structure and firm performance. This theory highlights the potential conflict between managers and shareholders, particularly in times of uncertainty.

Vuong et al. (2022) examined stock market volatility and its effect on capital structure in Chinese firms. They found that volatility had mixed effects on leverage components, prompting firms to adjust their debt structure based on perceived risks. Although few studies focus on volatility as a moderator in emerging markets, Vuong et al. (2022) offer a valuable foundation for this investigation.

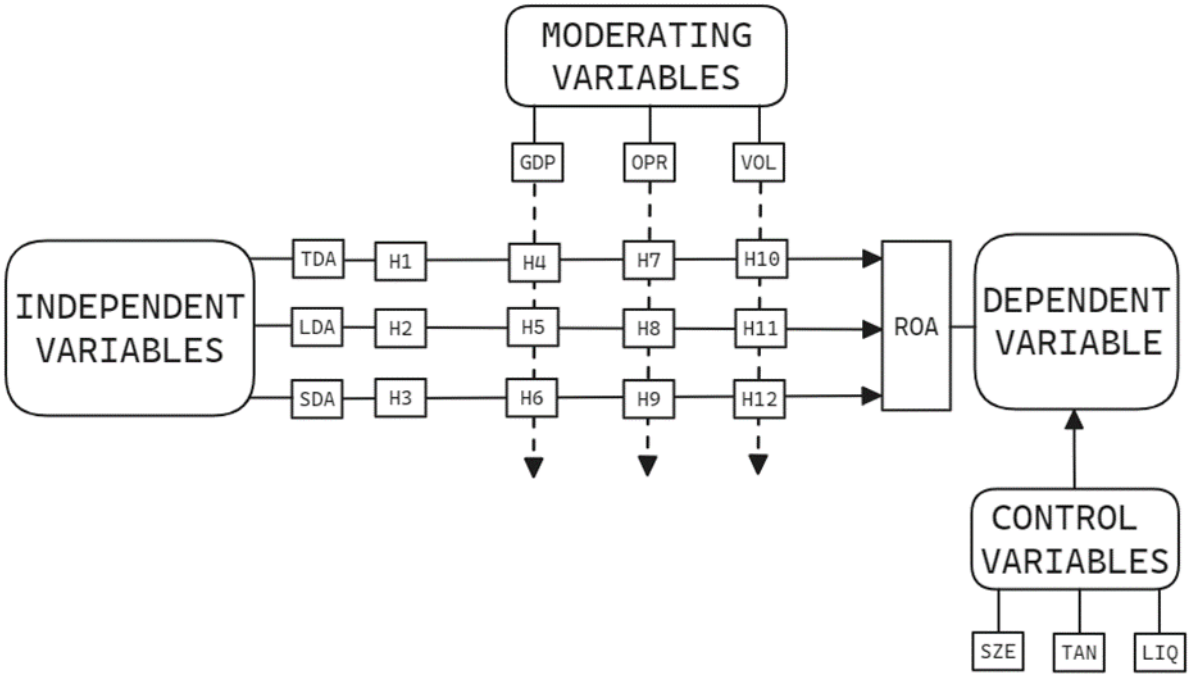
H10: The relationship between TDA and ROA is significantly moderated by VOL.

H11: The relationship between LDA and ROA is significantly moderated by VOL.

H12: The relationship between SDA and ROA is significantly moderated by VOL.

2.8.5 Hypotheses Model

The proposed hypotheses model in Figure 2.2 integrates the hypotheses to illustrate the relationship between capital structure and firm performance, along with the moderating effects of economic conditions, monetary policy changes, and stock market volatility on this relationship. This model provides a comprehensive framework for understanding how these external factors influence the capital structure decisions of Malaysian firms and their subsequent performance.



Note: Author (2025)

Figure 2.2: Proposed Hypotheses Model

The model indicates that TDA, LDA, and SDA affect ROA, with each of these relationships being influenced by the moderating variables GDP, OPR, and VOL. The control variables, including SZE, TAN, and LIQ, are included to account for other factors that might affect firm performance.

Arrows from independent to dependent variables illustrate the direct relationships between capital structure variables (TDA, LDA, and SDA) and firm performance measures (ROA). These arrows signify how changes in capital structure directly impact firm performance, representing hypotheses H1, H2, and H3.

Dashed arrows from the moderating variables indicate the moderating effects of external economic factors, namely GDP, OPR, and VOL. These dashed arrows highlight that the impact of TDA, LDA, and SDA on ROA is influenced by these moderating variables. For instance, the strength and direction of the relationship between capital structure and firm performance can be altered by economic conditions, changes in monetary policy, and market volatility.

The dashed arrows intersecting with the lines between independent and dependent variables depict the specific moderated relationships being tested. Each hypothesis (H4 to H12) shows how the independent variables' effects on the dependent variables are altered under different conditions of the moderating variables. This visual representation clarifies the comprehensive nature of the hypotheses being investigated.

The control variables block is positioned below the dependent variables, connecting directly to them. This indicates that factors such as SZE, TAN, and LIQ are accounted for in the analysis to isolate the effect of the independent variables on firm performance. Including

these control variables ensures that the study accurately measures the impact of capital structure decisions by controlling for other influences that might affect firm performance.

This framework allows for a detailed examination of how capital structure decisions impact firm performance, considering the influence of external economic factors and controlling for firm-specific attributes. It ensures a robust analysis by integrating both direct and moderated relationships, providing a thorough understanding of the dynamics between capital structure and firm performance in the context of Malaysian firms.

2.9 Chapter Summary

This chapter reviewed literature on the relationship between capital structure and firm performance, supporting the use of ROA as the key performance metric. It outlined the roles of TDA, LDA, and SDA as leverage proxies, and examined how GDP, OPR, and VOL moderate this relationship, each framed by relevant financial theories.

Theoretical foundations—including MM, trade-off, pecking order, agency, and market timing theories—were discussed to explain financing behaviour. Empirical findings from global and Malaysian studies reinforced the need to align capital structure with firm, sector, and economic contexts.

The chapter concluded with the development of a conceptual framework and hypotheses model to guide the empirical analysis, incorporating both direct and moderated effects, supported by control variables.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology used to investigate the relationship between capital structure and firm performance among Malaysian companies listed on Bursa Malaysia. It covers data collection methods, study design, selected variables, and the statistical techniques used to test the research hypotheses. The study employs a quantitative approach, utilizing secondary data from the Orbis financial database and company annual reports, enabling a detailed analysis of how different financial structures influence firm performance under varying economic conditions. The chapter begins with an outline of the research approach and data collection methods, followed by a discussion of the study's population, timeframe, and exclusion criteria to ensure dataset relevance. It then details the variables used, including independent, dependent, moderating, and control variables. The data analysis methods introduce the statistical techniques applied, including panel data regression models and diagnostic tests. Finally, the chapter discusses both static and dynamic model specifications

3.1 Research Approach

This study adopts a quantitative research approach, underpinned by secondary data drawn from Orbis financial databases and the annual reports of publicly listed firms in Malaysia. The use of quantitative methods is grounded in the need to objectively evaluate the relationship between capital structure and firm performance across a broad population, enabling generalizability and statistical precision.

The value of quantitative analysis in capital structure research is widely acknowledged in recent literature. Malik (2023) demonstrated how a robust quantitative framework allows researchers to dissect the intricate relationship between financing decisions and firm outcomes. His findings showed that firms achieve higher profitability and lower financial risk when they strike a strategic balance between debt and equity. This emphasizes how quantitative models are not only tools for measurement but also serve as decision-making guides for optimizing capital mix.

In support of this methodological stance, Brusov and Filatova (2023) provided a theoretical lens by tracing the evolution of capital structure theories—from the foundational Modigliani-Miller theorem to more contemporary frameworks like the Brusov–Filatova–Orekhova theory. Their work highlighted how these theories have been increasingly operationalized using quantitative techniques, making them more adaptable to real-world complexities. The ability to test and refine theoretical constructs using empirical data strengthens their relevance for current financial environments.

Complementing these theoretical and conceptual perspectives, Ayaz et al. (2021) offered empirical evidence specific to the Malaysian context. Their study, involving 528 non-financial firms listed on Bursa Malaysia from 2005 to 2016, employed fixed effects and two-step system-GMM models. The results revealed a nonlinear relationship between leverage and firm performance—performance improved with increased leverage up to an optimal point, after which it declined. This nonlinear pattern could only be identified through quantitative modelling, further affirming the method's capacity to uncover complex financial dynamics and inform practical financial strategy.

Taken together, these studies justify the adoption of a quantitative approach for this research. They show how statistical modelling enables a structured examination of capital structure decisions and their performance outcomes—particularly in capturing patterns that are not visible through qualitative analysis alone. By anchoring this research in established quantitative traditions, the study is positioned to deliver insights that are both theoretically grounded and practically useful.

3.2 Data Collection Methods

The study primarily relied on secondary data obtained from Orbis financial databases, complemented by the annual reports of Malaysian listed companies. These sources provided comprehensive and reliable financial data essential for analysing the relationship between capital structure and firm performance. Utilizing secondary data was advantageous for several reasons. Firstly, it ensured the availability of a vast amount of historical data, allowing for extensive analysis over a significant period. This was crucial for understanding trends and drawing robust conclusions. Additionally, secondary data from reputable databases like Orbis and annual reports were generally well-validated and standardized, ensuring consistency and reliability in the data collection process.

The decision to use secondary data aligned with the context of this study, as it involved analysing financial data from a large sample of companies over a decade. Primary data collection in this context would have been impractical due to the extensive time frame and the large number of companies involved. Moreover, secondary data sources have been widely used in previous studies within the same domain, ensuring comparability and enhancing the credibility of the research findings. For instance, Ayaz et al. (2021) utilized secondary data from Bursa Malaysia to examine the impact of capital structure on firm

performance, employing sophisticated econometric models to establish their findings. Similarly, Saif-Alyousfi et al. (2020) and Julkid and Lau (2020) relied on secondary data from databases like DataStream and the World Bank to explore the determinants of capital structure among Malaysian firms.

The use of secondary data also facilitated the application of advanced statistical and econometric techniques, such as panel data regression models, which required large datasets to produce reliable results. Given the study's aim to explore the moderating effects of macroeconomic and firm-specific factors on the relationship between capital structure and firm performance, secondary data provided the necessary breadth and depth of information to conduct such an analysis comprehensively.

The reliance on secondary data from Orbis financial databases and annual reports was justified based on the need for extensive, reliable, and validated financial information over a long period. This approach ensured the robustness and credibility of the research findings, in line with established practices in the field.

3.3 Population of the Study

The population of this study included all companies listed on the Main Market of Bursa Malaysia during the period from 2012 to 2022. This period was chosen to capture a broad range of economic conditions, enabling a comprehensive analysis of how different economic cycles, such as booms, recessions, and recoveries, influenced the capital structure and performance of firms in Malaysia. The study adopted a census approach, encompassing all non-financial firms, to ensure complete representativeness and avoid potential biases associated with sampling. Financial firms, which have unique regulatory environments and leverage dynamics, as well as firms with incomplete or inconsistent financial data, were

excluded to maintain a consistent and reliable dataset. Additionally, firms classified as PN17 (financial distress), and those listed on the ACE and LEAP Markets, were excluded to prevent anomalies in financial performance data and ensure that the analysis was relevant to the typical dynamics of non-financial firms.

3.3.1 Population and Census Design

This study adopts a census approach, covering all eligible non-financial firms listed on the Main Market of Bursa Malaysia from 2012 to 2022. The census method was selected to ensure full population coverage within a clearly defined scope, providing a reliable foundation for generalising findings across Malaysia's non-financial corporate sector. No sampling was employed; all firms meeting the inclusion criteria were analysed.

The scope of the study was shaped by both theoretical relevance and data consistency. Financial firms such as banks and insurance companies were excluded due to their distinct capital structures, regulatory frameworks, and business models, which are not directly comparable to those of non-financial firms. The capital structure theories adopted in this study—namely, the trade-off theory, pecking order theory, and agency theory—are more consistently applied to non-financial firms, where financing decisions and operating characteristics align more closely with theoretical assumptions.

To further ensure dataset reliability, firms classified as PN17 (indicating financial distress) were excluded, as distressed firms often exhibit abnormal financial behaviour, including extreme leverage, negative profitability, and irregular financial reporting. Firms involved in financial distress or bankruptcy proceedings were excluded to prevent anomalies in financial performance data. This decision is supported by Tarighi et al. (2022), who found that financially distressed companies tend to report lower-quality financial information,

often resorting to earnings manipulation to conceal their true condition from stakeholders. In parallel, Halim (2021) highlighted that financial distress compromises the integrity of financial statements, making such data unreliable for empirical analysis. PN17-designated firms, in particular, often display abnormal financial behaviour, including excessive leverage, persistent negative profitability, and asset liquidation, all of which can distort statistical relationships and bias results. Moreover, financial data for distressed firms is frequently incomplete or inconsistent, further weakening its utility for longitudinal analysis. By excluding these firms, the study maintains a focus on stable, ongoing businesses, thereby ensuring a more accurate and representative assessment of the relationship between capital structure and firm performance.

Firms listed on the ACE Market and LEAP Market were also excluded, as these entities typically represent smaller, younger, or higher-risk companies with different reporting requirements and financial structures compared to Main Market firms. In addition, firms with incomplete or inconsistent financial data across the study period were excluded to maintain the integrity of the panel dataset.

This approach is consistent with previous empirical studies. Ayaz et al. (2021) and Saif-Alyousfi et al. (2020) applied similar full-coverage designs within a well-defined set of non-financial firms in Malaysia, while international studies such as Abdullah and Tursoy (2021) and Krištofík and Medzihorský (2022) employed the same logic in their census-based analyses across Germany and the European Union, respectively.

By including all firms that meet clear and relevant criteria, the study constitutes a census of the defined population. This ensures comprehensive coverage, avoids sampling

bias, and enables consistent, theory-aligned analysis of capital structure and firm performance in the Malaysian context.

3.3.2 Time Frame

The study covers a period of eleven years, from 2012 to 2022, selected to provide a comprehensive and contextually rich longitudinal dataset for analysing the relationship between capital structure and firm performance in Malaysia. While a ten-year timeframe is commonly adopted in panel data research, the inclusion of 2022 is deliberate and justified. It captures the initial phase of post-COVID-19 recovery, which is critical for assessing how firms adjusted their financing structures following one of the most severe global economic disruptions in recent history. Excluding this year would omit important financial responses and capital restructuring efforts that emerged as firms resumed operations and adapted to the new economic environment.

The choice to begin the analysis in 2012, rather than 2013, is equally purposeful. The year 2012 represents the post-global financial crisis normalisation phase, during which firms began operating under more stable macroeconomic conditions. This year provides a necessary baseline for capturing firm behaviour prior to a decade marked by policy reforms, financial shocks, and political transitions. Removing 2012 would limit the analysis's ability to contrast firm performance and capital structure decisions during later periods of instability with an appropriate pre-shock reference point. By including both 2012 and 2022, the study spans a full cycle of economic stabilisation, disruption, and recovery, offering deeper insights into firm-level financial strategy under varying external conditions.

The selected time frame also aligns with established academic practices. Similar studies have employed periods exceeding ten years to examine structural changes and long-

term financial behaviours. For instance, Amin and Çek (2023) examined firms in France and the UK from 2002 to 2021, identifying an optimal capital structure ratio linked to superior performance. Abdullah and Tursoy (2021) analysed German non-financial firms over a 23-year period, revealing how regulatory changes and accounting reforms influenced the leverage-performance relationship. Toader et al. (2022) used panel data from 1996 to 2020 across Eastern European countries to evaluate macroeconomic and institutional impacts on capital structure. Even in the Malaysian context, Ayaz et al. (2021) studied 528 non-financial listed firms from 2005 to 2016, reinforcing the precedent for extended time horizons in this domain.

Moreover, the 2012–2022 period in Malaysia was marked by major economic and institutional events, making it highly suitable for a study on firm behaviour. Early years included post-GFC recovery, electoral reforms (Smeltzer and Paré, 2015), and legislative shifts like the Security Offences Act (Dhanapal and Sabaruddin, 2015). The introduction of the GST in 2015, followed by its abolition in 2018, reshaped corporate tax planning (Sanusi et al., 2015; Saidi and Harun, 2020). The 1MDB scandal (Jones, 2020), fluctuating oil prices (US EIA, 2016), and regime change in 2018 (Nadzri, 2018) added further uncertainty. Malaysia then faced severe economic contraction during the COVID-19 pandemic, combined with rapid political turnover, leading to a period of crisis management and later fiscal recovery (Amirah, 2022; Chin, 2023b). The 15th General Election in 2022, resulting in a hung parliament and the appointment of Anwar Ibrahim as Prime Minister, capped the decade with a renewed political structure (Chin, 2023a).

Together, these developments reflect a period of significant economic, policy, and institutional transitions. The selected timeframe ensures that the study captures how

Malaysian firms navigated shocks, adapted their financing strategies, and adjusted performance outcomes across diverse and dynamic conditions.

3.4 Variables and Measurement

This study focuses on examining the relationship between capital structure and firm performance, with an emphasis on how different economic factors might moderate this relationship. To achieve this, various variables were identified and measured, each grounded in established research practices. The independent variables in this study—TDA, LDA, and SDA—represent different aspects of capital structure. The dependent variable, ROA, was chosen to measure firm performance due to its widespread use and reliability in previous research. Additionally, the study considered the moderating effects of macroeconomic factors, including GDP growth rate, the OPR, and VOL, to explore how these factors might influence the relationship between capital structure and firm performance. Control variables, such as firm SZE, TAN, and LIQ, were included to account for firm-specific factors that could potentially affect the results. Each of these variables was carefully selected based on their significance in the literature and their relevance to the research objectives.

3.4.1 Dependent Variables

The dependent variable represented firm performance, measured by ROA. These performance metrics were calculated as follows:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}} \qquad \text{Equation 3.1}$$

This study adopts ROA as the sole proxy for firm performance. The choice to rely solely on ROA is both methodologically and empirically grounded, and is consistent with established practices in capital structure literature.

ROA offers a direct, internally focused measure of operating efficiency, capturing how effectively firms use their asset base to generate earnings. It is widely used in empirical research across various sectors in Malaysia, including the food processing (Sahari et al., 2019), technology (En and Malek, 2021), plantation (Foong et al., 2021), and property sectors (Tan et al., 2021). These studies demonstrate ROA's broad applicability and relevance in capturing firm-level performance responses to capital structure decisions.

In contrast to ROE, ROA is less susceptible to mechanical distortions caused by changes in financial leverage. Because ROE uses equity as the denominator, it can inflate performance measures simply through increased debt, making it less appropriate in studies examining the effect of capital structure itself. ROA, by incorporating total assets, provides a more neutral ground for evaluating firm performance, especially in studies assessing the financial consequences of debt.

Other metrics such as ROS, EPS, and Tobin's Q serve different analytical purposes. ROS focuses on operational margins but omits capital intensity. EPS is shareholder-focused and subject to accounting discretion and equity structure changes, making it volatile and sometimes inconsistent across firms. Tobin's Q, while valuable for capturing market-based perceptions of firm value, is influenced by investor sentiment and external factors unrelated to firm efficiency, such as speculative behaviour, governance variables, and macroeconomic shocks (Kramarić et al., 2021; Al-ahdal et al., 2023).

Recent literature supports the selection of ROA in studies examining firm resilience, internal resource allocation, and macroeconomic sensitivity. For example, Yu (2024) showed that ROA declined in firms lacking adaptive strategies during supply chain disruptions, while Anggraeni and Syarief (2024) found that inflation and non-performing loans had significant effects on ROA in Indonesian banks. These findings support ROA's role as both a profitability indicator and a reflection of firms' responses to external economic conditions—precisely the focus of this study, which includes macro-level moderators such as GDP growth, monetary policy shifts, and stock market volatility.

From a technical standpoint, ROA is also favourable for regression analysis due to its comparative stability, reduced volatility, and lower susceptibility to multicollinearity, particularly when capital structure ratios are among the independent variables. It has also proven suitable for machine learning–based forecasting, with Son and Duong (2024) achieving high predictive accuracy ($R^2 = 0.9762$) using ROA as the target variable in a random forest model, reinforcing its utility in data-driven financial modelling.

Given these theoretical, empirical, and methodological strengths, the selection of ROA as the single dependent variable in this study is purposeful and sufficient. While other metrics provide alternative dimensions of firm performance, their inclusion would not necessarily enhance the explanatory power of the model and may introduce confounding effects given the study's focus on capital structure. Thus, ROA provides a consistent, validated, and widely accepted basis for examining the relationship between capital structure and firm performance in the Malaysian context.

3.4.2 Independent Variables

The capital structure of a firm is often represented through debt-based financial ratios that quantify the extent and composition of a firm's leverage. In this study, capital structure is measured using three widely accepted ratios: TDA, LDA, and SDA, defined as follows:

$$\text{TDA} = \frac{\text{Total Debts}}{\text{Total Assets}} \qquad \text{Equation 3.2}$$

$$\text{LDA} = \frac{\text{Long Term Debts}}{\text{Total Assets}} \qquad \text{Equation 3.3}$$

$$\text{SDA} = \frac{\text{Short Term Debts}}{\text{Total Assets}} \qquad \text{Equation 3.4}$$

These three ratios have been consistently used in empirical research across sectors and time periods in Malaysia, reflecting their robustness in capturing the structure and implications of debt financing. Their use enables not only a comprehensive understanding of a firm's overall leverage position (TDA), but also the differential effects of long-term and short-term debt on performance (LDA and SDA respectively).

The relevance of these variables is supported by a broad body of Malaysian studies. For instance, Mohammad et al. (2019) and Mohammad and Bujang (2020) applied these ratios across sectors including construction, finance, and plantations. Their findings confirmed that disaggregating debt into long-term and short-term components reveals important differences in how each type of financing affects profitability measures such as ROA and ROE. Similarly, Zaidi et al. (2019), focusing on the consumer product industry, reported significant relationships between firm performance and both LDA and SDA, indicating that debt maturity structure plays a critical role in financial outcomes.

The utility of these ratios has also been tested across sector-specific studies. Ramlan et al. (2020), studying trading and services firms, and En and Malek (2021), focusing on the technology sector, both identified statistically significant links between TDA, LDA, and SDA and firm performance. These studies highlight how the nature of industry operations—capital intensity, asset turnover, and cash flow cycles—interact with debt maturity structure to influence firm outcomes.

In the plantation sector, Foong et al. (2021) demonstrated how asset-heavy operations amplify the importance of managing short-term and long-term debt judiciously. They found that high SDA ratios adversely impacted performance in firms with volatile revenues tied to commodity prices. Likewise, Tan et al. (2021) reported nuanced effects of debt in the property sector, where both LDA and SDA showed positive but statistically insignificant relationships with ROA—suggesting that sector-specific dynamics and project-based financing affect how debt influences returns.

Beyond sectoral studies, Salam and Shourkashti (2019) examined a wide sample of Malaysian non-financial firms over more than a decade. Their results showed a nonlinear (inverted U-shaped) relationship between capital structure and firm performance, reinforcing the need to distinguish debt by maturity. Their findings were particularly relevant in periods of economic stress, such as the global financial crisis, where short-term debt pressures and liquidity constraints had markedly different impacts compared to long-term debt obligations.

The recurring use of TDA, LDA, and SDA in Malaysian empirical literature reflects their methodological strength and conceptual clarity. These ratios provide a structured lens through which to observe how different layers of debt exposure affect firm profitability, particularly in dynamic environments subject to macroeconomic and monetary policy shifts.

Their inclusion in this study allows for continuity with prior research and supports rigorous comparative analysis.

Moreover, differentiating between short-term and long-term debt is essential in understanding how firms balance liquidity needs, cost of financing, and risk exposure. Short-term debt often reflects working capital needs and may signal operational agility or liquidity risk, while long-term debt typically finances fixed assets and strategic investments, potentially reflecting financial stability or rigidity.

The selection of TDA, LDA, and SDA as independent variables in this study is theoretically grounded, empirically validated, and methodologically consistent. These measures not only enable detailed examination of capital structure effects on firm performance but also position this study within the broader body of capital structure literature in Malaysia.

3.4.3 Moderating Variables

The study examined the moderating effects of macroeconomic factors on the relationship between capital structure and firm performance. The moderating variables were GDP, OPR, and VOL. GDP, OPR, and VOL were chosen as moderating variables due to their potential influence on capital structure and firm performance. Their inclusion in the study allowed for a comprehensive analysis of how economic conditions, monetary policy, and market volatility affect corporate financial decisions and outcomes in the Malaysian context.

3.4.3.1 Annual Gross Domestic Product Growth Rate (GDP)

Malaysia's annual GDP growth rate, representing the economic performance of Malaysia, was obtained from the World Bank. It was measured as the percentage increase or decrease in the country's economic output over a year. Curry and Fikri (2022) used GDP as a moderating variable in their study, measuring it as the GDP for the current year minus the GDP for the previous year, divided by GDP for the current year, and expressed as a percentage. This measurement aligned with the GDP growth rate obtained from the World Bank (2024). This metric provides a broad indication of economic health and growth trends, which are crucial for analysing their impact on capital structure and firm performance. Higher GDP growth often signals economic expansion, which can improve firm performance by increasing market opportunities and enhancing profitability. Curry and Fikri (2022) found that GDP moderated the effect of capital structure on financial performance. Julkid and Lau (2020) further substantiated this by demonstrating that GDP growth significantly affected capital structure decisions in Malaysian firms.

3.4.3.2 Overnight Policy Rate (OPR)

OPR, the benchmark interest rate set by BNM, was obtained from BNM and measured based on the actual value at the end of each year from 2012 to 2022 (31 December), expressed in percentage terms. OPR influences the cost of borrowing and economic activity in the country. It is a critical tool for monetary policy and has significant implications for the borrowing costs and financing decisions of firms. Hussain et al. (2020) and Ayala and Blazsek (2020) provided evidence that interest rates significantly influence firms' capital structures by affecting the cost of capital and investment risk. Higher interest rates typically increase borrowing costs, reducing the attractiveness of debt financing, while lower rates

have the opposite effect. Thus, OPR served as a vital moderator in understanding how monetary policy impacts the relationship between capital structure and firm performance.

3.4.3.2 Stock Market Volatility (VOL)

VOL, a measure of fluctuations in the stock market representing market risk and investor sentiment, was obtained using an Asymmetric GARCH model from the Volatility Laboratory of the NYU Stern Volatility and Risk Institute (2024), which produced the daily volatility of stock prices alongside their returns for firms listed on Bursa Malaysia. For this study, VOL was measured by the standard deviation of the annual standard deviation of daily stock volatilities of Bursa Malaysia from 2012 to 2022, indicating the degree of variation or uncertainty in the market. High volatility can increase the risk of equity financing and influence firms' reliance on debt. Vuong et al. (2022) examined the effects of stock market volatility on the capital structure of Chinese listed firms and found that stock market volatility has immediate positive effects on both total market leverage and short-term market leverage but a negative influence on long-term market leverage. The study suggested that in response to increased volatility, Chinese listed firms adjusted their debt structure by increasing their reliance on bank debts, which are perceived to be less costly, and reducing their use of trade credit. This adjustment aimed to manage the increased risks associated with volatile market conditions. The relationship between stock market volatility and capital structure decisions is critical, especially in emerging markets where market fluctuations can be more pronounced. Vuong et al. (2022) provided a framework for investigating the link between stock market volatility and capital structure decisions in a typical emerging market, making this study particularly significant.

3.4.4 Control Variables

The selection of control variables in this study was grounded in established literature and empirical evidence, which highlighted the significance of these variables in influencing firm performance. Specifically, the chosen control variables were SZE, TAN, and LIQ. These variables were instrumental in isolating the effects of capital structure on firm performance, ensuring that the model accounted for crucial firm-specific factors that could otherwise confound the results.

SZE, measured as the natural log of total assets (Ayaz et al., 2021), was included as a control variable due to its well-documented influence on firm performance. Larger firms typically have greater access to capital markets, can achieve economies of scale, and benefit from better diversification, which collectively enhance their performance. Ayaz et al. (2021) noted that larger firms tend to utilize higher levels of debt, which can improve their performance due to lower borrowing costs and reduced insolvency risk. Additionally, Foong et al. (2021) highlighted that larger firms possess stronger bargaining power, enabling them to secure more favourable credit terms from suppliers. Shaari and Kamarudin (2024) further supported the inclusion of firm size, emphasizing its impact on firm performance. Thus, firm size was included to account for its significant positive relationship with firm performance.

TAN, defined as the ratio of net fixed tangible assets to total assets (Ayaz et al., 2021), was another critical control variable. The proportion of tangible assets in a firm's asset base can significantly affect its ability to obtain financing and its overall performance. Firms with higher tangibility can use these assets as collateral to secure debt, potentially leading to higher leverage. However, empirical evidence, such as that presented by Ayaz et al. (2021), indicated that firms with excessive tangible assets may experience lower profitability

because such firms often hold fewer liquid assets and may invest less in innovative activities, which are crucial for long-term performance. Shaari and Kamarudin (2024) also included tangibility as a control variable, highlighting its relevance in examining firm performance. Therefore, tangibility was included to capture its potentially negative impact on firm performance, as corroborated by studies emphasizing the detrimental effects of over-investment in physical assets.

LIQ, measured by the ratio of current assets to current liabilities (Ayaz et al., 2021), was an essential control variable due to its dual role in firm performance. High liquidity ensures that a firm can meet its short-term obligations and invest in profitable projects without relying excessively on external financing. Ayaz et al. (2021) stated that liquidity can reduce agency problems by providing firms with the means to finance new investments or pay dividends. However, excessive liquidity can lead to overinvestment problems, which might adversely affect firm performance. This dichotomy was further elaborated by Salam and Shourkashti (2019), who acknowledged that liquidity's impact on performance can be both positive and negative. Shaari and Kamarudin (2024) reinforced the importance of including liquidity as a control variable, given its critical role in determining firm performance. Including liquidity as a control variable helped in understanding its complex relationship with firm performance, predicting a generally positive effect.

The selection of these control variables was thus justified by their proven significance in previous studies. Each variable captured a unique aspect of firm characteristics that can influence the relationship between capital structure and firm performance. By controlling for firm size, tangibility, and liquidity, this study aimed to provide a more accurate and comprehensive analysis of how capital structure impacts firm

performance in the context of Malaysian non-financial firms. The insights from Ayaz et al. (2021), Foong et al. (2021), Salam and Shourkashti (2019), and Shaari and Kamarudin (2024) collectively supported the inclusion of these variables, ensuring the robustness and validity of the research findings.

3.4.5 Summary of Variables and Measurement

Table 3.1 provides the specific calculations and data sources used for each variable, ensuring transparency and reproducibility in the research methodology.

Table 3.1: Summary of Variables and Measurement

Variables	Operational Definition	Measurement	Sources
Dependent variable:			
Return on Assets (ROA)	$\frac{\text{Net income}}{\text{Total assets}}$	Percent	Sahari et al. (2019); Salam and Shourkashti (2019); En and Malek (2021); Foong et al. (2021); Tan et al. (2021)
Independent variables:			
Total Debts to Assets (TDA)	$\frac{\text{Total debts}}{\text{Total assets}}$	Percent	Mohammad et al. (2019); Zaidi et al. (2019); Mohammad and Bujang (2020); Ramlan et al. (2020); En and Malek (2021); Foong et al. (2021); Tan et al. (2021); Salam and Shourkashti (2019)
Long-Term Debts to Assets (LDA)	$\frac{\text{Long-term debts}}{\text{Total assets}}$	Percent	
Short-Term Debts to Assets (SDA)	$\frac{\text{Short-term debts}}{\text{Total assets}}$	Percent	
Moderating variables:			
GDP Growth Rate (GDP)	$\frac{GDP_t - GDP_{t-1}}{GDP_t}$	Percent	GDP growth rate for Malaysia from 2012 to 2022 was obtained from World Bank (2024); Curry and Fikri (2022)
Overnight Policy Rate (OPR)	Value at the end of the year	Percent	Data was obtained from BNM website
Stock Market Volatility (VOL)	Annual σ of daily stock volatilities	Percent	Data was obtained using an Asymmetric GARCH model from the Volatility Laboratory of the NYU Stern Volatility and Risk Institute (2024)

Table 3.1 continued

Control variables:			
Firm Size (SZE)	Ln (Total assets)	Index	Ayaz et al. (2021)
Tangibility (TAN)	$\frac{\text{Tangible assets}}{\text{Total assets}}$	Percent	
Liquidity (LIQ)	$\frac{\text{Current assets}}{\text{Current liabilities}}$	Ratio	

Note: Author's compilation (2025)

3.5 Data Analysis Methods

Both static and dynamic panel data analyses were employed to capture key dynamics. Panel data analysis, incorporating cross-sectional and time-series dimensions, allowed for the examination of differences across firms over time. Descriptive analysis provided a preliminary understanding of the dataset, while multiple regression analysis assessed the impact of various factors on firm performance.

Econometric issues were addressed using static panel data models, including pooled OLS, RE, FE, GLS, and PCSE. Dynamic panel data analysis, employing GMM estimators, accounted for the potential persistence in firm performance. Stata 18 facilitated these analyses, ensuring a thorough examination of the relationship between capital structure and firm performance.

3.5.1 Panel Data

This study adopts a panel data framework, integrating both cross-sectional and time-series dimensions to examine how capital structure decisions influence firm performance over time. The panel structure allows the study to simultaneously assess variations between firms (cross-sectional differences) and within the same firms across years (temporal changes). This is particularly useful for controlling unobserved firm-specific effects that do

not vary over time but could bias the relationship between debt levels and performance. By accounting for these latent characteristics, panel data improves estimation accuracy and produces more reliable empirical results.

To reflect the practical realities of the Malaysian market, the study uses an unbalanced panel, which includes firms even if they lack complete data across the entire 2012–2022 period. This approach increases the number of usable observations and avoids excluding firms that may have temporarily halted reporting due to restructuring, listing delays, or financial distress. It also accommodates firms entering or exiting the market during the study window—an expected condition in dynamic economies. The flexibility of unbalanced panels makes them especially suitable for emerging markets, where full financial reporting consistency across long time spans is rare.

The literature widely supports this methodological choice. Toader et al. (2022) demonstrated the value of unbalanced panel data in capturing firm-level variation across different regulatory and economic transitions in developing countries. Their work showed that panel structures accommodating partial-year records enhance empirical richness without compromising reliability. Similarly, Khan et al. (2023b) used an unbalanced panel approach in their study of banks in the MENA region, affirming its practicality in contexts where firms face frequent operational or structural changes. Habibniya et al. (2022) also applied unbalanced panel data in a highly competitive industry, highlighting its advantage in managing data irregularities while preserving robustness in capital structure analysis.

Taken together, these studies highlight the importance of panel data not only as a statistical technique but also as a realistic and adaptive methodological framework. Its ability to capture both firm-specific patterns and macro-level transitions aligns well with this

study's objective of exploring capital structure impacts under Malaysia's shifting economic conditions from 2012 to 2022. The unbalanced panel approach also helps mitigate common issues in corporate finance research, such as survivorship bias and sample attrition, while enabling the inclusion of a more diverse and representative set of firms.

Therefore, panel data—particularly in its unbalanced form—offers the necessary structure to model complex financial relationships with greater empirical depth. It strengthens the reliability, inclusiveness, and relevance of the analysis, providing a solid foundation for investigating how capital structure interacts with firm performance across time and under varied economic influences.

3.5.2 Descriptive Analysis

The descriptive analysis provided a preliminary understanding of the dataset by summarizing and presenting the key characteristics of the variables involved in the study. The analysis included a thorough examination of the data's central tendencies, dispersion, and distributional properties. By highlighting these aspects, the analysis aimed to offer insights into the overall data structure and identify any potential anomalies or patterns that could influence subsequent analyses (Gujarati and Porter, 2009; Wooldridge, 2010).

The summary statistics included measures such as the mean, median, standard deviation, minimum, and maximum values for each variable. These statistics provided a concise overview of the central tendency and variability within the dataset. For instance, calculating the mean ROA helped determine the average performance level of the firms in the sample, while the standard deviation indicated the extent of variation in firm performance across the sample. Similarly, examining the mean and variability of debt ratios provided insights into the common capital structure practices among Malaysian firms during the study

period (Bryman and Cramer, 2011). Recent empirical research supports this approach: studies by Tanui (2021), Chirchir et al. (2024), and Deneke and Gujral (2021) emphasized the importance of descriptive statistics in understanding the interaction between asset structure, capital structure, and firm performance.

The Pearson correlation matrix was employed to examine the linear relationships between the variables. This matrix displayed the correlation coefficients, which ranged from -1 to 1, indicating the strength and direction of the relationship between pairs of variables. A coefficient close to 1 implied a strong positive relationship, whereas a coefficient close to -1 suggested a strong negative relationship. Correlation analysis helped in identifying multicollinearity issues among the independent variables, which was essential for ensuring the reliability of regression models (Brooks, 2019). This method has been widely applied in recent studies to assess the interdependence of financial indicators such as return on assets, capital structure ratios, and firm value (Liong and Uluputty, 2024; Malik, 2023; Nyaga and Deya, 2022).

3.5.3 Multiple Regression Analysis

This study employs multiple regression analysis as the primary method for evaluating the relationship between capital structure and firm performance. Multiple regression enables the simultaneous analysis of several independent variables—such as total debt, long-term debt, and short-term debt—against a dependent outcome variable, in this case, ROA. This method is particularly suited to complex financial environments where multiple factors interact and potentially influence firm performance.

The use of multiple regression is well supported in recent literature, especially for its ability to capture the multifaceted nature of capital structure decisions. Studies such as

Sunaryo and Lestari (2021) demonstrated how multiple regression could identify the impact of different leverage measures—like debt-to-asset and debt-to-equity ratios—on firm performance within the Southeast Asian food and beverage sector. Their findings confirmed that not all forms of leverage exert the same influence, highlighting the value of modelling multiple explanatory variables concurrently.

In addition to measuring direct effects, multiple regression also enables the identification of financial distress signals and risk exposures. For example, Rosi and Hasanuh (2020) applied this method to assess how ROA, leverage, and liquidity ratios contributed to financial distress predictions in Indonesian consumer firms. Similarly, Agustin et al. (2022) used multiple regression to analyse the performance of general insurance firms, showing how capital structure interacts with industry-specific financial indicators such as risk-based capital.

The versatility of multiple regression extends to sector-specific and ratio-based modelling, as seen in Mazanec's (2023) work on the transport industry, where the approach helped uncover debt pattern preferences based on operational indicators. Moreover, Paramita et al. (2021) applied the method to explore the influence of liquidity on capital structure across firms, further validating its adaptability to diverse research questions and financial constructs.

Importantly, multiple regression also supports the inclusion of moderating variables—an essential feature for this study, which examines macroeconomic conditions and monetary policy as moderators. Hastuti and Carolina (2022) exemplified this application by incorporating interest rates as a moderating factor in their regression model, showing how external conditions can alter the strength and direction of financial relationships.

Together, these studies illustrate the methodological strength and empirical flexibility of multiple regression analysis. Its capacity to estimate the net effect of each variable while controlling for the influence of others makes it ideal for studying capital structure, where variables often co-move and interact. By adopting this approach, the study ensures a rigorous and comprehensive framework for understanding how various forms of debt financing affect firm performance, both in isolation and within broader economic contexts.

3.5.4 Static Panel Data Analysis

This study applied static panel data analysis to assess how capital structure affects firm performance among Malaysian non-financial firms over time. Given the nature of the panel dataset—multiple firms observed across several years—various models were employed to account for unobserved heterogeneity, address endogeneity, and correct for potential econometric issues.

The pooled OLS model served as a baseline, treating the panel as a single cross-sectional dataset. The RE model allowed for firm-specific effects that are uncorrelated with the explanatory variables, while the FE model controlled for these effects by allowing correlation. The GLS model adjusted for heteroscedasticity and serial correlation, whereas the PCSE model corrected for both heteroscedasticity and contemporaneous correlation. The 2SLS model was introduced to address potential endogeneity by using valid instruments and performing staged regression analysis.

Each model was chosen based on its strength in addressing a particular econometric challenge, ensuring the robustness of the static analysis. Further methodological details and diagnostic test outcomes are discussed in Section 3.6.

3.5.5 Dynamic Panel Data Analysis

Dynamic panel data analysis was employed to capture temporal dimensions and potential inertia in firm performance. Dynamic panel data models were particularly useful when the dependent variable exhibited persistence over time, indicating that past performance influenced current performance. This was especially relevant in financial studies where a firm's current financial performance could be influenced by its historical performance. The dynamic nature of the data necessitated the use of lagged dependent variables as regressors, which introduced additional complexity and potential endogeneity issues.

To address these challenges, the GMM was employed. GMM estimators were designed to handle the dynamic panel data structure effectively by using internal instruments derived from the lagged values of the variables. This method helped mitigate the biases associated with endogeneity and provided consistent and efficient parameter estimates.

Two prominent GMM approaches were utilized. The diff-GMM, developed by Arellano and Bond (1991), used lagged levels of the variables as instruments for differenced equations, effectively addressing endogeneity and autocorrelation. The sys-GMM, developed by Arellano and Bover (1995) and Blundell and Bond (1998), improved upon diff-GMM by using both the differenced and level equations, providing more robust and efficient estimates.

The detailed methodologies and diagnostic tests for these dynamic panel data models are discussed in Section 3.7.

3.6 Static Panel Data Analysis

Static panel data methods were initially employed to evaluate the relationship between capital structure and firm performance. These methods allowed the study to incorporate both cross-sectional and time-series dimensions, accounting for unobserved firm-specific effects that may remain constant over time. The specific model selection and econometric strategies are elaborated in the following section.

3.6.1 Pooled Ordinary Least Squares (OLS)

Pooled OLS was used as a baseline regression method, combining all the data across time and entities and treating it as a single cross-sectional dataset. This method did not account for the panel structure of the data, meaning it assumed that individual-specific effects (firm-specific characteristics) and time effects (changes over time) were either non-existent or insignificant. Essentially, pooled OLS treated the data as if it were drawn from a simple random sample, ignoring any potential correlations within the same firm across different time periods.

While pooled OLS provided preliminary insights, it is often criticized for potentially yielding biased and inconsistent estimates due to its neglect of unobserved heterogeneity among firms and time periods. This unobserved heterogeneity could lead to omitted variable bias, particularly if firm-specific traits or time-specific events influenced the dependent variable. Differences in management quality, firm culture, industry-specific shocks, or macroeconomic conditions could all introduce bias if not properly controlled for (Baltagi, 2005; Wooldridge, 2010). This has been echoed in more recent research, where studies applying pooled OLS in panel contexts have found it insufficient compared to more robust

panel models like FE or RE, especially when firm-specific effects are present (Amin et al., 2021; Jeet and Aspal, 2021; Digar, 2023).

To mitigate these issues, diagnostic tests were conducted to assess the presence of individual-specific and time effects. If these effects were present, models such as the FE or RE models were considered more appropriate, as they could better account for the structure of panel data (Hsiao, 2003).

3.6.2 Random Effects (RE) Model

The RE model was used as a panel data estimation technique that accounts for individual-specific effects, assuming that these effects are randomly distributed across entities and are uncorrelated with the explanatory variables. Unlike the FE model, which controls for all time-invariant differences between entities, the RE model assumes that the variation across entities is random and can be incorporated into the error term.

The RE model was particularly suitable when the differences across entities (such as firms) were considered random and not correlated with the independent variables in the model. This approach allowed for the inclusion of time-invariant variables that were excluded in the FE model. When the assumptions of the RE model held true, it provided more efficient estimates than the FE model because it used both within-entity and between-entity variations (Baltagi, 2005; Wooldridge, 2010). This technique has remained relevant and has been applied in recent studies across diverse contexts, including firm valuation during crisis periods (Vintilă, 2024), earnings management analysis (Theiri et al., 2022), financial performance in banking (Medyawati and Yunanto, 2021), and board governance impacts (Marashdeh et al., 2021).

A key diagnostic test associated with the RE model was the Breusch-Pagan LM test. This test determined whether the RE model was more appropriate than the pooled OLS model by testing for the presence of random effects. If the test indicated that random effects were significant, the RE model was preferred over pooled OLS, as it accounted for the entity-specific random variation (Breusch and Pagan, 1980; Greene, 2012).

3.6.3 Fixed Effects (FE) Model

The FE model was used as a panel data estimation technique that controls for time-invariant characteristics of the entities (such as firms) by allowing individual-specific effects to be correlated with the explanatory variables. This approach effectively removed the bias caused by omitted variables that do not vary over time, making it particularly useful for addressing omitted variable bias due to unobserved heterogeneity. The FE model isolates the effect of variables that change over time within an entity, providing a clearer understanding of the relationship between the independent and dependent variables.

A key diagnostic test associated with the FE model was the F-test for fixed effects. This test compared the FE model to the pooled OLS model to determine whether the inclusion of fixed effects significantly improved the model fit. If the F-test indicated that fixed effects were significant, the FE model was preferred over pooled OLS, as it accounted for the individual-specific effects that could otherwise lead to biased estimates (Baltagi, 2005; Greene, 2012; Wooldridge, 2010). Recent research confirms the relevance and robustness of the FE model in financial performance analysis across diverse contexts. Studies have used the FE model to uncover non-linear relationships between debt structure and performance (Zeitun and Goaied, 2022), analyze ESG impacts (Dou and Yin, 2024), and study firm-specific factors influencing earnings management (Theiri et al., 2022).

3.6.4 Generalized Least Squares (GLS)

GLS was used as an advanced econometric technique to provide more reliable estimates in the presence of heteroscedasticity and serial correlation, which are common issues in panel data analysis. Unlike OLS, which assumes constant variance of errors (homoscedasticity) and no correlation between error terms (no autocorrelation), GLS accommodated these violations by transforming the data. This transformation ensured that the estimates were not only unbiased but also more efficient.

In panel data settings, where repeated observations of the same entities over time often led to heteroscedasticity and autocorrelation, GLS became particularly valuable. For instance, different firms may exhibit different levels of variance in their performance measures, or economic shocks might have lingering effects over time, causing serial correlation in the error terms. By addressing these issues, GLS helped produce more accurate coefficient estimates, leading to better statistical inference.

GLS operated by applying a weighting matrix to the data, which corrected for the non-constant variance and correlation structure. This resulted in more efficient estimates, making it superior to OLS when the classical assumptions were violated (Greene, 2012). The technique has been widely applied in recent studies analysing capital structure. For example, Sike et al. (2023) used GLS to assess the mixed effects of short- and long-term debt on firm performance across sectors in Nigeria, while Nguyen (2022) applied GLS to examine the bidirectional relationship between capital structure and stock price in Vietnamese firms.

3.6.5 Panel Corrected Standard Errors (PCSE)

The PCSE methodology was used to correct for contemporaneous correlation and heteroscedasticity across panels in panel data analysis. In situations where the error terms

were correlated across entities (such as firms) or exhibited varying levels of variance, traditional standard errors could be misleading, leading to incorrect statistical inferences.

PCSE addressed these issues by adjusting the standard errors, ensuring they were robust against the problems of contemporaneous correlation and heteroscedasticity. This adjustment was particularly crucial in panel data settings where ignoring these issues could result in underestimated standard errors, leading to inflated t-statistics and an increased likelihood of Type I errors (falsely rejecting the null hypothesis).

The PCSE methodology, introduced by Beck and Katz (1995), has become a standard approach in panel data analysis when researchers suspect or detect the presence of these problems. By providing more reliable standard errors, PCSE allowed for more accurate hypothesis testing, making it a valuable tool for empirical research in various fields, including economics, finance, and political science. Recent studies in the capital structure domain have reinforced the practical relevance of PCSE. For instance, Zidi and Hamdi (2024) applied PCSE to assess how capital structure affects bank performance in Tunisia, revealing a negative effect of equity ratios and a positive effect of debt on performance. Similarly, Sandow et al. (2021) found nuanced effects of regulatory capital requirements on bank performance in Ghana, highlighting a threshold beyond which the effect reverses. Uddin et al. (2022) also used PCSE to show how firm-specific factors like liquidity and asset structure influence capital structure choices in Bangladesh.

3.6.6 Two-Stage Least Squares (2SLS)

2SLS was employed as an econometric method designed to address the problem of endogeneity in regression analysis by using IVs. Endogeneity arises when an explanatory variable is correlated with the error term, leading to biased and inconsistent estimates in OLS

regression. This issue commonly occurs due to omitted variable bias, measurement errors, or reverse causality.

The 2SLS method proceeded in two stages. In the first stage, the potentially endogenous explanatory variables were regressed on the IVs. These instruments were chosen for their correlation with the endogenous variables but had to be uncorrelated with the error term in the main regression. The result of this stage was the predicted values (fitted values) of the endogenous variables, which were free from endogeneity bias. In the second stage, these predicted values from the first stage were used in place of the original endogenous variables in the main regression equation. This step ensured that the estimates of the coefficients in the regression were consistent and unbiased, provided that the instruments were valid.

To test for endogeneity, the Durbin-Wu-Hausman (DWH) test was commonly employed. This test compared the OLS estimates with the 2SLS estimates; if significant differences were found, it suggested the presence of endogeneity, thereby justifying the use of 2SLS.

Additionally, overidentification tests were conducted to validate the instruments used. These tests assessed whether the instruments were appropriately exogenous, meaning they were uncorrelated with the error term and thus valid for the model. If the instruments passed these tests, the results from 2SLS could be considered robust (Wooldridge, 2010).

Recent research in capital structure has applied 2SLS extensively. For instance, Balboula and Shemes (2025) used 2SLS to show that strong corporate governance mitigates the increase in leverage during financial distress. Singh et al. (2021) employed 2SLS to test the pecking order theory in Indian SMEs, finding strong support for non-debt tax shields and

profitability. In a broader review of endogeneity solutions in corporate finance, Selezneva and Evdokimova (2022) confirmed that 2SLS remains one of the most reliable methods to address endogeneity in estimating capital cost models.

3.6.7 Diagnostic Tests for Static Panel Data Analysis

Several diagnostic tests were conducted to rigorously validate the assumptions underlying the static panel data models. These tests were essential for ensuring the reliability and accuracy of the regression estimates by identifying and addressing potential issues such as multicollinearity, heteroscedasticity, serial correlation, and endogeneity. By systematically applying these diagnostic tests, the study aimed to detect and correct any violations of the classical regression assumptions, thereby enhancing the robustness of the results and ensuring that the models accurately reflected the underlying relationships between the variables. These tests were selected based on their relevance to the specific challenges commonly encountered in panel data analysis, allowing for a thorough evaluation of the model's performance.

3.6.7.1 Variance Inflation Factor (VIF)

VIF serves as a widely adopted diagnostic tool for detecting multicollinearity in regression analysis. Multicollinearity, a condition where explanatory variables are highly correlated, can severely undermine the precision of estimated coefficients by inflating their standard errors. This, in turn, hampers statistical inference and can lead to misleading conclusions (Kutner et al., 2004).

Conceptually, VIF quantifies the extent to which the variance of a regression coefficient is increased due to collinearity with other predictors. A VIF of 1 suggests no multicollinearity, while values exceeding commonly accepted thresholds (5 or 10) raise

concerns about collinearity problems. These thresholds, however, are not universally fixed, and recent literature has challenged their applicability in all contexts.

In response to the limitations of traditional VIF, recent advancements have proposed refined measures. Salmerón-Gómez et al. (2024) introduced the Redefined Variance Inflation Factor (RVIF), tailored to improve diagnostics particularly in models involving binary or categorical regressors. Meanwhile, Jacob and Varadharajan (2024) developed a Robust VIF that incorporates resistance to outliers, a common issue in large datasets that can distort standard collinearity metrics. Kalnins and Hill (2024) further argued that relying solely on conventional VIF thresholds may be inadequate, especially if the regression model suffers from misspecification, which can mask or exaggerate true multicollinearity effects.

Practically, when elevated VIF values are observed, researchers are prompted to examine the structure of their models more closely. Common remedial strategies include removing or consolidating correlated predictors, or applying regularisation techniques such as ridge regression or dimensionality reduction through principal component analysis. These methods not only mitigate collinearity but can also enhance model interpretability and robustness.

VIF remains a fundamental diagnostic measure, but its application must be context-sensitive, especially in light of recent methodological innovations and critiques. The integration of enhanced VIF variants allows for more reliable assessment of multicollinearity, ensuring greater validity in regression-based research.

3.6.7.2 Breusch-Pagan Lagrange Multiplier (LM) Test for Random Effects

The Breusch-Pagan LM test is a foundational diagnostic in panel data analysis, primarily used to assess whether the RE model provides a better fit than the pooled OLS model (Breusch and Pagan, 1980). It evaluates whether unobserved individual-specific effects exist and are randomly distributed across cross-sectional units—such as firms—by testing the null hypothesis that the variance of these random effects is zero. A significant test statistic implies that the pooled OLS model is inadequate, thereby justifying the use of the RE estimator.

In capital structure research, the LM test remains an essential tool for model specification. Its relevance is evident in a growing body of contemporary empirical studies. For instance, Khan and Rahman (2023) applied the LM test in their analysis of governance and capital structure decisions in Pakistani firms. The test guided their methodological decision to adopt the RE model over pooled OLS, strengthening the validity of their estimates. Likewise, Bustani et al. (2024) utilized the LM test in conjunction with the Hausman test to determine the appropriate model for examining leverage-profitability dynamics among low-carbon firms in Indonesia. Their dual-approach highlights the LM test's complementary role in comprehensive panel diagnostics.

Tubastuvi et al. (2023) also demonstrated the importance of the LM test in their study of capital structure's influence on firm value within Indonesia's emerging market. The detection of significant random effects supported their decision to employ RE estimation, aligning with best practices in handling firm-level heterogeneity. Similarly, Shrestha (2023) integrated the LM test when evaluating the link between working capital management and

firm profitability among publicly listed companies in Nepal, further validating the test's application across diverse corporate finance settings.

These recent studies reaffirm the continued utility of the Breusch-Pagan LM test in guiding empirical model selection. By identifying latent firm-specific variance components, the test ensures that regression models capture the true structure of the data, thus enhancing the credibility and robustness of econometric findings in capital structure analysis.

3.6.7.3 F-Test for Fixed Effects

The F-Test for Fixed Effects serves as a key diagnostic tool for determining whether the FE model provides a superior fit compared to the pooled OLS model in panel data analysis. As outlined by Baltagi (2005), the FE model accounts for unobserved, time-invariant characteristics unique to each entity—such as firm-specific managerial practices or regional economic conditions—that may correlate with explanatory variables. Ignoring these latent differences can lead to biased estimates.

The F-test operates by testing the null hypothesis that all individual-specific intercepts are equal—effectively assuming no fixed effects. A significant result implies that these effects matter and that the FE model captures critical heterogeneity overlooked by pooled OLS. In such cases, the FE framework is preferred, as it mitigates omitted variable bias arising from unobserved firm-level traits that remain constant over time.

Recent methodological contributions have expanded and refined the practical use of the F-test in applied research. Papke and Wooldridge (2022) introduced a robust variant of the F-test designed to maintain validity in the presence of heteroskedasticity and serial

correlation—common features in financial and economic panel data. Their approach enables more reliable inferences when classical assumptions are violated.

Building on the theme of enhancing model diagnostics, Spierdijk (2022) developed a regression-based Wald test to assess the internal consistency of the FE estimator. This test helps detect situations where the fixed effects assumptions may not hold, offering a more nuanced assessment than the traditional F-test. In parallel, Pigini et al. (2023) proposed a bootstrap-based version of the Hausman test tailored for models using grouped fixed effects, further improving specification testing in panels with structured unobserved heterogeneity.

These innovations highlight the evolving role of the F-test and fixed effects modelling in modern panel econometrics. Together, they emphasize the importance of rigorously testing for unobserved individual effects, particularly in contexts such as capital structure research, where firm-level idiosyncrasies are both persistent and influential. By applying these advanced testing techniques, researchers can ensure that their models are both statistically sound and substantively meaningful.

3.6.7.4 Hausman Test

The Hausman test is a cornerstone in panel data econometrics, designed to guide the choice between FE and RE models. Introduced by Hausman (1978), the test assesses whether the RE estimator, which assumes no correlation between the unobserved individual-specific effects and the regressors, is both consistent and efficient. If this assumption holds, the RE model is statistically preferred due to its use of both within- and between-entity variation, resulting in more efficient estimates.

However, the FE model becomes necessary when the individual-specific effects are correlated with the explanatory variables—a situation that violates the RE model's core assumption. The Hausman test operationalises this decision-making by comparing the coefficient estimates from the two models. A significant test statistic leads to the rejection of the RE model in favour of the FE model, as it suggests that the RE estimates are biased and inconsistent. This decision has far-reaching implications for the validity of the empirical results, especially in research contexts where firm-level or country-level heterogeneity may be systematically related to the regressors.

Building on the traditional framework, recent studies have advanced the application of the Hausman test to handle more complex data structures and real-world irregularities. Pigini et al. (2023) proposed a bootstrap-based Hausman test to detect model misspecification in grouped fixed-effects models. Their approach accommodates time-varying unobserved heterogeneity, which is particularly relevant in longitudinal studies involving clustered or hierarchical data structures.

Yang (2022) introduced a robust Hausman test suitable for models with multiple fixed effects, demonstrating its equivalence with the correlated random effects estimator. This refinement enhances the robustness of model selection in contexts where multiple sources of unobserved heterogeneity coexist—such as industry and time fixed effects in corporate finance studies.

Complementing these developments, Sani et al. (2024) formulated a Robust Hausman Test that accounts for both heteroscedasticity and the influence of outliers. Their method improves model selection accuracy by ensuring the test remains valid even when classical assumptions about error terms and data distribution are violated.

Collectively, these methodological innovations emphasize the evolving relevance of the Hausman test in empirical research. By addressing practical issues such as misspecification, multiple fixed effects, and data irregularities, modern variants of the test ensure more reliable identification of the appropriate econometric model—thus strengthening the credibility of findings in capital structure analysis and beyond.

3.6.7.5 Breusch-Pagan Test for Heteroscedasticity

In regression analysis, the presence of heteroscedasticity—where the variance of error terms varies across observations—violates the classical assumptions of OLS estimation. This can lead to inefficient coefficient estimates and unreliable statistical inference. The Breusch-Pagan test, introduced by Breusch and Pagan (1979), is a standard method for diagnosing this issue by testing the null hypothesis of homoscedasticity, i.e., constant variance of residuals.

In panel data settings, heteroscedasticity is especially prevalent due to the inherent variability across cross-sectional units such as firms or countries. When the Breusch-Pagan test yields a significant result, it indicates that residual variance is not constant, prompting the need for corrective strategies. These may include heteroscedasticity-robust standard errors, GLS, or Weighted Least Squares to restore the validity of inference.

Recent studies have both reaffirmed and expanded the utility of the Breusch-Pagan test, offering insights into its performance under diverse data environments. For instance, Akewugberu et al. (2024) conducted extensive simulation analyses across various heteroscedasticity patterns, revealing that the test performs more effectively when the error variance follows exponential or quadratic forms. Their findings emphasize the importance of understanding the nature of heteroscedasticity when interpreting test results.

Further methodological advancement came from Martín (2023), who developed a robustified version of the Breusch-Pagan test using the beta-score framework. This innovation enhances the test's reliability in datasets that feature outliers or non-identically distributed residuals—conditions that often compromise the performance of traditional diagnostics.

On the empirical front, Babeshko and Kharitonov (2024) applied the Breusch-Pagan test in a bilateral trade model between Russia and India, demonstrating its practical relevance in international economic studies. Upon detecting heteroscedasticity, they employed weighted least squares to correct for non-constant variance, thereby reinforcing the role of the test in guiding appropriate remedial measures.

Taken together, these recent contributions illustrate the enduring relevance of the Breusch-Pagan test in both methodological and applied contexts. Its ability to detect violations of homoscedasticity, combined with modern refinements and adaptive applications, makes it a vital tool for ensuring the robustness and reliability of regression-based research—especially in complex panel data models commonly used in capital structure and firm performance studies.

3.6.7.6 Modified Wald Test

The Modified Wald test plays a key role in panel data diagnostics by detecting group-wise heteroscedasticity, a condition in which the variance of error terms differs across cross-sectional units such as firms or countries. While this form of heteroscedasticity does not bias coefficient estimates, it compromises their efficiency and leads to unreliable standard errors, thereby weakening hypothesis testing and the overall credibility of regression results (Greene, 2012).

The test specifically evaluates the null hypothesis that the error variances are equal across entities—i.e., homoscedasticity. A statistically significant test result indicates a violation of this assumption, prompting researchers to adopt corrective strategies such as heteroscedasticity-robust standard errors or GLS estimation, both of which help restore statistical validity.

Recent empirical and methodological research has reinforced the Modified Wald test's importance, especially in panel data settings with inherent structural differences across entities. For instance, Özkul and Kasim (2021) applied the test to macroeconomic models examining stock market development across Asia-Pacific countries. Their findings of group-wise heteroscedasticity led to the adoption of GLS, showcasing the test's practical utility in guiding robust estimation procedures.

Extending its methodological reach, Cui et al. (2023) proposed an enhanced Wald-type test suited for large panel datasets with interactive effects. Their approach combines consistent variance estimation with flexibility to accommodate both slope homogeneity and heterogeneity, making it particularly useful in complex economic models involving firm-level or regional dynamics.

Complementing this line of work, Zhu (2021) introduced a novel adaptation of the Wald test within the framework of autoregressive models, addressing unknown forms of heteroscedasticity. By leveraging weighted least absolute deviations and random weighting methods for estimating the covariance structure, Zhu's approach adds robustness in time-dependent panel structures commonly observed in financial data.

These recent contributions highlight the evolving capabilities of the Modified Wald test in identifying heteroscedasticity across diverse model types and data configurations. Its

integration into panel data analysis remains critical, ensuring that regression estimates are both efficient and statistically defensible—particularly in research on firm performance, capital structure, and broader macroeconomic phenomena.

3.6.7.7 Inoue and Solo (2006) Lagrange Multiplier (LM) Tests for Serial Correlation

Serial correlation—where regression error terms are correlated across time within individual entities—is a common issue in panel data analysis, especially when dealing with longitudinal datasets involving repeated firm-level or country-level observations. Left unaddressed, serial correlation can lead to inefficient estimators and biased standard errors, ultimately undermining the validity of hypothesis testing and inference.

To diagnose this issue, the LM tests developed by Inoue and Solo (2006) offer a robust framework for detecting serial correlation in panel regression models. These tests evaluate the null hypothesis of no serial correlation in the error terms across time within each panel unit. A statistically significant test result signals the presence of autocorrelation, necessitating the use of robust estimation techniques such as GLS or autocorrelation-consistent standard errors.

As empirical applications of panel data have grown in complexity, recent research has introduced important refinements to the LM testing framework. Chen (2022) developed a nonparametric LM test that enhances robustness in the presence of weak cross-sectional dependence and heterogeneous serial correlation across entities. This approach is flexible, accommodating both fixed and random effects structures and suitable for both balanced and unbalanced panels—making it particularly valuable for real-world datasets with structural variation.

Expanding on this, Cui et al. (2023) proposed integrating a Panel Heteroskedasticity and Autocorrelation Consistent (PHAC) estimator into a generalized LM testing procedure. Their method accounts simultaneously for both serial correlation and heteroscedasticity, offering improved reliability in large panel datasets commonly used in macroeconomic and financial research.

Further methodological development was offered by Kapetanios et al. (2023), who introduced a specialized LM test designed to assess the conditional independence between regressors and factor loadings in panel models with interactive effects. This framework is applicable to both static and dynamic models and addresses challenges unique to panels that exhibit complex latent structures—such as those with unobserved common shocks or latent heterogeneity.

Together, these advances reflect the enduring relevance of LM-based diagnostics in econometric practice. As panel data models increasingly incorporate time-series dynamics, unobserved heterogeneity, and structural complexity, refined LM tests such as those developed by Inoue and Solo—and their modern extensions—remain essential tools for ensuring model validity and credible empirical conclusions in fields such as corporate finance, macroeconomics, and policy analysis.

3.6.7.8 Durbin-Wu-Hausman (DWH) Test

Endogeneity poses a significant threat to the validity of regression results, particularly in models where explanatory variables are potentially correlated with the error term. This correlation can arise from omitted variable bias, measurement error, or simultaneous causality, leading to biased and inconsistent OLS estimates. To detect and

address this problem, the DWH test is widely employed as a formal diagnostic (Wooldridge, 2010).

The DWH test compares OLS estimates to those generated by IV methods. Under the null hypothesis, the OLS estimator is assumed to be both consistent and efficient, indicating no endogeneity. A statistically significant test result leads to the rejection of this null, signalling that one or more regressors are endogenous and that IV estimation should be preferred for more reliable inference.

In recent years, researchers have expanded and refined the DWH framework to improve its robustness and relevance in applied settings. Kock (2022) applied the DWH test in the context of PLS-SEM using stochastic instrumental variables. His approach offered a practical solution for models involving latent endogenous constructs, such as those often encountered in behavioural finance or management research.

Addressing limitations under heteroskedasticity, Tchatoka (2021) proposed a hybrid bootstrap version of the DWH test that corrects for size distortions, enhancing accuracy in small and moderate samples. This adaptation is particularly relevant for applied economic studies where variance in the error terms can compromise traditional inference.

Demonstrating its practical utility in financial markets, Vuković et al. (2021) used the DWH test to assess the effects of currency shocks on municipal bond pricing, illustrating the test's effectiveness in identifying simultaneity and reinforcing the use of IV models in real-world financial datasets. Likewise, Clemens et al. (2021) applied the DWH test in the field of health economics, where IV techniques are commonly used to mitigate endogeneity in treatment-effect models. Their work highlighted the test's role in validating IV assumptions and improving policy-relevant inference.

Together, these advancements affirm the central importance of the DWH test in modern econometric practice. By systematically identifying endogeneity and confirming the appropriateness of IV estimation, the DWH test ensures that empirical models yield credible and consistent results—a critical requirement in both academic research and evidence-based policy or financial decision-making.

3.6.7.9 Tests of Overidentifying Restrictions

In IV estimation—especially in models such as 2SLS—it is essential to establish that the instruments used are both relevant and valid. Relevance refers to a strong correlation between instruments and the endogenous regressors, while validity requires that the instruments be uncorrelated with the error term. To assess the latter condition, tests of overidentifying restrictions are employed, ensuring the reliability of the IV estimation (Sargan, 1958; Hansen, 1982).

The Sargan test is one of the earliest methods used to verify instrument validity in overidentified models, testing whether the excluded instruments are uncorrelated with the residuals of the structural equation. However, it assumes homoscedastic errors. In contrast, the Hansen J test—also known as the robust Sargan test—relaxes this assumption, making it more appropriate in the presence of heteroskedasticity, which is often observed in cross-sectional and panel datasets.

While these tests are standard, their limitations have spurred a wave of recent methodological advancements. Kiviet and Kripfganz (2021) raised concerns about the power of the Sargan-Hansen test, particularly in settings with weak instruments, where the test may fail to detect violations of the exclusion restriction. This is a critical issue in empirical finance and economics, where weak instruments are common and can severely distort inference.

In response to such challenges, Fan et al. (2022) introduced a heteroskedasticity-robust overidentification test that performs reliably even in high-dimensional settings—specifically when the number of covariates and instruments exceeds the sample size. This innovation addresses the increasing complexity of modern datasets used in firm-level and macroeconomic research.

Expanding further, Shi et al. (2024) proposed a U-statistic-based test for overidentifying restrictions that maintains statistical power and robustness in models with many instruments and covariates. This approach is particularly useful when working with large panels or structural models involving latent variables.

Other researchers have tackled the issue of instrument selection in overidentified models. For example, Apfel and Liang (2021) developed a hierarchical clustering approach integrated with the Sargan-Hansen test to improve performance in models involving numerous—and potentially weak—instruments. This method aids in filtering out invalid instruments prior to estimation.

Additionally, Carrasco and Doukali (2021) introduced a regularized jackknife IV test, which enhances finite-sample properties in settings where both heteroskedasticity and many instruments are present. Their method improves the accuracy and stability of overidentification testing in smaller samples, a frequent constraint in firm-level studies.

These methodological developments emphasize the continued importance of robust overidentification tests in IV estimation. As empirical research increasingly relies on complex, high-dimensional data, rigorous instrument validation—supported by newer diagnostic techniques—remains essential to ensure credible and consistent estimates in models prone to endogeneity.

3.7 Dynamic Panel Data Analysis

Dynamic panel data analysis is an advanced econometric technique used to manage the complexities of panel data, where observations are repeated over time for the same units. This method is particularly useful for addressing issues such as autocorrelation, heteroscedasticity, endogeneity, and dynamic panel bias, which commonly arise in models involving lagged dependent variables. To address these issues, GMM estimators—specifically, diff-GMM and sys-GMM—were employed. These estimators enabled consistent and efficient estimates by using appropriate instruments to control for endogenous variables and mitigate dynamic panel bias.

3.7.1 Difference Generalized Method of Moments (Diff-GMM)

The diff-GMM estimator, developed by Arellano and Bond (1991), has become a cornerstone in the analysis of dynamic panel data models, particularly where concerns of endogeneity and dynamic panel bias are present. These issues commonly arise when lagged dependent variables are used as regressors, violating strict exogeneity assumptions. To address this, the diff-GMM framework transforms the model into first differences, effectively removing unobserved time-invariant fixed effects. It then uses lagged levels of the endogenous variables as instruments, preserving consistency in the presence of endogenous regressors.

The methodology was further expanded by Blundell and Bond (1998), who developed the sys-GMM estimator, combining equations in both levels and differences to improve efficiency. Additionally, Roodman (2009) offered implementation guidance, particularly addressing practical challenges such as instrument proliferation and specification testing in short panel contexts.

Diff-GMM estimators come in two forms: one-step and two-step. The one-step estimator assumes homoscedastic errors and uses a simpler weighting matrix, while the two-step version employs an efficient weighting matrix that accounts for heteroscedasticity and autocorrelation. However, the two-step estimator is known to produce downward-biased standard errors, especially in finite samples. To correct this, Windmeijer (2005) proposed a robust adjustment that improves inference by making standard errors more reliable.

This estimator is particularly well-suited to panels where the number of cross-sectional units (N) is large relative to the number of time periods (T). In such contexts, it helps mitigate biases stemming from omitted fixed effects and endogeneity. However, when T becomes moderate or large, or when N is small, the assumptions and performance of diff-GMM may weaken, requiring careful model diagnostics and potentially alternative estimators (Blundell and Bond, 1998; Roodman, 2009).

Recent studies have further refined the methodology to suit evolving empirical needs. Cheng and Bang (2021) emphasized the sensitivity of diff-GMM results to model specification, particularly in information systems research, and stressed the importance of transparency in robustness checks. Kruiniger (2021) addressed estimator limitations in non-mean-stationary environments, proposing a modified two-step GMM estimator that maintains consistency amid high heterogeneity—an issue frequently encountered in real-world economic data.

In response to challenges associated with high-dimensional instruments, Chernozhukov et al. (2024) introduced the Arellano-Bond LASSO estimator, which applies regularization and variable selection techniques to filter moment conditions. This approach

reduces the risk of overidentification bias, enhancing the stability of estimates in long panel settings.

Practical innovations have also kept pace. Wu et al. (2023) developed pydynpd, a Python-based package that facilitates dynamic panel estimation using diff-GMM. The package includes features such as Windmeijer-corrected standard errors, enhanced diagnostics, and flexibility for researchers operating outside of traditional software environments like Stata.

While the theoretical structure of diff-GMM remains solid, its practical application demands careful attention to specification, instrument validity, and sample dimensions. The method's evolution—through both methodological refinement and computational tools—ensures that it continues to offer a robust framework for examining causal relationships in economic, financial, and social science research, particularly in panels marked by dynamic behaviour and endogeneity.

3.7.2 System Generalized Method of Moments (Sys-GMM)

The System Generalized Method of Moments (sys-GMM) estimator, developed by Arellano and Bover (1995) and further refined by Blundell and Bond (1998), represents a methodological advancement over the traditional diff-GMM framework. While diff-GMM relies solely on the first-differenced equations and uses lagged levels as instruments, sys-GMM improves efficiency by estimating a system of equations—combining both the differenced and level equations simultaneously. In doing so, it introduces lagged first differences as instruments for the levels equation, thereby expanding the set of valid moment conditions and enhancing estimator reliability (Blundell and Bond, 1998; Roodman, 2009).

This dual-equation structure directly addresses a key limitation of diff-GMM: weak instruments, particularly in contexts where variables display high persistence over time. When lagged levels of endogenous variables provide insufficient explanatory power for their first differences, the validity of diff-GMM estimates may suffer. sys-GMM strengthens the identification process by drawing on additional moment conditions that are more informative, especially when dealing with short panels or slowly evolving economic variables (Bond, 2002).

As with diff-GMM, sys-GMM can be implemented using one-step or two-step estimators. The one-step variant uses a weighting matrix under the assumption of homoscedasticity. In contrast, the two-step estimator applies a more efficient, heteroskedasticity-consistent weighting matrix, yielding greater efficiency in large samples. However, the two-step variant is known to produce downward-biased standard errors, particularly in finite samples. To correct for this bias, Windmeijer (2005) introduced a finite-sample adjustment that provides more reliable standard errors and enhances inference accuracy.

Recent empirical work continues to validate the practical relevance of sys-GMM. Gunawan et al. (2023) employed the estimator in modelling Indonesia's economic growth, finding that sys-GMM outperformed the Arellano-Bond estimator in capturing the dynamics of development indicators over time. Aini et al. (2023) used sys-GMM in the analysis of pharmaceutical stock price movements in short time-series panel settings, demonstrating the method's robustness and efficiency in datasets with limited temporal depth. From a methodological standpoint, Blundell and Bond (2023) revisited the estimator's theoretical foundations, reaffirming its superiority in handling persistent series and initial condition bias, which are common challenges in macroeconomic and firm-level panel datasets.

Given its flexibility and robustness, sys-GMM has become a preferred estimator in empirical finance, macroeconomics, and corporate governance research, where endogeneity, autocorrelation, and unobserved heterogeneity frequently threaten model validity. Notably, sys-GMM is especially beneficial in applications where the number of time periods (T) is not small relative to the number of cross-sectional units (N)—a setting where diff-GMM may lose efficiency or consistency.

Sys-GMM represents a comprehensive and robust extension of the GMM framework. Its ability to draw on both level and differenced information, correct for endogeneity, and manage persistent unobserved heterogeneity makes it one of the most widely endorsed estimators for dynamic panel data models in contemporary applied economics.

3.7.3 Diagnostic Tests for Dynamic Panel Data Analysis

In dynamic panel data analysis, ensuring the validity and reliability of the model estimates is crucial. Diagnostic tests are essential for verifying the assumptions underlying the GMM estimators, particularly in addressing issues of serial correlation and the validity of the instruments used. The Arellano-Bond test for autocorrelation and the Sargan / Hansen test for overidentifying restrictions are two key diagnostic tools that assess the appropriateness of the model specification and the exogeneity of the instruments. These tests help ensure that dynamic panel data models provide consistent and efficient estimates, thereby reinforcing the robustness of the empirical findings.

3.7.3.1 Arellano-Bond Test for Autocorrelation

The Arellano-Bond test for autocorrelation is a fundamental diagnostic tool in the estimation of dynamic panel data models, especially those relying on GMM estimators such

as diff-GMM and sys-GMM. Introduced by Arellano and Bond (1991), the test examines whether the residuals of the first-differenced regression equation exhibit serial correlation, which has critical implications for the validity of the instrumental variables employed in the GMM framework.

The test is designed to verify the assumption of no serial correlation in the idiosyncratic errors, an essential condition for the internal validity of GMM estimators. It does so by testing the null hypothesis of no autocorrelation in the first-differenced residuals. Importantly, the presence of first-order autocorrelation (AR(1)) is expected and typically observed due to the construction of the first-difference transformation. However, the primary focus is on second-order autocorrelation (AR(2))—its detection would signal that the instruments are correlated with the error term, violating the exogeneity condition and rendering the GMM estimates inconsistent (Arellano and Bond, 1991; Roodman, 2009).

The test is applied sequentially in two stages; AR(1) is checked to confirm that the model behaves as theoretically expected post-differencing. Then, AR(2) is tested to validate the exogeneity of the instruments. A non-significant AR(2) result confirms that the instruments are likely valid and uncorrelated with the residuals.

This sequential structure is essential in GMM estimation workflows, ensuring that model specification is sound and that the moment conditions used are valid (Blundell and Bond, 1998; Bond, 2002). If AR(2) is present, researchers must reconsider their instrument strategy or re-specify the dynamic model to prevent erroneous inferences.

Recent developments and applications reinforce the enduring relevance of the Arellano-Bond test. Wu et al. (2023) incorporated the AR(1) and AR(2) diagnostics into the *pydynpd* Python package, enhancing the transparency and reproducibility of dynamic panel

estimation within computational environments. Their implementation supports Windmeijer-corrected standard errors and rigorous diagnostic output, facilitating better-informed model validation.

In terms of empirical awareness, Cheng and Bang (2021) stressed the importance of reporting and interpreting AR(2) test results correctly. They cautioned against mechanical application of GMM estimators without proper diagnostic verification, noting that overlooking AR(2) outcomes can lead to flawed policy implications, especially in fields like information systems and finance.

Illustrating its practical relevance, Gholizadeh (2021) employed the Arellano-Bond test in examining the relationship between energy consumption and economic growth across EU countries. The test was pivotal in validating the dynamic structure of the model, thereby strengthening the robustness of the economic conclusions drawn.

Arellano-Bond test is not merely a statistical formality but a crucial checkpoint in ensuring the credibility of dynamic panel model estimates. Its ability to detect problematic serial correlation, particularly at the second order, helps safeguard against instrument invalidity—making it indispensable for sound empirical research using GMM estimators.

3.7.3.2 Sargan / Hansen Test of Overidentifying Restrictions

In the context of GMM estimation—particularly in dynamic panel data models—the Sargan and Hansen tests of overidentifying restrictions serve as critical diagnostics for assessing instrument validity. Both tests examine whether the instruments used in the model are exogenous, that is, uncorrelated with the error term and correctly excluded from the structural equation.

The Sargan test, introduced by Sargan (1958), is traditionally associated with the one-step GMM estimator, which assumes homoscedasticity in the error terms. The test evaluates the null hypothesis that all instruments are valid. A non-rejection of the null supports the appropriateness of the instrument set, while a rejection suggests that at least some instruments may be correlated with the residuals, thus invalidating the moment conditions (Sargan, 1958; Hayashi, 2000).

To address limitations under heteroscedasticity, the Hansen test (also known as the J-statistic test) extends the Sargan framework. Developed by Hansen (1982), it is the preferred diagnostic in the two-step GMM estimation where heteroscedasticity and autocorrelation are likely present. The Hansen test maintains the same null hypothesis as the Sargan test—that the instruments are valid—but its robustness to heteroscedasticity makes it more suitable for real-world datasets that exhibit error variance inconsistencies (Roodman, 2009).

Both tests are particularly important in overidentified models, where the number of instruments exceeds the number of endogenous variables. In such settings, overidentification provides an opportunity to test instrument validity, but also raises the risk of instrument proliferation, which can weaken the power of the test or induce overfitting. A rejection of the null in the Hansen test may indicate either instrument invalidity or that too many instruments have diluted the diagnostic power of the model.

Recent methodological research has highlighted both the relevance and limitations of these tests. Kiviet and Kripfganz (2021) cautioned that the Sargan-Hansen tests may exhibit low power in small samples, potentially failing to reject invalid instruments and leading to false conclusions about instrument validity. Responding to this challenge, Chen

et al. (2023) and Leung et al. (2025) proposed enhanced versions of the tests suited for online and streaming GMM applications—contexts where real-time estimation and instrument updating are required.

Empirical studies across diverse fields continue to demonstrate the practical value of these tests. For instance, Masoud (2025) applied it in labour market analysis using dynamic panels, while Mulusew and Mingyong (2023) used both tests in examining food security determinants, highlighting their role in applied development research.

The Sargan and Hansen tests remain central to the integrity of GMM estimation. They offer a formal, transparent means to verify the exogeneity of instruments, ensuring that the estimated relationships are not distorted by invalid identifying assumptions. As panel data models grow in complexity and dimensionality, these diagnostic tools—alongside their modern extensions—continue to serve as the cornerstone of instrument validation in dynamic econometric research.

3.8 Model Specification

The model specification for this study is designed to examine the impact of capital structure on firm performance while accounting for the moderating effects of economic conditions, monetary policy, and stock market volatility. The analysis employs both static and dynamic panel data models to capture the complexities of the relationship. Both models are essential for understanding the complex interactions between capital structure decisions and external economic factors. The static model provides a clear, simplified view of the immediate effects, while the dynamic model introduces a temporal dimension, enhancing the analysis by reflecting the ongoing nature of firm performance adjustments. Together,

these models offer a comprehensive framework for examining how firm-specific decisions and broader economic environments interact to shape firm outcomes.

3.8.1 Static Model

The static model was designed to analyze the impact of capital structure on firm performance, considering the moderating effects of economic conditions, monetary policy, and stock market volatility. The model is based on the assumption that firm performance is influenced not only by the capital structure choices made by firms but also by the broader economic and financial environment in which they operate.

$$\text{Performance}_{it} = \beta_0 + \beta_1\text{Capital Structure}_{it} + \beta_2\text{GDP}_t + \beta_3(\text{GDP}_t \text{ x Capital Structure}_{it}) + \beta_4\text{OPR}_t + \beta_5(\text{OPR}_t \text{ x Capital Structure}_{it}) + \beta_6\text{VOL}_t + \beta_7(\text{VOL}_t \text{ x Capital Structure}_{it}) + \alpha X_{it} + \mu_i + \epsilon_{it} \quad \text{Equation 3.5}$$

In this model:

Performance_{it} represents the performance of firm i at time t, measured using ROA.

β_0 is the intercept term, representing the baseline level of firm performance when all other independent variables are equal to zero. It indicates the expected value of the dependent variable (Performance_{it}) in the absence of other factors.

$\beta_1\text{Capital Structure}_{it}$ is the coefficient for capital structure, with $\text{Capital Structure}_{it}$ representing the proportion of debt and equity used by firm i at time t. β_1 measures the effect of capital structure on firm performance, with a positive β_1 indicating that an increase in debt (or equity) relative to the other improves firm performance, and a negative β_1 suggesting the opposite. TDA, LDA, and SDA are used to represent capital structure in this study.

$\beta_2 GDP_t$ is the coefficient for economic conditions, indicated by Malaysia's annual GDP growth rate. GDPt represents the economic condition at time t, with β_2 measuring how changes in GDP affect firm performance. Higher GDP typically indicates better economic conditions, which can positively influence firm performance.

$\beta_3(GDP_t \text{ x Capital Structure}_{it})$ is the coefficient for the interaction term between economic conditions and capital structure. This term captures how the effect of capital structure on firm performance is moderated by economic conditions. A positive β_3 indicates that the beneficial impact of capital structure on performance is enhanced under better economic conditions.

$\beta_4 OPR_t$ is the coefficient for monetary policy, as indicated by the OPR set by BNM at time t. β_4 captures the impact of monetary policy on firm performance, where a higher OPR can indicate tighter monetary policy, potentially increasing borrowing costs and reducing firm performance.

$\beta_5(OPR_t \text{ x Capital Structure}_{it})$ is the coefficient for the interaction term between monetary policy and capital structure, capturing how the effect of capital structure on firm performance is moderated by monetary policy changes. A positive β_5 indicates that the beneficial impact of capital structure on performance is enhanced under favorable monetary policy conditions.

$\beta_6 VOL_t$ is the coefficient for stock market volatility, as indicated by Bursa Malaysia's annualized stock market volatility. VOLt measures the stock market's volatility at time t, with β_6 assessing how market uncertainty impacts firm performance. High volatility may increase risk and uncertainty, negatively affecting performance.

β_7(VOL$_t$ x Capital Structure$_{it}$) is the coefficient for the interaction term between stock market volatility and capital structure. This term captures how the effect of capital structure on firm performance is moderated by stock market volatility. A positive β_7 indicates that the beneficial impact of capital structure on performance is enhanced under lower market volatility.

αX_{it} represents the coefficients for control variables, including firm-specific factors such as firm size, tangibility, and liquidity. These controls account for additional factors that might affect performance, ensuring a more accurate estimation of the primary relationships.

μ_i represents the unobserved firm-specific effects, capturing individual characteristics of each firm that do not vary over time but still influence performance, such as management quality or corporate culture.

ϵ_{it} is the error term, capturing the random variability in firm performance that cannot be explained by the model, including all unobserved factors affecting performance.

Equation 3.5 is structured to capture both direct effects and interaction effects. The direct effects include the influence of capital structure, GDP growth, the OPR, and stock market volatility on firm performance. The interaction effects, represented by the terms involving GDP, OPR, and VOL with capital structure, are intended to explore how these broader economic factors might alter the impact of capital structure on performance.

This model is essential for understanding how firm-specific decisions, like the mix of debt and equity, interact with external economic conditions to shape firm outcomes. By incorporating both direct and interaction effects, the model provides a comprehensive

framework for analyzing how macroeconomic factors can moderate the relationship between capital structure and firm performance.

The inclusion of control variables, firm-specific effects, and an error term ensures that the model accounts for other potential influences on performance, allowing for a more precise estimation of the key relationships under study. The static nature of the model assumes that these relationships are stable over time, providing a baseline from which more dynamic analyses can be developed.

3.8.2 Dynamic Model

The dynamic model builds upon the static model by incorporating a critical element: the lagged performance of the firm. This addition acknowledges that firm performance is influenced not only by current factors but also by its past performance. By including the lagged performance term, the model captures the dynamic nature of firm performance, recognizing that past success or challenges can carry over into the present period.

$$\text{Performance}_{it} = \beta_0 + \beta_1\text{Capital Structure}_{it} + \beta_2\text{GDP}_t + \beta_3(\text{GDP}_t \text{ x Capital Structure}_{it}) + \beta_4\text{OPR}_t + \beta_5(\text{OPR}_t \text{ x Capital Structure}_{it}) + \beta_6\text{VOL}_t + \beta_7(\text{VOL}_t \text{ x Capital Structure}_{it}) + \beta_8\text{Performance}_{i,t\text{-}1} + \alpha X_{it} + \mu_i + \epsilon_{it} \quad \text{Equation 3.6}$$

The terms for the dynamic model are basically unchanged from the static model, except for the inclusion of lagged performance:

$\beta_8\text{Performance}_{i,t\text{-}1}$ is the coefficient for lagged performance. $\text{Performance}_{i,t\text{-}1}$ represents the lagged performance of firm i at time $t - 1$, capturing the dynamic nature of firm performance. Including this term helps control for persistence in performance, acknowledging that past performance can influence current performance.

The core structure of the dynamic model remains consistent with the static model, retaining the terms for capital structure, GDP, OPR, and VOL, along with their respective interaction terms. These variables continue to provide insights into how firm-specific decisions and broader economic factors influence firm performance. However, the introduction of the lagged performance term allows the model to account for performance persistence, meaning that if a firm performed well or poorly in the previous period, it is likely to affect its performance in the current period.

This dynamic approach is particularly relevant in scenarios where past performance creates momentum, influencing future outcomes. By including this lagged term, the model offers a more realistic representation of how firm performance evolves over time, making it a powerful tool for understanding the continuous process of firm growth or decline.

Incorporating the lagged performance also helps address potential issues of autocorrelation and endogeneity that might arise in a purely static model. The dynamic model, therefore, provides a more accurate estimation of the relationships under study, reflecting the temporal dependencies that are often present in real-world data.

This model's enhanced ability to capture the relationship between past and present performance, along with the moderating effects of external factors, makes it a valuable framework for examining the complexities of firm performance in a dynamic economic environment.

3.9 Chapter Summary

This chapter outlined the research methodology used to investigate the relationship between capital structure and firm performance among Malaysian non-financial firms listed

on Bursa Malaysia from 2012 to 2022. It detailed the quantitative approach, data collection from Orbis financial databases and company annual reports, and the selection of variables, including independent, dependent, moderating, and control variables. The chapter also explained the static and dynamic panel data analyses employed, supported by relevant diagnostic tests to ensure robustness and validity. The model specifications incorporated direct and interaction effects of capital structure, economic conditions, monetary policy, and stock market volatility on firm performance, with the dynamic model capturing the influence of past performance. This methodological foundation prepares for the subsequent presentation and analysis of empirical results.

CHAPTER 4

EMPIRICAL RESULTS

4.0 Introduction

This chapter presents the empirical results of the study. It begins by detailing the panel data structure and the steps taken to refine the dataset for accurate and relevant analysis. Descriptive analysis follows, providing a summary of the variables used in the study, offering key insights into their distribution and characteristics. The analysis proceeds with correlation and VIF analysis to examine relationships among variables and address potential multicollinearity issues. The chapter then presents results from various regression models, starting with pooled OLS as a baseline, followed by RE and FE models, each accompanied by diagnostic tests to determine their suitability. To address issues such as heteroscedasticity, autocorrelation, and endogeneity, analyses using GLS, PCSE, and 2SLS regressions are included. Recognizing the limitations of static models, the study also applies dynamic panel data techniques, specifically two-step diff-GMM and sys-GMM estimators, to enhance the robustness of the estimates. The findings across these different models are then discussed, comparing their results and exploring the implications for the relationship between capital structure and firm performance in the Malaysian context. The exploration of various models aims to identify the most appropriate method for this study, ensuring the validity and reliability of the empirical results. Once the most appropriate method has been selected, robustness checks will be performed to ensure the reliability of the results from the selected model.

4.1 Panel Data Structure

Out of 1,027 companies initially obtained from Orbis, exclusions were made based on specific criteria to ensure the dataset's consistency and relevance to the study's objectives. The detailed exclusion process is as follows.

First, 31 financial firms were excluded from the dataset, including banks, insurance companies, and other financial institutions. These firms were excluded because they operate under unique financial structures and regulatory environments, which are not directly comparable to non-financial firms. Their leverage dynamics and capital structure decisions are influenced by factors such as regulatory capital requirements and risk management practices specific to the financial sector. Including them could skew the analysis and complicate the application of capital structure theories that are more applicable to non-financial firms.

Second, 179 firms from the ACE market were excluded. The ACE market is designed for high-growth and emerging companies that often have different characteristics, financial structures, and risk profiles compared to more established firms in the Main Market. These firms are generally at an earlier stage of development, leading to variability in financial performance and capital structure that is not representative of more mature firms. Including ACE market firms could introduce significant variability and affect the generalizability of the study's findings.

Third, 49 firms from the LEAP market were excluded. The LEAP market caters to sophisticated investors and smaller companies, which typically have different financial behaviours and capital structures compared to Main Market firms. The regulatory and reporting requirements for LEAP market firms also differ, potentially leading to

inconsistencies in the data. Excluding these firms ensures that the dataset remains focused on firms with comparable financial structures and reporting standards.

Fourth, 42 firms classified as PN17 were excluded. PN17 classification is a financial distress indicator triggered by criteria such as low equity levels or the winding up of a subsidiary. Firms under financial distress often exhibit abnormal financial behaviour, such as high leverage, negative profitability, and asset liquidation, which can distort the overall analysis. Additionally, financial data for distressed firms may be incomplete or inconsistent, affecting the reliability of the study. Any firms classified as PN17 during 2012 to 2022 (based on the announcement from Bursa Malaysia during the period) were excluded. Excluding these firms ensures the dataset focuses on stable and ongoing firms, providing a clearer understanding of typical capital structure and performance relationships.

Fifth, two firms were excluded due to inconsistencies in their financial reporting. These two firms are essentially one firm that changed its name but maintained separate financial reports under each name when there should have been a single consolidated report. Such discrepancies can lead to data continuity and accuracy issues. Ensuring consistent and reliable financial reporting is crucial for the integrity of the dataset, and these firms were excluded to maintain data quality.

Sixth, four firms from non-traditional sectors were excluded. These sectors may have unique financial structures and operating environments that differ significantly from the majority of firms in the dataset. Including such firms could introduce heterogeneity that complicates the analysis of capital structure and firm performance. The specific non-traditional sectors excluded are Business Trust, Closed-End Fund, Exchange Traded Fund - Bond, and Exchange Traded Fund - Equity.

Seventh, one firm with incomplete financial data was excluded from the analysis. Specifically, the particular firm had no financial account data available from 2012 to 2022. Complete and continuous financial data are essential for a robust longitudinal analysis. Firms with missing data cannot be accurately analysed over the study period, and their inclusion could compromise the study's findings.

By applying these exclusion criteria, the panel data structure includes 719 distinct firms, each identified by a unique identifier (FIRM). The dataset spans 11 years, from 2012 to 2022, providing a comprehensive longitudinal analysis of each firm over this period. The delta (or time difference between observations) is consistently 1 year, indicating annual data collection for each firm. The span of the data is 11 years, reflecting the full period covered by the study. The dataset comprises a total of 7,516 observations across all firms and years.

The distribution of observations per firm (T_i) shows that the majority of firms, 551 out of 719, have complete data for all 11 years, as indicated by the pattern "11111111111." This represents 76.63% of the firms. However, the remaining firms, accounting for 23.37%, have incomplete data for some years, leading to various observation patterns. This variation in the number of observations per firm makes the panel data unbalanced.

The unbalanced nature of the panel arises because, in some cases, firms may not have reported data for every year within the study period due to reasons such as late listing on the stock exchange, delisting, mergers, acquisitions, or gaps in financial reporting. This is typical in empirical studies, reflecting real-world conditions where data availability may vary across firms and over time. Despite this, the panel remains robust and suitable for analysis, as it still provides a comprehensive view of the capital structure and performance dynamics across a significant number of firms and years.

This detailed distribution highlights the robustness of the panel data, with the majority of firms having consistent, full-year observations, ensuring reliable and comprehensive analysis. The inclusion of firms with varying lengths of data, as indicated by the other patterns, reflects the real-world challenges in data collection but does not significantly detract from the overall dataset's integrity.

The distribution of firms across various sectors is as follows: Construction (46 firms), Consumer Products and Services (161 firms), Energy (22 firms), Health Care (18 firms), Industrial Products and Services (213 firms), Plantation (41 firms), Property (97 firms), Real Estate Investment Trusts (17 firms), Technology (49 firms), Telecommunications and Media (15 firms), Transportation and Logistics (28 firms), and Utilities (12 firms). This sectoral distribution reflects the composition of the non-financial firms listed on Bursa Malaysia and provides the basis for analysing the relationship between capital structure and firm performance over the study period.

4.2 Descriptive Analysis

Table 4.1: Descriptive Analysis

Variable	Obs	Mean	Std. dev.	Min	Max
ROA	7,516	0.0331	0.1420	-2.1438	6.6751
TDA	7,516	0.1749	0.1535	0.0000	1.0041
LDA	7,516	0.0905	0.1149	0.0000	0.8237
SDA	7,516	0.0844	0.1016	0.0000	0.9832
GDP	7,516	0.0426	0.0340	-0.0546	0.0865
OPR	7,516	0.0281	0.0053	0.0175	0.0325
VOL	7,516	0.0308	0.0178	0.0100	0.0788
SZE	7,516	5.7350	0.6716	2.0569	8.3137
TAN	7,516	0.2902	0.2189	0.0000	0.9663
LIQ	7,516	3.6455	8.5645	0.0224	329.1174

Note: Author's computation using Stata 18.0

Table 4.1 provides a detailed overview of the distribution of the variables, revealing key insights into their characteristics. The summary statistics show that ROA has an average of 3.31% and a standard deviation of 14.2%, indicating significant variability in firm performance, with ROA ranging from -2.1438 to 6.6751. TDA has a mean of 17.49% and a standard deviation of 15.35%, highlighting that firms, on average, finance 17.49% of their assets through total debt. The variability in TDA is evident, as some firms have no debt, while others have their assets almost entirely financed by debt.

LDA averages 9.05%, with a standard deviation of 11.49%. This suggests that while some firms have no long-term debt, others have long-term debt comprising up to 82.37% of their assets. Similarly, SDA accounts for 8.44% of total assets on average, with a standard deviation of 10.16%, indicating that short-term debt levels also vary significantly among firms.

GDP in the dataset has an average of 4.26% and a standard deviation of 3.4%, with values ranging from -0.0546 to 0.0865, showing moderate economic growth with periods of contraction. OPR is relatively stable, averaging 2.81% with a small standard deviation of 0.53%, reflecting consistent monetary policy. VOL averages at 3.08%, with a standard deviation of 1.78%, indicating periods of higher volatility in the stock market.

SZE has a mean of 5.735 and a standard deviation of 0.6716, showing a diverse sample of firms in terms of size. TAN averages 29.02%, with a standard deviation of 21.89%, indicating considerable variability; some firms have no tangible assets, while others have up to 96.63%. LIQ has an average of 3.6455, suggesting that current assets are, on average, 3.6455 times current liabilities. The high standard deviation and maximum value indicate that some firms have extraordinarily high liquidity ratios.

Overall, the dataset includes a wide range of firm performances, debt levels, and sizes, with significant variation in both firm-specific factors and macroeconomic indicators. This variability necessitates robust statistical methods to analyse the relationships between these variables, accounting for heterogeneity and potential outliers.

4.3 Pearson Correlation Matrix Analysis

The Pearson correlation matrix analysis, shown in Table 4.2, provides insight into the linear relationships between the variables in the dataset, with significance levels indicated.

Table 4.2: Pearson Correlation Matrix Analysis

	ROA	TDA	LDA	SDA	GDP	OPR	VOL	SZE	TAN	LIQ
ROA	1.0000									
TDA	-0.1059 0.0000	1.0000								
LDA	-0.0491 0.0000	0.7494 0.0000	1.0000							
SDA	-0.1044 0.0000	0.6632 0.0000	0.0015 0.8960	1.0000						
GDP	0.0439 0.0001	-0.0163 0.1574	-0.0265 0.0218	0.0053 0.6476	1.0000					
OPR	0.0438 0.0001	-0.0075 0.5141	-0.0451 0.0001	0.0396 0.0006	0.6818 0.0000	1.0000				
VOL	-0.0421 0.0003	0.0135 0.2402	0.0284 0.0137	-0.0117 0.3116	-0.8136 0.0000	-0.5284 0.0000	1.0000			
SZE	0.0715 0.0000	0.3516 0.0000	0.4135 0.0000	0.0637 0.0000	-0.0137 0.2361	-0.0531 0.0000	0.0249 0.0310	1.0000		
TAN	-0.0437 0.0001	0.0778 0.0000	0.0429 0.0002	0.0690 0.0000	-0.0151 0.1906	-0.0020 0.8637	0.0102 0.3776	-0.0032 0.7837	1.0000	
LIQ	0.0717 0.0000	-0.2487 0.0000	-0.1534 0.0000	-0.2021 0.0000	-0.0121 0.2935	-0.0088 0.4440	0.0110 0.3388	-0.1130 0.0000	-0.0939 0.0000	1.0000

Note: Author's computation using Stata 18.0

ROA was found to have a negative correlation with TDA (r = -0.1059, p = 0.0000), LDA (r = -0.0491, p = 0.0000), and SDA (r = -0.1044, p = 0.0000), suggesting that higher levels of debt are associated with lower firm performance. While these correlations were significant, they indicated a weak to moderate inverse relationship between debt ratios and ROA. ROA is positively correlated with SZE (r = 0.0715, p = 0.0000) and LIQ (r = 0.0717, p = 0.0000), suggesting that larger firms and those with higher liquidity tend to perform better. There is also a slight positive correlation with GDP (r = 0.0439, p = 0.0001) and OPR (r = 0.0438, p = 0.0001), while a slight negative correlation is observed with VOL (r = -0.0421, p = 0.0003).

TDA shows a strong positive correlation with LDA (r = 0.7494, p = 0.0000) and SDA (r = 0.6632, p = 0.0000), reflecting the inherent relationship between total debt and its components. This high correlation indicates substantial multicollinearity among the debt ratios themselves, which can complicate regression analyses involving these variables. TDA has a moderate positive correlation with firm size (SZE) (r = 0.3516, p = 0.0000) and a negative correlation with liquidity (LIQ) (r = -0.2487, p = 0.0000).

LDA is moderately positively correlated with SZE (r = 0.4135, p = 0.0000) and negatively with LIQ (r = -0.1534, p = 0.0000). SDA shows weaker but positive correlations with SZE (r = 0.0637, p = 0.0000) and a negative correlation with LIQ (r = -0.2021, p = 0.0000).

GDP displays a significant positive correlation with OPR (r = 0.6818, p = 0.0000) and a strong negative correlation with VOL (r = -0.8136, p = 0.0000). OPR is also negatively correlated with VOL (r = -0.5284, p = 0.0000). These relationships suggest that higher GDP growth and policy rates are associated with lower market volatility. The macroeconomic

variables show strong correlations, indicating potential multicollinearity among these variables, which can affect the precision of the estimated coefficients in regression models.

VOL is positively correlated with SZE ($r = 0.0249$, $p = 0.0310$), suggesting that larger firms experience slightly higher volatility. There are weak but significant correlations between VOL and other variables, indicating its influence across the dataset.

SZE has weak correlations with tangible assets (TAN) ($r = -0.0032$, $p = 0.7837$) and a moderate negative correlation with LIQ ($r = -0.1130$, $p = 0.0000$). TAN has a weak negative correlation with LIQ ($r = -0.0939$, $p = 0.0000$).

The analysis reveals significant relationships among the variables, with ROA negatively correlated with debt ratios and positively correlated with firm size and liquidity. Debt ratios are closely interrelated and show moderate correlations with firm size and liquidity. Macroeconomic variables like GDP and OPR are significantly correlated with market volatility, indicating broader economic impacts on firm-specific variables.

However, attention is needed to address the multicollinearity issues among the debt ratios and macroeconomic variables. Addressing these multicollinearity issues is essential for ensuring the robustness and reliability of the regression analyses.

4.4 Variance Inflation Factor (VIF)

The VIF analysis was conducted to diagnose multicollinearity among the independent variables in the regression model. The VIF values and the regression results provided insights into potential collinearity issues and the overall model's performance. The initial analysis revealed an issue where LDA was omitted due to collinearity, which was expected since TDA is equal to LDA plus SDA. Specifically, TDA is a composite measure of LDA and SDA, introducing perfect collinearity among these variables.

Table 4.3: Initial VIF Analysis

Variable	VIF	1/VIF
GDP	4.01	0.2493
VOL	2.97	0.3364
TDA	2.19	0.4556
SDA	1.91	0.5239
OPR	1.89	0.5295
SZE	1.22	0.8200
LIQ	1.08	0.9282
TAN	1.01	0.9864
Mean VIF	2.04	

Notes: LDA omitted because of collinearity. Computation performed using Stata 18.0

Despite the acceptable VIF values shown in Table 4.3, the perfect collinearity between TDA and its components is not reflected in the VIF results but is evident in the omission of LDA. Therefore, TDA, LDA, and SDA were included in separate models and were not run together to avoid multicollinearity.

Table 4.4: Separate VIF Analysis for Each Model

TDA model			LDA model			SDA model		
Variable	VIF	1/VIF	Variable	VIF	1/VIF	Variable	VIF	1/VIF
GDP	4.01	0.2494	GDP	4.01	0.2496	GDP	4.01	0.2493
VOL	2.97	0.3365	VOL	2.97	0.3365	VOL	2.97	0.3364
OPR	1.88	0.5307	OPR	1.88	0.5309	OPR	1.89	0.5295
TDA	1.21	0.8278	LDA	1.23	0.8156	LIQ	1.06	0.9423
SZE	1.15	0.8700	SZE	1.21	0.8234	SDA	1.05	0.9520
LIQ	1.07	0.9314	LIQ	1.04	0.9652	SZE	1.02	0.9804
TAN	1.01	0.9865	TAN	1.01	0.9892	TAN	1.01	0.9880
Mean VIF	1.90		Mean VIF	1.91		Mean VIF	1.86	

Note: Author's computation using Stata 18.0

In these models, GDP had the highest VIF at 4.01 across all models, which is still below the commonly used threshold of 10, indicating that multicollinearity was not excessively high. TDA, LDA, and SDA had VIFs of 1.21, 1.23, and 1.05, respectively, suggesting low multicollinearity issues. The mean VIF values for all three models (1.90,

1.91, and 1.86) indicated that overall, multicollinearity was at an acceptable level. Given these results, each model avoided issues of perfect multicollinearity by including TDA, LDA, and SDA in separate models rather than together. This approach ensured the robustness and reliability of the regression analyses.

4.5 Pooled Ordinary Least Squares (OLS) Regression Analysis

The pooled OLS regression analysis is presented as the baseline for examining the relationship between the variables of interest. Pooled OLS provided an initial assessment of the impact of debt structures on firm performance, offering a straightforward approach by assuming homogeneity across firms and time. The results from this analysis served as a foundation for comparison with more advanced models.

The pooled OLS regression analysis in Table 4.5 across the TDA, LDA, and SDA models consistently revealed a significant negative relationship between debt levels and firm performance, as measured by ROA. Specifically, in the TDA model, the coefficient for TDA was -0.1257, significant at the 1% level (p-value = 0.000). In the LDA model, the coefficient for LDA was -0.1029, also significant at the 1% level (p-value = 0.000), and in the SDA model, the coefficient for SDA was -0.1343, significant at the 1% level (p-value = 0.000). These findings suggest that higher debt levels, regardless of term structure, are generally detrimental to firm performance.

Table 4.5: Results from Pooled OLS Regression

Variables	TDA model Coeff.	P>|t|		LDA model Coeff.	P>|t|		SDA model Coeff.	P>|t|	
TDA	-0.1257	0.000	***						
	(0.0116)								
LDA				-0.1029	0.000	***			
				(0.0157)					
SDA							-0.1343	0.000	***
							(0.0164)		
GDP	-0.0205	0.830		0.0055	0.954		-0.0127	0.895	
	(0.0952)			(0.0957)			(0.0957)		
GDP_TDA	0.1520	0.806							
	(0.6203)								
GDP_LDA				-0.4012	0.621				
				(0.8126)					
GDP_SDA							0.9610	0.326	
							(0.9777)		
OPR	1.0444	0.012	**	0.8940	0.034	**	1.0456	0.013	**
	(0.4180)			(0.4206)			(0.4213)		
OPR_TDA	-4.6984	0.084	*						
	(2.7227)								
OPR_LDA				-1.6150	0.646				
				(3.5209)					
OPR_SDA							-8.7695	0.048	**
							(4.4330)		
VOL	-0.2186	0.163		-0.1979	0.208		-0.2208	0.160	
	(0.1565)			(0.1573)			(0.1571)		
VOL_TDA	-0.2196	0.830							
	(1.0224)								
VOL_LDA				-0.6279	0.645				
				(1.3637)					
VOL_SDA							0.4406	0.779	
							(1.5668)		
SZE	0.0269	0.000	***	0.0245	0.000	***	0.0184	0.000	***
	(0.0026)			(0.0027)			(0.0024)		
TAN	-0.0184	0.013	**	-0.0216	0.004	***	-0.0200	0.007	***
	(0.0074)			(0.0075)			(0.0074)		
LIQ	0.0008	0.000	***	0.0012	0.000	***	0.0010	0.000	***
	(0.0002)			(0.0002)			(0.0002)		
_cons	-0.1190	0.000	***	-0.1056	0.000	***	-0.0698	0.000	***
	(0.0151)			(0.0156)			(0.0144)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the pooled OLS method, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

GDP did not exhibit a statistically significant relationship with ROA across all three models, with coefficients of -0.0205 (p-value = 0.830), 0.0055 (p-value = 0.954), and -0.0127 (p-value = 0.895) in the TDA, LDA, and SDA models, respectively. Additionally, the interaction terms between GDP and the respective debt measures (TDA, LDA, and SDA) were not statistically significant, indicating that GDP does not moderate the relationship between debt levels and firm performance.

On the other hand, OPR demonstrated a consistent positive relationship with ROA across the models. The coefficients for OPR were 1.0444 in the TDA model, significant at the 5% level (p-value = 0.012), 0.8940 in the LDA model, significant at the 5% level (p-value = 0.034), and 1.0456 in the SDA model, significant at the 5% level (p-value = 0.013). However, the interaction effects between OPR and the debt measures revealed that higher debt levels, particularly short-term debt, might diminish the positive impact of OPR on ROA. For example, the interaction between OPR and SDA had a coefficient of -8.7695, significant at the 5% level (p-value = 0.048).

VOL did not show a statistically significant direct relationship with ROA in any of the models, with coefficients of -0.2186 (p-value = 0.163), -0.1979 (p-value = 0.208), and -0.2208 (p-value = 0.160) for the TDA, LDA, and SDA models, respectively. Similarly, the interaction terms between VOL and the debt measures were not statistically significant, indicating that stock market volatility does not moderate the relationship between debt levels and firm performance.

Firm-specific factors such as SZE and LIQ positively influenced ROA across all models. The coefficients for SZE were 0.0269 (p-value = 0.000), 0.0245 (p-value = 0.000), and 0.0184 (p-value = 0.000), and for LIQ, the coefficients were 0.0008 (p-value = 0.000),

0.0012 (p-value = 0.000), and 0.0010 (p-value = 0.000) in the TDA, LDA, and SDA models, respectively. Conversely, tangible assets (TAN) consistently exhibited a significant negative relationship with ROA, with coefficients of -0.0184 (p-value = 0.013), -0.0216 (p-value = 0.004), and -0.0200 (p-value = 0.007) in the TDA, LDA, and SDA models, respectively.

The constant term was statistically significant and negative across all models, reflecting the underlying challenges or fixed costs that firms encounter, resulting in a negative baseline ROA when all other factors were controlled for.

Overall, the pooled OLS regression analyses highlighted the detrimental effects of high debt levels on firm performance, with the influence of OPR providing some positive offset, though moderated by the extent of firm indebtedness. Meanwhile, GDP and VOL did not appear to have significant direct or moderating effects on firm performance within these models. These results provide a baseline understanding of the relationships between debt structures, moderating variables, and firm performance, setting the stage for more sophisticated analyses.

4.6 Breusch and Pagan Lagrangian Multiplier (LM) Test for Random Effects

Table 4.6: Results from Breusch and Pagan LM Test for Random Effects

	TDA	LDA	SDA
chibar2(01) =	1,229.62	1,256.73	1,289.08
Prob > chibar2 =	0.0000	0.0000	0.0000

Note: Author's computation using Stata 18.0

The Breusch and Pagan LM test for random effects was conducted to determine whether an RE model was more appropriate than a simple pooled OLS regression model. The test evaluated whether there was significant variability across firms that could not be

captured by the pooled OLS model, indicating the need for a RE model to account for unobserved heterogeneity across entities.

For the TDA model, the test statistic was chibar2(01) = 1229.62, with a p-value of 0.0000. This result was significant at all conventional levels, indicating that the RE model was suitable for this analysis. The significant variability across firms suggested that the model should account for these differences, confirming the appropriateness of incorporating random effects.

Similarly, for the LDA model, the test statistic was chibar2(01) = 1256.73, with a p-value of 0.0000. This significant result also supported the use of the RE model, suggesting that firm-specific random effects were an essential component to consider due to the significant variability across firms.

For the SDA model, the test statistic was chibar2(01) = 1289.08, with a p-value of 0.0000. As with the other models, this significant result indicated that the RE model was appropriate, highlighting the presence of significant variability across firms that needed to be accounted for in the model.

Overall, the Breusch and Pagan LM tests for all three models—TDA, LDA, and SDA—showed significant test statistics, confirming that the RE model was more suitable than the pooled OLS model in each case.

4.6.1 Random Effects (RE) Model Regression Analysis

To further validate the findings, the data were analysed using the RE model. This approach accounted for individual-specific effects that vary across firms while assuming these effects are uncorrelated with the explanatory variables. By employing the RE model,

the robustness of the initial findings was assessed, providing deeper insights into the relationship between debt structure, firm performance, and other key variables. The Breusch and Pagan LM test was conducted to determine the appropriateness of the RE model over the pooled OLS model. The LM test assessed whether the variance across entities (firms) was significantly different from zero, indicating the necessity of using the RE model. A significant result from the Breusch and Pagan LM test suggested that the RE model was more suitable, as it captured the unobserved heterogeneity across firms that the pooled OLS model overlooks.

The RE model regression analysis shown in Table 4.7 revealed a consistent negative relationship between debt ratios and firm performance across all models. In the TDA model, the coefficient for TDA was -0.1378, significant at the 1% level, indicating that higher total debt relative to assets negatively impacts ROA. Similarly, in the LDA model, the coefficient for LDA was -0.0902, also significant at the 1% level, showing that higher long-term debt adversely affects firm performance. The SDA model further supported this, with a coefficient for SDA of -0.1640, significant at the 1% level, indicating that short-term debt has the most pronounced negative impact on ROA among the three debt ratios. This stronger negative effect of short-term debt can be attributed to significant liquidity risk, as short-term obligations require frequent repayment or rollover, which can strain cash flow and disrupt operations

GDP did not have a statistically significant impact on firm performance in any of the models. In the TDA model, the coefficient for GDP was -0.0339 with a p-value of 0.693, showing no significant relationship with ROA. The LDA model produced a GDP coefficient of -0.0053 with a p-value of 0.951, also indicating no significant effect. Similarly, in the SDA model, the coefficient for GDP was -0.0333 with a p-value of 0.700, suggesting that

GDP does not directly influence firm performance across the debt models, nor does it moderate the relationship between debt ratios and ROA.

OPR showed a significant positive relationship with firm performance in all models. The TDA model yielded a coefficient of 1.2394 for OPR, significant at the 1% level, suggesting that higher OPRs are associated with improved ROA. This positive relationship was also evident in the LDA model, where the coefficient for OPR was 1.0720, significant at the 1% level. The SDA model showed an even stronger positive relationship, with an OPR coefficient of 1.2690, also significant at the 1% level. However, in both the TDA and SDA models, the positive effect of OPR on ROA was moderated by high debt levels, as indicated by the interaction terms, which were significant at the 10% level.

VOL generally did not have a statistically significant impact on ROA across most models. In the TDA model, the coefficient for VOL was -0.2245 with a p-value of 0.112, showing no significant effect. The LDA model similarly showed no significant impact, with a VOL coefficient of -0.2035 and a p-value of 0.151. However, in the SDA model, VOL had a significant negative effect on ROA, with a coefficient of -0.2331 at the 10% significance level, indicating that increased stock market volatility adversely affects firm performance when short-term debt is considered. Despite this, the interaction terms for VOL with debt ratios were not significant across any of the models.

Table 4.7: Results from RE Regression

Variables	TDA model Coeff.	P>|t|		LDA model Coeff.	P>|t|		SDA model Coeff.	P>|t|	
TDA	-0.1378	0.000	***						
	(0.0151)								
LDA				-0.0902	0.000	***			
				(0.0196)					
SDA							-0.1640	0.000	***
							(0.0213)		
GDP	-0.0339	0.693		-0.0053	0.951		-0.0333	0.700	
	(0.0859)			(0.0863)			(0.0863)		
GDP_TDA	0.1548	0.784							
	(0.5638)								
GDP_LDA				-0.2537	0.731				
				(0.7390)					
GDP_SDA							0.5559	0.532	
							(0.8898)		
OPR	1.2394	0.001	***	1.0720	0.005	***	1.2690	0.001	***
	(0.3793)			(0.3811)			(0.3821)		
OPR_TDA	-4.3199	0.085	*						
	(2.5051)								
OPR_LDA				-1.7842	0.582				
				(3.2391)					
OPR_SDA							-6.7402	0.097	*
							(4.0661)		
VOL	-0.2245	0.112		-0.2035	0.151		-0.2331	0.099	*
	(0.1411)			(0.1417)			(0.1413)		
VOL_TDA	-0.1656	0.858							
	(0.9252)								
VOL_LDA				-0.1945	0.875				
				(1.2345)					
VOL_SDA							-0.1868	0.895	
							(1.4174)		
SZE	0.0277	0.000	***	0.0231	0.000	***	0.0184	0.000	***
	(0.0040)			(0.0040)			(0.0038)		
TAN	-0.0317	0.003	***	-0.0385	0.000	***	-0.0367	0.001	***
	(0.0107)			(0.0107)			(0.0107)		
LIQ	0.0006	0.005	***	0.0009	0.000	***	0.0007	0.002	***
	(0.0002)			(0.0002)			(0.0002)		
_cons	-0.1179	0.000	***	-0.0903	0.000	***	-0.0634	0.004	***
	(0.0233)			(0.0237)			(0.0223)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the RE model, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

VOL generally did not have a statistically significant impact on ROA across most models. In the TDA model, the coefficient for VOL was -0.2245 with a p-value of 0.112, showing no significant effect. The LDA model similarly showed no significant impact, with a VOL coefficient of -0.2035 and a p-value of 0.151. However, in the SDA model, VOL had a significant negative effect on ROA, with a coefficient of -0.2331 at the 10% significance level, indicating that increased stock market volatility adversely affects firm performance when short-term debt is considered. Despite this, the interaction terms for VOL with debt ratios were not significant across any of the models.

Firm-specific characteristics consistently influenced firm performance across all models. SZE positively affected ROA, with significant coefficients of 0.0277, 0.0231, and 0.0184 in the TDA, LDA, and SDA models, respectively, all at the 1% significance level. LIQ also showed a positive relationship with firm performance, with coefficients of 0.0006, 0.0009, and 0.0007, all significant at the 1% level in the respective models. Conversely, the proportion of TAN was negatively associated with ROA, with significant coefficients of -0.0317, -0.0385, and -0.0367 in the TDA, LDA, and SDA models, respectively, all at the 1% significance level.

The constant term in each model indicated a significant negative baseline level of ROA when all independent variables were zero. The constant coefficients were -0.1179 in the TDA model, -0.0903 in the LDA model, and -0.0634 in the SDA model, all significant at the 1% level. These results suggested that firms may face inherent challenges or fixed costs that negatively affect their performance even when other variables were controlled for.

Overall, the RE model regression analysis emphasized the detrimental impact of high debt levels on firm performance, with short-term debt having the most pronounced negative

effect. GDP did not significantly influence ROA, while higher OPRs generally improved firm performance, though this effect was moderated by high debt levels. Stock market volatility only negatively impacted firm performance in the short-term debt model. Larger, more liquid firms tended to perform better, whereas those with higher tangible assets faced reduced profitability. The significant negative constant terms across all models suggested underlying challenges that firms must address to improve their ROA.

4.7 F-Test for Fixed Effects

Table 4.8: Results from F-Test for Fixed Effects

	TDA	LDA	SDA
Test statistic Prob > F =	F(718, 6787) = 3.53 0.0000	F(718, 6787) = 3.56 0.0000	F(718, 6787) = 3.59 0.0000

Note: Author's computation using Stata 18.0

In the TDA model, the F-test for FE yielded a test statistic of F(718, 6787) = 3.53 with a p-value of 0.0000. This result was significant, indicating that the FE model was appropriate for this data. The significant test statistic suggested that there was considerable variability across firms that needed to be accounted for in the model, justifying the use of fixed effects.

Similarly, in the LDA model, the F-test for FE produced a test statistic of F(718, 6787) = 3.56 with a p-value of 0.0000. The significance of this result reinforced the need for an FE model, as it highlighted the presence of significant firm-specific variability that should not be ignored in the analysis.

For the SDA model, the F-test for FE returned a test statistic of F(718, 6787) = 3.59 with a p-value of 0.0000. Again, the significant result confirmed that the FE model was the

appropriate choice, indicating substantial variability across firms that had to be included in the model.

Overall, the F-tests for fixed effects across all three models—TDA, LDA, and SDA—demonstrated that the FE model was necessary to account for significant firm-specific variability, ensuring that the regression analysis accurately captured the effects of interest.

4.7.1 Fixed Effects (FE) Model Regression Analysis

The next phase of the analysis employed the FE model, which allowed for a deeper exploration of the relationships identified in the RE model by controlling for unobserved, time-invariant characteristics within the firms. The FE model was particularly valuable in isolating the impact of variables that vary over time, providing a clearer understanding of how changes in debt levels, macroeconomic factors, and firm-specific characteristics influence firm performance. By focusing on within-firm variation, the FE model helped ensure that the results were not biased by omitted variables that are constant over time, offering a more robust and reliable assessment of the determinants of firm performance. To determine the appropriateness of using the FE model, an F-test for fixed effects was conducted for each of the models which shows that the FE model is more suitable than the pooled OLS regression model.

The FE model regressions for TDA, LDA, and SDA in Table 4.9 consistently revealed significant negative relationships between debt ratios and firm performance, as measured by ROA. Specifically, TDA, LDA, and SDA had coefficients of -0.1562, -0.0754, and -0.1999, respectively, all significant at the 1% level, highlighting that higher levels of debt, whether total, long-term, or short-term, are associated with reduced firm profitability.

Table 4.9: Results from FE Regression

Variables	TDA model Coeff.	P>|t|	LDA model Coeff.	P>|t|	SDA model Coeff.	P>|t|
TDA	-0.1562	0.000 ***				
	(0.0205)					
LDA			-0.0754	0.003 ***		
			(0.0250)			
SDA					-0.1999	0.000 ***
					(0.0285)	
GDP	-0.0708	0.415	-0.0371	0.671	-0.0758	0.385
	(0.0869)		(0.0872)		(0.0873)	
GDP_TDA	0.1760	0.756				
	(0.5654)					
GDP_LDA			-0.1360	0.854		
			(0.7410)			
GDP_SDA					0.3084	0.730
					(0.8931)	
OPR	1.5566	0.000 ***	1.3433	0.001 ***	1.6033	0.000 ***
	(0.3930)		(0.3940)		(0.3961)	
OPR_TDA	-4.3768	0.083 *				
	(2.5285)					
OPR_LDA			-2.2261	0.496		
			(3.2679)			
OPR_SDA					-5.6709	0.166
					(4.0980)	
VOL	-0.2510	0.076 *	-0.2261	0.112	-0.2642	0.062 *
	(0.1416)		(0.1421)		(0.1418)	
VOL_TDA	-0.1202	0.897				
	(0.9256)					
VOL_LDA			0.0413	0.973		
			(1.2351)			
VOL_SDA					-0.5000	0.724
					(1.4181)	
SZE	0.0397	0.000 ***	0.0303	0.001 ***	0.0285	0.001 ***
	(0.0089)		(0.0090)		(0.0087)	
TAN	-0.0673	0.000 ***	-0.0855	0.000 ***	-0.0812	0.000 ***
	(0.0176)		(0.0175)		(0.0173)	
LIQ	0.0003	0.244	0.0005	0.104	0.0003	0.303
	(0.0003)		(0.0003)		(0.0003)	
_cons	-0.1761	0.001 ***	-0.1178	0.023 **	-0.1080	0.033 **
	(0.0519)		(0.0520)		(0.0506)	

Notes: The table presents the results from three separate multiple regression analyses estimated using the FE model, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

Regarding the moderating role of GDP, the analysis showed that GDP did not significantly affect firm performance across the models, with coefficients of -0.0708 (TDA), -0.0371 (LDA), and -0.0758 (SDA), all statistically insignificant. Moreover, the interaction terms between GDP and the debt ratios (GDP_TDA, GDP_LDA, GDP_SDA) were also not significant, indicating that GDP does not moderate the relationship between debt and firm performance.

In contrast, the OPR exhibited a robust positive effect on firm performance, with coefficients of 1.5566 (TDA), 1.3433 (LDA), and 1.6033 (SDA), all significant at the 1% level. This suggested that higher policy rates are beneficial for firm profitability. However, the interaction terms (OPR_TDA, OPR_LDA, OPR_SDA) showed varying results; while the interaction was significant and negative in the TDA model at the 10% level, it was insignificant in the LDA and SDA models. This implies that the positive impact of OPR on ROA may be reduced by higher debt levels, particularly in the context of total debt.

The mixed results of the interaction terms between OPR and the debt ratios suggest that the moderating effect of monetary policy varies by debt composition. The negative and significant interaction in the TDA model indicates that higher total debt reduces the positive impact of OPR on firm performance, likely due to increased interest costs or financial strain during periods of tighter monetary policy. In contrast, the insignificant interactions in the LDA and SDA models imply that long-term and short-term debts individually do not significantly alter the OPR-performance relationship, possibly because of fixed interest structures or effective short-term liquidity management.

VOL demonstrated a consistent negative relationship with firm performance, with coefficients of -0.2510 (TDA), -0.2261 (LDA), and -0.2642 (SDA), though significance was

only reached at the 10% level for TDA and SDA. The interaction terms between VOL and the debt ratios (VOL_TDA, VOL_LDA, VOL_SDA) were not statistically significant, indicating that VOL does not significantly moderate the debt-performance relationship.

Firm-specific factors also played a crucial role in influencing performance. SZE showed a positive and significant relationship with ROA across all models, suggesting that larger firms benefit from economies of scale and greater operational capabilities. On the other hand, TAN was negatively associated with ROA, with significant coefficients in all models, implying that firms with higher tangible assets may face reduced flexibility and profitability. LIQ, however, did not show a significant impact on ROA in any of the models.

The constant terms were negative and significant across all models, indicating that the baseline ROA was negative when all independent variables were zero, which might reflect underlying challenges or fixed costs inherent to the firms.

Overall, the FE model results indicated that higher debt levels adversely affect firm performance, while OPR positively influences ROA, with its effect being partially moderated by total debt. GDP and VOL did not show significant direct or moderating effects. Firm size positively correlates with better performance, while higher tangibility is associated with lower profitability.

4.8 Hausman Test

The Hausman test was employed to ascertain the appropriateness of the FE model versus the RE model. The null hypothesis of the Hausman test suggests that the RE model is preferred, while the alternative hypothesis suggests that the FE model is more suitable.

Table 4.10: Results from Hausman Test

	TDA	LDA	SDA
chi2(10) =	121.27	612.87	278.43
Prob > chi2 =	0.0000	0.0000	0.0000

Note: Author's computation using Stata 18.0

For the model comparison involving TDA, the Hausman test result indicated a chi-square value of 121.27 with a corresponding p-value of 0.0000. This result suggests a rejection of the null hypothesis, implying that the FE model is more appropriate for this dataset.

Similarly, the model comparison for LDA yielded a chi-square value of 612.87, with a p-value of 0.0000. This significant result again favoured the FE model over the RE model, indicating systematic differences between the models' coefficients.

The comparison for the SDA model also showed a significant chi-square value of 278.43 and a p-value of 0.0000. As with the previous models, this result supported the selection of the FE model.

The consistent rejection of the null hypothesis across all three models (TDA, LDA, and SDA) highlighted the systematic differences in the coefficients between the FE and RE models. Therefore, it was concluded that the FE model is more appropriate for analysing the relationship between capital structure—specifically TDA, LDA, and SDA—and firm performance (measured by ROA). This conclusion was based on the need to account for significant individual-specific effects within the dataset.

4.9 Addressing Heteroscedasticity and Autocorrelation

While the FE model was determined to be more appropriate for analysing the relationship between capital structure and firm performance, as indicated by the Hausman test and F-tests, addressing potential issues such as heteroscedasticity and autocorrelation was essential to ensure the robustness of the regression analysis. Although the FE model was the preferred choice, it did not inherently resolve these potential issues, which could compromise the validity of the results if left unaddressed.

To detect and correct these issues, several diagnostic tests were conducted. The Breusch-Pagan test for heteroscedasticity was employed to identify the presence of heteroscedasticity in the error terms, which can bias the standard errors and undermine the reliability of the regression results. In addition, the Modified Wald test for groupwise heteroscedasticity was applied to detect heteroscedasticity across different groups in the panel data. Addressing groupwise heteroscedasticity was critical to ensure that the model appropriately accounted for varying error variances across different firms, thereby preventing inefficient estimates.

To address potential autocorrelation, the Inoue and Solo (2006) LM tests for Autocorrelation were performed. These tests were designed to detect autocorrelation in the panel data, which, if present, could lead to biased coefficient estimates and unreliable standard errors. Correcting for autocorrelation was necessary to maintain the accuracy and efficiency of the regression analysis.

4.9.1 Breusch-Pagan Test for Heteroscedasticity

The Breusch-Pagan test examines the null hypothesis that the variance of the residuals is constant, indicating homoscedasticity. A significant chi-square value in this test suggests the presence of heteroscedasticity, thereby rejecting the null hypothesis.

Table 4.11: Results from Breusch-Pagan Test for Heteroscedasticity

	TDA	LDA	SDA
chi2(1) =	1392.55	1063.78	1269.99
Prob > chi2 =	0.0000	0.0000	0.0000

Note: Author's computation using Stata 18.0

For the model incorporating TDA, the test statistic yielded a chi-square value of 1392.55 with a p-value of 0.0000. This result led to the rejection of the null hypothesis, providing strong evidence of heteroscedasticity.

Similarly, the model with LDA produced a chi-square value of 1063.78 and a p-value of 0.0000. The null hypothesis was again rejected, confirming the presence of heteroscedasticity.

Lastly, the model incorporating SDA presented a chi-square value of 1269.99 with a p-value of 0.0000. This result also indicated significant heteroscedasticity.

The outcomes from the Breusch-Pagan tests across all three models—TDA, LDA, and SDA—revealed a clear violation of the homoscedasticity assumption. The presence of significant heteroscedasticity suggested that the variance of the residuals varied across observations, contravening one of the essential assumptions underpinning the classical linear regression model.

4.9.2 Modified Wald Test for Groupwise Heteroskedasticity

The Modified Wald test for groupwise heteroskedasticity was employed to detect heteroskedasticity within an FE regression model. The test assessed the null hypothesis that the variance of the residuals remains constant across all groups, implying homoscedasticity.

Table 4.12: Results from Modified Wald Test for Groupwise Heteroskedasticity

	TDA	LDA	SDA
chi2 (719) =	1.10E+07	1.80E+07	8.10E+06
Prob > chi2 =	0.0000	0.0000	0.0000

Note: Author's computation using Stata 18.0

In the model incorporating TDA, the test statistic produced a chi-square value of 1.1e+07 with a p-value of 0.0000, leading to the rejection of the null hypothesis and indicating significant groupwise heteroskedasticity.

Similarly, the model with LDA resulted in a chi-square value of 1.8e+07 with a p-value of 0.0000. The null hypothesis was again rejected, confirming the presence of groupwise heteroskedasticity.

In the model that included SDA, the test statistic showed a chi-square value of 8.1e+06 with a p-value of 0.0000. This outcome also indicated significant groupwise heteroskedasticity.

The findings from the Modified Wald tests across all three models—TDA, LDA, and SDA—demonstrated a clear violation of the homoscedasticity assumption. The significant heteroskedasticity detected implied that the variance of the residuals varied across groups, which contradicts one of the fundamental assumptions of the fixed effects regression model.

The results from both the Breusch-Pagan test and the Modified Wald test consistently confirmed the presence of heteroskedasticity in the data, highlighting the need to address this issue in the regression analysis. The Breusch-Pagan test detects general heteroskedasticity in regression models, while the Modified Wald test is specifically tailored for fixed effects panel data to identify groupwise heteroskedasticity—i.e., variation in error variance across entities. The outcomes of both tests justified the application of robust standard errors to ensure valid statistical inference.

4.9.3 Inoue and Solo (2006) Lagrange Multiplier (LM) Tests for Autocorrelation

The Inoue and Solo (2006) LM test was utilized to detect autocorrelation in panel data. This test examined the null hypothesis that there is no autocorrelation of any order, against the alternative hypothesis that autocorrelation exists up to the specified order.

Table 4.13: Results from Inoue and Solo (2006) LM Test for Autocorrelation

	TDA	LDA	SDA
IS-stat	93.98	90.70	94.85
p-value	0.000	0.000	0.000

Note: Author's computation using Stata 18.0

In the model involving TDA, the test statistic yielded an IS-stat value of 93.98 with a p-value of 0.000, leading to the rejection of the null hypothesis. This result indicated significant evidence of autocorrelation up to order 2.

Similarly, in the model with LDA, the IS-stat value was 90.70 with a p-value of 0.000, resulting in the rejection of the null hypothesis and confirming the presence of autocorrelation up to order 2.

For the model incorporating SDA, the IS-stat value was 94.85 with a p-value of 0.000, which also led to the rejection of the null hypothesis, indicating significant autocorrelation up to order 2.

The results from the Inoue and Solo (2006) LM tests across all three models—TDA, LDA, and SDA—highlighted the presence of significant autocorrelation. This finding suggested that the residuals were correlated across time, which violates the assumption of no autocorrelation in the regression models. The results from the test emphasized the need for adjustments to the regression models to account for this issue.

4.9.4 Corrective Measures and Advanced Estimation Techniques

To address the identified issues of heteroskedasticity and autocorrelation, the FE model was re-estimated using robust and clustered standard errors. This correction was essential as it adjusted for heteroskedasticity and autocorrelation within clusters, ensuring that the standard errors were reliable and that the statistical inferences drawn from the model remained valid. The use of robust and clustered standard errors in the FE model specifically targeted the within-firm variations over time, addressing potential violations of the classical regression assumptions within these clusters. This approach was particularly appropriate in panel data settings, where repeated observations over time could lead to autocorrelation and heteroskedasticity, which could otherwise bias the results.

In addition to the FE model with robust and clustered standard errors, GLS was employed to further address heteroskedasticity and autocorrelation simultaneously. GLS modified the estimation process by transforming the data, ensuring that the coefficient estimates remained both unbiased and efficient. Unlike the FE model, which corrected standard errors after estimation, GLS accounted for these issues during the estimation

process, potentially leading to more precise estimates. This technique was especially relevant in panel data analysis where error variances may differ across entities, and residuals may be correlated over time, as indicated by the diagnostic tests.

PCSE was also utilized to correct for potential across-panel correlation. This method was particularly relevant in the presence of macroeconomic variables like GDP, OPR, and VOL, which may introduce contemporaneous correlation across firms. Macroeconomic factors could cause residuals for different firms to be correlated within the same time period due to shared external shocks or common economic conditions. By applying PCSE, the analysis accounted for such cross-sectional dependencies, ensuring that the results were not biased by unaddressed across-panel correlation. This step was crucial for maintaining the accuracy and reliability of the findings, particularly when analysing the impact of broad economic indicators that affect all firms within the dataset simultaneously.

Together, these corrective measures and advanced estimation techniques provided a comprehensive approach to addressing the statistical challenges posed by heteroskedasticity, autocorrelation, and potential cross-sectional dependence in the data. By employing a combination of robust and clustered standard errors, GLS, and PCSE, the analysis ensured that the estimates of the relationships between capital structure and firm performance were both accurate and reliable, forming a solid foundation for the study's conclusions.

4.10 FE Model Regression Analysis with Robust and Clustered Standard Errors

The results of the FE model regression analysis, utilizing robust and clustered standard errors, address potential heteroskedasticity and within-cluster correlation in the panel data. The analysis of the relationship between debt ratios and firm performance across all models revealed consistent patterns. In the TDA model, TDA had a significant negative

impact on firm performance, with a coefficient of -0.1562 and a p-value of 0.000, indicating significance at the 1% level. This finding suggests that higher leverage reduces profitability. Similarly, the LDA model showed a significant negative relationship for LDA, with a coefficient of -0.0754 and a p-value of 0.005, also significant at the 1% level. The SDA model demonstrated a significant negative impact for SDA, with a coefficient of -0.1999 and a p-value of 0.000, again significant at the 1% level. These results consistently indicate that higher leverage, whether long-term or short-term, is detrimental to firm performance at a high level of significance.

GDP did not exhibit a statistically significant impact on firm performance in any of the models. In the TDA model, the coefficient for GDP was -0.0708 with a p-value of 0.398; in the LDA model, the coefficient was -0.0371 with a p-value of 0.666; and in the SDA model, the coefficient was -0.0758 with a p-value of 0.353. The interaction terms between GDP and the debt ratios also lacked significance, indicating that GDP did not significantly moderate the relationship between capital structure and firm performance in these models.

OPR had a significant positive impact on firm performance across all models. In the TDA model, the OPR coefficient was 1.5566 with a p-value of 0.001, significant at the 1% level. In the LDA model, it was 1.3433 with a p-value of 0.004, also significant at the 1% level. In the SDA model, it was 1.6033 with a p-value of 0.000, significant at the 1% level. These results suggest that firms may perform better under stricter monetary policies. However, the interaction terms between OPR and the debt ratios showed mixed results. In the TDA model, the interaction term was marginally significant at the 10% level, with a coefficient of -4.3768 and a p-value of 0.073, suggesting that higher interest rates might exacerbate the negative impact of debt on firm performance, although this effect was less robust. In the LDA and SDA models, the interaction terms were not significant.

Table 4.14: Results from FE Regression (with Robust and Clustered Standard Errors)

Variables	TDA model Coeff.	P>|t|		LDA model Coeff.	P>|t|		SDA model Coeff.	P>|t|	
TDA	-0.1562	0.000	***						
	(0.0287)								
LDA				-0.0754	0.005	***			
				(0.0267)					
SDA							-0.1999	0.000	***
							(0.0529)		
GDP	-0.0708	0.398		-0.0371	0.666		-0.0758	0.353	
	(0.0837)			(0.0860)					
GDP_TDA	0.1760	0.734							
	(0.5172)								
GDP_LDA				-0.1360	0.812				
				(0.5710)					
GDP_SDA							0.3084	0.700	
							(0.7994)		
OPR	1.5566	0.001	***	1.3433	0.004	***	1.6033	0.000	***
	(0.4511)			(0.4663)			(0.4331)		
OPR_TDA	-4.3768	0.073	*						
	(2.4390)								
OPR_LDA				-2.2261	0.364				
				(2.4484)					
OPR_SDA							-5.6709	0.155	
							(3.9871)		
VOL	-0.2510	0.036	**	-0.2261	0.060	*	-0.2642	0.027	**
	(0.1193)			(0.1198)			(0.1194)		
VOL_TDA	-0.1202	0.888							
	(0.8535)								
VOL_LDA				0.0413	0.963				
				(0.8821)					
VOL_SDA							-0.5000	0.672	
							(1.1813)		
SZE	0.0397	0.059	*	0.0303	0.182		0.0285	0.185	
	(0.0210)			(0.0227)			(0.0215)		
TAN	-0.0673	0.002	***	-0.0855	0.000	***	-0.0812	0.000	***
	(0.0216)			(0.0223)			(0.0217)		
LIQ	0.0003	0.878		0.0005	0.828		0.0003	0.893	
	(0.0021)			(0.0021)			(0.0022)		
_cons	-0.1761	0.147		-0.1178	0.373		-0.1080	0.387	
	(0.1214)			(0.1322)			(0.1247)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the FE model, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are both robust and clustered at the firm level to account for heteroscedasticity and within-entity correlation. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

VOL showed a significant negative impact on firm performance in the TDA and SDA models, with coefficients of -0.2510 (p-value of 0.036, significant at the 5% level) and -0.2642 (p-value of 0.027, significant at the 5% level), respectively. The LDA model showed a marginally significant negative impact, with a coefficient of -0.2261 and a p-value of 0.060, significant at the 10% level. However, the interaction terms between VOL and the debt ratios were not significant in any model, indicating that market volatility did not significantly moderate the relationship between leverage and firm performance.

Regarding firm-specific factors, SZE showed a marginally significant positive impact on ROA in the TDA model, with a coefficient of 0.0397 and a p-value of 0.059, significant at the 10% level. However, it was not significant in the LDA and SDA models. TAN consistently showed a significant negative impact on ROA across all models, with coefficients ranging from -0.0673 to -0.0855 and p-values between 0.002 and 0.000, significant at the 1% level. LIQ did not show a statistically significant impact on ROA in any of the models, with p-values well above conventional significance thresholds.

The constant terms in all models were not statistically significant, with p-values greater than 0.10, indicating that the baseline level of firm performance, when all variables are set to zero, did not significantly differ from zero.

Overall, the analysis revealed that higher leverage, whether total, long-term, or short-term, negatively impacts firm performance, with all models showing significance at the 1% level. Stricter monetary policies are associated with better performance, with results significant at the 1% level, although their interaction with leverage is only marginally significant in one model. Economic conditions and market volatility do not significantly moderate the relationship between capital structure and firm performance, except for a

marginal impact of volatility in some cases. Firm size has a marginally positive impact, asset tangibility consistently reduces profitability, and liquidity does not significantly influence firm performance across models.

4.10.1 FE Models Comparison

The comparison between the FE model with robust and clustered standard errors in Table 4.14 and the standard FE model in Table 4.8 reveals several important distinctions in interpreting and assessing the reliability of the results.

In both models, the coefficients for the debt ratios were consistent, indicating a significant negative impact on firm performance. This finding suggests that higher leverage, whether total, long-term, or short-term, consistently reduces profitability. The inclusion of robust and clustered standard errors generally resulted in slightly more conservative estimates of standard errors, which is evident in the strong significance of these key variables at the 1% level, even after adjusting for potential heteroskedasticity and within-cluster correlation. Without these adjustments, the standard FE model still showed strong significance but might be more susceptible to the influence of heteroskedasticity or serial correlation within the clusters, potentially leading to inflated Type I error rates.

Regarding macroeconomic variables, GDP did not exhibit a statistically significant impact on firm performance in either model. The interaction terms between GDP and debt ratios were also not significant, confirming that GDP does not moderate the relationship between capital structure and firm performance. The robustness of these findings is reinforced in the model with robust and clustered standard errors.

OPR showed a significant positive impact on firm performance across both models, with coefficients significant at the 1% level. However, in the model with robust and clustered

standard errors, the interaction term between OPR and TDA was marginally significant, suggesting that higher interest rates might exacerbate the negative impact of debt on firm performance. This interaction was less pronounced in the standard FE model, where the uncorrected standard errors could influence the results.

VOL presented a significant negative impact on firm performance in both models for the TDA and SDA specifications. The significance was slightly stronger in the model with robust and clustered standard errors, particularly for the SDA model, where the coefficient remained significant at the 5% level. However, the interaction terms between VOL and the debt ratios were not significant in either model, indicating that VOL does not moderate the relationship between leverage and firm performance. This consistency suggests that the impact of market volatility on firm performance is more direct rather than through interaction with leverage.

Firm-specific factors showed some variation between the models. The impact of SZE on ROA was marginally significant in the TDA model with robust and clustered standard errors but lost significance in the LDA and SDA models. In contrast, the standard FE model showed SZE as significant across all models, suggesting that larger firms consistently benefit from economies of scale. This difference highlights the potential overstatement of significance in the standard FE model. TAN consistently showed a significant negative impact on ROA across both models, with the robust and clustered SE model confirming this relationship with more reliable standard errors. LIQ did not show a significant impact on ROA in any model, a finding that remained consistent across both specifications.

The constant terms revealed a noteworthy difference between the models. In the standard FE model, the constant terms were negative and significant across all models,

suggesting that the baseline ROA is negative when all independent variables are zero. However, in the model with robust and clustered standard errors, these constant terms were not statistically significant, indicating that the baseline performance may not significantly differ from zero when adjusting for heteroskedasticity and within-cluster correlation.

Overall, the FE model with robust and clustered standard errors provides more reliable and conservative estimates by addressing potential issues like heteroskedasticity and within-cluster correlation. While the general findings regarding the negative impact of debt ratios on firm performance, the positive influence of OPR, and the role of market volatility are consistent across both models, the model with robust and clustered standard errors offers a more cautious and likely more accurate interpretation, especially for the interaction effects and firm-specific factors.

4.11 Generalized Least Squares (GLS) Regression Analysis

While the FE model with robust and clustered standard errors effectively addressed issues of heteroskedasticity and within-cluster (within-firm) autocorrelation, GLS regression analysis was employed to provide additional insights and ensure the robustness of the findings. GLS is particularly advantageous in cases where the classical assumptions of homoscedasticity and no autocorrelation are violated, as it corrects for these issues simultaneously by transforming the data. This method is especially useful in panel data contexts, where error variances may differ across entities and residuals may be correlated over time. By applying GLS, the coefficient estimates remain both unbiased and efficient, addressing the heteroskedasticity and autocorrelation issues identified through the Breusch-Pagan and Inoue and Solo LM tests.

Despite the ability of the FE model with robust and clustered standard errors to correct for heteroskedasticity and autocorrelation, GLS was performed for several reasons. First, GLS is robust to first-order autoregressive disturbances within unbalanced panels and can account for cross-sectional correlation and heteroskedasticity across panels (Wooldridge, 2009). This makes it particularly useful for datasets where the inclusion of macroeconomic variables such as GDP, OPR, and VOL might introduce cross-sectional dependencies across firms. Additionally, GLS estimators have been shown to outperform FE and RE models in terms of efficiency under conditions of heteroskedasticity and autocorrelation (Saif-Alyousfi et al., 2020; Gujarati, 2003). Therefore, applying GLS provided a complementary estimation method, allowing for a cross-validation of results obtained from the FE model.

The GLS model regression analysis in Table 4.15 across the TDA, LDA, and SDA models demonstrated a consistent negative relationship between debt ratios and firm performance. In the TDA model, the coefficient for TDA was -0.1060, significant at the 1% level, indicating that an increase in total debt is associated with a decrease in ROA. Similarly, in the LDA model, the coefficient for LDA was -0.0727, also significant at the 1% level, suggesting that higher long-term debt leads to lower firm performance. The SDA model reflected this trend, with a coefficient of -0.1073 for SDA, significant at the 1% level, reinforcing the negative impact of short-term leverage on performance.

Table 4.15: Results from GLS Regression

Variables	TDA model Coeff.	P>|z|		LDA model Coeff.	P>|z|		SDA model Coeff.	P>|z|	
TDA	-0.1060	0.000	***						
	(0.0046)								
LDA				-0.0727	0.000	***			
				(0.0054)					
SDA							-0.1073	0.000	***
							(0.0067)		
GDP	0.0350	0.155		0.0447	0.062	*	0.0456	0.063	*
	(0.0246)			(0.0239)			(0.0245)		
GDP_TDA	-0.1832	0.222							
	(0.1499)								
GDP_LDA				-0.3181	0.058	*			
				(0.1675)					
GDP_SDA							0.2721	0.269	
							(0.2462)		
OPR	0.2175	0.087	*	0.0978	0.433		0.2295	0.071	*
	(0.1273)			(0.1248)			(0.1273)		
OPR_TDA	0.3567	0.637							
	(0.7549)								
OPR_LDA				2.2492	0.007	***			
				(0.8342)					
OPR_SDA							-3.6898	0.003	***
							(1.2582)		
VOL	-0.0987	0.002	***	-0.0969	0.001	***	-0.0925	0.003	***
	(0.0311)			(0.0300)			(0.0312)		
VOL_TDA	-0.2393	0.220							
	(0.1952)								
VOL_LDA				-0.1709	0.443				
				(0.2228)					
VOL_SDA							-0.1917	0.542	
							(0.3140)		
SZE	0.0134	0.000	***	0.0120	0.000	***	0.0057	0.000	***
	(0.0012)			(0.0012)			(0.0012)		
TAN	-0.0171	0.000	***	-0.0200	0.000	***	-0.0180	0.000	***
	(0.0031)			(0.0031)			(0.0032)		
LIQ	0.0001	0.535		0.0007	0.000	***	0.0002	0.194	
	(0.0002)			(0.0002)			(0.0002)		
_cons	-0.0342	0.000	***	-0.0284	0.000	***	0.0097	0.181	
	(0.0072)			(0.0074)			(0.0072)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the GLS method, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

GDP varied in significance across the models. In the TDA model, GDP had a coefficient of 0.0350, but it was not significant, indicating that GDP does not substantially impact ROA in this context. However, in the LDA and SDA models, GDP coefficients of 0.0447 and 0.0456, respectively, were marginally significant at the 10% level, suggesting a slight positive effect on firm performance. The interaction terms between GDP and the debt ratios indicated that while GDP did not significantly moderate the relationship in the TDA and SDA models, it had a marginal moderating effect in the LDA model, with the GDP_LDA interaction term showing a coefficient of -0.3181 and marginal significance.

OPR also showed varying effects. In the TDA model, OPR had a coefficient of 0.2175, marginally significant at the 10% level, implying a weak positive impact on ROA. However, in the LDA model, while the direct effect of OPR was not significant, the interaction term OPR_LDA was highly significant at the 1% level, with a coefficient of 2.2492, indicating that monetary policy significantly mitigates the negative impact of long-term leverage on firm performance. In contrast, the SDA model showed that while OPR had a marginally positive direct effect, its interaction with SDA, with a coefficient of -3.6898 and significance at the 1% level, exacerbated the negative impact of short-term leverage on performance.

VOL consistently demonstrated a significant negative impact on firm performance across all models. In the TDA model, VOL had a coefficient of -0.0987, significant at the 1% level, suggesting that increased volatility leads to lower ROA. This negative relationship was mirrored in the LDA and SDA models, with coefficients of -0.0969 and -0.0925, respectively, both significant at the 1% level. However, the interaction terms between VOL and the debt ratios were not significant, indicating that while volatility directly affects performance, it does not significantly moderate the relationship between leverage and ROA.

Firm-specific factors such as SZE and TAN played a crucial role in influencing performance across all models. Firm size consistently showed a positive and significant impact on ROA, with coefficients of 0.0134, 0.0120, and 0.0057 in the TDA, LDA, and SDA models, respectively, all significant at the 1% level. This suggests that larger firms tend to perform better. Conversely, tangibility had a negative and significant impact, with coefficients of -0.0171, -0.0200, and -0.0180 across the respective models, also significant at the 1% level, implying that firms with higher asset tangibility experience lower performance. LIQ had a significant positive effect only in the LDA model, with a coefficient of 0.0007, significant at the 1% level, but showed no significant impact in the TDA and SDA models.

The constant terms across the models highlighted the presence of other factors influencing ROA that were not captured by the models. In the TDA and LDA models, the constants were significant, with coefficients of -0.0342 and -0.0284, respectively, both at the 1% level. However, in the SDA model, the constant was not significant, suggesting no significant baseline ROA when all predictors are zero.

Overall, the GLS regression analyses consistently revealed that higher leverage, whether total, long-term, or short-term, negatively impacts firm performance. Economic conditions and monetary policy changes showed varying degrees of influence, with GDP having a marginally positive effect and OPR significantly moderating the impact of long-term and short-term leverage. Stock market volatility detracts from firm performance, though its moderating effects on leverage are not significant. Firm-specific characteristics such as size and tangibility significantly influence performance, with larger firms performing better and higher tangibility being detrimental. Liquidity's impact was model-dependent, showing significance only in the context of long-term leverage.

4.12 Panel Corrected Standard Errors (PCSE) Model Regression

The PCSE model regression is employed to improve the estimation process by addressing issues of heteroskedasticity and contemporaneous correlation across panels. In panel data analysis, where observations span multiple entities over time, the potential for errors to be correlated across cross-sectional units within the same time period is a significant concern. This contemporaneous correlation, if unaddressed, can lead to biased standard errors, resulting in inaccurate inferences. The PCSE approach is particularly advantageous in providing robust standard errors that account for these potential correlations, ensuring more reliable and precise inferences about the relationship between capital structure and firm performance.

Macroeconomic factors such as GDP, OPR, and VOL play a crucial role in this study and are likely to affect all firms simultaneously during the same periods. These factors introduce the possibility of contemporaneous correlation across firms, as external economic conditions may impact their performance similarly. For example, a significant change in OPR by BNM could influence borrowing costs for all firms, leading to correlated residuals across the panel. Similarly, shifts in GDP or VOL might have widespread effects on firms, further contributing to cross-sectional dependence. The application of PCSE in this context is critical as it adjusts for these correlations, providing a more accurate depiction of how these macroeconomic variables interact with firm-specific factors to influence performance.

PCSE modifies the standard estimation process to correct for both heteroskedasticity and cross-sectional dependence, which are common in macroeconomic studies that involve broad economic factors affecting multiple firms simultaneously. According to Saif-Alyousfi et al. (2020) and Hoechle (2007), most standard panel data estimators, such as pooled OLS,

RE, FE, and even GLS, often struggle to address both serial correlation and cross-sectional dependence. These limitations can lead to inefficiencies in the estimation process and undermine the validity of the results. PCSE, however, overcomes these challenges by providing a more robust framework that adjusts the standard errors to reflect both serial correlation within panels and cross-sectional correlation across panels.

PCSE is a modified two-step version of the 'inefficient' OLS estimator, specifically designed to handle the complexities of panel data. This method has been shown to significantly outperform other estimators when serial correlation and cross-sectional dependence are present. Hoechle (2007) and Saif-Alyousfi et al. (2020) highlight that PCSE is particularly effective in producing reliable estimates under these conditions, making it a preferred choice for studies where macroeconomic factors might induce correlation across firms in the same time period. Additionally, Beck and Katz (1995) emphasize that the PCSE method generates robust covariances in panel data analysis, effectively accounting for deviations from spherical errors, which are often assumed but rarely observed in real-world data.

By applying PCSE in this study, the analysis aims to produce more reliable standard errors, thereby enabling more precise inferences about the impact of capital structure on firm performance. This technique is especially important in a study that examines the relationship between firm-level financial decisions and broader economic conditions, as it ensures that the statistical results accurately reflect the underlying relationships without being distorted by unaddressed correlations in the data. Given the significant role of macroeconomic factors in this study, PCSE provides the necessary adjustments to accurately assess how these broader economic conditions influence firm performance across different levels of leverage.

Table 4.16: Results from PCSE Regression

Variables	TDA model Coeff.	P>|z|		LDA model Coeff.	P>|z|		SDA model Coeff.	P>|z|	
TDA	-0.1349	0.000	***						
	(0.0174)								
LDA				-0.0990	0.000	***			
				(0.0186)					
SDA							-0.1383	0.000	***
							(0.0294)		
GDP	-0.0456	0.752		-0.0151	0.916		-0.0299	0.842	
	(0.1445)			(0.1432)			(0.1501)		
GDP_TDA	0.2658	0.661							
	(0.6063)								
GDP_LDA				-0.2049	0.717				
				(0.5656)					
GDP_SDA							0.8044	0.401	
							(0.9577)		
OPR	0.3254	0.658		0.1392	0.849		0.2533	0.743	
	(0.7353)			(0.7310)			(0.7719)		
OPR_TDA	-3.3708	0.237							
	(2.8529)								
OPR_LDA				0.8786	0.729				
				(2.5360)					
OPR_SDA							-8.8988	0.072	*
							(4.9423)		
VOL	-0.2683	0.161		-0.2460	0.189		-0.2635	0.179	
	(0.1914)			(0.1873)			(0.1963)		
VOL_TDA	-0.0465	0.956							
	(0.8475)								
VOL_LDA				0.0149	0.984				
				(0.7454)					
VOL_SDA							-0.2189	0.876	
							(1.4052)		
SZE	0.0360	0.000	***	0.0324	0.000	***	0.0272	0.000	***
	(0.0042)			(0.0049)			(0.0043)		
TAN	-0.0236	0.102		-0.0286	0.057	*	-0.0297	0.051	*
	(0.0145)			(0.0150)			(0.0153)		
LIQ	0.0015	0.188		0.0017	0.132		0.0016	0.168	
	(0.0012)			(0.0011)			(0.0012)		
_cons	-0.1719	0.000	***	-0.1508	0.000	***	-0.1203	0.000	***
	(0.0237)			(0.0279)			(0.0249)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the method of PCSE, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

The analysis of the PCSE model in Table 4.16 across different leverage ratios—TDA, LDA, and SDA—shows a consistent negative impact of debt on firm performance. Specifically, TDA, LDA, and SDA all have significant negative coefficients (-0.1349, -0.0990, and -0.1383, respectively, all with p-values of 0.000), suggesting that higher levels of both short-term and long-term leverage are associated with poorer firm performance as measured by ROA. This highlights the detrimental effect of increased debt burdens on the financial health of firms across various models.

Regarding the influence of GDP on firm performance, the findings indicate that GDP does not have a significant direct effect in any of the models. The coefficients for GDP are -0.0456, -0.0151, and -0.0299 (with p-values of 0.752, 0.916, and 0.842, respectively), and the interaction terms with TDA, LDA, and SDA are also not significant. These results suggest that economic growth, as measured by GDP, does not moderate the relationship between leverage and firm performance.

OPR similarly shows no direct significant effect on firm performance, with coefficients of 0.3254, 0.1392, and 0.2533 (p-values of 0.658, 0.849, and 0.743, respectively). However, an interesting finding emerges in the SDA model, where the interaction term OPR_SDA is significant at the 10% level (coefficient = -8.8988, p-value = 0.072), indicating that monetary policy changes significantly moderate the relationship between short-term debt and firm performance, with higher OPR levels exacerbating the negative impact of SDA on ROA.

The analysis of VOL reveals that it does not have a significant direct effect on firm performance in any of the models, with coefficients of -0.2683, -0.2460, and -0.2635 (p-values of 0.161, 0.189, and 0.179, respectively). Additionally, the interaction terms

VOL_TDA, VOL_LDA, and VOL_SDA are not significant, indicating that stock market volatility does not moderate the relationship between leverage and firm performance.

Firm-specific factors yield mixed results. SZE consistently shows a significant positive impact on performance across all models, with coefficients of 0.0360, 0.0324, and 0.0272 (all with p-values of 0.000), suggesting that larger firms tend to perform better. TAN presents a marginal negative impact on performance in the LDA and SDA models, with coefficients of -0.0286 (p-value = 0.057) and -0.0297 (p-value = 0.051), respectively, indicating that higher tangibility is associated with lower firm performance, albeit at a 10% significance level. LIQ does not show a significant impact in any of the models, with coefficients of 0.0015, 0.0017, and 0.0016 (p-values of 0.188, 0.132, and 0.168, respectively).

Finally, the constant terms across all models are significant, with negative coefficients, suggesting the presence of other unobserved factors influencing ROA that are not captured by the variables in the models.

Overall, the PCSE model regression analysis reveals that higher leverage, both short-term and long-term, is consistently associated with poorer firm performance. SZE positively influences performance, while GDP, OPR, and VOL do not have significant direct effects, nor do they significantly moderate the relationship between leverage and firm performance, with the exception of OPR's moderation effect in the SDA model. TAN shows a marginally negative impact, while LIQ does not significantly influence firm performance in this analysis.

4.13 Addressing Endogeneity

As shown in Tables 4.14, 4.15, and 4.16, the analyses across the FE (robust and clustered standard errors), GLS, and PCSE models consistently showed that higher leverage negatively impacted firm performance, with firm size positively influencing performance and asset tangibility having a detrimental effect. GDP, OPR, and VOL exhibited more complex and varied effects depending on the model and type of debt, but they did not consistently moderate the relationship between leverage and performance. These findings provide a comprehensive view of how capital structure, macroeconomic factors, and firm-specific characteristics interact to influence firm performance.

However, it is important to acknowledge that none of these models directly addressed the issue of endogeneity, which can arise from potential reverse causality or omitted variable bias in the relationship between capital structure and firm performance. Endogeneity can lead to biased and inconsistent estimates, undermining the validity of the conclusions drawn from these models. Therefore, to ensure a more robust analysis, it is crucial to apply techniques specifically designed to address endogeneity. Endogeneity may arise from several sources, including omitted variables that should be included in the model, measurement errors in the explanatory variables, or simultaneity where the causality between the independent and dependent variables is bidirectional.

To identify the presence of endogeneity, the DWH test was applied. This test examines whether the explanatory variables are correlated with the error terms. If such a correlation exists, it suggests that the model suffers from endogeneity, implying that the standard regression techniques may not provide valid results. Addressing endogeneity is vital

for the integrity of the regression analysis, as it ensures that the relationships observed between the variables are genuine and not the result of underlying biases.

4.13.1 Durbin-Wu-Hausman (DWH) Test

The DWH test is employed to assess the presence of endogeneity in regression models. This diagnostic involves a two-stage procedure. In the first stage, the suspected endogenous regressor is regressed on all exogenous variables and instruments to generate residuals. In the second stage, these residuals are included in the main regression equation. If the residual term is statistically significant, it indicates that the regressor is endogenous—suggesting a violation of the exogeneity assumption of the classical linear regression model.

Source	SS	df	MS	Number of obs	=	6,702
				F(4, 6697)	=	16.94
Model	1.57744977	4	.394362444	Prob > F	=	0.0000
Residual	155.920126	6,697	.023282085	R-squared	=	0.0100
				Adj R-squared	=	0.0094
Total	157.497576	6,701	.023503593	Root MSE	=	.15258

TDA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
L_ROA	-.1064408	.0130945	-8.13	0.000	-.1321102	-.0807714
GDP	-.0587535	.1069273	-0.55	0.583	-.2683651	.150858
OPR	.3041641	.4606414	0.66	0.509	-.5988397	1.207168
VOL	.0607429	.182182	0.33	0.739	-.2963917	.4178776
_cons	.003531	.0019294	1.83	0.067	-.0002512	.0073132

Note: Author's computation using Stata 18.0

Figure 4.1: First-Stage Regression Results for DWH Test using Stata 18.0 (TDA)

In the first-stage regression, TDA was regressed on the lagged dependent variable (L_ROA), GDP, OPR, and VOL. The output is displayed in Figure 4.1. Among these variables, only L_ROA was found to be statistically significant. Residuals from this regression (res_TDA) were then extracted for the second stage. In the second-stage

regression, ROA was regressed on TDA, res_TDA, the macroeconomic variables, and their respective interaction terms.

Source	SS	df	MS	Number of obs	=	6,702
				F(4, 6697)	=	7.34
Model	.394072013	4	.098518003	Prob > F	=	0.0000
Residual	89.8418906	6,697	.013415244	R-squared	=	0.0044
				Adj R-squared	=	0.0038
Total	90.2359626	6,701	.013466044	Root MSE	=	.11582

LDA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
L_ROA	-.0387804	.0099398	-3.90	0.000	-.0582655	-.0192952
GDP	.087846	.0811665	1.08	0.279	-.0712662	.2469583
OPR	-1.063731	.3496643	-3.04	0.002	-1.749184	-.3782775
VOL	.1026796	.1382909	0.74	0.458	-.1684147	.3737738
_cons	.0020837	.0014646	1.42	0.155	-.0007873	.0049547

Note: Author's computation using Stata 18.0

Figure 4.2: First-Stage Regression Results for DWH Test using Stata 18.0 (LDA)

Source	SS	df	MS	Number of obs	=	6,702
				F(4, 6697)	=	19.92
Model	.78870966	4	.197177415	Prob > F	=	0.0000
Residual	66.2783131	6,697	.009896717	R-squared	=	0.0118
				Adj R-squared	=	0.0112
Total	67.0670228	6,701	.01000851	Root MSE	=	.09948

SDA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
L_ROA	-.0676604	.0085374	-7.93	0.000	-.0843964	-.0509245
GDP	-.1465995	.0697145	-2.10	0.036	-.2832622	-.0099369
OPR	1.367895	.3003292	4.55	0.000	.7791541	1.956636
VOL	-.0419366	.1187791	-0.35	0.724	-.2747815	.1909082
_cons	.0014473	.0012579	1.15	0.250	-.0010186	.0039132

Note: Author's computation using Stata 18.0

Figure 4.3: First-Stage Regression Results for DWH Test using Stata 18.0 (SDA)

The same DWH testing procedure was repeated for LDA and SDA. Figures 4.2 and 4.3 present the respective first-stage regression results. Consistent with the TDA model, L_ROA was statistically significant in both cases, while GDP, OPR, and VOL remained insignificant. The corresponding residuals (res_LDA and res_SDA) were then included in their respective second-stage regressions.

Table 4.17: Second-Stage Regression Results from DWH Test

	res_TDA	res_LDA	res_SDA
t	23.42	24.03	23.94
P>|t|	0.000	0.000	0.000

Note: Author's computation using Stata 18.0

The results of the second-stage regressions are summarized in Table 4.17. The coefficient of res_TDA was statistically significant, confirming the presence of endogeneity in TDA. Similarly, the coefficients of res_LDA and res_SDA were also statistically significant, indicating that LDA and SDA are endogenous in their respective models.

These findings demonstrate that all three capital structure proxies—TDA, LDA, and SDA—exhibit endogeneity. Consequently, relying on OLS estimators may lead to biased and inconsistent results. To address this issue and obtain valid coefficient estimates, alternative estimation methods are required. One such approach is the use of IV, particularly through the 2SLS technique. An IV is a variable that is correlated with the endogenous regressor but uncorrelated with the error term. By employing valid instruments, the 2SLS method provides consistent estimators, thus mitigating the bias caused by endogeneity.

4.14 Two-Stage Least Squares (2SLS) Model Regression

In the analysis, the 2SLS model was employed to address endogeneity, as identified by the DWH test. This technique is crucial when the explanatory variables are potentially endogenous. In the first stage of 2SLS, these variables were regressed on a set of instruments that are correlated with the endogenous variables but uncorrelated with the error term. The predicted values from this regression were then used in the second stage as predictors in the original regression model. This approach effectively mitigates the bias and inconsistency arising from endogeneity, ensuring that the estimated relationships between the variables reflect the true underlying dynamics.

According to Saif-Alyousfi et al. (2020), while panel data methods like pooled OLS, RE, FE, GLS, and PCSE address the problem of time-constant omitted variables, they do not resolve the issue of time-varying omitted variables correlated with the explanatory variables. Firm-wise heteroscedasticity is also a concern in the estimation process. The 2SLS approach was used to overcome these problems. This study utilized the 2SLS instrumental variable estimator because of the potential endogeneity concerns within the empirical model. By employing 2SLS, the method eliminated constant unobserved effects and addressed unit-root processes, thereby enhancing the robustness of the analysis.

The summary statistics of the first-stage regression provide insights into the strength of the instruments. Key metrics such as the F-statistic for the instruments were crucial in determining their relevance. A weak instrument problem is indicated by an F-statistic below the conventional threshold of 10, which would suggest that the instruments do not sufficiently explain the endogenous regressors. Therefore, the strength of the instruments was carefully evaluated to ensure the validity of the 2SLS estimates.

In addition to the first-stage regression, tests of overidentifying restrictions were conducted to validate the instruments used in the 2SLS estimation. Sargan's (1958) and Basmann's (1960) chi-squared tests, as well as Wooldridge's (1995) robust score test, were reported. These tests were crucial in assessing whether the instruments are exogenous, meaning they are uncorrelated with the error term in the structural equation. A non-significant result indicates that the instruments are valid, supporting the assumption that they are appropriately exogenous. This validation is critical because it ensures that the instruments do not introduce bias into the 2SLS estimates. A significant test result would imply that the instruments are not valid, suggesting that they are correlated with the error term, which could lead to biased and inconsistent estimates.

For the TDA model, the coefficient of -2.2071 (p-value 0.000) revealed a significant negative impact on ROA at the 1% level, indicating that higher total leverage reduces firm performance. This negative effect was consistent across the LDA and SDA models, with coefficients of -4.5035 (p-value 0.000) and -4.4014 (p-value 0.000), respectively, showing that both long-term and short-term leverage similarly detract from performance.

When considering GDP's moderating role, the interaction terms for GDP_TDA (coefficient 5.3002, p-value 0.001), GDP_LDA (coefficient 15.7528, p-value 0.000), and GDP_SDA (coefficient 6.8172, p-value 0.037) all indicated significant positive moderating effects. These findings suggest that economic growth can alleviate the negative impacts of both total, long-term, and short-term leverage on firm performance. Interestingly, GDP alone did not significantly impact ROA in the TDA and LDA models but showed a significant negative effect in the SDA model (coefficient -0.6524, p-value 0.043), indicating a complex relationship between economic conditions and firm performance.

Table 4.18: Results from 2SLS Regression

Variables	TDA model Coeff.	P>|z|		LDA model Coeff.	P>|z|		SDA model Coeff.	P>|z|	
TDA	-2.2071	0.000	***						
	(0.2313)								
LDA				-4.5035	0.000	***			
				(0.7078)					
SDA							-4.4014	0.000	***
							(0.6356)		
GDP	-0.2528	0.258		0.0475	0.886		-0.6524	0.043	**
	(0.2235)			(0.3321)			(0.3229)		
GDP_TDA	5.3002	0.001	***						
	(1.5553)								
GDP_LDA				15.7528	0.000	***			
				(3.8288)					
GDP_SDA							6.8172	0.037	**
							(3.2718)		
OPR	2.3959	0.013	**	-1.0559	0.468		6.5421	0.000	***
	(0.9679)			(1.4565)			(1.5677)		
OPR_TDA	-20.7504	0.001	***						
	(6.4343)								
OPR_LDA				-75.8271	0.000	***			
				(16.7550)					
OPR_SDA							31.1562	0.038	**
							(15.0319)		
VOL	-0.0773	0.837		0.1084	0.848		-0.2755	0.596	*
	(0.3763)			(0.5652)			(0.5197)		
VOL_TDA	14.3828	0.000	***						
	(2.9718)								
VOL_LDA				31.6177	0.000	***			
				(7.1362)					
VOL_SDA							39.2981	0.000	***
							(7.8690)		
SZE	0.1889	0.000	***	0.3352	0.000	***	0.0492	0.000	***
	(0.0188)			(0.0506)			(0.0092)		
TAN	0.0474	0.012	**	0.0331	0.232		0.0599	0.025	**
	(0.0190)			(0.0277)			(0.0268)		
LIQ	-0.0066	0.000	***	-0.0048	0.000	***	-0.0085	0.000	***
	(0.0009)			(0.0012)			(0.0015)		
_cons	-1.0456	0.000	***	-1.8880	0.000	***	-0.2419	0.000	***
	(0.1078)			(0.2902)			(0.0535)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the 2SLS method, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

OPR showed a varied impact. In the TDA model, OPR had a significant positive effect on ROA (coefficient 2.3959, p-value 0.013), suggesting that higher interest rates improve firm performance. This positive effect was also present in the SDA model (coefficient 6.5421, p-value 0.000). However, OPR did not significantly affect ROA in the LDA model (coefficient -1.0559, p-value 0.468). The interaction terms OPR_TDA (coefficient -20.7504, p-value 0.001), OPR_LDA (coefficient -75.8271, p-value 0.000), and OPR_SDA (coefficient 31.1562, p-value 0.038) showed significant moderating effects, indicating that changes in monetary policy exacerbate or mitigate the leverage-performance relationship depending on the type of debt considered.

VOL did not directly impact ROA in any of the models. The coefficients for VOL in the TDA (coefficient -0.0773, p-value 0.837), LDA (coefficient 0.1084, p-value 0.848), and SDA (coefficient -0.2755, p-value 0.596) models were insignificant. However, the interaction terms VOL_TDA (coefficient 14.3828, p-value 0.000), VOL_LDA (coefficient 31.6177, p-value 0.000), and VOL_SDA (coefficient 39.2981, p-value 0.000) revealed significant positive moderating effects, suggesting that during periods of high stock market volatility, the negative impact of leverage on performance may be offset, highlighting the importance of considering market conditions in the analysis.

Firm-specific characteristics also played a significant role in determining ROA. Across all models, SZE had a significant positive impact on performance, with coefficients of 0.1889 (p-value 0.000) for TDA, 0.3352 (p-value 0.000) for LDA, and 0.0492 (p-value 0.000) for SDA, indicating that larger firms tend to perform better. TAN showed a significant positive impact in the TDA (coefficient 0.0474, p-value 0.012) and SDA (coefficient 0.0599, p-value 0.025) models, suggesting that higher asset tangibility is associated with improved performance. In contrast, LIQ consistently showed a significant negative impact on ROA

across all models, with coefficients of -0.0066 (p-value 0.000) for TDA, -0.0048 (p-value 0.000) for LDA, and -0.0085 (p-value 0.000) for SDA, implying that higher liquidity is linked to lower firm performance.

The constant terms in all models were significant, indicating baseline levels of ROA when all predictors are zero. In the TDA model, the constant was -1.0456 (p-value 0.000), in the LDA model, it was -1.8880 (p-value 0.000), and in the SDA model, it was -0.2419 (p-value 0.000). These significant constants suggest that factors not captured by the models also play a substantial role in influencing firm performance.

The 2SLS regression analysis revealed significant negative effects of total, long-term, and short-term leverage on firm performance, with all three leverage measures showing strong negative coefficients. GDP moderated these relationships positively, suggesting that economic growth can offset the negative impact of leverage. OPR showed mixed effects, with a positive impact on firm performance in some models but not others. However, OPR's interaction with leverage indicated that changes in monetary policy can either exacerbate or mitigate leverage's impact. VOL did not directly affect performance, but it positively moderated the leverage-performance relationship during high market volatility. Firm size and asset tangibility positively influenced performance, while liquidity negatively affected it. Overall, the analysis highlighted the importance of considering macroeconomic conditions and firm-specific factors in understanding the relationship between leverage and firm performance.

4.14.1 First-Stage Regression Summary Statistics

Table 4.19: Results from First-Stage Regression Summary Statistics

	TDA	LDA	SDA
F(1,6691)	98.504	41.8274	49.9807
Prob > F	0.0000	0.0000	0.0000

Note: Author's computation using Stata 18.0

In the analysis of the first-stage regression summary statistics for the TDA model, the F-statistic was 98.504, with a p-value of 0.0000. This result indicates that the instruments used in the model were highly significant and collectively explained a substantial portion of the variation in TDA. The strong F-statistic confirms the relevance of the instruments, demonstrating their adequacy in addressing endogeneity concerns within the model.

For the LDA model, the first-stage regression summary statistics revealed an F-statistic of 41.8274, with a p-value of 0.0000. Similar to the TDA model, this result signifies that the instruments were strongly significant and capable of explaining a considerable portion of the variation in LDA. The significance of the F-statistic suggests that the instruments were effective in mitigating the bias that could arise from endogenous regressors in the model.

In the SDA model, the first-stage regression summary statistics showed an F-statistic of 49.9807, with a p-value of 0.0000. This result confirmed that the instruments were strongly significant and successfully explained a significant portion of the variation in SDA. The high F-statistic indicates the strength of the instruments, ensuring that the model accurately captures the relationship between the variables while addressing potential endogeneity.

Overall, the first-stage regression results across all three models—TDA, LDA, and SDA—demonstrate the robustness of the instruments employed. The strong F-statistics in each case provide confidence that the instruments effectively address endogeneity, thereby reinforcing the validity of the subsequent 2SLS estimations.

4.14.2 Tests of Overidentifying Restrictions

The analysis of the tests of overidentifying restrictions for the TDA model shows that no overidentifying restrictions were found, which confirms the validity of the instruments employed. This outcome suggests that the instruments are appropriately exogenous and not correlated with the error term, thereby supporting the reliability of the 2SLS estimates for this model.

Similarly, for the LDA model, the tests of overidentifying restrictions indicated that no overidentifying restrictions were present. This result further confirms the validity of the instruments used, ensuring that they are correctly specified and exogenous. The absence of overidentifying restrictions reinforces the robustness of the findings in the LDA model.

For the SDA model, the tests also revealed no overidentifying restrictions, indicating that the instruments are valid. This outcome suggests that the instruments are uncorrelated with the error term and thus appropriately address endogeneity in the model. The validity of the instruments, as confirmed by these tests, enhances the credibility of the 2SLS results in the SDA model.

Overall, the absence of overidentifying restrictions across all three models—TDA, LDA, and SDA—validates the choice of instruments and ensures the robustness of the empirical findings derived from the 2SLS estimations.

4.15 Addressing Dynamic Panel Bias

The F-statistics test results across all models provide confidence that the instruments used in the subsequent 2SLS estimations were effective in addressing endogeneity, reinforcing the validity of the findings. However, while 2SLS is robust for dealing with endogeneity in static models, dynamic panel data models present additional challenges that require careful consideration.

Saif-Alyousfi et al. (2020), Gaud et al. (2005), and Khémiri and Noubbigh (2018) highlighted the inherently dynamic nature of capital structure. These studies emphasized that capital structure decisions are not made in isolation but are influenced by past performance, historical leverage decisions, and other temporal factors. This dynamic relationship means that the current capital structure is often a reflection of past financial strategies, making it crucial to account for these historical dependencies in any analytical model.

Given this dynamic context, the issue of dynamic panel bias becomes particularly relevant. Dynamic panel bias, often referred to as Nickell Bias, arises when lagged dependent variables are included as predictors in the model. The correlation between these lagged variables and the unobserved fixed effects leads to a correlation with the error term, introducing bias into the estimates. As Nickell (1981) demonstrated, this bias is especially problematic in panels with a short time dimension (T).

In the context of this study, where the time dimension (T) is 11, it was crucial to consider whether this period was sufficient to mitigate the impact of dynamic panel bias. Although a T of 11 is relatively moderate—neither extremely short nor particularly long—it still warrants addressing dynamic panel bias. Even with a time dimension of 11, the presence of lagged dependent variables in the model can result in biased estimates if the bias

is not properly addressed. This is particularly true in studies where the relationship between variables is expected to evolve over time, such as the relationship between capital structure and firm performance.

While 2SLS effectively addresses endogeneity by using IVs, it does not resolve dynamic panel bias. 2SLS is primarily designed for static models, and when applied to dynamic panels, it does not adequately account for the correlation between the lagged dependent variable and the error term. As a result, despite correcting for endogeneity, the estimates may still be biased if dynamic panel bias is not addressed.

The dynamic nature of capital structure, as supported by existing studies, stresses the importance of addressing dynamic panel bias in this study. Although the FE model with robust and clustered standard errors, GLS, and PCSE address heteroscedasticity and autocorrelation, and 2SLS mitigates endogeneity, these methods do not fully resolve the issue of dynamic panel bias. To address this, GMM was employed as an advanced technique to correct for dynamic panel bias, heteroscedasticity, autocorrelation, and endogeneity, resulting in more reliable estimates in dynamic panel data models.

4.16 Difference Generalized Method of Moments (diff-GMM) Regression Analysis

GMM is recognized as a more efficient estimation technique compared to 2SLS, particularly because it addresses issues such as normality, autocorrelation, heteroscedasticity, and endogeneity (Hall, 2005; Lee et al., 2015). Diff-GMM and sys-GMM methods are especially recommended for estimating the parameters of target capital structures in the presence of firm-specific effects and lagged dependent variables (Flannery and Hankins, 2013).

GMM was particularly suited for this study due to the potential for reverse causality, where past firm performance might influence current capital structure decisions. To mitigate the risks of endogeneity bias, omitted variable bias, and the high persistence of firm performance variables, dynamic GMM estimators were utilized. Specifically, this study employed the two-step GMM estimator, which has demonstrated greater regression power than the one-step estimator (Richard, 2022). Hwang and Sun (2015) further highlighted that the two-step GMM estimator performs better in large samples, where the use of an optimal weighting matrix outweighs the costs associated with estimating it.

The two-step GMM approach was preferred over the one-step GMM because the latter can lead to a significant loss of observations, especially in models with large datasets (Arellano and Bover, 1995; Roodman, 2009; Paleologou, 2022). While the one-step GMM is often used in studies with smaller sample sizes, such as those by Ledhem and Mekidiche (2021) with 75 observations and Bayiley (2022) with 140 observations, the large sample size in this study (7,516 observations) made the two-step GMM more appropriate.

Given that debt typically exhibits persistent behaviour (Lemmon et al., 2008), GMM estimators were employed in both diff-GMM and sys-GMM forms. Both two-step diff-GMM and two-step sys-GMM were utilized to address the complex nature of the data and the dynamic relationships among the variables in this study. The initial analysis concentrated on the two-step diff-GMM, with a subsequent focus on the two-step sys-GMM.

The two-step diff-GMM was essential for addressing dynamic panel bias and endogeneity in models with lagged dependent variables. Dynamic panel bias occurs when a lagged dependent variable is included as a regressor, leading to potentially biased estimates. The two-step diff-GMM mitigates this bias by using lagged levels of the explanatory

variables as instruments for the differenced equation. These instruments are uncorrelated with the error term, ensuring the validity of the estimation.

The two-step diff-GMM procedure began with an initial one-step GMM estimation, which applied robust standard errors but used a non-optimal weighting matrix. In the second step, a more efficient weighting matrix was constructed using the residuals from the first step, resulting in more accurate parameter estimates. However, the standard errors in the two-step GMM may be biased downward, requiring correction to ensure the reliability of the results.

Diff-GMM is particularly effective in scenarios with moderate to large time periods (T) and a small number of entities (N). For example, Aali-Bujari et al. (2016) used a balanced panel data analysis for the period 2002-2014 across six major world economies using the two-step diff-GMM. Similarly, Waziri (2015) applied the two-step diff-GMM to a study of 33 Sub-Saharan African countries over 11 years (2002–2012).

Although diff-GMM is typically more suited to studies with fewer entities, the large number of entities (N=719) and the moderate time dimension (T=11) in this study still justified the use of the two-step GMM approach. Despite the large N, the moderate T allowed for sufficient variation and persistence in the data, which are critical for the effectiveness of GMM estimators. Moreover, the two-step GMM was particularly advantageous in large samples like this one, as it enhanced efficiency through a more accurate weighting matrix, providing robust and consistent parameter estimates even in complex and extensive datasets. Thus, the application of two-step GMM in this context was not only appropriate but necessary to address the challenges posed by dynamic panel bias and endogeneity in a dataset of this scale.

Table 4.20: Results from Two-Step Diff-GMM Regression

Variables	TDA model			LDA model			SDA model		
	Coeff.	P>|z|		Coeff.	P>|z|		Coeff.	P>|z|	
L.ROA	0.5890	0.000	***	0.5885	0.000	***	0.5993	0.000	***
	(0.1461)			(0.1567)			(0.1449)		
TDA	-0.4672	0.440							
	(0.6053)								
LDA				-0.6776	0.359				
				(0.7386)					
SDA							-0.1211	0.728	
							(0.3486)		
GDP	-0.0020	0.990		0.0784	0.487		0.1246	0.317	
	(0.1595)			(0.1127)			(0.1246)		
GDP_TDA	-3.3150	0.515							
	(5.0860)								
GDP_LDA				-6.7993	0.477				
				(9.5533)					
GDP_SDA							-3.6132	0.668	
							(8.4375)		
OPR	-0.8811	0.176		-1.0772	0.222		-1.5798	0.010	**
	(0.6509)			(0.8828)			(0.6148)		
OPR_TDA	-1.6386	0.950							
	(26.0594)								
OPR_LDA				-21.5696	0.699				
				(55.8147)					
OPR_SDA							-16.6890	0.603	
							(32.0480)		
VOL	-0.2658	0.103		-0.2151	0.134		-0.1467	0.330	
	(0.1629)			(0.1436)			(0.1507)		
VOL_TDA	-4.6277	0.458							
	(6.2363)								
VOL_LDA				-11.0054	0.460				
				(14.9020)					
VOL_SDA							-3.7980	0.654	
							(8.4697)		
SZE	0.0739	0.575		0.0457	0.636		-0.0189	0.759	
	(0.1317)			(0.0966)			(0.0616)		
TAN	-0.0785	0.336		-0.0544	0.533		-0.1306	0.002	***
	(0.0815)			(0.0873)			(0.0420)		
LIQ	0.0004	0.877		0.0009	0.724		0.0006	0.814	
	(0.0025)			(0.0025)			(0.0025)		

Notes: The table presents the results from three separate multiple regression analyses estimated using the two-step diff-GMM, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

The results highlighted the persistent nature of firm performance, with past ROA consistently predicting current ROA across all models. However, the impact of capital structure on performance, as well as the moderating effects of economic conditions, monetary policy, and market volatility, remained largely inconclusive, with the exception of OPR in the SDA model and asset tangibility in its impact on ROA. These findings suggest that while some factors like past performance and specific firm characteristics are important, the broader economic and market variables may not have as strong a direct or moderating influence as initially hypothesized.

4.16.1 Arellano-Bond Test for Autocorrelation

The diagnostic tests conducted on the TDA, LDA, and SDA models using the Arellano-Bond test in first differences primarily assessed the presence of autocorrelation, with a specific focus on detecting second-order autocorrelation (AR(2)), which is crucial for validating the instruments used in dynamic panel data models.

Table 4.21: Results from Arellano-Bond Test - Two-Step diff-GMM

	TDA	LDA	SDA
Arellano-Bond test for AR(1) in first differences: Pr > z =	0.094	0.097	0.153
Arellano-Bond test for AR(2) in first differences: Pr > z =	0.100	0.178	0.209

Note: Author's computation using Stata 18.0

For the TDA model, the test for AR(1) revealed weak evidence of first-order autocorrelation, although it was not statistically significant at conventional levels, with a p-value of 0.094. This outcome was expected due to the negative correlation introduced by the

differencing process. The AR(2) test, however, indicated no evidence of second-order autocorrelation, with a p-value of 0.100. The absence of AR(2) suggests that the instruments were not correlated with the error term, thereby supporting their validity according to the criteria established by Arellano and Bond (1991) and Roodman (2009).

In the LDA model, the AR(1) test similarly showed weak evidence of first-order autocorrelation, with a p-value of 0.097, again reflecting the expected negative correlation from differencing. The AR(2) test, with a p-value of 0.178, confirmed the lack of second-order autocorrelation, reinforcing the validity of the instruments used in this model.

For the SDA model, the AR(1) test indicated no significant evidence of first-order autocorrelation, with a p-value of 0.153, which aligned with expectations. The AR(2) test further confirmed the absence of second-order autocorrelation, with a p-value of 0.209, thus supporting the validity of the instruments in this model.

Across all models, the consistent absence of significant second-order autocorrelation (AR(2)) strongly suggested that the instruments employed were valid, thereby reinforcing the reliability and robustness of the dynamic panel data estimations in this study, consistent with the recommendations by Arellano and Bond (1991) and Roodman (2009).

4.16.2 Application of Sargan / Hansen Tests of Overidentifying Restrictions in GMM

In the context of GMM estimations, both the Sargan and Hansen tests are crucial for assessing the validity of the instruments used. The choice between these two tests depends on the specific GMM estimation method, particularly whether it is a one-step or two-step approach.

The Sargan test is traditionally applied in one-step GMM estimations. Introduced by Sargan (1958), this test evaluates the validity of the overidentifying restrictions by testing the exogeneity of the instruments used in the GMM estimation. The Sargan test assumes homoskedasticity of the error terms, which limits its reliability in the presence of heteroskedasticity (Arellano and Bond, 1991). As a result, while the Sargan test is effective in simpler one-step GMM contexts, its applicability is diminished in scenarios where heteroskedasticity is a concern, particularly in more complex two-step GMM estimations (Roodman, 2009).

The Hansen test, also known as the J-test, is an extension of the Sargan test and is designed to be robust to heteroskedasticity. It is typically employed in two-step GMM estimations (Blundell and Bond, 1998). The Hansen test provides a more reliable check on the validity of instruments, particularly in the presence of heteroskedasticity, which is often a consideration in two-step GMM estimations. This robustness makes the Hansen test the preferred choice in these contexts, especially for sys-GMM, where the complexity of using both level and differenced equations requires a more robust test (Roodman, 2009).

Since this study employed only two-step GMM estimations, the Hansen test was exclusively reported to assess the validity of the instruments used. This approach ensured that the results were robust to potential issues such as heteroskedasticity.

4.16.3 Hansen Test of Overidentifying Restrictions

The Hansen test of overidentifying restrictions was conducted for the TDA, LDA, and SDA models to assess the validity of the instruments used in the two-step diff-GMM estimation.

Table 4.22: Results from Hansen Test - Two-Step diff-GMM

	TDA	LDA	SDA
Hansen test of overid. restrictions: Prob > chi2 =	0.305	0.442	0.364

Note: Author's computation using Stata 18.0

For the TDA model, the Hansen test yielded a p-value of 0.305, indicating that the instruments were valid and not over-identified. This result suggests that the instruments used in this model were appropriate and did not suffer from over-identification issues.

In the LDA model, the Hansen test produced a p-value of 0.442, further supporting the validity of the instruments. The lack of over-identification provided additional confidence in the reliability of the results derived from this model.

For the SDA model, the Hansen test resulted in a p-value of 0.364, confirming that the instruments were valid and not over-identified. This outcome reinforced the credibility of the model's findings.

Overall, the Hansen test results across all models demonstrated that the instruments employed were appropriate and did not suffer from over-identification, ensuring the robustness of the dynamic panel data analysis.

4.16.4 Discussion on the Results - Two-Step diff-GMM

The two-step diff-GMM model revealed several statistically insignificant findings, as shown in Table 4.20. The debt ratios (TDA, LDA, SDA) exhibited negative but insignificant effects on firm performance (ROA), suggesting that leverage's impact on profitability remained inconclusive in this context. Additionally, the interaction terms

between GDP, OPR, VOL, and the debt ratios were not significant, indicating that economic conditions, monetary policy changes, and stock market volatility did not meaningfully moderate the relationship between capital structure and firm performance. Among firm-specific factors, SZE and LIQ were also insignificant, while TAN showed a significant negative impact only in the SDA model. These results suggest that the anticipated relationships between these variables and firm performance were not strongly supported by the data, possibly due to the inherent limitations of the diff-GMM estimator in this study's context.

The two-step diff-GMM estimator is most effective when the time dimension (T) is moderate to large and the number of entities (N) is small. Previous studies illustrate this well. Aali-Bujari et al. (2016) analysed the relationship between economic growth and financial development across six major world economies from 2002 to 2014 (T=12, N=33). The study effectively used the two-step diff-GMM estimator to address endogeneity, finding robust results due to the balanced panel and moderate time dimension. Waziri et al. (2015) explored the determinants of capital structure in 33 Sub-Saharan African countries over an 11-year period (2002–2012) with T=11 and N=33. The use of diff-GMM was particularly suited for this analysis, as the moderate T allowed the model to control for dynamic panel bias, providing reliable estimates of the impact of country-specific factors on capital structure decisions. Sebki (2021) examined the effect of trade openness on economic growth in 40 developing countries between 2002 and 2016 (T=14, N=40). By employing diff-GMM, Sebki (2021) successfully addressed potential endogeneity issues, with the estimator's efficiency enhanced by the larger time dimension, which provided a sufficient number of observations to ensure the validity of the instruments used. Van Bon (2015) investigated the impact of institutional quality on attracting foreign direct investment in 43 provinces of

Vietnam over a seven-year period (2005–2012) with T=7 and N=43. Although the time dimension was on the lower end, the relatively small number of entities allowed the diff-GMM estimator to perform effectively, controlling for unobserved heterogeneity and providing reliable estimates in the study's context. These examples illustrate that diff-GMM performs well when the number of time periods allows the estimator to address endogeneity and dynamic panel bias adequately.

However, in this study, with a time dimension of T=11 and N=719, several methodological challenges arose. A primary concern was instrument proliferation. When N is large relative to T, the model can generate an excessive number of instruments, which weakens the power of diagnostic tests such as the Hansen test, making it difficult to assess the validity of the instruments accurately. This overabundance of instruments can also lead to overfitting, where the model captures noise rather than the underlying relationships in the data, resulting in unreliable parameter estimates.

Another critical issue was finite sample bias. The diff-GMM method relies on differencing to eliminate fixed effects, but this process can reduce the variation in the data, particularly when T is not sufficiently large. This reduction can introduce bias, especially in the presence of strong persistence in the dependent variable. In such cases, the lagged instruments used by diff-GMM may be weak, further exacerbating bias and inefficiency in the estimates.

Dynamic panel bias remained a significant challenge when the time dimension was small. This bias arose when the lagged dependent variable correlated with the error term, leading to inconsistent estimates. While diff-GMM is designed to mitigate this issue, its

effectiveness diminishes in smaller T scenarios, particularly when the model's instruments are weak or overfitted.

Given these limitations, relying on the results from diff-GMM in contexts with a small T and large N should be approached with caution. The method’s inherent challenges in such settings can produce results that are less robust and more prone to bias. As a more robust alternative, sys-GMM was employed in subsequent analyses. sys-GMM, which combines differenced and level equations, generates a more reliable set of instruments, offering more efficient and valid estimates, particularly in scenarios where N is large and T is small.

While diff-GMM remains a valuable tool in dynamic panel data analysis, its application in contexts like this study—where T is moderate and N is large—requires careful consideration of its methodological limitations. The shift to sys-GMM was expected to address these challenges and provide more reliable insights.

4.17 System Generalized Method of Moments (Sys-GMM) Regression Analysis

Sys-GMM regression analysis addressed the challenges identified with the two-step diff-GMM estimator, particularly in the context of this study's panel data characteristics, where the number of entities (N) is large, and the time dimension (T) is moderate. The sys-GMM approach, designed to handle dynamic panel bias more effectively, offered an enhanced framework for dealing with the methodological challenges that arise when using diff-GMM in such contexts.

Sys-GMM combines the differenced and level equations in a system, generating instruments that are more robust and efficient, particularly when the time dimension is insufficient for the diff-GMM estimator to perform optimally. This dual-equation approach

helped mitigate the issue of weak instruments, a common concern in large-N, small-T panels, by leveraging both the cross-sectional and time-series dimensions of the data more effectively.

In this study, sys-GMM also employed the two-step method, as was the case with diff-GMM. The two-step GMM approach was preferred over the one-step GMM because the latter can lead to a significant loss of observations, especially in models with large datasets (Arellano and Bover, 1995; Roodman, 2009; Paleologou, 2022). While the one-step GMM is often used in studies with smaller sample sizes, such as those by Ledhem and Mekidiche (2021) with 75 observations and Bayiley (2022) with 140 observations, the large sample size in this study (7,516 observations) made the two-step GMM more appropriate.

Given the limitations of diff-GMM, sys-GMM provided a more reliable alternative in this study. It was expected to provide more valid estimates by reducing instrument proliferation, a significant issue in the diff-GMM model. By utilizing a system of equations, sys-GMM also addressed the potential biases introduced by dynamic relationships within the panel data, particularly the correlation between the lagged dependent variable and the error term, which can lead to inconsistent estimates.

The relevance of sys-GMM in capturing the dynamic and often nonlinear relationships within capital structure studies is well-supported in the literature. For instance, Ayaz et al. (2021) examined the relationship between leverage and firm performance in Malaysia, utilizing FE model and two-step sys-GMM models. They found that while leverage initially improves firm performance, its impact turns negative beyond an optimal level, highlighting the nonlinear effects of debt on performance. This study emphasized the utility of sys-GMM in capturing the effects of leverage on firm performance.

Similarly, Saif-Alyousfi et al. (2020) applied sys-GMM to analyse the determinants of capital structure in Malaysian firms. Their findings supported the propositions of the pecking order and trade-off theories, revealing significant impacts of profitability, growth opportunities, and liquidity on debt measures. This further demonstrated the applicability of sys-GMM in understanding the complex dynamics of capital structure decisions.

Beyond the Malaysian context, Khoa and Thai (2021) explored the trade-off theory of capital structure in Vietnamese real estate companies using sys-GMM. Their study highlighted the dynamic nature of capital structure adjustments in response to various influencing factors, providing empirical evidence of the theory's applicability in a rapidly growing market. Additionally, Khan et al. (2023b) examined capital structure decisions of banks in the MENA region using sys-GMM, identifying significant relationships between leverage and various macroeconomic and institutional factors, offering valuable insights for policymakers and bank managers in the region.

The sys-GMM model's robustness in handling these challenges was particularly relevant for this study's focus on the moderating effects of macroeconomic variables (GDP, OPR, VOL) on the relationship between capital structure and firm performance. The anticipated advantages of sys-GMM included more reliable and efficient parameter estimates, crucial for accurately capturing the dynamics between leverage and profitability in the presence of potential endogeneity and autocorrelation.

The analysis of the two-step system GMM model regression, with robust and cluster standard errors applied to account for potential heteroskedasticity and within-group correlation, as shown in Table 4.23, revealed significant findings across various parameters. For lagged ROA, all models consistently showed a strong positive coefficient, with

coefficients of 0.5267, 0.5615, and 0.5373 for the TDA, LDA, and SDA models, respectively, each significant at the 1% level (p-value 0.000). These results indicated that past firm performance strongly influenced current performance, highlighting the persistence of profitability over time.

Examining the relationship between debt ratios and firm performance, TDA exhibited a significant negative coefficient of -0.1302 (p-value 0.001), significant at the 1% level in the TDA model, demonstrating that higher leverage diminishes profitability. LDA, with a coefficient of -0.0744 (p-value 0.100), was marginally significant at the 10% level, indicating a potential, though less conclusive, negative impact on performance. In the SDA model, SDA had a significant negative coefficient of -0.1329 (p-value 0.044), significant at the 5% level, further affirming that increased short-term debt adversely affects firm performance.

Table 4.23: Results from Two-Step Sys-GMM Regression

Variables	TDA model			LDA model			SDA model		
	Coeff.	P>|z|		Coeff.	P>|z|		Coeff.	P>|z|	
L.ROA	0.5267	0.000	***	0.5615	0.000	***	0.5373	0.000	***
	(0.1085)			(0.1003)			(0.1213)		
TDA	-0.1302	0.001	***						
	(0.0379)								
LDA				-0.0744	0.100	*			
				(0.0453)					
SDA							-0.1329	0.044	**
							(0.0659)		
GDP	0.0506	0.443		0.0759	0.265		0.1387	0.144	
	(0.0660)			(0.0680)			(0.0948)		
GDP_TDA	2.2382	0.452							
	(2.9737)								
GDP_LDA				-3.1998	0.560				
				(5.4858)					
GDP_SDA							5.2393	0.435	
							(6.7166)		
OPR	-0.7757	0.131		-0.8685	0.138		-1.4887	0.012	**
	(0.5139)			(0.5857)			(0.5936)		
OPR_TDA	-29.0739	0.161							
	(20.7564)								

Table 4.23: continued

OPR_LDA		-9.9700 0.781 (35.7977)	
OPR_SDA			-58.9029 0.128 (38.7271)
VOL	-0.2205 0.019 ** (0.0942)	-0.2026 0.024 ** (0.0898)	-0.1476 0.235 (0.1243)
VOL_TDA	1.3747 0.767 (4.6415)		
VOL_LDA		-7.3796 0.433 (9.4188)	
VOL_SDA			6.8307 0.454 (9.1278)
SZE	0.0443 0.203 (0.0347)	0.0340 0.288 (0.0320)	0.0219 0.543 (0.0360)
TAN	-0.0679 0.074 * (0.0380)	-0.0795 0.026 ** (0.0356)	-0.0636 0.129 (0.0419)
LIQ	0.0003 0.845 (0.0017)	0.0004 0.794 (0.0016)	0.0005 0.801 (0.0019)
_cons	-0.2261 0.275 (0.2071)	-0.1641 0.383 (0.1881)	-0.0980 0.652 (0.2176)

Notes: The table presents the results from three separate multiple regression analyses estimated using the two-step sys-GMM, with ROA as the dependent variable. Each model includes a different capital structure variable (TDA, LDA, or SDA) as the main independent variable, while all other variables are held constant across specifications. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

The GDP variable and its interaction terms with debt ratios did not show significant impacts on firm performance across the models. The coefficients for GDP were 0.0506 (p-value 0.443), 0.0759 (p-value 0.265), and 0.1387 (p-value 0.144) for the TDA, LDA, and SDA models, respectively, with all p-values indicating insignificance. The interaction terms between GDP and debt ratios similarly lacked significance, suggesting that economic conditions, as measured by GDP growth, did not directly moderate the relationship between capital structure and firm performance in this context.

Regarding the OPR, the TDA and LDA models showed no significant impact of OPR on ROA, with coefficients of -0.7757 (p-value 0.131) and -0.8685 (p-value 0.138), respectively, both not significant. However, the SDA model revealed a significant negative

impact with a coefficient of -1.4887 (p-value 0.012), significant at the 5% level, indicating that higher interest rates significantly reduced firm performance. The interaction terms between OPR and debt ratios, although negative, did not significantly impact ROA, suggesting that while interest rates may have direct adverse effects, they did not significantly moderate the relationship between debt and profitability.

VOL presented a mixed picture. In the TDA and LDA models, VOL had a significant negative coefficient of -0.2205 (p-value 0.019) and -0.2026 (p-value 0.024), respectively, both significant at the 5% level, indicating that higher market volatility negatively impacted firm performance. However, in the SDA model, VOL did not significantly affect ROA, with a coefficient of -0.1476 (p-value 0.235). The interaction terms between VOL and debt ratios were also not significant across all models, implying that market volatility did not significantly moderate the relationship between capital structure and firm performance.

Firm-specific characteristics yielded varying results. SZE did not significantly impact ROA in any of the models, with coefficients close to zero and high p-values, suggesting that scale may not be a critical determinant of profitability. TAN exhibited a marginally significant negative coefficient of -0.0679 (p-value 0.074) in the TDA model, significant at the 10% level, and a significant negative coefficient of -0.0795 (p-value 0.026) in the LDA model, significant at the 5% level, indicating that higher tangibility may reduce profitability, likely due to reduced operational flexibility. In the SDA model, TAN was not significant. LIQ remained insignificant across all models, with coefficients close to zero and p-values indicating no significant impact on firm performance.

Finally, the constant term was not significant in any of the models, with coefficients of -0.2261 (p-value 0.275), -0.1641 (p-value 0.383), and -0.0980 (p-value 0.652), suggesting

that the baseline level of ROA, when all predictors are at zero, did not contribute meaningfully to the model's predictions.

Overall, the persistence of firm performance, as indicated by the significant positive lagged ROA across all models, was a key finding. Debt ratios, particularly TDA and SDA, exhibited a consistent negative relationship with firm performance. GDP and its interactions with debt ratios did not significantly influence ROA, while the impact of OPR was significant only in the SDA model. Stock market volatility negatively affected firm performance in the TDA and LDA models but not in the SDA model. Firm-specific factors, including size, tangibility, and liquidity, generally did not significantly impact performance, with tangibility showing some marginal effects.

4.17.1 Arellano-Bond Test for Autocorrelation

Table 4.24: Results from Arellano-Bond Test - Two-Step Sys-GMM

	TDA	LDA	SDA
Arellano-Bond test for AR(1) in first differences: Pr > z =	0.161	0.158	0.162
Arellano-Bond test for AR(2) in first differences: Pr > z =	0.233	0.216	0.238

Note: Author's computation using Stata 18.0

In the TDA model, the Arellano-Bond test for AR(1) in first differences reported a p-value of 0.161. While the rejection of the null hypothesis at AR(1) was expected due to the negative correlation introduced by differencing, this did not invalidate the model. The AR(2) test, which is the critical indicator of instrument validity, produced a p-value of 0.233,

indicating no significant second-order autocorrelation. This absence of AR(2) confirmed the validity of the instruments and supported the reliability of the model.

For the LDA model, the AR(1) test provided a p-value of 0.158, again reflecting expected first-order autocorrelation. The AR(2) test showed a p-value of 0.216, confirming the absence of second-order autocorrelation, thereby validating the instruments used in this model.

Similarly, in the SDA model, the AR(1) test yielded a p-value of 0.162, consistent with the expected first-order autocorrelation due to the differencing process. The AR(2) test reported a p-value of 0.238, indicating no significant second-order autocorrelation, thus confirming the validity of the instruments in this model as well.

Overall, the Arellano-Bond test results across all models consistently showed no significant second-order autocorrelation, which is critical according to Arellano and Bond (1991) and Roodman (2009). This lack of AR(2) validated the instruments used and confirmed the robustness of the two-step sys-GMM estimation in this analysis.

4.17.2 Hansen Test of Overidentifying Restrictions

Table 4.25: Results from Hansen Test - Two-Step Sys-GMM

	TDA	LDA	SDA
Hansen test of overid. restrictions: Prob > chi2 =	0.063	0.092	0.134

Note: Author's computation using Stata 18.0

In the TDA model, the test results yielded a p-value of 0.063, suggesting that the instruments used were valid and not over-identified. This outcome supported the reliability

of the model's findings, indicating that the instruments had been appropriately chosen and applied.

For the LDA model, the Hansen test reported a p-value of 0.092. This result further confirmed the validity of the instruments used, showing that they were neither over-identified nor invalid. The robustness of the Hansen test in this context affirmed that the instruments were suitable for capturing the dynamics within the LDA model.

In the SDA model, the Hansen test results showed a p-value of 0.134, providing strong evidence that the instruments were valid and appropriately specified. The higher p-value offered confidence in the reliability of the SDA model's results, suggesting that the instruments were well-aligned with the underlying data structure.

Across all three models—TDA, LDA, and SDA—the Hansen test results consistently indicated that the instruments used were valid and not over-identified. This consistency across different models reinforced the reliability and robustness of the sys-GMM estimation approach employed in this study. The validity of the instruments, as confirmed by the Hansen test, supported the overall credibility of the analysis and the conclusions drawn from these models.

4.17.3 GMM Models Comparison

The comparison between the two-step diff-GMM and sys-GMM models reveals several noteworthy differences, as shown in Table 4.20 and Table 4.23. Starting with the treatment of lagged ROA, both models consistently show a positive and significant coefficient, indicating that past firm performance is a robust predictor of current performance. However, the magnitude of the coefficients is slightly higher in the sys-GMM models (0.5267 to 0.5615) compared to the diff-GMM models (0.5885 to 0.5993). This

suggests that while both models capture the persistence of profitability, sys-GMM may provide a more conservative estimate of this persistence, possibly due to its enhanced ability to handle dynamic relationships within the panel data.

When examining the relationship between debt ratios and firm performance, the two models present different conclusions. In the diff-GMM analysis, the coefficients for TDA, LDA, and SDA are negative but not statistically significant, implying that while higher leverage might reduce firm performance, the effect cannot be conclusively determined. In contrast, the sys-GMM results show significant negative coefficients for TDA and SDA, indicating that higher leverage, particularly in total and short-term debt, indeed diminishes profitability. The more robust findings in the sys-GMM models suggest that this method may better capture the adverse impact of debt on firm performance, likely due to its ability to address issues like instrument proliferation and dynamic panel bias more effectively than diff-GMM.

The analysis of GDP and its interaction terms with debt ratios shows that neither model finds significant effects on firm performance. In both diff-GMM and sys-GMM analyses, the coefficients for GDP and its interactions with TDA, LDA, and SDA are insignificant, suggesting that broader economic conditions, as measured by GDP growth, do not have a direct or moderating effect on the relationship between capital structure and firm performance in this context. The consistency across both models indicates that GDP may not be a crucial determinant in this study's framework, regardless of the estimation method employed.

The impact of the OPR on firm performance also varies between the two models. In the diff-GMM analysis, OPR shows a significant negative impact on firm performance only

in the SDA model, with no significant effects observed in the TDA and LDA models. The sys-GMM results confirm the significant negative impact of OPR on SDA but do not find significant effects for TDA and LDA, similar to diff-GMM. This alignment between the models regarding the effect of OPR on short-term debt emphasizes the sensitivity of firms' profitability to interest rate changes, particularly when they rely more on short-term debt. However, the sys-GMM's results are slightly more robust, suggesting that it may provide a more reliable estimate of this relationship.

Regarding VOL, both diff-GMM and sys-GMM present a mixed picture, but sys-GMM findings are more definitive. In the diff-GMM analysis, VOL and its interaction terms do not show significant results across any model. However, in the sys-GMM analysis, VOL exhibits significant negative coefficients in the TDA and LDA models, indicating that higher market volatility negatively impacts firm performance. The lack of significance in the SDA model remains consistent across both methods. The sys-GMM model's ability to capture the adverse effects of market volatility more clearly suggests its superiority in handling complex relationships in the data.

Firm-specific factors, including SZE, TAN, and LIQ, generally do not significantly impact ROA in either model. In both diff-GMM and sys-GMM analyses, SZE and LIQ do not exhibit significant effects on firm performance, indicating that these factors may not be critical determinants in this context. However, TAN shows a marginally significant negative impact in the sys-GMM models for TDA and LDA, whereas it is only significant in the SDA model under diff-GMM. This suggests that sys-GMM might be slightly more sensitive to variations in asset tangibility and its effects on profitability, likely due to its improved handling of endogeneity and dynamic panel bias.

Finally, the constant term is not significant in any of the models across both methods. The coefficients for the constant term in diff-GMM and sys-GMM are close to zero and lack statistical significance, indicating that the baseline level of ROA, when all predictors are at zero, does not meaningfully contribute to the models' predictions. This consistency across both methods reinforces the notion that the specific predictors analysed, rather than an underlying baseline effect, drive firm performance in this study.

Overall, while both diff-GMM and sys-GMM models offer valuable insights into the relationship between capital structure and firm performance, sys-GMM generally provides more robust and reliable estimates. This is particularly evident in its treatment of lagged ROA, debt ratios, and market volatility, where sys-GMM consistently produces more significant and conclusive results. The consistency in the findings related to GDP and firm-specific factors across both models suggests that these variables may not be as influential in this context. However, the sys-GMM's ability to handle the complexities of dynamic panel data more effectively makes it the preferred method in this study, especially given the challenges associated with instrument proliferation and dynamic panel bias in large-N, moderate-T datasets.

4.18 Model Validation Procedure

The validation of the most suitable model for this study addressed five critical econometric challenges in panel data analysis: multicollinearity, heteroscedasticity, autocorrelation, endogeneity, and dynamic panel bias.

The procedure began with a thorough descriptive analysis to provide a detailed overview of the data’s distribution and characteristics (Mohammad et al., 2019; Sahari et al., 2019; Salam and Shourkashti, 2019; Zaidi et al., 2019; Mohammad and Bujang, 2020; Ayaz

et al., 2021; En and Malek, 2021; Foong et al., 2021; Tan et al., 2021; Lim and Naysary, 2022; Chen and Marsidi, 2023; Shaari and Kamarudin, 2024). This step was essential for identifying variability and potential outliers within the dataset. Significant variability was observed in firm performance (ROA), debt structures (TDA, LDA, SDA), and macroeconomic variables (GDP, OPR, VOL), highlighting the need for robust statistical methods to manage this diversity effectively.

Next, correlation and multicollinearity were examined. Pearson Correlation Matrix Analysis revealed significant relationships between variables, such as the negative correlation between ROA and debt ratios and positive correlations with firm size and liquidity (Mohammad et al., 2019; Sahari et al., 2019; Salam and Shourkashti, 2019; Mohammad and Bujang, 2020; Ramlan et al., 2020; Ayaz et al., 2021; En and Malek, 2021; Foong et al., 2021; Tan et al., 2021; Chen and Marsidi, 2023). To ensure reliable regression results, VIF analysis was conducted separately for TDA, LDA, and SDA, confirming that multicollinearity was within acceptable limits (Mohammad et al., 2019; Sahari et al., 2019; Salam and Shourkashti, 2019; Mohammad and Bujang, 2020; Ayaz et al., 2021; En and Malek, 2021; Foong et al., 2021).

Regression analysis followed, utilizing pooled OLS, RE, and FE models to explore the relationships between capital structure and firm performance (Mohammad et al., 2019; Sahari et al., 2019; Mohammad and Bujang, 2020; Ayaz et al., 2021; Tan et al., 2021; Chen and Marsidi, 2023). The pooled OLS model served as a baseline, indicating that higher debt levels generally negatively impact firm performance, with OPR providing a positive counterbalance. The RE model highlighted the detrimental effects of high leverage, particularly short-term debt, with significant variability across firms. The FE model corroborated the negative impact of debt on performance, with OPR exerting a positive

influence when moderated by total debt. F-Test and Hausman Test results confirmed the FE model's appropriateness for this analysis (Mohammad et al., 2019; Sahari et al., 2019; Mohammad and Bujang, 2020; Ayaz et al., 2021; En and Malek, 2021; Foong et al., 2021; Tan et al., 2021).

Heteroscedasticity and autocorrelation were addressed through diagnostics, including the Breusch-Pagan Test and Modified Wald Tests, which detected significant heteroscedasticity (Mohammad et al., 2019; Mohammad and Bujang, 2020; Ayaz et al., 2021; En and Malek, 2021; Foong et al., 2021; Tan et al., 2021; Chen and Marsidi, 2023), while the Inoue and Solo (2006) LM-Tests confirmed the presence of autocorrelation. In response, regression models were refined using the FE model with robust and clustered standard errors, as well as GLS and PCSE models. These adjustments ensured that estimates remained valid by correcting for heteroscedasticity, autocorrelation, and contemporaneous correlation. The FE model with robust and clustered standard errors consistently showed the negative impact of leverage on firm performance. The GLS and PCSE models further reinforced these findings, highlighting the varying effects of macroeconomic variables and firm-specific characteristics.

Endogeneity was tackled through the DWH test and the 2SLS method. The DWH test identified TDA, LDA, and SDA as endogenous, necessitating the use of IVs. The 2SLS method provided consistent estimates, confirming the significant negative effects of leverage on firm performance and the moderating roles of GDP and OPR. First-stage regression statistics and tests of overidentifying restrictions validated the instruments employed.

Dynamic panel bias was addressed through two-step diff-GMM and sys-GMM estimators. The two-step GMM approach was preferred over one-step GMM for its superior

efficiency and robustness, especially in large datasets. While the diff-GMM estimator revealed the persistence of firm performance, it was less conclusive regarding the broader effects of capital structure and macroeconomic variables. Conversely, the sys-GMM estimator offered more reliable estimates, effectively managing dynamic panel bias. It confirmed the negative impact of debt ratios on firm performance and clarified the moderating effects of economic conditions and firm-specific factors.

The two-step sys-GMM model was selected to test the hypotheses of this study, making it the optimal choice for the final analysis (Salam and Shourkashti, 2019; Ayaz et al., 2021). This selection was based on its ability to address the key issues of multicollinearity, heteroscedasticity, autocorrelation, endogeneity, and dynamic panel bias, particularly in a dataset with a large number of entities (N) and a moderate time dimension (T). The sys-GMM model excelled in managing multicollinearity by incorporating lagged values as instruments, crucial for time-series data. Additionally, using robust and clustered standard errors in the sys-GMM framework adjusted for both heteroscedasticity and autocorrelation, ensuring unbiased estimates. The sys-GMM approach was designed to handle endogeneity through internal instruments (lagged variables), effectively addressing potential reverse causality and omitted variable bias. By combining difference and level equations, sys-GMM mitigated dynamic panel bias, providing accurate estimates of the relationships between variables. The Arellano-Bond test and Hansen test validated the choice of instruments in the sys-GMM model (Salam and Shourkashti, 2019; Ayaz et al., 2021), confirming that the model was well-specified and reliable.

Although the two-step system GMM was ultimately selected as the optimal estimation technique, the static panel models were intentionally applied as a preliminary step in the analytical framework. These models played a critical role in establishing baseline

relationships, identifying data characteristics, and conducting specification diagnostics such as the Hausman, F, and Breusch–Pagan LM tests. This staged approach is widely adopted in empirical research to ensure that the transition to dynamic estimation is justified and methodologically sound. For instance, Faustino and Leitão (2005) used static panel models to examine intra-industry trade in the EU before validating their structure through GMM estimation. Similarly, Tinungki et al. (2022) applied static panel models to investigate dividend policies during COVID-19 and then proceeded with SYS-GMM to address endogeneity. In the context of financial risk modelling, Sudarsono et al. (2024) also adopted this two-stage approach, beginning with fixed and random effects estimations before implementing SYS-GMM. These studies demonstrate that static models serve as a critical foundation for advanced dynamic modelling, contributing to more robust and defensible empirical findings.

4.19 Robustness Checks

The model validation procedure identified the two-step sys-GMM as the optimal choice for the final analysis due to its effectiveness in addressing multicollinearity, heteroscedasticity, autocorrelation, endogeneity, and dynamic panel bias, particularly within a dataset characterized by a large number of entities (N) and a moderate time dimension (T). To ensure the reliability and consistency of the findings, several robustness checks were conducted using alternative models.

The robustness checks included the FE model with robust and clustered standard errors, the GLS model, the PCSE model, and the 2SLS model. By comparing the results obtained from these robustness models with those of the two-step sys-GMM model, the study aimed to confirm the stability and reliability of the estimated relationships. Consistent

results across these models strengthened the confidence in the findings, ensuring that the conclusions drawn were robust and not dependent on any single model. The robustness checks conducted for the TDA, LDA, and SDA models involved a comparison of the two-step sys-GMM results with those obtained from other estimation techniques, namely FE, GLS, PCSE, and 2SLS. The comparison of results from different models is shown in Table 4.26, Table 4.27, and Table 4.28, respectively.

The results in Table 4.26 show that TDA consistently had a negative and significant effect on ROA across all models, including FE, GLS, PCSE, 2SLS, and two-step sys-GMM. This consistency indicates that the negative impact of total debt on firm performance is robust to different model specifications. The coefficients for TDA varied slightly, but the overall negative trend remained significant, suggesting a strong and reliable negative relationship between total debt and firm performance.

Table 4.27 presents the robustness checks for the LDA model. Similar to the TDA model, LDA showed a consistently negative effect on ROA across all models. The two-step sys-GMM model showed a marginally significant negative coefficient for LDA, while the 2SLS model produced a highly significant negative effect. This consistency across various models reinforces the finding that long-term debt has a detrimental effect on firm performance. The robustness checks confirm that this relationship is not model-specific but a generalizable finding across different estimation techniques.

The robustness checks for the SDA model, as shown in Table 4.28, revealed a negative and significant relationship between short-term debt and ROA across most models. The two-step sys-GMM model also showed a significant negative effect, further validating the finding that short-term debt negatively impacts firm performance. The consistency of

these results across different models strengthens the conclusion that higher levels of short-term debt reduce profitability.

Table 4.26: Robustness Checks - TDA Model

Variable	FE	GLS	PCSE	2SLS	2S sys-GMM
L.ROA					0.5267 *** (0.1085)
TDA	-0.1562 *** (0.0287)	-0.1060 *** (0.0046)	-0.1349 *** (0.0174)	-2.2071 *** (0.2313)	-0.1302 *** (0.0379)
GDP	-0.0708 (0.0837)	0.0350 (0.0246)	-0.0456 (0.1445)	-0.2528 (0.2235)	0.0506 (0.0660)
GDP_TDA	0.1760 (0.5172)	-0.1832 (0.1499)	0.2658 (0.6063)	5.3002 *** (1.5553)	2.2382 (2.9737)
OPR	1.5566 *** (0.4511)	0.2175 * (0.1273)	0.3254 (0.7353)	2.3959 ** (0.9679)	-0.7757 (0.5139)
OPR_TDA	-4.3768 * (2.4390)	0.3567 (0.7549)	-3.3708 (2.8529)	-20.7504 *** (6.4343)	-29.0739 (20.7564)
VOL	-0.2510 ** (0.1193)	-0.0987 *** (0.0311)	-0.2683 (0.1914)	-0.0773 (0.3763)	-0.2205 ** (0.0942)
VOL_TDA	-0.1202 (0.8535)	-0.2393 (0.1952)	-0.0465 (0.8475)	14.3828 *** (2.9718)	1.3747 (4.6415)
SZE	0.0397 * (0.0210)	0.0134 *** (0.0012)	0.0360 *** (0.0042)	0.1889 *** (0.0188)	0.0443 (0.0347)
TAN	-0.0673 *** (0.0216)	-0.0171 *** (0.0031)	-0.0236 (0.0145)	0.0474 ** (0.0190)	-0.0679 * (0.0380)
LIQ	0.0003 (0.0021)	0.0001 (0.0002)	0.0015 (0.0012)	-0.0066 *** (0.0009)	0.0003 (0.0017)
_cons	-0.1761 (0.1214)	-0.0342 *** (0.0072)	-0.1719 *** (0.0237)	-1.0456 *** (0.1078)	-0.2261 (0.2071)

Notes: The table presents the estimated coefficients for each variable for TDA model across different regression models. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

Table 4.27: Robustness Checks - LDA Model

Variable	FE	GLS	PCSE	2SLS	2S sys-GMM
L.ROA					0.5615 *** (0.1003)
LDA	-0.0754 *** (0.0267)	-0.0727 *** (0.0054)	-0.0990 *** (0.0186)	-4.5035 *** (0.7078)	-0.0744 * (0.0453)
GDP	-0.0371 (0.0860)	0.0447 * (0.0239)	-0.0151 (0.1432)	0.0475 (0.3321)	0.0759 (0.0680)
GDP_LDA	-0.1360 (0.5710)	-0.3181 * (0.1675)	-0.2049 (0.5656)	15.7528 *** (3.8288)	-3.1998 (5.4858)
OPR	1.3433 *** (0.4663)	0.0978 (0.1248)	0.1392 (0.7310)	-1.0559 (1.4565)	-0.8685 (0.5857)
OPR_LDA	-2.2261 (2.4484)	2.2492 *** (0.8342)	0.8786 (2.5360)	-75.8271 *** (16.7550)	-9.9700 (35.7977)
VOL	-0.2261 * (0.1198)	-0.0969 *** (0.0300)	-0.2460 (0.1873)	0.1084 (0.5652)	-0.2026 ** (0.0898)
VOL_LDA	0.0413 (0.8821)	-0.1709 (0.2228)	0.0149 (0.7454)	31.6177 *** (7.1362)	-7.3796 (9.4188)
SZE	0.0303 (0.0227)	0.0120 *** (0.0012)	0.0324 *** (0.0049)	0.3352 *** (0.0506)	0.0340 (0.0320)
TAN	-0.0855 *** (0.0223)	-0.0200 *** (0.0031)	-0.0286 * (0.0150)	0.0331 (0.0277)	-0.0795 ** (0.0356)
LIQ	0.0005 (0.0021)	0.0007 *** (0.0002)	0.0017 (0.0011)	-0.0048 *** (0.0012)	0.0004 (0.0016)
_cons	-0.1178 (0.1322)	-0.0284 *** (0.0074)	-0.1508 *** (0.0279)	-1.8880 *** (0.2902)	-0.1641 (0.1881)

Notes: The table presents the estimated coefficients for each variable for LDA model across different regression models. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

Table 4.28: Robustness Checks - SDA Model

Variable	FE	GLS	PCSE	2SLS	2S sys-GMM
L.ROA					0.5373 *** (0.1213)
SDA	-0.1999 *** (0.0529)	-0.1073 *** (0.0067)	-0.1383 *** (0.0294)	-4.4014 *** (0.6356)	-0.1329 ** (0.0659)
GDP	-0.0758 (0.0816)	0.0456 * (0.0245)	-0.0299 (0.1501)	-0.6524 ** (0.3229)	0.1387 (0.0948)
GDP_SDA	0.3084 (0.7994)	0.2721 (0.2462)	0.8044 (0.9577)	6.8172 ** (3.2718)	5.2393 (6.7166)
OPR	1.6033 *** (0.4331)	0.2295 * (0.1273)	0.2533 (0.7719)	6.5421 *** (1.5677)	-1.4887 ** (0.5936)
OPR_SDA	-5.6709 (3.9871)	-3.6898 *** (1.2582)	-8.8988 * (4.9423)	31.1562 ** (15.0319)	-58.9029 (38.7271)
VOL	-0.2642 ** (0.1194)	-0.0925 *** (0.0312)	-0.2635 (0.1963)	-0.2755 (0.5197)	-0.1476 (0.1243)
VOL_SDA	-0.5000 (1.1813)	-0.1917 (0.3140)	-0.2189 (1.4052)	39.2981 *** (7.8690)	6.8307 (9.1278)
SZE	0.0285 (0.0215)	0.0057 *** (0.0012)	0.0272 *** (0.0043)	0.0492 *** (0.0092)	0.0219 (0.0360)
TAN	-0.0812 *** (0.0217)	-0.0180 *** (0.0032)	-0.0297 * (0.0153)	0.0599 ** (0.0268)	-0.0636 (0.0419)
LIQ	0.0003 (0.0022)	0.0002 (0.0002)	0.0016 (0.0012)	-0.0085 *** (0.0015)	0.0005 (0.0019)
_cons	-0.1080 (0.1247)	0.0097 (0.0072)	-0.1203 *** (0.0249)	-0.2419 *** (0.0535)	-0.0980 (0.2176)

Notes: The table presents the estimated coefficients for each variable for SDA model across different regression models. Standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Computation performed using Stata 18.0

Across all models, the relationship between debt ratios and firm performance consistently demonstrated a negative and significant effect, highlighting the robustness of the main finding that higher debt levels tend to negatively impact firm performance.

Regarding GDP, both as a direct and moderating variable, the results were mixed. In the TDA model, GDP as a direct variable was insignificant across all models. The two-step sys-GMM showed a positive relationship with ROA, aligning with GLS, while the remaining models indicated a negative relationship. When considering the moderating effect of GDP, only the 2SLS model showed a significant positive relationship. In the LDA model, GDP as a direct variable showed a positive significant relationship with ROA in the GLS model. For the moderating effect, most models exhibited a negative relationship, with the GLS model showing a significant negative relationship, while the 2SLS model presented a significant positive relationship. In the SDA model, the results indicated a negative relationship between GDP and ROA, with the 2SLS model showing significance.

The analysis of the OPR also revealed inconsistent results across the models. In the TDA model, as a direct variable, only the two-step sys-GMM indicated a negative relationship, which was insignificant. In contrast, the other models demonstrated a positive relationship, with the FE, GLS, and 2SLS models showing significance. When considering OPR as a moderating variable, the results were more consistent, with a generally negative relationship observed across the models. In the LDA model, as a direct variable, the two-step sys-GMM showed an insignificant negative relationship, which was consistent with the 2SLS model. Regarding OPR as a moderating variable, the two-step sys-GMM again showed an insignificant negative relationship, aligned with the 2SLS model, where the latter was significant. The results for the SDA model were similar to those of the TDA model.

The analysis of VOL revealed varied outcomes across the models. In the TDA model, when considering VOL as a direct variable, the two-step sys-GMM indicated a significant negative relationship, which was consistent with the FE and GLS models. When VOL was treated as a moderating variable, the results were mixed. In the LDA model, as a direct

variable, the two-step sys-GMM again showed a significant negative relationship, aligning with the FE and GLS models. When VOL was considered as a moderating variable, the results were mixed, with the two-step sys-GMM and 2SLS models demonstrating a positive relationship. For the SDA model, a negative relationship was consistently observed across all models when VOL was treated as a direct variable, but only the FE and GLS models reached significance.

The analysis of firm-specific factors revealed consistent patterns across the models. For SZE, a consistently positive relationship was observed across all models, although the two-step sys-GMM model was the only one that showed insignificance in some cases. For TAN, a negative relationship was found in the majority of the models, including the two-step sys-GMM, with only the PCSE model showing insignificance. For LIQ, an insignificant positive relationship was observed across all models except for the 2SLS model, which showed a significant negative relationship.

4.19.1 Conclusion from Robustness Checks

The robustness checks provided strong validation for using the two-step sys-GMM model, which consistently delivered reliable results across the TDA, LDA, and SDA models. When analysing firm-specific factors such as SZE, TAN, and LIQ, the consistency observed across different models reinforced the validity of these relationships. For example, SZE consistently showed a positive relationship with firm performance across all models, although the two-step sys-GMM sometimes indicated insignificance, likely due to the more rigorous control for endogeneity. TAN generally exhibited a negative relationship, except in the 2SLS model, where it occasionally showed a positive relationship, possibly due to model-specific sensitivities. LIQ followed a largely consistent pattern, although deviations

in the 2SLS model suggested that certain firm-specific dynamics might be more complex than initially assumed. Despite these occasional anomalies, the overall consistency across models strengthened the confidence in the core relationships between firm-specific factors and capital structure, affirming the robustness of the findings.

However, notable inconsistencies were observed when GDP, OPR, and VOL were considered as either direct or moderating variables. These inconsistencies likely stemmed from the inherent complexities of these macroeconomic variables, which may be sensitive to the specific analytical approach employed. These inconsistencies warrant careful consideration in interpreting the results and drawing conclusions. While the two-step sys-GMM provides a robust framework for addressing issues like endogeneity and dynamic panel bias, the varying results across different models for GDP, OPR, and VOL suggest that these factors introduce complexities that are sensitive to the specific analytical approach. This complexity highlights the need for cautious interpretation of the findings, particularly when drawing conclusions about the moderating effects of economic conditions, monetary policy, and market volatility.

The decision to use the results from the two-step sys-GMM model for hypotheses testing is justified based on several factors. Firstly, the two-step sys-GMM is specifically designed to address issues of endogeneity and dynamic panel bias, which are critical concerns in this study. Its ability to produce consistent estimators in the presence of such issues makes it a preferred choice, especially given the complexity of the dataset. Secondly, the two-step sys-GMM model consistently demonstrated robustness in the core relationships between debt ratios and firm performance, which are central to this study's objectives. While the inconsistencies observed in GDP, OPR, and VOL across different models suggest that these variables are sensitive to the estimation technique, the two-step sys-GMM remains the

most appropriate method for capturing the dynamic nature of the relationships being examined.

Therefore, despite the challenges posed by the inconsistencies in macroeconomic variables, the two-step sys-GMM model offers the most reliable and theoretically sound approach for hypotheses testing in this context. The model's ability to handle the complex relationships among variables, particularly in the presence of dynamic effects and potential endogeneity, provides a strong foundation for drawing valid conclusions from the analysis. Consequently, the results from the two-step sys-GMM model will be used for hypotheses testing, with the understanding that any limitations will be duly acknowledged and addressed in the interpretation of the findings.

4.20 Hypotheses Testing

The hypotheses testing examined the relationships between capital structure components and firm performance, along with the moderating effects of economic conditions, monetary policy, and market volatility. Table 4.23 presents the results, which were analysed using the two-step system GMM estimation, focusing on the significance and direction of these relationships. The findings are interpreted within the context of the underpinned theories developed in Section 2.7, with each hypothesis examined in detail.

4.20.1 Capital Structure and Firm Performance

The coefficient for TDA is -0.1302, with a p-value of 0.001, indicating a significant negative relationship between TDA and ROA at the 1% level. This finding supports the hypothesis (H1) that higher levels of total debt relative to assets are associated with lower firm performance. This result aligns with the trade-off theory, which suggests that although debt can offer tax benefits, excessive debt raises the risk of financial distress, thereby

reducing firm performance. The significant negative relationship implies that for the firms in the sample, the costs linked to high leverage surpass the benefits, leading to a decline in ROA as TDA increases.

The coefficient for LDA is -0.0744, with a p-value of 0.100, indicating a weaker but still statistically significant negative relationship with ROA at the 10% level, supporting hypothesis (H2). While long-term debt may provide greater flexibility in managing repayment schedules and interest obligations, the negative coefficient suggests that the associated risks can still reduce firm performance, especially if not managed carefully. This result, although less pronounced than that for TDA, is consistent with the trade-off theory's view that the risks of financial distress can outweigh the benefits of debt, even over a longer horizon.

For SDA, the coefficient is -0.1329 with a p-value of 0.044, showing a significant negative relationship with ROA at the 5% level, supporting hypothesis (H3). The stronger significance of this relationship compared to LDA suggests that short-term debt poses a more immediate threat to firm performance. Reliance on short-term debt, often accompanied by higher interest rates and frequent refinancing requirements, can strain a firm's financial resources, leading to a reduction in ROA. This finding is in line with the trade-off theory, where the risks associated with debt, particularly the risk of financial distress, outweigh the potential benefits when firms rely heavily on short-term financing.

Overall, the results from the two-step sys-GMM estimation align with the trade-off theory. The significant negative coefficients for TDA, LDA, and SDA indicate that while debt might offer tax advantages, the associated risks, particularly the risk of financial distress, tend to outweigh these benefits, resulting in reduced firm performance. The

different levels of significance among TDA, LDA, and SDA highlight the varying impact of debt types on firm performance, with short-term debt posing the highest risk, followed by total debt and long-term debt.

4.20.2 Moderating Effect of Economic Conditions

The coefficient for GDP_TDA is 2.2382, with a p-value of 0.452, indicating that the interaction between GDP and TDA is not statistically significant. This result does not support the hypothesis (H4) that GDP significantly moderates the relationship between TDA and ROA. Although the positive coefficient suggests that higher GDP could theoretically lessen the negative impact of TDA on ROA, the lack of statistical significance implies that GDP does not have a meaningful influence on the TDA-ROA relationship in this study. This finding suggests that other factors may be more critical in determining firm performance under varying economic conditions.

Similarly, the coefficient for GDP_LDA is -3.1998, with a p-value of 0.560, indicating no statistically significant moderating effect of GDP on the LDA-ROA relationship, contrary to hypothesis (H5). The negative coefficient suggests a possible increase in the negative impact of LDA on ROA during periods of economic growth, potentially due to overleveraging. However, the non-significant result implies that GDP does not meaningfully moderate this relationship within the sample.

For GDP_SDA, the coefficient is 5.2393 with a p-value of 0.435, indicating no statistically significant interaction between GDP and SDA. This finding does not support the hypothesis (H6) that GDP significantly moderates the relationship between SDA and ROA. While the positive coefficient hints at a potential reduction in the adverse impact of short-

term debt during periods of economic growth, the non-significant p-value indicates that GDP does not significantly alter the SDA-ROA relationship in this context.

These results challenge the applicability of market timing theory in this study. According to market timing theory, firms are expected to adjust their capital structure based on prevailing market conditions, such as economic growth. However, the findings do not support this expectation. The absence of significant moderating effects suggests that in this sample, firms' capital structure decisions in relation to GDP do not align with the predictions of market timing theory. This indicates that economic conditions, as measured by GDP, do not significantly influence the relationship between capital structure components and firm performance.

4.20.3 Moderating Effect of Monetary Policy

The coefficient for OPR_TDA is -29.0739 with a p-value of 0.161, indicating no statistically significant moderating effect of OPR on the TDA-ROA relationship, contrary to hypothesis (H7). The large negative coefficient suggests that an increase in OPR could potentially exacerbate the negative impact of TDA on ROA, likely due to higher debt servicing costs under tighter monetary policy. However, the lack of statistical significance implies that this potential effect is not robust in the context of this study.

Similarly, the coefficient for OPR_LDA is -9.9700 with a p-value of 0.781, showing no significant moderating effect of OPR on the LDA-ROA relationship, which does not support hypothesis (H8). The negative coefficient suggests that an increase in OPR could negatively impact firms with long-term debt, possibly due to higher refinancing costs. However, the non-significant result indicates that long-term debt, often with fixed interest

rates, is less sensitive to changes in OPR, reducing the impact of monetary policy on this aspect of capital structure.

For OPR_SDA, the coefficient is -58.9029 with a p-value of 0.128, indicating no statistically significant moderating effect of OPR on the SDA-ROA relationship, contrary to hypothesis (H9). While the large negative coefficient suggests that an increase in OPR could significantly worsen the performance of firms relying heavily on short-term debt, the non-significant p-value shows that this effect is not statistically meaningful within this study.

These findings challenge the applicability of the pecking order theory, which suggests that firms prefer internal financing and, consequently, might be less sensitive to changes in interest rates. Although the negative coefficients indicate that a higher OPR could exacerbate the negative impact of debt on firm performance, the non-significant results show that monetary policy, as measured by OPR, does not significantly affect the relationship between capital structure components and firm performance in this context. This questions the theory's assumption that firms can strategically manage their capital structure to minimize the influence of external factors such as interest rates.

4.20.4 Moderating Effect of Market Volatility

The coefficient for VOL_TDA is 1.3747 with a p-value of 0.767, indicating no statistically significant moderating effect of market volatility on the TDA-ROA relationship, contrary to hypothesis (H10). The positive coefficient suggests that higher market volatility could theoretically lessen the negative impact of TDA on ROA, as firms might adapt to uncertain environments by effectively managing debt levels. However, the lack of statistical significance indicates that market volatility does not meaningfully alter the TDA-ROA relationship in this sample.

The coefficient for VOL_LDA is -7.3796 with a p-value of 0.433, showing no statistically significant moderating effect of market volatility on the LDA-ROA relationship, which does not support hypothesis (H11). The negative coefficient suggests that increased market volatility could worsen the impact of LDA on ROA, as long-term debt becomes riskier in volatile markets. However, the non-significant p-value indicates that market volatility does not have a robust effect in this context.

The coefficient for VOL_SDA is 6.8307 with a p-value of 0.454, indicating no statistically significant moderating effect of market volatility on the SDA-ROA relationship, contrary to hypothesis (H12). Although the positive coefficient suggests that higher market volatility might reduce the negative impact of SDA by enhancing firms' agility in managing short-term debt, the lack of statistical significance means that market volatility does not significantly influence the SDA-ROA relationship in this dataset.

These results challenge the applicability of agency theory in this context. Agency theory suggests that conflicts of interest between managers and shareholders, particularly under volatile market conditions, could lead to suboptimal capital structure decisions. However, the non-significant interaction terms indicate that market volatility does not significantly alter the relationship between capital structure components and firm performance. This suggests that either firms in the sample have effective mechanisms to mitigate agency conflicts under volatile conditions, or other factors are more influential in determining firm performance during periods of market volatility.

4.20.5 Hypotheses Testing Summary

A concise summary of the results obtained from the hypotheses testing, encapsulating the key interpretations of each hypothesis, is shown in Table 4.29. It highlights the

relationship between the tested hypotheses and the corresponding theoretical implications, providing a quick reference to the findings discussed earlier.

Table 4.29: Hypotheses Testing Summary

Hypothesis	Results
H1: Significant negative relationship between TDA and ROA	Supports H1, consistent with trade-off theory
H2: Significant negative relationship between LDA and ROA	Supports H2, consistent with trade-off theory
H3: Significant negative relationship between SDA and ROA	Supports H3, consistent with trade-off theory
H4: GDP significantly moderates the TDA-ROA relationship	Does not support H4, challenges market timing theory
H5: GDP significantly moderates the LDA-ROA relationship	Does not support H5, challenges market timing theory
H6: GDP significantly moderates the SDA-ROA relationship	Does not support H6, challenges market timing theory
H7: OPR significantly moderates the TDA-ROA relationship	Does not support H7, challenges pecking order theory
H8: OPR significantly moderates the LDA-ROA relationship	Does not support H8, challenges pecking order theory
H9: OPR significantly moderates the SDA-ROA relationship	Does not support H9, challenges pecking order theory
H10: Market volatility significantly moderates the TDA-ROA relationship	Does not support H10, challenges agency theory
H11: Market volatility significantly moderates the LDA-ROA relationship	Does not support H11, challenges agency theory
H12: Market volatility significantly moderates the SDA-ROA relationship	Does not support H12, challenges agency theory

Note: Author (2025)

4.21 Chapter Summary

This chapter provided a detailed analysis of the relationship between capital structure and firm performance among non-financial firms listed on Bursa Malaysia. Key econometric challenges, such as multicollinearity, heteroscedasticity, autocorrelation, endogeneity, and

dynamic panel bias, were carefully addressed throughout the analysis. It began with descriptive statistics that highlighted significant variability in firm performance (ROA), debt structures (TDA, LDA, SDA), and macroeconomic variables (GDP, OPR, VOL), necessitating the use of robust statistical methods.

Correlation and multicollinearity were assessed through Pearson Correlation and VIF analyses, confirming that multicollinearity remained within acceptable limits. Regression analyses employing pooled OLS, RE, and FE models consistently showed the negative impact of higher debt levels on firm performance, with OPR having a positive moderating effect. Diagnostic tests identified heteroscedasticity and autocorrelation, prompting the use of refined FE models with robust and clustered standard errors, GLS, and PCSE, which all reinforced the negative impact of leverage on performance.

Endogeneity concerns were addressed using the DWH Test and 2SLS, which confirmed that leverage negatively affects firm performance. Dynamic panel bias was managed using two-step diff-GMM and sys-GMM estimators, with the two-step sys-GMM model emerging as the preferred choice due to its efficiency and robustness, particularly with large datasets. This model consistently highlighted the negative impact of debt ratios on firm performance and provided clarity on the moderating effects of economic conditions and firm-specific factors.

Robustness checks revealed some inconsistencies with GDP, OPR, and VOL as direct or moderating variables. Nonetheless, the two-step sys-GMM model proved to be the most reliable method for this study. Hypotheses testing confirmed a significant negative relationship between capital structure components and ROA, aligning with the trade-off

theory. However, the moderating effects of GDP, OPR, and VOL were not significant, suggesting that these theories might be less applicable in the Malaysian context.

The study will now progress to the discussions and conclusion in the next chapter, where the results will be compared with existing literature, providing insights into the dynamics of capital structure in emerging markets.

CHAPTER 5

DISCUSSIONS AND CONCLUSION

5.0 Introduction

This chapter provides a comprehensive discussion of the implications of the findings, aligned with the study's research objectives and questions. The discussion starts by examining the relationship between capital structure and firm performance, followed by an analysis of the influence of economic conditions, monetary policy, market volatility, past performance, and firm-specific factors. It also addresses the inconsistencies observed in the results for GDP, OPR, and VOL across different models. The chapter further explores how these findings relate to the initial problem statement and research objectives. Theoretical and practical implications are examined, emphasizing their relevance for both academics and practitioners. Additionally, the chapter discusses the study's limitations and suggests areas for future research. It concludes by summarizing the key findings and their broader significance, effectively bringing the study to a close.

5.1 Discussion on the Results

The discussion focuses on the relationship between capital structure and firm performance and how this relationship was influenced by economic conditions, monetary policy, and market volatility. The analysis used a two-step sys-GMM estimation, which provided insights into the direct and moderating effects of these variables across different models. The findings are compared with existing literature, identifying areas of agreement and divergence, and their implications are considered in the context of the Malaysian market. The discussion also addresses inconsistencies in the results, particularly regarding

macroeconomic variables, and explores how firm-specific factors and past performance impacted the overall analysis.

5.1.1 Capital Structure and Firm Performance

The two-step sys-GMM estimation revealed a clear and significant negative relationship between capital structure and firm performance, measured by ROA. Across all three capital structure proxies—TDA, LDA, and SDA—higher debt levels were associated with weaker firm performance. These results support hypotheses H1, H2, and H3 and align with the trade-off theory, which posits that although debt offers tax shields, excessive leverage increases the likelihood of financial distress, thereby reducing firm profitability.

Among the three forms of debt, short-term debt (SDA) had the most pronounced negative effect on ROA. This reflects the immediate strain imposed by short-term obligations, which typically carry higher refinancing risk and interest costs. The results are consistent with findings by Qiao (2023), Do et al. (2022), and Attom and Hamza (2021), who reported that firms in China, Vietnam, and Ghana experienced significant reductions in ROA due to high levels of short-term borrowing. These studies suggest that frequent refinancing and liquidity constraints linked to short-term debt impose a severe burden on operational performance.

Long-term debt (LDA) also showed a statistically significant negative relationship with ROA, though the effect was weaker than that of short-term debt. Despite having more manageable repayment structures, long-term borrowings still contribute to financial burden through interest obligations and reduced flexibility in capital allocation. Studies in Vietnam and Algeria confirm this pattern, where firms with elevated long-term debt ratios saw

reductions in profitability, indicating that the costs associated with long-term financial commitments often outweigh their structured benefits (Dat, 2024; Boussiki, 2023).

Total debt (TDA), which aggregates both long- and short-term components, showed a consistent and negative association with firm performance. This broad measure of leverage captures the cumulative strain of debt on firm operations. Studies from various contexts reinforce this observation. In India, manufacturing firms with higher debt-equity ratios recorded lower ROA, a trend also documented among Chinese firms, supporting the trade-off theory's prediction that excessive leverage curtails firm performance through heightened bankruptcy risk (Panchal and Chand, 2023; Qiao, 2023). Further support comes from Hussain et al. (2024), who applied GMM estimation on Pakistani firms and found that the total debt ratio exerted a strong inverse effect on ROA, again validating the trade-off theory within dynamic panel settings.

This negative leverage-performance relationship has been documented across a wide range of emerging markets and industries. For example, Bedada (2020) observed adverse effects of TDA and LTDA on ROA in Tigray's manufacturing sector, while Linqing (2021) reported similar results in China's real estate sector. In the Vietnamese food and beverage sector, Dat (2022) found that all major debt ratios—including total, short-term, and long-term—diminished profitability. Likewise, Hussein (2020) confirmed the detrimental effect of both short- and long-term debts on ROA using a sample of Egyptian firms. Malaysian evidence from Salam and Shourkashti (2019) aligns with these patterns, highlighting significant negative correlations between total debt and firm performance among non-financial listed companies.

Despite the general trend, several sector-specific and context-driven studies reported divergent outcomes. For instance, Zaidi et al. (2019) found that both short- and long-term debts had a positive impact on ROA within Malaysia's consumer product industry. Mohammad and Bujang (2020) observed contrasting results between sectors: negative for finance firms and positive for plantation companies. Ramlan et al. (2020) also noted a positive relationship between leverage and firm performance in the trading and services sector. Ayaz et al. (2021), analyzing a broader sample of Malaysian non-financial firms, found that moderate leverage improved performance, interpreting the results within the frameworks of both trade-off and agency cost theories.

Other studies add nuance to these sectoral differences. En and Malek (2021) found that only short-term debt negatively influenced ROA in the technology sector, while other forms were insignificant. Foong et al. (2021) reported weak positive but largely insignificant relationships between various debt ratios and performance in the plantation sector. In the property sector, Tan et al. (2021) found no significant impact of either short- or long-term debt. Healthcare firms examined by Lim and Naysary (2022) also showed no notable association, suggesting that certain industries may be more resilient to debt exposure.

Macroeconomic context also plays a role. Shaari and Kamarudin (2024), examining the COVID-19 period, found that while total debt reduced firm performance, long-term debt had a positive effect due to its liquidity benefits. Their study also highlighted the mitigating role of government aid during the crisis, which helped soften the negative impact of leverage—a factor not captured in the present research.

While the evidence from this study reinforces the trade-off theory by confirming that higher leverage generally reduces firm performance across Malaysian non-financial firms,

it also reveals the complexity of this relationship. The effect of debt on performance is not uniform—it is shaped by debt maturity, sectoral characteristics, macroeconomic conditions, and firm-specific strategies. These findings support a cautious approach to debt financing and highlight the importance of contextual factors in interpreting capital structure decisions.

5.1.2 Moderating and Direct Effects of Economic Conditions

The analysis of the moderating role of economic conditions—measured through GDP—on the relationship between capital structure and firm performance revealed statistically insignificant results across all interaction terms. Although positive and negative coefficients emerged for the respective GDP-capital structure interactions, none were significant at conventional levels, suggesting that GDP does not meaningfully alter the influence of capital structure on firm performance within the Malaysian context.

From a theoretical standpoint, these findings challenge the relevance of market timing theory in explaining firm behaviour in this dataset. Market timing theory posits that firms strategically adjust their capital structure based on prevailing macroeconomic conditions, such as periods of economic expansion or contraction. In an economic upswing, firms are expected to increase equity issuance to avoid overleveraging, while during downturns, they may rely more on debt due to declining equity valuations. The expectation under this theory is that economic growth—captured by higher GDP—would moderate the negative impact of debt by creating more favourable financing conditions and improving firm performance.

However, the results of this study do not support such a mechanism. For example, while the interaction term GDP_TDA had a positive coefficient—suggesting that GDP growth might reduce the adverse impact of total debt on ROA—its insignificance indicates

that this theoretical moderating effect is not empirically supported. Similarly, the negative sign for GDP_LDA implies that economic growth could exacerbate the negative impact of long-term debt, perhaps due to increased borrowing during optimistic periods, but this too lacks statistical support. The GDP_SDA interaction showed a weak positive sign, hinting that short-term debt may be less damaging in strong economic periods, but again, this effect is not robust.

The direct relationship between GDP and ROA was also found to be statistically insignificant. This is another departure from what market timing theory would suggest—that firm performance improves during economic expansion due to increased demand, higher profitability, and improved access to financing. The absence of a significant direct effect indicates that Malaysian firms in this sample may not experience performance gains from macroeconomic growth in a predictable or uniform way.

Comparing these findings with existing literature further highlights the complexity and context-dependence of the relationship between macroeconomic variables and firm-level outcomes. For instance, Curry and Fikri (2022) reported a significant moderating effect of GDP on capital structure-performance dynamics in Indonesian firms, consistent with market timing expectations. The discrepancy with the present study may reflect structural differences between the Malaysian and Indonesian economies, such as varying levels of financial market development, government intervention, or industry composition.

Similarly, Khan et al. (2023b) found a positive link between GDP and leverage in MENA-region banks, suggesting that economic growth encourages borrowing. However, their study focused on leverage decisions rather than firm performance, which may explain the divergence. Studies such as Julkid and Lau (2020) and Shahzad et al. (2021) also support

a significant relationship between GDP and capital structure among Malaysian and SAARC-region firms, respectively. Again, these works emphasize the determinants of capital structure rather than its performance consequences, making direct comparison with the current study difficult.

The contrast is further highlighted by Rehan et al. (2024), who found a significant negative relationship between GDP and capital structure in SAARC-region banks, suggesting counter-cyclical leverage behaviour. However, this also relates more to capital structure formation than to its performance impact, and within a banking context rather than the broader non-financial sector examined here.

The findings of this study reveal that GDP does not play a statistically significant moderating or direct role in the relationship between capital structure and firm performance among Malaysian non-financial firms. This result runs counter to the expectations of market timing theory, suggesting that these firms may not actively adjust their financing strategies in response to macroeconomic cycles—or that such adjustments do not meaningfully affect performance outcomes. Instead, the findings imply that other factors—such as firm-specific characteristics, industry conditions, or alternative macroeconomic indicators—may exert stronger influences on performance than GDP fluctuations.

5.1.3 Moderating and Direct Effects of Monetary Policy

This study examined the role of monetary policy—represented by the OPR—in moderating the relationship between capital structure and firm performance among Malaysian firms. The interaction terms between OPR and the three capital structure measures (TDA, LDA, and SDA) were found to be statistically insignificant. These results

indicate that monetary policy, at least as captured by OPR, does not significantly alter how leverage influences performance in the Malaysian context.

From a theoretical lens, this outcome challenges the explanatory power of the pecking order theory. According to this theory, firms prefer internal financing and only resort to debt when internal resources are insufficient. Consequently, firms that follow this hierarchy are presumed to be less exposed to the effects of external factors such as interest rate fluctuations. If firms predominantly use retained earnings or low-risk debt financing, changes in OPR should not significantly moderate the relationship between capital structure and performance. The findings in this study, particularly the insignificant interaction effects, align with this aspect of the theory, suggesting that Malaysian firms may not actively rebalance their capital structure in response to interest rate changes.

However, the pecking order theory also assumes that when external financing is required, firms favour debt over equity due to information asymmetry. Under this framework, an increase in interest rates should discourage additional borrowing, particularly short-term debt, as it becomes more costly. Yet, the lack of a moderating effect in this study implies that firms do not adjust their debt structure significantly in response to OPR fluctuations. This questions the degree to which Malaysian firms follow pecking order behaviour or manage their capital structure with strategic responsiveness to monetary conditions.

Although moderating effects were insignificant, the analysis of direct effects of OPR revealed important insights, particularly concerning short-term debt. The direct relationship between OPR and ROA was significantly negative in the presence of high SDA, suggesting that firms heavily reliant on short-term financing are vulnerable to interest rate hikes. This

makes intuitive sense: short-term debt is often more sensitive to market interest rate fluctuations, and increases in the OPR raise borrowing costs, immediately eroding profitability. This finding does not contradict the pecking order theory outright, but rather points to the consequences for firms that have deviated from its preference for internal financing and low-risk capital sources.

The direct effects of OPR on ROA in models using TDA and LDA, however, were not statistically significant. This suggests that long-term borrowing or total leverage may be less affected by short-term shifts in monetary policy—possibly due to fixed-rate structures or strategic planning that cushions against rate changes. Again, this reinforces the idea that maturity structure matters and that short-term debt poses greater exposure to interest rate volatility.

When compared with prior studies, the findings in this study present a more constrained view of the influence of monetary policy on capital structure-performance dynamics. For example, Hussain et al. (2020) showed that interest rates significantly influenced capital structure decisions, particularly when interacting with firm size in Pakistani sugar firms. However, their study emphasized the determinants of capital structure rather than performance outcomes. Similarly, Saif-Alyousfi et al. (2020) and Julkid and Lau (2020) found that interest rates were important determinants of leverage in Malaysian firms, indicating that firms adjust their debt levels in response to monetary policy. But again, these studies did not address whether such adjustments translate into improved or worsened performance, which is the focus here.

Ayala and Blazsek (2020) extended this line of inquiry by showing that firms in the United States adjust their capital structure in response to interest rate levels. Their evidence

supports the argument that monetary policy shapes financing behaviour. However, like earlier studies, their emphasis was on capital structure formation rather than performance outcomes. In contrast, the present study suggests that while monetary policy might influence debt decisions, it does not significantly moderate the impact of debt on performance outcomes in the Malaysian setting.

It is important to note that while these comparative studies use general interest rates, the use of OPR in the Malaysian context is directly relevant. The OPR serves as the benchmark for domestic lending rates, making it an appropriate proxy for assessing the effects of monetary policy on firm-level financial dynamics.

Although the hypothesized moderating effect of OPR was not statistically supported, the significant direct negative impact of OPR on firms with high short-term debt exposure offers practical insight into how monetary policy affects performance. This highlights the importance of debt maturity in shaping sensitivity to macroeconomic conditions. From a theoretical perspective, the findings only partially align with the pecking order theory: while firms may prefer internal financing and thus show low responsiveness to interest rate shifts overall, those that rely on short-term external financing remain exposed to the adverse effects of monetary tightening. These insights suggest that firm behaviour in response to monetary policy is complex and context-dependent, requiring further investigation into how financing strategy and debt maturity jointly shape performance outcomes.

5.1.4 Moderating and Direct Effects of Market Volatility

This study assessed the extent to which VOL moderates the relationship between capital structure and firm performance among Malaysian firms. Across all models—whether involving total debt, long-term debt, or short-term debt—the interaction terms with VOL

were statistically insignificant. While the direction of the coefficients suggested potential moderating effects, the absence of statistical significance indicates that market volatility does not meaningfully alter the capital structure–performance relationship in this context.

From a theoretical perspective, these results challenge the applicability of agency theory, which anticipates heightened agency problems in volatile environments. According to the theory, increased market uncertainty exacerbates conflicts between managers and shareholders, particularly over risk-taking and debt usage. In periods of high volatility, managers might either over-leverage to pursue risky projects that serve their personal interests (moral hazard), or under-leverage to avoid risk altogether, depending on their incentives. Either case could lead to suboptimal capital structure choices that weaken firm performance.

However, the findings in this study suggest that market volatility does not significantly moderate the impact of capital structure on firm performance. For example, the positive coefficient for the VOL_TDA interaction implies that firms may become more cautious and disciplined in managing total debt during volatile periods. Similarly, the negative coefficient for VOL_LDA might indicate that long-term debt becomes riskier under unstable market conditions. The positive VOL_SDA interaction hints at agility in managing short-term debt amidst uncertainty. Despite these theoretical interpretations, none of these relationships were statistically significant, indicating that agency problems expected under volatile conditions may be either mitigated or not as influential as theory predicts—at least in the Malaysian context.

One possible explanation is that Malaysian firms may have adopted sound internal governance mechanisms or conservative debt policies that limit the adverse effects of agency

conflicts, even in volatile environments. Alternatively, other macroeconomic or firm-specific factors—such as cash reserves, managerial discipline, or institutional support—may exert a stronger influence on capital structure outcomes than market volatility.

When examining VOL as a direct predictor of firm performance, the results were partially significant. VOL had a significant negative effect on ROA in the TDA and LDA models, indicating that market volatility directly undermines firm performance—especially for firms with higher total or long-term debt levels. This aligns with agency theory's core premise: in volatile markets, firm value can erode due to increased uncertainty and inefficient managerial behaviour. The non-significant effect of VOL in the SDA model, however, may suggest that short-term debt is either managed more flexibly during volatile periods or is less exposed to market-driven performance risks. This contrast in the direct effects across different debt maturities supports the idea that the structure and duration of debt play a critical role in determining how market volatility translates into performance outcomes.

The findings also diverge from those of Vuong et al. (2022), who examined Chinese firms and found that market volatility influenced capital structure adjustments: increasing total and short-term debt while decreasing long-term debt. Their focus, however, was on how volatility shapes financing decisions, rather than performance. In contrast, this study evaluated whether volatility changes the impact of capital structure on firm performance—and found no evidence of such moderation. This distinction highlights the complexity of the capital structure–performance–volatility nexus and highlights the context-specific nature of these relationships.

While market volatility had some direct negative effects on performance, its role as a moderator between capital structure and ROA was not statistically supported. These results

suggest that agency theory, while conceptually relevant, does not fully explain firm behaviour under volatile market conditions in Malaysia. The limited moderating role of VOL could reflect firm resilience, sectoral stability, or risk-averse financial practices. Future research could explore whether these dynamics vary across firm sizes, industries, or during specific macroeconomic shocks to better capture the conditional role of volatility in capital structure-performance interactions.

5.1.5 Inconsistencies in the Results for GDP, OPR and VOL

The inconsistencies in the results for GDP, OPR, and VOL across different models highlight the intricate and complex nature of analysing the moderating effects of macroeconomic variables on the relationship between capital structure and firm performance. These discrepancies revealed that the interactions involving GDP, OPR, and VOL are highly sensitive to the analytical methods employed, including the assumptions and specifications unique to each model. While the two-step sys-GMM model is robust in addressing issues such as endogeneity and dynamic panel bias, it may still face challenges in fully capturing the complex dynamics at play, especially when dealing with macroeconomic variables that exert a broad, economy-wide influence on firms.

This sensitivity arises because GDP, OPR, and VOL are macroeconomic variables that impact all firms within an economy, creating a uniform influence across the board. However, the degree to which these variables affect firm performance can vary widely depending on the sector and the specific characteristics of each firm. The interactions involving these macroeconomic variables are particularly susceptible to changes in model assumptions, such as how heterogeneity across firms is treated or how lagged effects are incorporated. For example, in some models, GDP might show a strong moderating effect on

the relationship between capital structure and firm performance, while in others, this effect may appear weaker or even insignificant, depending on how time-varying factors or firm-specific characteristics are accounted for.

In contrast, firm-specific factors such as TDA, LDA, SDA, SZE, TAN, and LIQ are inherently tied to each firm's unique characteristics and operational context. These factors are influenced by the individual firm's strategies, management decisions, and market position, leading to varying levels of impact on firm performance. Unlike GDP, OPR, and VOL, which are common factors shared across all firms, firm-specific variables reflect the diversity and heterogeneity within the corporate sector. The sensitivity of GDP, OPR, and VOL to different analytical methods highlights the challenge of disentangling the effects of these broad, economy-wide variables from the more localized, firm-specific factors that also drive performance outcomes.

For instance, TDA reflects a firm's leverage, which results from decisions made by the firm's management based on internal policies and the external environment. The impact of GDP on TDA's relationship with firm performance might be moderated differently in various sectors, depending on how sensitive the sector is to economic cycles. Similarly, the moderating effect of OPR on LDA might differ across firms depending on their debt maturity structures and their sector's exposure to interest rate changes. VOL might interact with SDA differently depending on a firm's LIQ and the sector's overall market sentiment.

A significant challenge in comparing these findings with existing literature is the limited number of studies that examine the moderating role of macroeconomic variables, particularly OPR and VOL, in the context of capital structure and firm performance. This scarcity presents a considerable gap in the literature, making it difficult to draw comparisons

and justify the results conclusively. The lack of extensive research on OPR and VOL as moderators may stem from the complexity of accurately capturing these effects, the availability of comprehensive data, or a historical focus on other macroeconomic variables like GDP. Exploring how OPR and VOL interact with firm-specific factors to influence firm performance is crucial for expanding the existing body of knowledge in this area.

For example, the moderating effect of GDP identified in some studies can be tentatively compared to the findings of Curry and Fikri (2022). However, this comparison is constrained by the fact that Curry and Fikri (2022) focus exclusively on food and beverage companies listed on the IDX from 2013 to 2019, utilizing the FE model for panel data regression. The differences in scope, sectoral focus, and methodology suggest that the findings may not be directly applicable to a broader sample or different analytical approaches. Even if Curry and Fikri (2022) had expanded their sample to include all companies on the IDX and employed a dynamic model regression, it remains uncertain whether the significant moderating effect of GDP would have persisted.

Regarding the moderating effect of OPR, the most pertinent comparison is with Hussain et al. (2020), who explored the moderating roles of company size and interest rates in the capital structure of 29 listed Pakistani enterprises in the sugar market over six years (2013–2018). This study employed both static and dynamic panel analyses, yielding significant results for the moderators. However, it is crucial to note that their research primarily focused on how significant factors such as interest rates and firm size influenced capital structure, rather than examining how capital structure impacts firm performance. Moreover, the study's limited sample size and specific sectoral focus may restrict the generalizability of its findings.

Regarding the moderating effect of VOL, the study by Vuong et al. (2022) offers a relevant point of comparison, as it is one of the first to investigate the link between stock market volatility and capital structure decisions in an emerging market context. This study focused on the volatility of returns on the Shanghai Stock Exchange Composite Index and its impact on the capital structure choices of listed firms in China. Despite utilizing a robust and well-balanced panel data set over 11 years, Vuong et al.'s (2022) reliance on quantile regression, rather than a dynamic approach, may limit the robustness of their findings. Additionally, similar to the study by Hussain et al. (2020), Vuong et al. (2022) did not explore the moderating role of market volatility on the relationship between capital structure and firm performance but instead examined its direct impact on capital structure decisions.

Importantly, the observed inconsistencies do not imply that the results of this study are unreliable. Instead, they highlight the inherent complexity in modelling macroeconomic interactions at the firm level and reinforce the need for careful model specification. The adoption of two-step sys-GMM as the final estimator, which corrects for endogeneity, dynamic bias, and unobserved heterogeneity, ensures that the core findings remain robust and credible despite the methodological challenges involved.

5.1.6 Firm-Specific Factors Effects

The results concerning firm-specific factors provide a clear understanding of their effects on firm performance. The analysis using the two-step sys-GMM revealed that SZE did not significantly impact ROA across the models. This finding suggests that firm scale might not be a decisive factor in determining profitability within the context of this study. This outcome diverges from the findings of Ayaz et al. (2021), Mansour et al. (2023), Ahmed

et al. (2023), Alfawareh (2022), and Shaari and Kamarudin (2024), who all reported a significant positive relationship between firm size and profitability.

TAN presented mixed results across different models. In the TDA model, TAN showed a marginally significant negative relationship with ROA, which became more pronounced in the LDA model. This suggests that higher tangibility may reduce profitability, potentially due to the inflexibility in operations that often accompanies substantial tangible assets. These results partially align with Alfawareh (2022) and Shaari and Kamarudin (2024), who found a significant negative relationship between tangibility and ROA. However, the findings differ from Ayaz et al. (2021) and Salam and Shourkashti (2019), where tangibility was found to be insignificant, and from Shaari and Kamarudin (2024), where tangibility had a positive significance in certain contexts.

LIQ, across all models, consistently showed an insignificant impact on ROA, with coefficients close to zero. This insignificance contrasts with Ayaz et al. (2021) and Salam and Shourkashti (2019), who found a significant negative relationship between liquidity and ROA, and with Shaari and Kamarudin (2024), who reported a significant positive relationship.

The robustness checks further corroborate these findings, showing consistent patterns across different model specifications. While SZE generally exhibited a positive relationship with ROA in most models, it remained insignificant in the two-step sys-GMM model. This consistency suggests that while firm size might be positively correlated with profitability in some contexts, it does not appear to have a statistically significant effect in the GMM framework. Similarly, the negative relationship of TAN with ROA was observed across most models, except in the 2SLS model, where a positive relationship was noted. This

anomaly highlights the potential variability in results depending on the estimation method used. LIQ, on the other hand, remained insignificant in most models except for the 2SLS model, where it exhibited a significant negative relationship, further emphasizing the complexities in determining its effect on firm performance.

The firm-specific factors analysed in this study, particularly firm size, tangibility, and liquidity, yielded mixed results regarding their impact on firm performance. The discrepancies between this study and previous research might be attributed to differences in methodological approaches, sample composition, and the specific context of the firms analysed, particularly within the Malaysian economic landscape. These findings highlight the importance of considering multiple factors and models when assessing firm performance, as results can vary significantly depending on the variables and methods employed.

5.1.7 Past Performance Effects

The consistent finding in this study is the significant negative relationship between capital structure and firm performance, which holds across all models. For firm-specific factors, while there are some anomalies in the robustness checks, the overall consistency suggests that these factors are not a major concern. However, the inconsistencies observed in macroeconomic factors across robustness checks raise concerns, particularly regarding the reliability of these findings. Despite a thorough discussion in Section 5.1.5, one key aspect that merits further attention is the dynamic nature of the data, specifically the influence of the lagged dependent variable.

For lagged ROA, all models consistently showed a strong positive relationship with current performance. This indicates that past firm performance has a significant influence on current performance, highlighting the persistence of profitability over time. The significant

relationship exhibited by lagged ROA justifies the use of dynamic panel data regression in this study. The dynamic panel data regression method is particularly well-suited for capturing these temporal effects, as it accounts for the impact of previous periods' performance on current outcomes. This approach allows for a more accurate and comprehensive analysis of the factors influencing firm performance, particularly when considering the potential lagged effects of both firm-specific and macroeconomic variables.

Moreover, reverse causality, where future performance expectations might influence current capital structure decisions, is a potential concern. This study addresses it by using the system GMM approach, which handles endogeneity through internal instruments like lagged ROA. The validity of these instruments, confirmed by the Hansen and Arellano-Bond tests, ensures that the observed relationships are not driven by reverse causality. Consequently, the strong influence of past performance on current outcomes may also explain the inconsistencies in macroeconomic factors, which static panel data regression did not fully capture. This emphasizes the importance of dynamic panel data regression in revealing the complex temporal dependencies in the data.

The findings of this study align with those of Ayaz et al. (2021), who also observed a significant positive relationship between lagged ROA and current ROA using a dynamic system GMM model. They emphasized the necessity of this approach to mitigate endogeneity concerns, which is consistent with the methodology adopted in this study. Similarly, Saif-Alyousfi et al. (2020) found that lagged dependent variables in their dynamic GMM analysis were significant predictors of current performance, reinforcing the idea that past performance is a strong determinant of future outcomes. Akhter et al. (2023) and Amin and Çek (2023) also reported a significant positive relationship between lagged ROA and

current ROA, using the two-step system GMM estimator to control for endogeneity issues, which further validates the robustness of these findings.

In contrast, Salam and Shourkashti (2019) reported mixed results, with lagged ROA showing a negative relationship with current ROA when total debt to total assets was used as the independent variable, but a positive relationship when market value to total debt was employed. However, both relationships were insignificant, suggesting that the impact of past performance on current outcomes may vary depending on the specific measures of capital structure and market context. Similarly, Ye (2021), in a study on capital structure and corporate performance in China, found a positive but insignificant relationship between lagged ROA and current ROA. These variations indicate that while the persistence of profitability is a common finding, its significance may depend on the specific context and market conditions.

Overall, the consistent positive relationship between past and current performance observed across various studies, despite some variations in specific outcomes, reinforces the robustness of this study's findings. It also situates the results within the broader literature, emphasizing the importance of accounting for past performance in dynamic models of firm performance.

5.2 Addressing Problem Statement, Research Objectives, and Research Questions

The study aimed to understand how recent political, economic, and financial developments in Malaysia have impacted the relationship between capital structure and firm performance. The focus was on evaluating both the direct effects of capital structure on firm performance and how this relationship is influenced by factors such as economic conditions, monetary policy, and market volatility.

The problem statement identified the challenges Malaysian firms face in optimizing their capital structure amid a volatile economic landscape. This environment, characterized by political instability, economic shocks like the COVID-19 pandemic, and fluctuating market conditions, creates significant risks. The findings align with these challenges, showing a strong negative relationship between various forms of debt (TDA, LDA, SDA) and firm performance. This relationship highlights the financial strain and risks associated with high debt levels during uncertain times.

The study also found that the expected moderating effects of macroeconomic factors—GDP growth, monetary policies, and market volatility—were less significant than anticipated. This suggests that Malaysian firms might be more influenced by internal factors and broader market trends rather than by these specific macroeconomic variables. These results contribute to the ongoing discussion about the primary drivers of firm performance in emerging markets like Malaysia.

The main objective—to explore the impact of capital structure on the performance of companies listed on Bursa Malaysia—was achieved. The results clearly demonstrate that higher debt levels are associated with poorer firm performance, supporting the relevance of the trade-off theory in the Malaysian context. However, the specific objectives related to the moderating effects of economic conditions, monetary policy, and market volatility produced mixed results. While the direct relationship between capital structure and firm performance was evident, the anticipated moderating effects were largely insignificant, challenging some initial assumptions and indicating the need for further research into these complex relationships. Specifically, to address the research objectives, the study answered the corresponding research questions.

In addressing the first research question, the study confirmed a significant relationship between capital structure and firm performance, with higher debt levels leading to lower performance as measured by ROA. This finding affirms the importance of the trade-off theory in the Malaysian context.

Regarding the second research question, which examined whether economic conditions moderate the relationship between capital structure and firm performance, no significant moderating effects from GDP growth were found. This result suggests that while economic conditions are important for overall firm operations, firms have already adapted to these conditions, making their performance more reliant on internal factors such as management practices, operational efficiency, and firm-specific strategies, rather than on broader economic trends. This adaptation could reduce the sensitivity of firm performance to changes in GDP.

The third research question explored whether monetary policy, as indicated by changes in the OPR, moderates the relationship between capital structure and firm performance. The findings revealed that OPR changes did not significantly affect this relationship, implying that firms may have anticipated these monetary policy changes and adjusted their financial strategies accordingly. This anticipation could involve locking in fixed interest rates, refinancing debt before expected rate changes, or optimizing their capital structure to minimize the impact of fluctuating interest rates. As a result, the direct effect of OPR changes on the relationship between debt levels and firm performance is reduced.

The fourth research question examined whether market volatility moderates the relationship between capital structure and firm performance. The findings showed that stock market volatility did not have a significant moderating effect, which suggests that firms may

have developed effective strategies to manage the risks associated with market fluctuations. These strategies could include diversifying revenue streams, using financial hedging instruments, or maintaining conservative debt levels to buffer against the unpredictability of the market. Additionally, firms might focus more on long-term goals rather than reacting to short-term market movements, reducing the impact of volatility on their overall performance. This ability to manage or absorb market shocks might explain why the expected influence of volatility on the debt-performance relationship was not observed in the study.

The study confirmed the direct negative impact of debt on firm performance, while the anticipated moderating effects of macroeconomic variables were less pronounced. These findings add to the understanding of how both external and internal factors shape firm performance in Malaysia.

5.3 Implications of the Study

The findings of this study offer important implications for both academic research and practical applications in corporate finance, particularly within the context of emerging markets like Malaysia. These implications span across theoretical insights, policy considerations, and managerial practices.

5.3.1 Theoretical Implications

This study contributes to the existing literature on capital structure and firm performance by providing empirical evidence from an emerging market. The findings reaffirm the relevance of the trade-off theory in explaining the relationship between capital structure and firm performance among Malaysian firms. The observed negative relationship between debt levels and firm performance aligns with the theory's assertion that firms

balance the benefits of debt, such as tax shields, against the costs, including financial distress and agency problems. This study further extends the theory by highlighting that, in the Malaysian context, the impact of debt is more pronounced during periods of economic instability, suggesting that firms in emerging markets may experience heightened sensitivity to debt-related risks.

The study also challenges some conventional assumptions about the moderating effects of macroeconomic factors. The lack of significant moderating effects from GDP growth, OPR adjustments, and market volatility suggests that these external variables may not play as pivotal a role in shaping the debt-performance relationship as previously thought. This finding opens up new avenues for understanding the role of firm-specific factors and internal strategies that might mitigate the influence of broader economic conditions.

5.3.2 Policy Implications

The results of this study carry significant implications for policymakers, particularly in the realm of monetary policy and economic regulation. The findings indicate that adjustments in the OPR by BNM do not significantly moderate the relationship between capital structure and firm performance. This suggests that while monetary policy is crucial for overall economic stability, its direct impact on firm-level financial decisions, specifically regarding debt management, may be limited. Policymakers should consider this when designing and implementing monetary policies, understanding that firms may already be adjusting their financial strategies in anticipation of such changes.

Moreover, the absence of significant moderating effects from GDP growth and market volatility implies that broader economic policies aimed at stabilizing the economy may not directly influence firm performance through capital structure adjustments. This

could lead policymakers to focus more on creating an environment that supports firm-level resilience and adaptability, rather than relying solely on macroeconomic levers. Initiatives that enhance corporate governance, encourage financial literacy, and promote the development of robust risk management practices could be more effective in ensuring that firms are better equipped to manage their capital structures in uncertain times.

5.3.3 Managerial Implications

The findings of this study offer several practical implications for corporate managers, particularly in navigating the relationship between capital structure and firm performance in uncertain economic environments. The consistently negative and significant impact of debt ratios on firm performance highlights the importance of prudent leverage management. High debt levels, may increase financial risk and reduce profitability. Managers should therefore consider maintaining a balanced capital structure that supports growth while minimizing exposure to financial distress, especially during periods of economic uncertainty.

The study also reveals that both firm-specific and macroeconomic variables yielded mixed and model-dependent results, suggesting that no single factor dominates in determining performance outcomes. This reinforces the importance of adopting a holistic financial strategy that is adaptable to both internal and external conditions. While internal strategies such as enhancing operational efficiency or strengthening management practices were not directly tested, the variability in results indicates that firm performance is shaped by complex interactions between financial structure, firm characteristics, and macroeconomic forces. Managers should thus remain attentive to both internal financial indicators and external policy or market signals when making strategic decisions.

While the macroeconomic variables examined in this study—GDP, OPR, and VOL—did not exhibit consistently significant effects on firm performance, this does not imply that external conditions are irrelevant. Rather, it suggests that their impact may be indirect, sector-specific, or moderated by other unobserved factors. Managers should therefore remain aware of external developments, even if immediate performance implications are not always evident. More importantly, the results emphasize the stronger and more consistent influence of capital structure on firm performance. This highlights the need for prudent debt management, with a focus on avoiding excessive short-term leverage that can constrain operational flexibility and increase financial risk.

5.3.4 Implications for Investors

The findings of this study provide several important insights for investors, particularly in the context of emerging markets like Malaysia. Across all models, TDA, LDA, and SDA exhibited a significant negative relationship with firm performance. This suggests that firms with higher leverage—regardless of maturity structure—are more likely to experience lower profitability. Investors should therefore view high levels of corporate debt as a potential risk factor and prioritise firms with more conservative capital structures when making investment decisions.

While both firm-specific and macroeconomic variables were included in this study, the results did not show a clear or consistent dominance of either category in explaining firm performance. The effects of capital structure variables—particularly total, long-term, and short-term debt—were significant and negative across models, indicating that leverage decisions are important considerations for investors. However, other firm-specific indicators such as size, tangibility, and liquidity produced weak or insignificant results, while

macroeconomic variables such as GDP, OPR, and VOL showed inconsistent effects depending on the model specification.

Given this variability, investors should adopt a balanced approach that considers both firm-level financial indicators—especially leverage—and the broader economic environment when evaluating investment opportunities. The findings suggest that no single set of factors offers a complete picture of firm performance, reinforcing the need for comprehensive financial analysis in investment decision-making.

5.4 Limitations of the Study

While this study provides valuable insights, it is important to acknowledge several limitations that may influence the interpretation and generalization of the findings.

5.4.1 Data Limitations

One of the primary limitations of this study is related to data availability and quality. The analysis relied on financial data from non-financial firms listed on Bursa Malaysia, covering the period from 2012 to 2022. This data was primarily sourced from Orbis. While Orbis served as the main collection centre, the correctness of the data heavily depended on the accuracy of the information it provided. Although some inaccuracies were detected and corrected by double-checking with annual reports, the large sample size of 719 final selected companies made it impractical to verify each data point individually. Consequently, there may still be undetected errors or inconsistencies in the data that could affect the robustness of the results.

Additionally, this study did not account for off-balance-sheet financing or other forms of debt that may not be fully captured in the financial statements. This omission could

potentially lead to an underestimation of the total debt burden of firms, thereby affecting the accuracy of the analysis on the relationship between capital structure and firm performance. These limitations suggest that while the data set is comprehensive, the findings should be interpreted with caution, particularly regarding the completeness and precision of the financial data used.

5.4.2 Methodological Limitations

The study employed both static and dynamic panel data techniques, including sys-GMM, to account for potential endogeneity issues. However, despite these efforts, the potential for bias due to unobserved heterogeneity and omitted variable bias remains. The choice of instruments in the sys-GMM framework, while carefully considered, could influence the results, particularly if the instruments are weak or not fully exogenous.

Additionally, the inclusion of three moderating variables—GDP, OPR, and VOL—introduced three interaction terms in the multiple regression analysis. The presence of these interaction terms can complicate the model and potentially affect the results, particularly in terms of multicollinearity and the stability of the estimates. This complexity is apparent in the inconsistencies of results across different models regarding these macroeconomic variables. The varying outcomes suggest that the inclusion of multiple interaction terms may have influenced the robustness and reliability of the findings, making it challenging to draw definitive conclusions about the individual effects of each moderator on the relationship between capital structure and firm performance. These inconsistencies highlight the need for caution when interpreting the results.

5.4.3 Focus on Moderating Variables

While the study examined the moderating effects of macroeconomic variables such as GDP, OPR, and VOL on the relationship between capital structure and firm performance, it did not fully explore other potential moderating factors. For instance, firm-specific characteristics such as ownership structure, corporate governance practices, or management quality could also play a significant role in shaping this relationship. The exclusion of these factors limits the study's ability to fully capture the complexity of the capital structure-performance nexus.

Additionally, it is important to note that this may be one of the first studies to specifically use OPR and VOL as moderating variables in this context. Although previous studies have considered interest rates as a moderating factor, they typically do not focus on the OPR (or its equivalent) set by BNM (or its equivalent). Moreover, the inclusion of VOL as a moderating variable is also novel, as previous studies have not typically explored this aspect.

While these choices offer novel insights, they also present limitations, particularly due to the lack of references and previous studies that have employed these specific variables in similar contexts. This lack of precedent in the literature means that the study's findings regarding OPR and VOL as moderating factors are relatively isolated and may require further validation. The limited references to prior studies using these specific variables may also restrict the ability to generalize the results or fully integrate them into the broader body of knowledge on capital structure and firm performance.

5.4.4 Time Frame Considerations

The study covered a decade-long period from 2012 to 2022, a timeframe that included several significant events such as the COVID-19 pandemic, periods of political instability in Malaysia, fluctuations in global economic conditions, and various changes in monetary policy. While this timeframe provides valuable insights into how these events have impacted the relationship between capital structure and firm performance, it also introduces certain limitations.

Firstly, the findings may be heavily influenced by the specific circumstances and unique challenges presented during this period. For example, the COVID-19 pandemic led to unprecedented economic disruptions, including widespread lockdowns, shifts in consumer behaviour, and significant government interventions in the economy. These factors may have caused firms to adopt short-term financial strategies that do not necessarily reflect their usual behaviour under more stable conditions. As a result, the study's results might capture short-term responses to these crises rather than long-term trends.

Secondly, the decade-long period, while substantial, may not encompass the full spectrum of economic cycles, such as prolonged recessions or extended periods of economic boom, which can have distinct effects on the relationship between capital structure and firm performance. The timeframe may also miss out on other critical events or phases that could significantly alter firm behaviour and financial decision-making, limiting the ability to generalize the findings over longer periods or different economic contexts.

Finally, while the study provides a snapshot of how firms responded to the challenges within this specific period, it may not fully account for the evolving nature of financial markets, regulatory environments, or technological advancements that could influence

capital structure decisions in the future. As such, while the findings offer important insights, they should be interpreted with an understanding of these temporal limitations.

5.5 Recommendations for Future Research

Building on the findings and limitations of this study, several avenues for future research are suggested to deepen the understanding of the relationship between capital structure and firm performance, particularly in the context of emerging markets like Malaysia.

5.5.1 Exploration of Small and Medium Enterprises (SMEs)

This study focused primarily on large, publicly listed companies on Bursa Malaysia. Future research could expand the scope to include SMEs, which represent a significant portion of the Malaysian economy. SMEs often have different capital structure dynamics compared to larger firms due to their limited access to capital markets, different risk profiles, and reliance on alternative financing sources. Investigating how these factors influence the relationship between capital structure and firm performance in SMEs would provide valuable insights and could potentially lead to different conclusions than those found in larger firms.

5.5.2 Analysis of the ACE and LEAP Markets

In addition to the Main Market of Bursa Malaysia, the ACE Market and the LEAP Market offer alternative platforms for smaller and high-growth companies to raise capital. Research could explore how capital structure decisions in firms listed on these markets differ from those on the Main Market and how these differences impact firm performance. Given the specific characteristics and regulatory frameworks of these markets, such studies could

provide a clearer understanding of the capital structure-performance relationship in different segments of the economy.

5.5.3 Broader Examination of Macroeconomic Moderators

While this study focused on GDP, OPR, and VOL as macroeconomic moderators, future research could explore additional macroeconomic factors that might influence the capital structure-performance relationship. Variables such as inflation rates, exchange rates, and government fiscal policies could be investigated to see if they have a significant moderating effect. Moreover, considering the global interconnectedness of financial markets, examining the impact of international economic conditions and external shocks on Malaysian firms could offer a more comprehensive view.

5.5.4 Exploring Firm-Specific Factors

While traditional firm-specific factors like size, tangibility, and liquidity have been extensively studied, future research could break new ground by investigating less commonly examined attributes. Factors such as a firm's digital transformation strategy, environmental sustainability practices, or cultural diversity within leadership teams might offer fresh insights into how internal company dynamics influence the relationship between capital structure and performance. By focusing on these unconventional aspects, researchers could uncover new dimensions of firm behaviour that impact financial outcomes in ways not yet fully understood.

5.5.5 Investigating the Impact of Economic Shocks and Recovery Patterns

Instead of traditional longitudinal studies, future research could focus on the impact of specific economic shocks, such as the COVID-19 pandemic or geopolitical events, and

how firms' capital structures adapt during these periods. This approach would emphasize the immediate responses and recovery patterns of firms, providing insights into how they navigate sudden economic disruptions. By analysing short-term adjustments and recovery strategies, researchers can gain a better understanding of how firms manage their capital structure in the face of unexpected challenges, potentially uncovering strategies that contribute to resilience and long-term success.

5.5.6 Impact of Technological Advancements and Market Innovations

As the financial markets and the broader economy continue to evolve, technological advancements and market innovations play an increasingly important role in shaping firm behaviour. Future studies could explore how developments such as fintech, digital finance, and alternative financing platforms are influencing capital structure decisions and, in turn, firm performance. Understanding these impacts would be particularly relevant for firms operating in highly dynamic and innovative sectors.

5.5.7 Exploring the Potential of AI in Financial Decision-Making

While the full integration of AI into capital structure management may still be decades away, future research could explore the early stages of AI adoption in financial decision-making. This might include examining how AI tools are currently being used for tasks like credit risk assessment, financial forecasting, or optimizing investment decisions. By focusing on these initial applications, researchers can gain insights into how AI might gradually influence capital structure strategies over time. This approach allows for a realistic assessment of AI's potential impact on financial practices, acknowledging that widespread adoption is still in its infancy.

5.5.8 Detailed Examination of the Role of OPR and VOL

Given the novel use of OPR and VOL as moderating variables in this study, future research should continue to explore their roles in greater detail. This could involve different methodological approaches, such as structural equation modelling or advanced econometric techniques, to better capture the complexities of these relationships. Additionally, further studies could explore the specific channels through which OPR and VOL influence firm performance, potentially leading to more refined and actionable insights.

5.6 Conclusion

This study has set out to examine the relationship between capital structure and firm performance within the context of Malaysia's evolving economic landscape. Through a detailed analysis employing both static and dynamic panel data techniques, particularly the two-step system GMM estimator, the study aimed to answer key research questions related to how economic conditions, monetary policy, and market volatility influence this relationship.

The findings of this study reveal a significant negative relationship between various forms of debt (total, long-term, and short-term) and firm performance. This outcome highlights the importance of carefully managing debt levels, especially in uncertain economic environments, as high leverage can severely impact a firm's financial health and operational success. The results support the trade-off theory, indicating that the costs associated with high levels of debt, such as financial distress and the risk of default, often outweigh the potential tax benefits, leading to a decline in firm performance.

However, the moderating effects of macroeconomic variables, specifically GDP growth, OPR, and market volatility, have not been as pronounced as initially hypothesized.

The study finds that these factors do not significantly alter the relationship between capital structure and firm performance in this context. This suggests that firms in Malaysia may be more influenced by internal factors and strategic management decisions than by external economic conditions.

The study also addresses the complex and sometimes inconsistent results across different models, particularly concerning the macroeconomic variables. These inconsistencies highlight the challenges of capturing the full impact of broad, economy-wide factors on firm-specific outcomes. The sensitivity of the results to different methodological approaches suggests a need for further research, particularly focusing on the role of firm-specific characteristics and more granular economic indicators.

While this study has contributed valuable insights into the dynamics of capital structure and firm performance in Malaysia, it also identifies several areas where further exploration is needed. The findings reinforce the importance of internal management practices and suggest that future research should delve deeper into the specific mechanisms through which firms navigate the challenges posed by debt and external economic factors. The study's implications for both theory and practice are significant, providing a foundation for future work in this critical area of corporate finance.

REFERENCES

Aali-Bujari, A., Venegas-Martínez, F., & Pérez-Lechuga, G. (2016). Impact of derivatives markets on economic growth in some of the major world economies: A difference-GMM panel data estimation (2002–2014). Aesti matio: The IEB International Journal of Finance, 12, 110–127. https://doi.org/10.5605/IEB.12.6

Abbana, S., & Marimuthu, F. (2023). Financing of state-owned entities: Can the Trade-off Theory explain the debt structure? International Journal of Entrepreneurship and Sustainability Studies, 3(1), 62–78. https://doi.org/10.31098/ijeass.v3i1.1483

Abdelhameed, F. A., & Rashdan, A. M. (2021). A deeper look into political instability and economic growth: Case study and empirical analysis on a selection of countries. Research in World Economy, 12(3), 18–31. https://doi.org/10.5430/rwe.v12n3p18

Abdullah, H., & Tursoy, T. (2021). Capital structure and firm performance: Evidence of Germany under IFRS adoption. Review of Managerial Science, 15(2), 379–398. https://doi.org/10.1007/s11846-019-00344-5

Abdullazade, Z. (2020). Empirical test of pecking order theory for the US listed firms. Corporate Law: Law & Finance eJournal, No. 3583126, pp. 1–28. SSRN. https://doi.org/10.2139/ssrn.3583126

Agustin, K. L., Dharmmesti, A. D., & Khairiyah, N. M. (2022). The effect of debt to equity ratio, debt to asset ratio, and risk-based capital on return on asset in general insurance companies on the Indonesia Stock Exchange for 2015–2021 period. MEC-J (Management and Economics Journal), 6(3), 237–248. https://doi.org/10.18860/mec-j.v6i3.17418

Ahmad, Z., Abdullah, N. M. H., & Roslan, S. (2012). Capital structure effect on firms performance: Focusing on consumers and industrials sectors on Malaysian firms. International Review of Business Research Papers, 8, 137–155. https://doi.org/10.1.1.458.8815

Ahmad, Z., Mahmood, R., & Zahari, A. S. M. (2022a). The impact of COVID-19 on credit risk: An assessment in Malaysian banking system. International Journal of Academic Research in Economics and Management Sciences, 11(3), 331–341. https://doi.org/10.6007/ijarems/v11-i3/14732

Ahmad, A. M., Hassan, S. U., & Abubakar, A. (2022b). Impact of capital structure on financial performance of listed agricultural companies in Nigeria. Gusau Journal of Accounting and Finance, 3(3), 192–204. https://doi.org/10.57233/gujaf.v3i3.189

Ahmed, A. M., Sharif, N. A., Ali, M. N., & Hágen, I. (2023). Effect of firm size on the association between capital structure and profitability. Sustainability, 15(14), 11196. https://doi.org/10.3390/su151411196

Ahmed, Z., & Hla, D. T. (2019). Stock return volatility and capital structure measures of nonfinancial firms in a dynamic panel model: Evidence from Pakistan. International Journal of Finance & Economics, 24(1), 604–628. https://doi.org/10.1002/ijfe.1682

Ai, H., Frank, M. Z., & Sanati, A. (2020). The trade-off theory of corporate capital structure. Corporate Finance: Capital Structure & Payout Policies eJournal, 1–64. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3595492

Aini, H. N., Ispriyanti, D., & Suparti, S. (2023). Analisis regresi faktor panel dinamis Blundell–Bond dengan estimasi system-generalized method of moment pada saham

farmasi di BEI. Jurnal Gaussian, 11(3), 447–457. https://doi.org/10.14710/j.gauss.11.3.447-457

Akewugberu, H. O., Umar, S. M., Musa, U. M., Ishaaq, O. O., Ibrahim, A., Osi, A. A., & Ganiyat, A. F. (2024). Breusch–Pagan test: A comprehensive evaluation of its performance in detecting heteroscedasticity across linear, exponential, quadratic, and square root structures using Monte Carlo simulations. FUDMA Journal of Sciences, 8(6), 233–239. https://doi.org/10.33003/fjs-2024-0806-2826

Akhter, T., Sultana, S., & Azad, A. K. (2023). Capital structure, firm performance and risk exposure: New evidence from OECD countries. Managing Global Transitions, 21(4), 329–351. https://doi.org/10.26493/1854-6935.21.329-351

Akpa, V. O., Asikhia, O. U., & Nneji, N. E. (2021). Organizational culture and organizational performance: A review of literature. International Journal of Advances in Engineering and Management, 3(1), 361–372. https://doi.org/10.35629/5252-0301361372

Al-ahdal, W., Hashim, H., Almaqtari, F., & Saudagaran, S. (2023). The moderating effect of an audit committee on the relationship between ownership structure and firm performance: Evidence from emerging markets. Cogent Business & Management, 10(1), 2194151. https://doi.org/10.1080/23311975.2023.2194151

Al Jazeera. (2017, February 20). Malaysia–North Korea row over Kim Jong-nam escalates. https://www.aljazeera.com/news/2017/2/20/malaysia-north-korea-row-over-kim-jong-nam-escalates

Albahadly, A. R., & Al-Hashemi, H. A. A. (2023). The impact of the market timing theory on the financial structure of the Iraq Stock Exchange. International Journal on

Economics, Finance and Sustainable Development, 5(7), 106–123. https://doi.org/10.31149/ijefsd.v5i7.4643

Alfawareh, F. A. (2022). The relationship between capital structure and performance of non-financial firms listed on the Amman Stock Exchange. Research Journal of Finance and Accounting, 13(2), 96–102. https://doi.org/10.7176/RJFA/13-2-09

Alter, A., & Elekdag, S. (2020). Emerging market corporate leverage and global financial conditions. Journal of Corporate Finance, 62, 101590. https://doi.org/10.1016/j.jcorpfin.2020.101590

Ambrose, S., & Inuwa, M. B. (2024). Impact of capital structure on financial performance of listed consumer goods companies in Nigeria. IDOSR Journal of Arts and Humanities, 10(3), 1–16. https://doi.org/10.59298/idosrjah/2024/103.1160000

Amin, H. I. M., & Çek, K. (2023). The effect of golden ratio-based capital structure on firm's financial performance. Sustainability, 15(9), 7424. https://doi.org/10.3390/su15097424

Amin, M. I., Ahsan, A., Muktadir, M. A., Azad, M., & Rezanur, R. H. B. (2021). Macroeconomic and firm-specific factors influencing non-performing loans in Bangladesh: A panel data regression approach. The Journal of Asian Finance, Economics and Business, 8(12), 95–105. https://doi.org/10.13106/jafeb.2021.vol8.no12.0095

Amirah, W. (2022). The Malaysian economy and COVID-19: Policies and responses from January 2020–April 2021. United Nations Conference on Trade and Development. https://unctad.org/system/files/official-document/BRI-Project_RP30_en.pdf

Anand, V. (2022). Southeast Asia and the Ukraine crisis. National Security, 5(3), 324–336. https://doi.org/10.32381/NS.2022.05.03.3

Anggraeni, K., & Syarief, M. (2024). Pengaruh NPL dan inflasi terhadap ROA pada Bank BUMN yang terdaftar di BEI periode 2013–2023. BanKu: Jurnal Perbankan dan Keuangan, 5(2), 114–123. https://doi.org/10.37058/banku.v5i2.11873

Ansca, C. C. (2019). The effect of capital structure and financial structure on firm performance (An empirical study of the financial crisis 2008 and 2009 in Indonesia). Jurnal Akuntansi dan Keuangan Indonesia, 16(2), 206–223. https://doi.org/10.21002/jaki.2019.11

Anugrahani, A. (2021). Moderating effect of board structure on equity market timing—capital structure relationship of Indonesian manufacturing companies. Ekonomi Bisnis, 26(1), 13–26. https://doi.org/10.17977/UM042V26I1P13-26

Apfel, N., & Liang, X. (2024). Agglomerative hierarchical clustering for selecting valid instrumental variables. Journal of Applied Econometrics, 39(7), 1201–1219. https://doi.org/10.1002/jae.3078

Aprianti, V., & Khomsiyah, K. (2022). Capital Structure, Accounting Conservatism, Agency Cost, dan Firm Value. Owner: Riset Dan Jurnal Akuntansi, 6(4), 3881-3888. https://doi.org/10.33395/owner.v6i4.1133

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. The Review of Economic Studies, 58(2), 277–297. https://doi.org/10.2307/2297968

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics, 68(1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-D

Asaolu, A. F. (2021). Capital structure and firm performance: A comparative study of oil & gas and manufacturing sectors in the United States of America. Business and Management Studies, 7(1), 29–44. https://doi.org/10.11114/BMS.V7I1.5130

Attom, B. E., & Hamza, N. (2021). Capital structure and firm performance: Evidence from manufacturing companies listed on the Ghana Stock Exchange (GSE). The International Journal of Business & Management, 9(4), 158–170. https://doi.org/10.24940/theijbm/2021/v9/i4/158532-390208-1-SM

Ayala, A., & Blazsek, S. (2020). Score-driven panel data models of the capital structure of US firms. Applied Economics Letters, 28, 1666–1670. https://doi.org/10.1080/13504851.2020.1845293

Ayaz, M., Mohamed Zabri, S., & Ahmad, K. (2021). An empirical investigation on the impact of capital structure on firm performance: Evidence from Malaysia. Managerial Finance, 47(8), 1107–1127. https://doi.org/10.1108/MF-11-2019-0586

Babeshko, L. O., & Kharitonov, D. A. (2024). Testing heteroscedasticity of the Russian and Indian trade turnover model: The Breusch–Pagan test. Soft Measurements and Computing, 12(85), 5–13. https://doi.org/10.36871/2618-9976.2024.12.001

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. The Journal of Finance, 57(1), 1–32. https://doi.org/10.1111/1540-6261.00414

Balboula, M. Z., & Shemes, M. A. (2025, February). The impact of financial distress on capital structure following Egypt's currency flotation: The moderating role of board characteristics and ownership structure. Journal of Applied Accounting Research, 26(3), 756–784. https://doi.org/10.1108/JAAR-04-2024-0151

Baltagi, B. H. (2005). Econometric analysis of panel data (3rd ed.). John Wiley & Sons. https://library.wbi.ac.id/repository/27.pdf

Bank Negara Malaysia. (n.d.). Overnight policy rate decisions. Bank Negara Malaysia. Retrieved May 9, 2024, from https://www.bnm.gov.my/monetary-stability/opr-decisions

Basa, D., Karim, Z., & Zaidi, M. (2020). Financial development and the effectiveness of monetary policy: New evidence from Malaysia. Asian Academy of Management Journal, 24, 21–39. https://doi.org/10.21315/aamj2019.24.2.2

Basmann, R. L. (1960). On finite sample distributions of generalized classical linear identifiability test statistics. Journal of the American Statistical Association, 55(292), 650–659. https://doi.org/10.2307/2281588

Basri, M. F. (2020). Competition and market structure of the Malaysian Islamic banking industry. Journal of Islamic Accounting and Business Research, 11(3), 721–740. https://doi.org/10.1108/JIABR-08-2017-0127

Basri, M. (2021). Factors influencing capital structure of Shariah-compliant Malaysian telecommunications and media companies. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12(3), 582–591. https://doi.org/10.17762/TURCOMAT.V12I3.763

Bayiley, Y. T. (2022). Assessing bank performance using Malmquist productivity index approach and one-step system GMM dynamic panel data model. Open Journal of Business and Management, 10(2), 798–821. https://doi.org/10.4236/ojbm.2022.102045

BBC News. (2024, May 6). How Malaysia Airlines came back from twin tragedies. https://www.bbc.com/news/world-asia-68487316

Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. American Political Science Review, 89(3), 634–647. https://doi.org/10.2307/2082979

Bedada, T. (2020). Effect of capital structure on firm's profitability (Evidence from Endowment Fund for Rehabilitation of Tigray/EFFORT/manufacturing companies). Research Journal of Finance and Accounting, 11(7), 31–37. https://doi.org/10.7176/RJFA/11-7-05

Ben Said, H. (2022). Determinants of capital structure of French SBF 120 listed companies: A comparison between trade-off theory and pecking order theory. Corporate Ownership & Control, 19(4), 55–65. https://doi.org/10.22495/cocv19i4art5

Bloomberg. (2012, January 9). Malaysian opposition leader Anwar acquitted in sodomy trial in High Court. https://www.bloomberg.com/news/articles/2012-01-09/malaysian-opposition-leader-anwar-acquitted-in-sodomy-trial-in-high-court

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Blundell, R., & Bond, S. (2023). Initial conditions and Blundell–Bond estimators. Journal of Econometrics, 234, 101–110. https://doi.org/10.1016/j.jeconom.2023.01.020

Bond, S. (2002). Dynamic panel data models: A guide to micro data methods and practice. Portuguese Economic Journal, 1(2), 141–162. https://doi.org/10.1007/s10258-002-0009-9

Bougatef, K., & Kassem, O. (2023). Do market timing incentives affect the debt–equity choice of Malaysian Shariah-compliant IPOs? Journal of Islamic Monetary Economics and Finance, 9(4), 589–610. https://doi.org/10.21098/jimf.v9i4.1743

Boussiki, H. (2023). The effect of capital structure on the financial performance of companies listed on the Algerian stock exchange: Case of the Saidal group. Finance and Business Economies Review, 7(1), 258–270. https://doi.org/10.58205/fber.v7i1.217

Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. Econometrica, 47(5), 1287–1294. https://doi.org/10.2307/1911963

Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. The Review of Economic Studies, 47(1), 239–253. https://doi.org/10.2307/2297111

Brooks, C. (2019). Introductory econometrics for finance (4th ed.). Cambridge University Press. https://doi.org/10.1017/9781108524872

Brusov, P., & Filatova, T. (2023). Capital structure theory: Past, present, future. Mathematics, 11(3), 616. https://doi.org/10.3390/math11030616

Bryman, A., & Cramer, D. (2011). Quantitative data analysis with IBM SPSS 17, 18 & 19: A guide for social scientists. Routledge. https://doi.org/10.4324/9780203180990

Buallay, A. (2021). Corporate governance, Sharia'ah governance and performance: A cross-country comparison in the MENA region. Al Qasimia University Journal of Islamic Economics, 1(1), 189–215. https://doi.org/10.52747/aqujie.1.1.26

Budiarso, N., & Pontoh, W. (2021). Pecking order, earnings management and capital structure. Accounting, 7, 1389–1394. https://doi.org/10.5267/j.ac.2021.3.026

Bustani, M. Z., Swandari, F., & Yunani, A. (2024, July). Green capital dynamics: Investigating the impact of capital structure on profitability among IDX LQ45 Low Carbon Leaders in Indonesia. Accounting and Finance Studies, 4(3), 225–242. https://doi.org/10.47153/afs44.11092024

Cahyo, H., Muntahanah, S., & Purnomo, S. (2023). The determinant factors of capital structure in cyclical sector: Empirical study from Indonesia. JBTI: Jurnal Bisnis: Teori dan Implementasi, 14(2), 352–363. https://doi.org/10.18196/jbti.v14i2.19480

Carrasco, M., & Doukali, M. (2021, June). Testing overidentifying restrictions with many instruments and heteroscedasticity using regularised jackknife IV. The Econometrics Journal, 25(1), 71–97. https://doi.org/10.1093/ectj/utab020

Chaklader, B., & Padmapriya, B. (2021, June). Impact of cash surplus on firm's capital structure: validation of pecking order theory. Managerial Finance, 47(12), 1801–1816. https://doi.org/10.1108/MF-08-2020-0417

Chen, B. (2022). A robust test for serial correlation in panel data models. Econometric Reviews, 41(12), 1095–1112. https://doi.org/10.1080/07474938.2022.2091362

Chen, L., Lee, H., & Cai, J. (2023). SGMM: Stochastic approximation to generalized method of moments. Machine Learning, 112(2), 671–697. https://doi.org/10.48550/arXiv.2308.13564

Chen, L. F., & Marsidi, A. (2023). Capital structure and performance of manufacturing companies on Bursa Malaysia. UNIMAS Review of Accounting and Finance, 7(1), 94–109. https://doi.org/10.33736/uraf.6386.2023

Cheng, C. (2020, January 16). Trading troubles: The US–China trade tensions and its impacts on Malaysia and the region. Institute of Strategic & International Studies (ISIS) Malaysia. https://www.isis.org.my/2020/01/16/trading-troubles-the-us-china-trade-tensions-and-its-impacts-on-malaysia-and-the-region/

Cheng, N., & Bang, Y. (2021). A comment on the practice of the Arellano-Bond/Blundell-Bond generalized method of moments estimator in IS research. Communications of the Association for Information Systems, 48, 38. https://doi.org/10.17705/1CAIS.04838

Chernozhukov, V., Fernández-Val, I., Huang, C., & Wang, W. (2024, February). Arellano-Bond LASSO estimator for dynamic linear panel models (CeMMAP Working Paper No. 09/24). Institute for Fiscal Studies. https://doi.org/10.47004/wp.cem.2024.0924

Chin, J. (2023). Anwar's long walk to power: The 2022 Malaysian general elections. The Round Table, 112(1), 1–13. https://doi.org/10.1080/00358533.2023.2165303

Chin, J. (2023b). Malaysia in 2021: Another regime change and the search for Malay political stability. In D. Singh & T. H. Hoang (Eds.), Southeast Asian affairs 2022 (pp. 195–210). ISEAS–Yusof Ishak Institute. https://doi.org/10.1355/9789815011036-013

Chirchir, F. K., Kalui, F., & Tari, J. (2024). Capital structure and financial performance of non-financial firms listed at Nairobi Securities Exchange, Kenya. International Journal of Research and Innovation in Social Science, 8(7), 534–543. https://doi.org/10.47772/ijriss.2024.807046

Chong, J. (2021). The emerging Asia Pacific capital markets: Malaysia (CFA Institute Research Foundation Series). CFA Institute Research Foundation. https://doi.org/10.2139/ssrn.3807401

Clemens, A., Mishra, P. P., Flouri, E., Lehtimäki, T., Raitakari, O., Keltikangas-Järvinen, L., & Heikkilä, K. (2021). C-reactive protein and temperament: An instrumental variable analysis. Brain, Behavior, & Immunity – Health, 14, 100241. https://doi.org/10.1016/j.bbih.2021.100241

CNN. (2013, February 15). Filipino group on Borneo claims to represent sultanate, Malaysia says. https://edition.cnn.com/2013/02/15/world/asia/malaysia-philippines-standoff

Crowley, M. (2020). Foreign labor shortages in the Malaysian palm oil industry: Impacts and recommendations. Asian Journal of Agriculture and Development, 17(2), 1–24. https://doi.org/10.37801/ajad2020.17.2.1

Cui, G., Hayakawa, K., Nagata, S., & Yamagata, T. (2023). A robust approach to heteroscedasticity, error serial correlation and slope heterogeneity in linear models with interactive effects for large panel data. Journal of Business & Economic Statistics, 41(3), 862–875. https://doi.org/10.1080/07350015.2022.2077349

Curry, K., & Fikri, I. (2022, January). The influence of capital structure on corporate financial performance moderated by GDP: Analysis on the food and beverage sub-sector listed on the IDX in 2013–2019. In Proceedings of the First Lekantara Annual

Conference on Public Administration, Literature, Social Sciences, Humanities, and Education (LePALISSHE 2021). EAI. https://doi.org/10.4108/eai.3-8-2021.2315095

Danila, N., Kamaludin, K., Sundarasen, S., & Bunyamin, B. (2021). Islamic index market sentiment: Evidence from the ASEAN market. Journal of Islamic Accounting and Business Research, 12, 380–400. https://doi.org/10.1108/JIABR-05-2020-0166

Daputra, A., Putri, D., Khotimah, N., Utami, F., Ramandhani, D., & Suria, G. (2024). Analisis standar rata-rata ROA dan ROE pada perusahaan transportasi dan logistik dan perusahaan kesehatan. Journal of Applied Management Studies, 6(1), 75–84. https://doi.org/10.51713/jamss.2024.6130

Dat, N. (2022). Impact of capital structure on firm performance of food and beverage listed companies on the Stock Exchange of Vietnam. International Journal of Current Science Research and Review, 5(9), 465–474. https://doi.org/10.47191/ijcsrr/v5-i9-21

Dat, N. D. (2024). The effect of capital structure on HOSE performance of companies in the plastics industry. International Journal of Current Science Research and Review, 7(3), 25–36. https://doi.org/10.47191/ijcsrr/v7-i3-25

Deneke, T. S., & Gujral, T. M. (2021). Capital structure as determinant of financial performance of commercial banks in Ethiopia: A case study on private banks in Ethiopia. International Journal of Advanced Research, 9(3), 216–231. https://doi.org/10.21474/IJAR01/12576

Dewianawati, D., Purwanto, F., & Setiawan, E. (2022). The effect of financial ratio and interest rate of bank on working capital loan distribution: Study on commercial banks listed in the Indonesia Stock Exchange for the period 2017–2021. Indonesian Journal of Business Analytics, 2(1), 72–85. https://doi.org/10.55927/ijba.v2i1.72

Dhanapal, S., & Sabaruddin, J. S. (2015). Rule of law: An initial analysis of Security Offences (Special Measures) Act (SOSMA) 2012. IIUM Law Journal, 23(1), 143. https://doi.org/10.31436/iiumlj.v23i1.143

Dian, K., & Nova, Y. C. (2020). The influence of capital structure, company size, corporate governance on company performance with agency cost as intervening variables. Russian Journal of Agricultural and Socio-Economic Sciences, 12(108), 81–88. https://doi.org/10.18551/rjoas.2020-12.10

Diantimala, Y., Syahnur, S., Mulyany, R., & Faisal, F. (2021). Firm size sensitivity on the correlation between financing choice and firm value. Cogent Business & Management, 8(1). https://doi.org/10.1080/23311975.2021.1926404

Digar, B. (2023). Does ESG improve firm performance? Evidence from Indian companies. International Journal of Scientific Research in Engineering and Management, 7(2), 224–234. https://doi.org/10.55041/ijsrem25224

Do, L., Luong, K. T., Mai, A. N. H., Dam, L. A., Pham, H., & Nguyen, N. T. T. (2022). The impact of capital structure on firm performance: Case of listed firms in processing and manufacturing industry in Vietnam. International Journal of Economics, Business and Management Research, 6(3), 307–320. https://doi.org/10.51505/ijebmr.2022.6307

Donaldson, G. (1961). Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity. Division of Research, Graduate School of Business Administration, Harvard University.

Dong, H., Zhang, R., & Xie, B. (2020). The impacts of market timing on capital structure: An empirical study of initial public offerings in the coastal regions of China. Journal of Coastal Research, 106, 329–333. https://doi.org/10.2112/SI106-076.1

Dou, X., & Yin, S. (2024). The impact of ESG on corporate financial performance: Based on fixed effects regression model. Journal of Computational Methods in Sciences and Engineering, 24, 2719–2731. https://doi.org/10.3233/jcm-247504

Elewa, M. (2021). Investigating capital structure, performance and stock price in U.S. technology firms: panel data analysis. International Journal of Accounting and Financial Reporting, 11(1), 43–65. https://doi.org/10.5296/ijafr.v11i1.18334

Elkamhi, R., Jo, C., & Salerno, M. (2020). Agency conflicts and investment: evidence from a structural estimation. Microeconomics: Intertemporal Firm Choice & Growth. https://doi.org/10.2139/ssrn.3680008

En, J. N. J., & Malek, N. I. A. (2021). Capital structure and firm performance of technology sector in Malaysia. International Journal of Academic Research in Accounting, Finance and Management Sciences, 11(3), 601–628. https://doi.org/10.6007/ijarafms/v11-i3/10660

Esghaier, R. (2023). The dynamic trade-off theory of capital structure: Evidence from a panel of US industrial companies. Studies in Economics and Finance, 41(4), 902–922. https://doi.org/10.1108/SEF-04-2023-0200

Ezu, G. (2020). Effect of capital structure on financial performance of oil and gas companies quoted on the Nigerian Stock Exchange. The International Journal of Business & Management, 8(4), 114–126. https://doi.org/10.24940/THEIJBM/2020/V8/I4/BM2004-046

Fan, Q., Guo, Z., & Mei, Z. (2022). A heteroskedasticity-robust overidentifying restriction test with high-dimensional covariates. Journal of Business & Economic Statistics. Advance online publication. https://doi.org/10.1080/07350015.2024.2388654

Fatima, K., & Yasmin, S. (2022). The determinants of capital structure of companies in an emerging economy: A critical review. International Journal of Business & Management Studies, 3(11), 25. https://doi.org/10.56734/ijbms.v3n11a4

Faustino, H., & Leitão, N. (2005). The intra-industry trade between Portugal and European Union: A static and dynamic panel data analysis (1996–2000). Discussion Papers from Economics Research Centre, University of Coimbra. https://hdl.handle.net/10419/117392

Fauzi, R., Achsani, N., Andati, T., & Anggraeni, L. (2022). The effect of capital structure on telecommunication firm performance. International Journal of Finance & Banking Studies, 11(2), 178–191. https://doi.org/10.20525/ijfbs.v11i2.1798

Flannery, M. J., & Hankins, K. W. (2013). Estimating dynamic panel models in corporate finance. Journal of Corporate Finance, 19(1), 1–19. https://doi.org/10.1016/j.jcorpfin.2012.09.004

Foo, V., Jamal, A. A. A., Karim, M. R. A., & Ulum, Z. K. A. B. (2015). Capital structure and corporate performance: Panel evidence from oil and gas companies in Malaysia. International Journal of Business Management and Economic Research, 6(6), 371–379. https://www.academia.edu/download/41757408/ijbmer2015060606.pdf

Foong, J. K., Ngui, J. E. J., Poh, P. P. J., Chan, W. L., & Wong, Y. S. (2021). Capital Structure and Firm Performance: Evidence from Malaysian Public Listed Plantation Companies. UNIMAS Review of Accounting and Finance, 5(1), 116–135. https://doi.org/10.33736/uraf.3536.2021

Frank, M. Z., Goyal, V. K., & Shen, T. (2020). The pecking order theory of capital structure: Where do we stand? Oxford Research Encyclopedia of Economics and Finance. https://doi.org/10.2139/ssrn.3540610

Gaud, P., Jani, E., Hoesli, M., & Bender, A. (2005). The capital structure of Swiss companies: An empirical analysis using dynamic panel data. European Financial Management, 11(1), 51–69. https://doi.org/10.1111/j.1354-7798.2005.00275.x

Gborogen, A., & Toluwa, O. (2023). Capital structure and agency costs. International Journal of Research and Innovation in Social Science, 7(4), 431–438. https://doi.org/10.47772/ijriss.2023.7433

Georgakopoulos, G., Toudas, K., Poutos, E. I., Kounadeas, T., & Tsavalias, S. (2022). Capital structure, corporate governance, equity ownership and their impact on firms' profitability and effectiveness in the energy sector. Energies, 15(10), 3625. https://doi.org/10.3390/en15103625

Ghani, E. K., Rehan, R., Salahuddin, S., & Hye, Q. M. A. (2023). Discovering capital structure determinants for SAARC energy firms. International Journal of Energy Economics and Policy, 13(1), 135–143. https://doi.org/10.32479/ijeep.13938

Gholizadeh, Y. (2021). Causality relationship between energy consumption and economic growth in the European Union countries. EERI Research Paper Series, 2020-12, 1–24. http://hdl.handle.net/10419/251104

Greene, W. H. (2012). Econometric analysis (7th ed.). Pearson Education.

Gunawan, A., Triansyah, F. A., Karlina, R., Yusuf, G., Dinantika, A. R., & Wahyudi, A. (2023). Econometric model of economic growth in Indonesia using dynamic panel

data: FD-GMM Arellano-Bond and SYS-GMM Blundell-Bond approaches. Kontigensi: Jurnal Ilmiah Manajemen, 11(1), 10–21. https://doi.org/10.56457/jimk.v11i1.344

Gujarati, D. N. (2003). Basic Econometrics (4th ed.). McGraw-Hill.

Gujarati, D. N., & Porter, D. C. (2009). Basic econometrics (5th ed.). McGraw Hill.

Guizani, M. (2020). Testing the pecking order theory of capital structure: The case of Islamic financing modes. Future Business Journal, 6(1), 1–12. https://doi.org/10.1186/s43093-020-00042-9

Habibniya, H., Dsouza, S., Rabbani, M. R., Nawaz, N., & Demiraj, R. (2022). Impact of capital structure on profitability: Panel data evidence of the telecom industry in the United States. Risks, 10(8), 157. https://doi.org/10.3390/risks10080157

Halim, K. I. (2021). The impact of financial distress, audit committee, and firm size on the integrity of financial statements. JAK (Jurnal Akuntansi): Kajian Ilmiah Akuntansi, 8(2), 223–233. https://doi.org/10.30656/jak.v8i2.2723

Halizam, M. A., Ridzuan, A. R., Shaari, M. S., Rahman, N. H. A., & Razak, M. I. M. (2021). Revisiting the impact of foreign direct investment on Malaysia economic growth. International Journal of Academic Research in Business and Social Sciences, 11(5), 814–826. https://doi.org/10.6007/IJARBSS/v11-i5/9755

Hall, A. R. (2005). Generalized Method of Moments. Oxford University Press.

Hamid, M. A., Abdullah, A., & Kamaruzzaman, N. A. (2015). Capital structure and profitability in family and non-family firms: Malaysian evidence. Procedia Economics and Finance, 31, 44–55. https://doi.org/10.1016/S2212-5671(15)01130-2

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. Econometrica, 50(4), 1029–1054. https://doi.org/10.2307/1912775

Harun, S. L., Yusof, R. M., Wahab, N. A., & Aliyu, S. (2023). Interest rates and Islamic commercial property financing: can there be a possible solution? Journal of Islamic Accounting and Business Research, 15(6), 942–958. https://doi.org/10.1108/JIABR-07-2021-0191

Hashim, S., & Hassan, H. H. (2017). The impact of capital structure on financial performance of Malaysian public listed construction firms. International Journal of Advanced Research and Publications, 1(3), 195–206. http://www.ijarp.org/published-research-papers/sep2017/The-Impact-Of-Capital-Structure-On-Financial-Performance-Of-Malaysian-Public-Listed-Construction-Firms.pdf

Hastuti, R. T., & Carolina, V. (2022, May 11). The effect of capital structure, profitability on firm value with interest rates as moderating variable. In Proceedings of the Tenth International Conference on Entrepreneurship and Business Management (ICEBM 2021) (pp. 429–434). Atlantis Press. https://doi.org/10.2991/aebmr.k.220501.065

Hausman, J. A. (1978). Specification tests in econometrics. Econometrica, 46(6), 1251–1271. https://doi.org/10.2307/1913827

Hayashi, F. (2000). Econometrics. Princeton University Press.

Heresi, R., & Powell, A. (2023). Research insights: How does debt affect corporate investment in periods of high uncertainty? Research Insights, Inter-American Development Bank. https://doi.org/10.18235/0004887

Ho, J., & Karagedikli, Ö. (2021). Effects of monetary policy communication in emerging market economies: Evidence from Malaysia. Crawford School of Public Policy, Australian National University Research Paper Series. https://doi.org/10.2139/ssrn.3896110

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. STATA Journal, 7(3), 281–312. https://doi.org/10.1177/1536867X0700700301

Hsiao, C. (2003). Analysis of panel data (2nd ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511754203

Humta, H., & Ghafourzay, H. (2024). Application of market timing theory: Evidence from Canadian firms. International Journal of Management, Accounting and Economics, 11(2), 183–193. https://doi.org/10.5281/zenodo.10892753

Hussain, A., Shabbir, A., & Rehman, A. (2024). Impact of corporate capital structure on corporate performance: An empirical study of emerging market using GMM estimation technique. Journal of Asian Development Studies, 13(2), 48. https://doi.org/10.62345/jads.2024.13.2.48

Hussain, S., Quddus, A., Tien, P. T., Rafiq, M., & Pavelková, D. (2020). The moderating role of firm size and interest rate in capital structure of the firms: Selected sample from sugar sector of Pakistan. Investment Management and Financial Innovations, 17(4), 341–355. https://doi.org/10.21511/imfi.17(4).2020.29

Hussein, A. (2020). The influence of capital structure on company performance: Evidence from Egypt. Corporate Ownership and Control, 18(1), 8–21. https://doi.org/10.22495/cocv18i1art1

Hwang, J., & Sun, Y. (2015). Should we go one step further? An accurate comparison of one-step and two-step procedures in a generalized method of moments framework. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.2646326

Ibrahim, M. (2022). Malaysia's trade and economy transition between the era of Tunku Abdul Rahman and Tun Mahathir, 1960s–1990s. Sejarah, 31(1), 125–139. https://doi.org/10.22452/sejarah.vol31no1.7

Ichwanudin, W., Nurhayati, E., & Anwar, C. J. (2023). Modeling the relationship between capital structure and company value in the perspective of agency and trade-off theory. WSEAS Transactions on Computer Research, 11, 429–439. https://doi.org/10.37394/232018.2023.11.39

Ilyas, M., Jehangir, M., & Ahmad, A. (2021). Earnings volatility and capital structure: Empirical evidence of non-financial firms of Pakistan. Journal of Business & Tourism, 2(1), 33–37. https://doi.org/10.34260/jbt.v2i1.26

Indahwati, R. (2021). Consistency of pecking order theory: Evidence from Indonesia capital market. Emerging Markets: Finance eJournal. https://doi.org/10.2139/ssrn.3801506

Inoue, A., & Solo, V. (2006). A new LM test for serial correlation. Econometric Theory, 22(5), 835–851. https://doi.org/10.1017/S0266466606060389

International Monetary Fund. (2021). Policy responses to COVID-19. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

Isa, M., Lee, S.-P., Bacha, O. I., & Ahmad, R. (2022). Some thoughts on resetting the roles and functions of Sharīʿah committees of Islamic banks in Malaysia. ISRA International

Journal of Islamic Finance, 14(2), 175–189. https://doi.org/10.1108/IJIF-05-2021-0096

Jacob, J., & Varadharajan, R. (2024). Robust variance inflation factor: A promising approach for collinearity diagnostics in the presence of outliers. Sankhya B, 86(2), 845–871. https://doi.org/10.1007/s13571-024-00342-y

Jayiddin, N. F., Jamil, A., & Roni, S. M. (2017). Capital structure influence on construction firm performance. SHS Web of Conferences, 36, 00025. https://doi.org/10.1051/shsconf/20173600025

Jeet, V., & Aspal, P. (2021). Empirical relationship of company's intangible resources and corporate financial performance – A panel data approach. Universal Journal of Accounting and Finance, 9(6), 630–642. https://doi.org/10.13189/ujaf.2021.090630

Jefrie, M., Bujang, I., Tuyon, J., & Nipo, D. (2020). Estimation and modelling of volatility in the Malaysian stock market. Malaysian Journal of Business and Economics (MJBE), 7(2), 1–12. https://doi.org/10.51200/mjbe.vi.2695

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Jones, D. S. (2020). 1MDB corruption scandal in Malaysia: A study of failings in control and accountability. Public Administration and Policy: An Asia-Pacific Journal, 23(1), 59–72. https://doi.org/10.1108/PAP-11-2019-0032

Julkid, N., & Lau, W. T. (2020). Capital structure decision: Micro- and macroeconomic determinants in Malaysia. International Journal of Academic Research in Accounting,

Finance and Management Sciences, 10(2), 76–86. https://doi.org/10.6007/ijarafms/v10-i2/7355

Kalnins, A., & Hill, K. P. (2025). Additional caution regarding rules of thumb for variance inflation factors: Extending O'Brien to the context of specification error. Quality & Quantity, 59(1), 291–314. https://doi.org/10.1007/s11135-024-01980-0

Kapetanios, G., Serlenga, L., & Shin, Y. (2023). An LM test for the conditional independence between regressors and factor loadings in panel data models with interactive effects. Journal of Business & Economic Statistics, 42(4), 743–761. https://doi.org/10.1080/07350015.2023.2238774

Kausar, A., & Sahi, C. A. I. (2021). Impact of bank capital and monetary policy on lending behavior of USA banking sector before and after global financial crises. Journal of Banking and Financial Economics, 3, 171–181. https://doi.org/10.47609/0301062021

Keh, C., & Tan, Y. (2021). COVID-19: The impact of government policy responses on economic activity and stock market performance in Malaysia. Jurnal Ekonomi Malaysia, 55(1), 123–133. http://dx.doi.org/10.17576/JEM-2021-5501-9

Keter, C. K. S., Cheboi, J. Y., Kosgei, D., & Chepsergon, A. K. (2023). Financial performance and firm value of listed companies: Financial performance measure ROA versus ROE. Journal of Business, Economics and Management Research Studies, 1(4), 1–11. https://doi.org/10.69897/jobemrs.v1i4.78

Khan, N. U., Farid, S., & Shah, R. U. (2023a). The influence of Pakistan's political unrest on the country's rate of economic growth. Global Economics Review, 8(2), 1–8. https://doi.org/10.31703/ger.2023(VIII-II).01

Khan, S., Bashir, U., Attuwaijri, H. A. S., & Khalid, U. (2023). The capital structure decisions of banks: An evidence from MENA region. SAGE Open, 13(4), 21582440231204600. https://doi.org/10.1177/21582440231204600

Khan, T., & Rahman, W. (2023). Country level governance as a capital structure determinant: A case of Pakistani non-financial listed firms. iRASD Journal of Economics, 5(3), 663–677. https://doi.org/10.52131/joe.2023.0503.0153

Khémiri, W., & Noubbigh, H. (2018). Determinants of capital structure: Evidence from Sub-Saharan African firms. The Quarterly Review of Economics and Finance, 70(11), 150–159. https://doi.org/10.1016/j.qref.2018.04.010

Khoa, B. T., & Thai, D. T. (2021). Capital structure and trade-off theory: Evidence from Vietnam. Journal of Asian Finance, Economics and Business, 8(1), 45–52. https://doi.org/10.13106/jafeb.2021.vol8.no1.045

Kiliç, M., & Sakalsız, S. A. (2023). An investigation of the validity of trade-off and pecking order theories in capital structure decisions of sustainable firms. Kahramanmaraş Sütçü İmam Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 13(2), 29–46. https://doi.org/10.47147/ksuiibf.1379933

Kiviet, J. F., & Kripfganz, S. (2021). Instrument approval by the Sargan test and its consequences for coefficient estimation. Economics Letters, 205, 109935. https://doi.org/10.1016/j.econlet.2021.109935

Kock, N. (2022). Testing and controlling for endogeneity in PLS-SEM with stochastic instrumental variables. Data Analysis Perspectives Journal, 3(3), 1–6. https://scriptwarp.com/dapj/2022_DAPJ_3_3/Kock_2022_DAPJ_3_3_TestControlEndogeneity.pdf

Kontuš, E. (2021). Agency costs, capital structure and corporate performance: A survey of Croatian, Slovenian and Czech listed companies. Ekonomski Vjesnik / Econviews, 34(1), 73–85. https://doi.org/10.51680/ev.34.1.6

Kouki, F. (2021). The impact of market timing on European firms' capital structure: RLBOs vs. IPOs. International Journal of Financial Research, 12(2), 219–232. https://doi.org/10.5430/ijfr.v12n2p219

Kramarić, T., Miletić, M., & Piplica, D. (2021). Determinants of accounting and market-based performance measures: Case of Croatian non-financial listed companies. SHS Web of Conferences, 92, 02049. https://doi.org/10.1051/shsconf/20219202049

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. The Journal of Finance, 28, 911–922. https://doi.org/10.1111/j.1540-6261.1973.tb01415.x

Krištofík, P., & Medzihorský, J. (2022). Capital structure of non-financial companies in EU countries – Macroeconomic view. WSB Journal of Business and Finance, 56(1), 8–16. https://doi.org/10.2478/wsbjbf-2022-0002

Kruiniger, H. (2021). Estimation of dynamic panel data models with a lot of heterogeneity. Econometric Reviews, 41(1), 117–146. https://doi.org/10.1080/07474938.2021.1899507

Kutner, M. H., Nachtsheim, C. J., Neter, J., & Li, W. (2004). Applied linear statistical models (5th ed.). McGraw-Hill/Irwin.

Laili, R., & Dalimunthe, S. (2022). The impact of liquidity on the capital structure of construction companies. Global Advances in Business Studies, 1(2), 94–103. https://doi.org/10.55584/Gabs.001.02.4

Ledhem, M. A., & Mekidiche, M. (2021). Islamic finance and economic growth nexus: An empirical evidence from Southeast Asia using dynamic panel one-step system GMM analysis. Journal of Islamic Accounting and Business Research, 12(8), 1165–1180. https://doi.org/10.1108/JIABR-07-2021-0191

Lee, C.-F., Liang, W., Lin, F.-L., & Yang, Y. (2015). Applications of simultaneous equations in finance research: Method and empirical results. Review of Quantitative Finance and Accounting, 47(4), 943–971. https://doi.org/10.1007/s11156-015-0526-0

Lee, C. (2021). Globalisation and economic development: Malaysia's experience. In S. Urata & H.-T. Doan (Eds.), Globalisation and its economic consequences. Routledge/Taylor & Francis. https://doi.org/10.4324/9781003138501-6

Lemmon, M. L., Roberts, M. R., & Zender, J. F. (2008). Back to the beginning: Persistence and the cross-section of corporate capital structure. The Journal of Finance, 63(4), 1575–1608. https://doi.org/10.1111/j.1540-6261.2008.01369.x

Leung, D., Chan, Y. C., & Zhao, M. (2025). Online generalized method of moments for time series models. Journal of Computational and Graphical Statistics. Advance online publication. https://doi.org/10.48550/arXiv.2502.00751

Lim, W. C., & Naysary, B. (2022). Capital structure and corporate performance of listed healthcare companies in Malaysia. PEOPLE: International Journal of Social Sciences, 8(1), 17–35. https://doi.org/10.20319/pijss.2022.81.1735

Lin, J. (2021). Determinants of capital structure: Evidence from China & UK company panel data. Proceedings of the 5th International Conference on E-Commerce, E-Business and E-Government, 117–121. https://doi.org/10.1145/3466029.3466044

Linqing, Z. (2021). Effect of capital structure on financial performance of Chinese listed real estate companies. Proceedings of the 2021 International Conference on Enterprise Management and Economic Development, 355–358. https://doi.org/10.2991/aebmr.k.210601.062

Liong, H., & Uluputty, N. F. (2024). Capital structure, financial performance, investment decision and firm value. Economic and Accounting Journal, 7(1), 23–31. https://doi.org/10.32493/eaj.v7i1.y2024.p23-31

Madina, H., Budiyanti, H., & Nurman. (2022). Perbandingan antara economic value added (EVA) dengan return on assets (ROA) dalam menilai kinerja keuangan perusahaan. Transekonomika: Akuntansi, Bisnis dan Keuangan, 2(5), 543–554. https://doi.org/10.55047/transekonomika.v2i5.247

Malarvizhi, C., & Chitra, M. (2020). Analysing the economic performance and projecting for future: The case of Malaysia. International Journal of Economics, 8, 83–87. https://doi.org/10.34293/economics.v8i3.3222

Malay Mail. (2015, February 10). Anwar gets five years as Federal Court maintains sodomy conviction. https://www.malaymail.com/news/malaysia/2015/02/10/anwar-jailed-as-federal-court-maintains-sodomy-conviction/838015

Malik, A. (2023). Role of Capital Structure in Firm Performance and Capital Structure: A Quantitative Research (2021). Journal of cardiovascular disease research, 12(06). https://doi.org/10.48047/jcdr.2021.12.06.327

Manan, M., Kupefaksi, M., & Hasnawati, S. (2022). The effect of market timing on capital structure in non-financial companies that do IPO on the Indonesia Stock Exchange for the 2010–2017 period. International Journal of Environmental, Sustainability, and Social Science, 3(1), 153–165. https://doi.org/10.38142/ijesss.v3i1.153

Mansour, M., Saleh, M., Alodat, A., Alshouha, L. F., & Zaid, A. (2021). The influence of capital structure level on firm performance: An empirical study of non-financial listed firms in Jordan. Journal of University of Shanghai for Science and Technology, 23(5), 422–430. https://doi.org/10.51201/jusst12563

Mansour, M., Al Zobi, M., Al-Naimi, A., & Daoud, L. (2023). The connection between capital structure and performance: Does firm size matter? Investment Management and Financial Innovations, 20(1), 195–206. https://doi.org/10.21511/imfi.20(1).2023.17

Marashdeh, Z., Alomari, M. W., Aleqab, M. M., & Alqatamin, R. M. (2021). Board characteristics and firm performance: The case of Jordanian non-financial institutions. Journal of Governance & Regulation, 10(3), 150–159. https://doi.org/10.22495/jgrv10i3art13

Martín, N. (2023). Robust and efficient Breusch–Pagan test-statistic: An application of the beta-score Lagrange multipliers test for non-identically distributed individuals. arXiv Preprint. https://doi.org/10.48550/arXiv.2301.07245

Masoud, N. (2025). Artificial intelligence and unemployment dynamics: An econometric analysis in high-income economies. Technological Sustainability, 4(1), 30–50. https://doi.org/10.1108/TECHS-04-2024-0033

Mazanec, J. (2023). Capital structure and corporate performance: An empirical analysis from Central Europe. Mathematics, 11(9), 2095. https://doi.org/10.3390/math11092095

Medyawati, H., & Yunanto, M. (2021). Determining firm value in the Indonesian banking sub sector. Economics and Business Quarterly Reviews, 4(2), 68–78. https://doi.org/10.31014/AIOR.1992.04.02.346

Mirza, H., Hussain, S., & Kumar, J. (2023). Regime change in Pakistan 2022: Implications for political and economic stability. Pakistan Journal of International Affairs, 6(1), 1–≥? (page range not specified in PDF). https://doi.org/10.52337/pjia.v6i1.709

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. The American Economic Review, 48(3), 261–297. http://www.jstor.org/stable/1809766

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: A correction. The American Economic Review, 53(3), 433–443. http://www.jstor.org/stable/1809167

Mohajeri, P., Taleblou, R., & Rahnama, A. (2021). Investigating the impact of market timing on the capital structure of companies in Tehran Stock Market. Iranian Journal of Economic Studies, 9(2), 359–375. https://doi.org/10.22099/ijes.2020.34169.1591

Mohammad, H. S., Bujang, I., & Hakim, T. A. (2019). Capital structure and financial performance of Malaysian construction firms. Asian Economic and Financial Review, 9(12), 1306–1319. https://doi.org/10.18488/journal.aefr.2019.912.1306.1319

Mohammad, H. S., & Bujang, I. (2020). Capital structure and financial performance: Evidence from three Malaysian industries. International Journal of Business and

Society, 21(3), 1153–1171. https://www.ijbs.unimas.my/images/repository/pdf/Vol21-no3-paper12.pdf

Mohd Shaari, S. N., & Nik Kamarudin, N. N. A. (2024). The moderating effect of the pandemic on capital structure and firm performance in Malaysia. Asia-Pacific Management Accounting Journal (APMAJ), 19(1), 25–49. https://doi.org/10.24191/APMAJ.V19i1-02

Mohsin, M. I. A., Ahmad, R., & Chan, W. M. (2022). Exploring digitalization of Malaysian banking and fintech companies' services from the customer's perspective. International Journal of Management and Applied Research, 9(2), 140–160. https://doi.org/10.18646/2056.92.22-007

Mukoma, P., Kung'u, J., & Gichuhi, D. (2023). Effects of capital structure on agency costs in commercial and services companies listed at the Nairobi Securities Exchange in Kenya. European Journal of Economic and Financial Research, 7(4), 1602–1620. https://doi.org/10.46827/ejefr.v7i4.1602

Mullick, M. (2023). Optimal capital structure for firm performance: A comprehensive analysis. International Journal of Scientific Research in Engineering and Management, 11(8), 75–83. https://doi.org/10.55041/ijsrem26171

Mulusew, A., & Mingyong, H. (2023). An empirical investigation of the dynamic linkages of land access and food security: Evidence from Ethiopia using system GMM approach. Journal of Agriculture and Food Research, 10, 100494. https://doi.org/10.1016/j.jafr.2023.100494

Mundlak, Y. (1978). On the pooling of time series and cross section data. Econometrica, 46(1), 69–85. https://doi.org/10.2307/1913646

Mustaffa, A., Zainal Abidin, N., Ahmad, N., & Abiodun Ogundare, E. (2021). Influence of COVID-19's active cases on Malaysia's key economic performance indicators. Journal of Emerging Economies and Islamic Research, 9(1), 68–87. https://doi.org/10.24191/jeeir.v9i1.12736

Myers, S. C. (1977). Determinants of corporate borrowing. Journal of Financial Economics, 5(2), 147–175. https://doi.org/10.1016/0304-405X(77)90015-0

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics, 13(2), 187–221. https://doi.org/10.1016/0304-405X(84)90023-0

Myers, S. C. (1984). The capital structure puzzle. Journal of Finance, 39(3), 574–592. https://doi.org/10.1111/j.1540-6261.1984.tb03646.x

Nadzri, M. M. N. (2018). The 14th general election, the fall of Barisan Nasional, and political development in Malaysia, 1957–2018. Journal of Current Southeast Asian Affairs, 37(3), 139–171. https://doi.org/10.1177/186810341803700307

Naysary, B., Salleh, M. C. M., & Abdullah, N. I. (2020). A comprehensive appraisal of Sharīʿah governance practices in Malaysian Islamic banks. ISRA International Journal of Islamic Finance, 12(3), 381–400. https://doi.org/10.1108/IJIF-09-2018-0104

Neves, M., Serrasqueiro, Z., Dias, A., & Hermano, C. (2020). Capital structure decisions in a period of economic intervention. International Journal of Accounting and Information Management, 28, 465–495. https://doi.org/10.1108/ijaim-08-2019-0094

Nga, N., & Long, G. (2021). The choice of capital structure: A study on energy industry in a developing country. Accounting, 7, 289–294. https://doi.org/10.5267/j.ac.2020.12.002

Nguyen, N. H. (2022). The nexus between capital structure and stock prices: Evidence from non-agricultural firms in Vietnam. European Journal of Business and Management Research, 7(4), 66–70. https://doi.org/10.24018/ejbmr.2022.7.4.1489

Nguyen, T., Tram, L., & Liem, N. (2021). The impact of stock market on enterprise capital structure in ASEAN developing countries. Science & Technology Development Journal: Economics - Law and Management, 5(1), 1359–1367. https://doi.org/10.32508/STDJELM.V5I1.729

Nickell, S. (1981). Biases in dynamic models with fixed effects. Econometrica, 49(6), 1417–1426. https://doi.org/10.2307/1911408

Nithin, K. S. (2023). A study on return on equity & return on assets at Featherlite Product Private Limited with respect to office equipments, Rajanukunte. International Journal of Scientific Research in Engineering and Management, 7(10), 78–83. https://doi.org/10.55041/ijsrem26666

Nurannisa, S., & Budiarto, T. (2024). ESG vs kinerja perusahaan, uji empiris perusahaan LQ45. Al-Kharaj: Jurnal Ekonomi, Keuangan & Bisnis Syariah, 6(6), 727–739. https://doi.org/10.47467/alkharaj.v6i6.2217

Nyaga, R. M., & Deya, J. (2022). Influence of capital structure on financial performance of construction and allied firms listed in Nairobi Securities Exchange in Kenya. International Journal of Finance, 7(2), 16–28. https://doi.org/10.47941/ijf.904

Okanda, T., Zhang, J., Sarfo, P., & Amankwah, O. (2025). Exploring the nexus between debt financing and firm performance: A robustness analysis using instrumental variables. International Journal of Advanced Engineering Research and Science, 12(2), 10–20. https://doi.org/10.22161/ijaers.122.2

Oktaviyanti, I., & Sumartik, S. (2023). The pecking order theory perspective in the study of company capital structure: Study on manufacturing companies on the Indonesia Stock Exchange. JBMP: Jurnal Bisnis, Manajemen dan Perbankan, 9(1), 42–51. https://doi.org/10.21070/jbmp.v9i1.1643

Ostwald, K. (2020). Malaysia 2020: The impasse of two-coalition politics. ISEAS Yusof Ishak Institute. https://www.kaiostwald.me/s/Ostwald-2020-Malaysia-Impasse.pdf

Othman, N., & Tai, T. (2022). The impact of fiscal policy instruments on economic wellness: Evidence from Malaysian per capita income. The Journal of Asian Finance, Economics and Business, 9(6), 245–252. https://doi.org/10.13106/JAFEB.2022.VOL9.NO6.0245

Özkul, G., & Kasım, M. (2021). The effect of macroeconomic factors on the stock market development in Asia-Pacific countries. Fiscaoeconomia, 5(1), 195–218. https://doi.org/10.25295/fsecon.851028

Paleologou, S. M. (2022). Happiness, democracy and socio-economic conditions: Evidence from a difference GMM estimator. Journal of Behavioral and Experimental Economics, 101, 101945. https://doi.org/10.1016/j.socec.2022.101945

Pamungkas, W. S., Supriyono, E., & Rahayu, M. K. P. (2023). The persistent effect of equity market timing on capital structure during rights issue. International Journal of Applied Economics, Finance and Accounting, 15(2), 53–60. https://doi.org/10.33094/ijaefa.v15i2.804

Panchal, S., & Chand, S. (2023). Impact of capital structure on firm performance: Empirical evidence from Indian manufacturing sector. Global Business Review, 24(3), 1–18. https://doi.org/10.1177/09721509231213235

Papke, L. E., & Wooldridge, J. (2022). A simple, robust test for choosing the level of fixed effects in linear panel data models. Empirical Economics, 64, 2683–2701. https://doi.org/10.1007/s00181-022-02337-y

Paramita, A. S., Suhardjo, Y., & Asri, M. (2021). The influence of liquidity toward capital structure. E-Jurnal Akuntansi, 31(11), 2800–2811. https://doi.org/10.24843/eja.2021.v31.i11.p10

Parveez, G. K. A., Tarmizi, A. H. A., Sundram, S., Loh, S. K., Ong-Abdullah, M., Palam, K. D. P., Salleh, K. M., Ishak, S. M., & Idris, Z. (2021). Oil palm economic performance in Malaysia and R&D progress in 2020. Journal of Oil Palm Research, 33, 159–190. https://doi.org/10.21894/jopr.2021.0026

Pigini, C., Pionati, A., & Valentini, F. (2023). Specification testing with grouped fixed effects. arXiv Preprint. https://doi.org/10.48550/arXiv.2310.01950

Pranita, W., Yaputri, L., Farhana, S., & Daniel, D. (2023). Pengaruh transaksi pihak berelasi terhadap performa perusahaan sektor basic materials di Indonesia. Jurnal Kajian Akuntansi, 7(1), 24–33. https://doi.org/10.33603/jka.v7i1.7754

Qiao, Y. (2023). The impact of capital structure on financial performance of agricultural listed companies in China. Advances in Economic Development and Management Research, 1(1), 72–80. https://doi.org/10.61935/aedmr.1.1.2023.p72

Rahim, N. A., Nor, F. M., Ramli, N. A., & Marzuki, A. M. (2020). Determinants of capital structure for Malaysian Shariah-compliant firms: The impact of revised screening methodology. International Journal of Banking and Finance, 14(S1), 71–90. https://doi.org/10.32890/ijbf2019.14.0.9911

Rahman, A., Ibrahim, N., & Basar, S. (2021). The effect of capital structure on the performance of Malaysian PLCs during a transition from SST to GST. Asian International Journal of Banking and Finance, 3, 69–81. https://doi.org/10.35631/AIJBAF.36007

Ramlan, H., Abdul Kahar, A. S., Abd Rahim, M. F., Syafiq Abdul Kahar, A., & Fahmi Abd Rahim, M. (2020). Impact of capital structure on performance of Malaysian trading and service firms. European Proceedings of Social and Behavioural Sciences, 100, 579–588. https://doi.org/10.15405/epsbs.2020.12.05.59

Rasiah, R., & Krishnan, G. (2020). Industrialization and industrial hubs in Malaysia. The Oxford Handbook of Industrial Hubs and Economic Development, 701–722. https://doi.org/10.1093/oxfordhb/9780198850434.013.36

Rathnayake, A. K. R., & Lasantha, S. A. R. (2021). Impact of corporate cash holdings on firm value: Evidence for trade-off theory. University of Jaffna Research and Review. Retrieved from http://repo.lib.jfn.ac.lk/ujrr/handle/123456789/3346

Rehan, R., Sa'ad, A. A., Haron, R., & Hye, Q. M. A. (2023). Are shariah and non-shariah firms' capital structure determinants and financial performance related? Evidence from Malaysia. Asian Journal of Economic Modelling, 11(3), 149–164. https://doi.org/10.55493/5009.v11i3.4903

Rehan, R., Sa'ad, A., Fu, G., & Khan, M. (2024). The determinants of banks' capital structure in SAARC economies. Edelweiss Applied Science and Technology, 8(4), 417–433. https://doi.org/10.55214/25768484.v8i4.1204

Richard, M. (2022). GMM analyses of the effects of digital services trade on economic growth of low, middle, and high income countries. Asian Journal of Economics,

Business and Accounting, 22(18), 58–85. https://doi.org/10.9734/AJEBA/2022/v22i1830643

Rizvi, S. A. R., Juhro, S. M., & Narayan, P. K. (2021). Understanding market reaction to COVID-19 monetary and fiscal stimulus in major ASEAN countries. Buletin Ekonomi Moneter dan Perbankan, 24(3), 313–334. https://doi.org/10.21098/bemp.v24i3.1690

Rohaizan, A. A., Latif, M. S. A., Zulkifli, N. Z., Haswani, W. N. S. W., & Zainoddin, A. I. (2021). Determinants of capital structure from Shariah-compliant firms in travel, leisure and hospitality sector in Malaysia. International Journal of Academic Research in Business and Social Sciences, 11(9), 1216–1226. https://doi.org/10.6007/ijarbss/v11-i9/10889

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. The Stata Journal, 9(1), 86–136. https://doi.org/10.1177/1536867X0900900106

Rosi, N. A., & Hasanuh, N. (2020). The influence of return on assets, debt to assets ratio and current ratio on financial distress. E-Jurnal Ekonomi dan Bisnis Universitas Udayana, 9(10), 995–1018. https://doi.org/10.24843/EEB.2020.v09.i10.p04

Rowland, R., Chia, R. C. J., & Liew, V. K.-S. (2023). Do non-pharmaceutical policies in response to COVID-19 affect stock performance? Evidence from Malaysia stock market return and volatility. PLOS ONE, 18(1), e0277252. https://doi.org/10.1371/journal.pone.0277252

Sagliaschi, U., & Savona, R. (2021). Dynamic capital structure without commitment. In Dynamical Corporate Finance: An Equilibrium Approach, 143–170. https://doi.org/10.1007/978-3-030-77853-8_6

Sahari, S., Rahim, N. A., & Tinggi, M. (2019). Capital structure and firm performance: Evidence from food processing industry in Malaysia. The Journal of Social Sciences Research, 5(2), 317–324. https://doi.org/10.32861/jssr.52.317.324

Sahudin, Z., Abdullah, H., Elias, N. L. M., Ali, H., & Annuar, A. (2020). Capital structure of property sector in Malaysia. Journal of Emerging Economies and Islamic Research, 8(3), 62–73. https://doi.org/10.24191/jeeir.v8i3.10856

Saidi, S., & Harun, M. (2020). Goods and Services Tax (GST) transition to Sales and Services Tax (SST): Impact on the welfare of B40 and M40 households in Malaysia. In Charting a Sustainable Future of ASEAN in Business and Social Sciences (545–554). Springer Singapore. https://doi.org/10.1007/978-981-15-3859-9_47

Saif-Alyousfi, A. Y. H. (2019). Determinants of bank shareholder value: Evidence from GCC countries. International Journal of Managerial Finance, 15(5), 1–27. https://doi.org/10.1108/IJMF-05-2019-0170

Saif-Alyousfi, A. Y. H., Md-Rus, R., Taufil-Mohd, K. N., Taib, H. M., & Shahar, H. K. (2020). Determinants of capital structure: Evidence from Malaysian firms. Asia-Pacific Journal of Business Administration, 12(3–4), 283–326. https://doi.org/10.1108/APJBA-09-2019-0202

Salam, Z. A., & Shourkashti, R. (2019). Capital structure and firm performance in emerging market: An empirical analysis of Malaysian companies. International Journal of Academic Research in Accounting, Finance and Management Sciences, 9(3), 79–91. http://dx.doi.org/10.6007/IJARAFMS/v9-i3/6334

Salim, M., & Yadav, R. (2012). Capital structure and firm performance: Evidence from Malaysian listed companies. Procedia - Social and Behavioral Sciences, 65, 156–166. https://doi.org/10.1016/j.sbspro.2012.11.105

Salmerón-Gómez, R., García-García, C. B., & García-Pérez, J. (2024). A redefined variance inflation factor: Overcoming the limitations of the variance inflation factor. Computational Economics, 65(1), 337–363. https://doi.org/10.1007/s10614-024-10575-8

Sandow, J. N., Duodu, E., & Oteng-Abayie, E. F. (2021). Regulatory capital requirements and bank performance in Ghana: Evidence from panel corrected standard error. Cogent Economics & Finance, 9(1), 2003503. https://doi.org/10.1080/23322039.2021.2003503

Sani, M., Suleiman, S., & Isyaku, M. (2023). Robust Hausman pretest for panel data model in the presence of heteroscedasticity and influential observations. Journal of Basics and Applied Sciences Research, 1(1), 27–35. https://doi.org/10.33003/jobasr-2023-v1i1-8

Saniye, C. A. N., & Camci, Ç. (2023). Generalized cross product in (2+s)-dimensional framed metric manifolds with application to Legendre curves. Journal of New Theory, 42, 94–107. https://doi.org/10.53570/jnt.1213002

Sanusi, S., Omar, N., & Sanusi, Z. M. (2015). Goods and Services Tax (GST) governance in the Malaysian new tax environment. Procedia Economics and Finance, 31, 373–379. https://doi.org/10.1016/S2212-5671(15)01212-5

Sargan, J. D. (1958). The estimation of economic relationships using instrumental variables. Econometrica, 26(3), 393–415. https://doi.org/10.2307/1907619

Selezneva, Z. V., & Evdokimova, M. S. (2022). Endogeneity problem in corporate finance: Theory and practice. Finance: Theory and Practice, 26(3), 64–84. https://doi.org/10.26794/2587-5671-2022-26-3-64-84

Sdiq, S. R., & Abdullah, H. A. (2022). Examining the effect of agency cost on capital structure-financial performance nexus: Empirical evidence for emerging market. Cogent Economics & Finance, 10(1), 2148364. https://doi.org/10.1080/23322039.2022.2148364

Sebki, W. (2021). Education and economic growth in developing countries: Empirical evidence from GMM estimators for dynamic panel data. Economics and Business, 35(1), 14–29. https://doi.org/10.2478/eb-2021-0002

Shahzad, A., Azeem, M., Nazir, M. S., Vo, X. V., & Linh, N. T. M. (2021). The determinants of capital structure: Evidence from SAARC countries. International Journal of Finance and Economics, 26(4), 6471–6487. https://doi.org/10.1002/ijfe.2132

Shangle, A., & Solaymani, S. (2020). Responses of monetary policies to oil price changes in Malaysia. Energy, 200, 117553. https://doi.org/10.1016/j.energy.2020.117553

Shi, H., Zhang, X., Guo, X., He, B., & Wang, C. (2024). Testing overidentifying restrictions on high-dimensional instruments and covariates. Annals of the Institute of Statistical Mathematics, Advance online publication. https://doi.org/10.1007/s10463-024-00918-5

Shiyanbola, A., Alu, C. D., & Timilehin, A. O. (2022). Effect of capital structure on growth of Nigerian quoted consumer goods firms. Archives of Business Research, 10(9), 178–188. https://doi.org/10.14738/abr.109.12980

Shrestha, P. (2023). The impact of working capital management on profitability: Evidence from non-financial firms listed in NEPSE. Interdisciplinary Journal of Innovation in Nepalese Academia, 2(1), 1–12. https://doi.org/10.3126/idjina.v2i1.55965

Sike, R. I., Ibrahim, U., & Maitala, F. M. (2023). Capital structure and financial performance: A sectorial analysis. WSEAS Transactions on Business and Economics, 20, 1315–1325. https://doi.org/10.37394/23207.2023.20.132

Sinnadurai, P., & Devi, S. S. (2022). Understanding post-privatisation performance of statutory bodies subject to government shareholding—A suggested theoretical framework, for Malaysian researchers. Journal of Risk and Financial Management, 15(5), 228. https://doi.org/10.3390/jrfm15050228

Singh, K., Pillai, D., & Rastogi, S. (2021). Pecking order theory of capital structure: Empirical evidence for listed SMEs in India. Vision: The Journal of Business Perspective, 25(4), 409–421. https://doi.org/10.1177/09722629211057208

Smeltzer, S., & Paré, D. J. (2015). Challenging electoral authoritarianism in Malaysia: The embodied politics of the Bersih movement. Interface: A Journal for and about Social Movements, 7(2), 120–144. http://www.interfacejournal.net/wordpress/wp-content/uploads/2015/12/Issue-7-2-Smeltzer-and-Pare.pdf

Son, P. V. H., & Duong, L. T. (2024). Research on applying machine learning models to predict and assess return on assets (ROA). Asian Journal of Civil Engineering, 25(5), 4269–4279. https://doi.org/10.1007/s42107-024-01046-4

Spierdijk, L. (2022). Assessing the consistency of the fixed-effects estimator: A regression-based Wald test. Empirical Economics, 64, 1599–1630. https://doi.org/10.1007/s00181-022-02298-2

Spitsin, V., Vuković, D. B., Spitsina, L., & Özer, M. (2022). The impact of high-tech companies' performance and growth on capital structure. Competitiveness Review: An International Business Journal, 32(6), 975–994. https://doi.org/10.1108/CR-03-2021-0042

Sudarsono, H., Anto, M. B. H., & Perdana, A. R. A. (2024). Financial risk determinants in Islamic rural banks: Static and dynamic models. Jurnal Ekonomi Pembangunan, 22(1), 54–72. https://doi.org/10.22219/jep.v22i01.33404

Suleiman, A., Othman, M., Daud, H., Abdullah, M., Kadir, E., Kane, I., & Husin, A. (2023). Forecasting the volatility of real residential property prices in Malaysia: A comparison of GARCH models. Real Estate Management and Valuation, 31(3), 20–31. https://doi.org/10.2478/remav-2023-0018

Sunaryo, D., & Lestari, E. P. (2021). The effect of debt to asset ratio and debt to equity ratio against return on assets. Proceedings of the 2nd Borobudur International Symposium on Humanities and Social Sciences (BIS-HSS 2020). https://doi.org/10.4108/eai.18-11-2020.2311805

Tan, A. T., Joo, C. N., Wei, J. C., Yien, L. Y., & Jin, Y. S. (2021). The influence of debt financing on firms' performance: Empirical evidence from Malaysia. UNIMAS Review of Accounting and Finance, 5(1), 69–80. https://publisher.unimas.my/ojs/index.php/URAF/article/view/3535

Tan, S. L., & Hamid, N. I. N. A. (2016). Capital structure and performance of Malaysia plantation sector. Journal of Advanced Research in Social and Behavioural Sciences, 3(1), 34–45. https://www.akademiabaru.com/doc/ARSBSV3_N1_P34_45.pdf

Tanui, P. K. (2021). Asset structure, corporate governance, capital structure and financial performance of construction and manufacturing firms listed in Kenya. Horizon Journal of Economics and Business Management, 2(3), 66–72. https://doi.org/10.47310/HJEBM.2021.V02I03.008

Tanwar, N. (2024). Capital structure impact on firm performance: An empirical study of the pharmaceutical sector in India. Economic Affairs, 69(3), 629–636. https://doi.org/10.46852/0424-2513.3.2024.8

Tarighi, H., Hosseiny, Z., Abbaszadeh, M. R., Zimon, G., & Haghighat, D. (2022). How do financial distress risk and related party transactions affect financial reporting quality? Empirical evidence from Iran. Risks, 10(3), 46. https://doi.org/10.3390/risks10030046

Tchatoka, D. (2021). Uniform inference after pretesting for exogeneity with heteroskedastic data. MPRA Paper, 106435. https://mpra.ub.uni-muenchen.de/106435/11/MPRA_paper_106435.pdf

Theiri, S., Kasraoui, N., & Bouzaiene, N. (2022). The impact of financial performance and firm characteristics on earnings management: Case of Tunisian companies. Investment Management and Financial Innovations, 19(4), 184–198. https://doi.org/10.21511/imfi.19(4).2022.15

Tinungki, G. M., Hartono, P., Robiyanto, R., Hartono, A., Jakaria, J., & Simanjuntak, L. (2022). The COVID-19 pandemic impact on corporate dividend policy of sustainable and responsible investment in Indonesia: Static and dynamic panel data model comparison. Sustainability, 14(10), 6152. https://doi.org/10.3390/su14106152

Toader, D., Vintilă, G., & Gherghina, Ș. C. (2022). Firm- and country-level drivers of capital structure: Quantitative evidence from Central and Eastern European listed companies.

Journal of Financial Studies and Research, 2022, 572694. https://doi.org/10.5171/2022.572694

Tubastuvi, N., Yuswandani, A., Fitriati, A., Darmawan, A., & Jaroenwanit, P. (2023). Profitability as a moderator: Assessing the influence of capital structure, investment decision, and firm size on firm value. Riset Akuntansi dan Keuangan Indonesia, 9(1), 46–56. https://doi.org/10.23917/reaksi.v9i1.4044

U.S. Energy Information Administration. (2016, January 4). Crude oil prices started 2015 relatively low, ended the year lower. Today in Energy. https://www.eia.gov/todayinenergy/detail.php?id=24432

Uddin, M. N., Khan, M. S. U., & Hosen, M. A. (2022). Do determinants influence the capital structure decision in Bangladesh? A panel data analysis. International Journal of Business and Society, 23(2), 1106–1122. https://doi.org/10.33736/ijbs.4868.2022

Ulfah, A., & Nurzianti, R. (2023). Analysis of total debt to asset ratio and profit margin as a measure of company financial performance. J-ISCAN: Journal of Islamic Accounting Research, 5(2), 114–124. https://doi.org/10.52490/jiscan.v5i2.1951

Upilin, S., & Mohammad, H. S. (2020). Firms' specific determinants of capital structure: An analysis into construction firms in Malaysia and Singapore. Insight Journal, 7(1), 45–54. https://doi.org/10.24191/ij.v7i1.64

Vaicondam, Y., & Ramakrishnan, S. (2017). Capital structure and profitability across Malaysian listed firms. Advanced Science Letters, 23(9), 9275–9278. https://doi.org/10.1166/asl.2017.10069

Van Bon, N. (2015). Effects of institutional quality on FDI in provinces of Vietnam: Empirical evidence based on differenced panel GMM. Journal of Economic Development, 22(3), 26–45. https://doi.org/10.24311/jed/2015.22.3.04

Vásquez Tejos, F. J., & Pape Larre, H. (2021). Market timing and pecking order theory in Latin America. Revista Finanzas y Política Económica, 13(2), 79–104. https://doi.org/10.14718/revfinanzpolitecon.3674

Vintilă, A. I. (2024). The determinants of firm value: A panel data approach on the S&P 500 companies. Scientific Annals of Economics and Business, 71(4), 625–640. https://doi.org/10.47743/saeb-2024-0030

Viphindrartin, S., Saleh, M., & Prestianawati, S. (2020). Effectiveness of the monetary transmission mechanism in achieving the ultimate goals of ASEAN-3. Advances in Economics, Business and Management Research, 452–458. https://doi.org/10.2991/aebmr.k.200606.077

Volatility Laboratory of the NYU Stern Volatility and Risk Institute. (2024). FTSE Bursa Malaysia KLCI Index – Kuala Lumpur Composite Index Asy. MEM Volatility Analysis. V-Lab, NYU Stern. https://vlab.stern.nyu.edu

Vuković, D. B., Rincón, C., & Maiti, M. (2021). Price distortions and municipal bonds premiums: Evidence from Switzerland. Financial Innovation, 7, 1–21. https://doi.org/10.1186/s40854-021-00276-8

Vuong, T., Wu, Y., Weng, T., Nguyen, H., & Vo, X. (2022). Capital structure choices and stock market volatility: Evidence from Chinese listed firms. The Chinese Economy, 56, 25–49. https://doi.org/10.1080/10971475.2022.2058180

Wan Daud, W. M. N., Norwani, N. M., Mansor, A. A., & Endut, W. A. (2016). Does financing decision influence corporate performance in Malaysia? International Journal of Economics and Financial Issues, 6(3), 1165–1171. https://www.econjournals.com/index.php/ijefi/article/view/2332

Wan, L. (2022). Monetary policy, fiscal policy, and capital structure dynamic adjustment: Evidence from Chinese listed companies. Mathematical Problems in Engineering, 2022, 8040641. https://doi.org/10.1155/2022/8040641

Wang, M., & Zhou, H. (2022). Does working capital financing structure affect firm value? An empirical research based on data of China's A-share listed companies. International Journal of Economics and Finance, 14(9), 9–16. https://doi.org/10.5539/ijef.v14n9p9

Waryati, S., & Ihsani, R. (2023). Contribution of capital structure, liquidity and firm size to financial performance. International Journal of Social Science, Humanity & Management Research, 2(11), 1–9. https://doi.org/10.58806/ijsshmr.2023.v2i11n01

Waziri, S. I., Mohamed Nor, N., Raja Abdullah, N. M., & Adamu, P. (2015). Effect of the prevalence of HIV/AIDS and the life expectancy rate on economic growth in SSA countries: Difference GMM approach. Global Journal of Health Science, 8(4), 212–220. https://doi.org/10.5539/gjhs.v8n4p212

Weiss, M. L. (2013). Malaysia's 13th general elections: Same result, different outcome. Asian Survey, 53(6), 1135–1158. https://doi.org/10.1525/as.2013.53.6.1135

Wilson, B. (2022). Impact of capital structure on the financial performance of listed financial institutions in Nigeria. Journal of Economics, Finance and Management Studies, 5(1), 91–97. https://doi.org/10.47191/jefms/v5-i1-11

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. Journal of Econometrics, 126, 25–51. https://doi.org/10.1016/j.jeconom.2004.02.005

Wooldridge, J. M. (1995). Selection corrections for panel data models under conditional mean independence assumptions. Journal of Econometrics, 68(1), 115–132. https://doi.org/10.1016/0304-4076(94)01645-G

Wooldridge, J. M. (2009). Introductory econometrics: A modern approach (4th ed.). South-Western Cengage Learning. https://doi.org/10.1002/jae.665

Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data (2nd ed.). MIT Press.

World Bank. (2024). GDP (current US$) – Malaysia. https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=MY

Wu, D., Hua, J., & Xu, F. (2023). pydynpd: A Python package for dynamic panel model. Journal of Open Source Software, 8(84), 4416. https://doi.org/10.21105/joss.04416

Yang, Y. (2022). A correlated random effects approach to the estimation of models with multiple fixed effects. Economics Letters, 213, 110408. https://doi.org/10.1016/j.econlet.2022.110408

Ye, Z. (2021). Capital structure and corporate performance: A case of China. BCP Business & Management, 15, 333. https://doi.org/10.54691/bcpbm.v15i.333

Yu, J. (2024). Factors affecting return on assets in the renewable energy sector during supply chain disruptions. Journal of Risk and Financial Management, 17(6), 253. https://doi.org/10.3390/jrfm17060253

Zaidi, N. S. B., Jais, M., & Karim, B. A. (2019). The influence of debt financing on firms' performance: A study of consumer product industry in Malaysia. International Journal of Academic Research in Business and Social Sciences, 9(9), 578–589. https://doi.org/10.6007/IJARBSS/v9-i9/6331

Zeitun, R., & Goaied, M. (2022). The nexus between debt structure, firm performance, and the financial crisis: Non-linear panel data evidence from Japan. Applied Economics, 54, 4681–4699. https://doi.org/10.1080/00036846.2022.2033680

Zhang, M., Lin, L., Chen, H., & Zhao, X. (2022). The impact of capital structure on the performance of Chinese e-commerce industry companies (2013–2019 panel data). Journal of Mathematics, 2022, 7612349. https://doi.org/10.1155/2022/7612349

Zhu, K. (2019). Statistical inference for autoregressive models under heteroscedasticity of unknown form. The Annals of Statistics, 47(6), 3185–3215. https://doi.org/10.1214/18-AOS1775

Zidi, M., & Hamdi, H. (2024). A panel-corrected standard error (PCSE) framework to estimate capital structure and banking performance within the Tunisian context. International Journal of Economics and Financial Issues, 14(2), 196–202. https://doi.org/10.32479/ijefi.15793

APPENDICES

Appendix A: Firms Selection and Exclusion for the Study

Table A1: List of Firms Selected for the Study

NO	FIRM	ID	SECTOR
1	THREE-A RESOURCES BERHAD	3A	CONSUMER PRODUCTS & SERVICES
2	ASTRAL ASIA BERHAD	AASIA	PLANTATION
3	ABLE GLOBAL BERHAD	ABLEGLOB	CONSUMER PRODUCTS & SERVICES
4	ABLEGROUP BERHAD	ABLEGRP	INDUSTRIAL PRODUCTS & SERVICES
5	ACME HOLDINGS BERHAD	ACME	PROPERTY
6	ADVANCECON HOLDINGS BERHAD	ADVCON	CONSTRUCTION
7	AE MULTI HOLDINGS BERHAD	AEM	INDUSTRIAL PRODUCTS & SERVICES
8	AEON CO. (M) BHD	AEON	CONSUMER PRODUCTS & SERVICES
9	ABM FUJIYA BERHAD	AFUJIYA	INDUSTRIAL PRODUCTS & SERVICES
10	AGESON BERHAD	AGES	CONSTRUCTION
11	APEX HEALTHCARE BERHAD	AHEALTH	HEALTH CARE
12	MALAYSIA AIRPORTS HOLDINGS BERHAD	AIRPORT	TRANSPORTATION & LOGISTICS
13	AJINOMOTO (MALAYSIA) BERHAD	AJI	CONSUMER PRODUCTS & SERVICES
14	AJIYA BERHAD	AJIYA	INDUSTRIAL PRODUCTS & SERVICES
15	AL-'AQAR HEALTHCARE REIT	ALAQAR	REAL ESTATE INVESTMENT TRUSTS
16	ALCOM GROUP BERHAD	ALCOM	INDUSTRIAL PRODUCTS & SERVICES
17	AL-SALAM REAL ESTATE INVESTMENT TRUST	ALSREIT	REAL ESTATE INVESTMENT TRUSTS
18	AME ELITE CONSORTIUM BERHAD	AME	CONSTRUCTION
19	AMFIRST REAL ESTATE INVESTMENT TRUST	AMFIRST	REAL ESTATE INVESTMENT TRUSTS
20	AMTEL HOLDINGS BERHAD	AMTEL	TELECOMMUNICATIONS & MEDIA
21	AMWAY (MALAYSIA) HOLDINGS BERHAD	AMWAY	CONSUMER PRODUCTS & SERVICES
22	ANALABS RESOURCES BHD	ANALABS	INDUSTRIAL PRODUCTS & SERVICES
23	ANCOM NYLEX BERHAD	ANCOMNY	INDUSTRIAL PRODUCTS & SERVICES
24	ANN JOO RESOURCES BERHAD	ANNJOO	INDUSTRIAL PRODUCTS & SERVICES
25	APB RESOURCES BERHAD	APB	INDUSTRIAL PRODUCTS & SERVICES
26	APM AUTOMOTIVE HOLDINGS BERHAD	APM	INDUSTRIAL PRODUCTS & SERVICES
27	APOLLO FOOD HOLDINGS BERHAD	APOLLO	CONSUMER PRODUCTS & SERVICES
28	A-RANK BERHAD	ARANK	INDUSTRIAL PRODUCTS & SERVICES
29	ARB BERHAD	ARBB	TECHNOLOGY
30	ARK RESOURCES HOLDINGS BERHAD	ARK	PROPERTY
31	ARKA BERHAD	ARKA	TRANSPORTATION & LOGISTICS
32	BUMI ARMADA BERHAD	ARMADA	ENERGY
33	AMANAHRAYA REAL ESTATE INVESTMENT TRUST	ARREIT	REAL ESTATE INVESTMENT TRUSTS
34	ADVANCE SYNERGY BERHAD	ASB	CONSUMER PRODUCTS & SERVICES
35	ASIA BRANDS BERHAD	ASIABRN	CONSUMER PRODUCTS & SERVICES
36	ASIA FILE CORP BERHAD	ASIAFLE	CONSUMER PRODUCTS & SERVICES
37	ASIAN PAC HOLDINGS BERHAD	ASIAPAC	PROPERTY
38	ASTEEL GROUP BERHAD	ASTEEL	INDUSTRIAL PRODUCTS & SERVICES
39	ASTINO BERHAD	ASTINO	INDUSTRIAL PRODUCTS & SERVICES
40	ASTRO MALAYSIA HOLDINGS BERHAD	ASTRO	TELECOMMUNICATIONS & MEDIA
41	ATA IMS BERHAD	ATAIMS	INDUSTRIAL PRODUCTS & SERVICES
42	AURELIUS TECHNOLOGIES BERHAD	ATECH	INDUSTRIAL PRODUCTS & SERVICES
43	ATLAN HOLDINGS BERHAD	ATLAN	CONSUMER PRODUCTS & SERVICES
44	ATRIUM REAL ESTATE INVESTMENT TRUST	ATRIUM	REAL ESTATE INVESTMENT TRUSTS
45	AURO HOLDINGS BERHAD (NWP HOLDINGS BERHAD)	AURO	INDUSTRIAL PRODUCTS & SERVICES
46	AVILLION BERHAD	AVI	CONSUMER PRODUCTS & SERVICES
47	AWANBIRU TECHNOLOGY BERHAD	AWANTEC	TECHNOLOGY
48	AWC BERHAD	AWC	INDUSTRIAL PRODUCTS & SERVICES
49	AXIATA GROUP BERHAD	AXIATA	TELECOMMUNICATIONS & MEDIA
50	AXIS REAL ESTATE INVESTMENT TRUST	AXREIT	REAL ESTATE INVESTMENT TRUSTS
51	AXTERIA GROUP BERHAD	AXTERIA	PROPERTY
52	AYER HOLDINGS BERHAD	AYER	PROPERTY
53	AYS VENTURES BERHAD	AYS	INDUSTRIAL PRODUCTS & SERVICES
54	AHMAD ZAKI RESOURCES BERHAD	AZRB	CONSTRUCTION
55	BENALEC HOLDINGS BERHAD	BANALEC	CONSTRUCTION
56	BRITISH AMERICAN TOBACCO (MALAYSIA) BERHAD	BAT	CONSUMER PRODUCTS & SERVICES
57	BERMAZ AUTO BERHAD	BAUTO	CONSUMER PRODUCTS & SERVICES
58	BCB BERHAD	BCB	PROPERTY
59	BINA DARULAMAN BERHAD	BDB	PROPERTY
60	BESHOM HOLDINGS BERHAD	BESHOM	CONSUMER PRODUCTS & SERVICES
61	BOUSTEAD HEAVY INDUSTRIES CORPORATION BERHAD	BHIC	TRANSPORTATION & LOGISTICS
62	B.I.G. INDUSTRIES BERHAD	BIG	INDUSTRIAL PRODUCTS & SERVICES
63	BINTAI KINDEN CORPORATION BERHAD	BINTAI	INDUSTRIAL PRODUCTS & SERVICES
64	BINTULU PORT HOLDINGS BERHAD	BIPORT	TRANSPORTATION & LOGISTICS
65	BERJAYA ASSETS BERHAD	BJASSET	PROPERTY
66	BERJAYA CORPORATION BERHAD	BJCORP	INDUSTRIAL PRODUCTS & SERVICES
67	BERJAYA FOOD BERHAD	BJFOOD	CONSUMER PRODUCTS & SERVICES
68	BERJAYA LAND BERHAD	BJLAND	CONSUMER PRODUCTS & SERVICES
69	BATU KAWAN BERHAD	BKAWAN	PLANTATION
70	BLD PLANTATION BERHAD	BLDPLNT	PLANTATION

Table A1: continued

71	BM GREENTECH BERHAD (BOILERMECH HOLDINGS BERHAD)	BMGREEN	INDUSTRIAL PRODUCTS & SERVICES
72	BONIA CORPORATION BERHAD	BONIA	CONSUMER PRODUCTS & SERVICES
73	BORNEO OIL BERHAD	BORNOIL	INDUSTRIAL PRODUCTS & SERVICES
74	BOX-PAK (MALAYSIA) BHD	BOXPAK	INDUSTRIAL PRODUCTS & SERVICES
75	BP PLASTICS HOLDING BERHAD	BPPLAS	INDUSTRIAL PRODUCTS & SERVICES
76	BINA PURI HOLDINGS BERHAD	BPURI	CONSTRUCTION
77	BRIGHT PACKAGING INDUSTRY BERHAD	BRIGHT	INDUSTRIAL PRODUCTS & SERVICES
78	BSL CORPORATION BERHAD	BSLCORP	INDUSTRIAL PRODUCTS & SERVICES
79	BTM RESOURCES BERHAD	BTM	INDUSTRIAL PRODUCTS & SERVICES
80	CAB CAKARAN CORPORATION BERHAD	CAB	CONSUMER PRODUCTS & SERVICES
81	CAM RESOURCES BERHAD	CAMRES	CONSUMER PRODUCTS & SERVICES
82	CAN-ONE BERHAD	CANONE	INDUSTRIAL PRODUCTS & SERVICES
83	CAREPLUS GROUP BERHAD	CAREPLS	HEALTH CARE
84	CARIMIN PETROLEUM BERHAD	CARIMIN	ENERGY
85	CARLSBERG BREWERY MALAYSIA BERHAD	CARLSBG	CONSUMER PRODUCTS & SERVICES
86	CB INDUSTRIAL PRODUCT HOLDING BERHAD	CBIP	INDUSTRIAL PRODUCTS & SERVICES
87	CCK CONSOLIDATED HOLDINGS BERHAD	CCK	CONSUMER PRODUCTS & SERVICES
88	CELCOMDIGI BERHAD	CDB	TELECOMMUNICATIONS & MEDIA
89	CAPE EMS BERHAD	CEB	INDUSTRIAL PRODUCTS & SERVICES
90	CENSOF HOLDINGS BERHAD	CENSOF	TECHNOLOGY
91	CEPATWAWASAN GROUP BERHAD	CEPAT	PLANTATION
92	CONCRETE ENGINEERING PRODUCTS BERHAD	CEPCO	INDUSTRIAL PRODUCTS & SERVICES
93	COMPUTER FORMS (MALAYSIA) BERHAD	CFM	INDUSTRIAL PRODUCTS & SERVICES
94	CENTRAL GLOBAL BERHAD	CGB	INDUSTRIAL PRODUCTS & SERVICES
95	CHEETAH HOLDINGS BERHAD	CHEETAH	CONSUMER PRODUCTS & SERVICES
96	CHIN HIN GROUP PROPERTY BERHAD	CHGP	TRANSPORTATION & LOGISTICS
97	COUNTRY HEIGHTS HOLDINGS BERHAD	CHHB	PROPERTY
98	CHIN HIN GROUP BERHAD	CHINHIN	INDUSTRIAL PRODUCTS & SERVICES
99	CHIN TECK PLANTATIONS BERHAD	CHINTECK	PLANTATION
100	CHIN WELL HOLDINGS BERHAD	CHINWEL	INDUSTRIAL PRODUCTS & SERVICES
101	CHOO BEE METAL INDUSTRIES BERHAD	CHOOBEE	INDUSTRIAL PRODUCTS & SERVICES
102	CHUAN HUAT RESOURCES BERHAD	CHUAN	INDUSTRIAL PRODUCTS & SERVICES
103	C.I. HOLDINGS BERHAD	CIHLDG	CONSUMER PRODUCTS & SERVICES
104	CITAGLOBAL BERHAD	CITAGLB	INDUSTRIAL PRODUCTS & SERVICES
105	CJ CENTURY LOGISTICS HOLDINGS BERHAD	CJCEN	TRANSPORTATION & LOGISTICS
106	CLASSITA HOLDINGS BERHAD	CLASSITA	CONSUMER PRODUCTS & SERVICES
107	CAPITALAND MALAYSIA TRUST	CLMT	REAL ESTATE INVESTMENT TRUSTS
108	CME GROUP BERHAD	CME	INDUSTRIAL PRODUCTS & SERVICES
109	CAHYA MATA SARAWAK BERHAD	CMSB	INDUSTRIAL PRODUCTS & SERVICES
110	CNERGENZ BERHAD	CNERGEN	TECHNOLOGY
111	CITRA NUSA HOLDINGS BERHAD	CNH	CONSUMER PRODUCTS & SERVICES
112	CHINA OUHUA WINERY HOLDINGS LIMITED	CNOUHUA	CONSUMER PRODUCTS & SERVICES
113	COASTAL CONTRACTS BERHAD	COASTAL	ENERGY
114	COMPUGATES HOLDINGS BERHAD	COMPUGT	INDUSTRIAL PRODUCTS & SERVICES
115	CPE TECHNOLOGY BERHAD	CPETECH	INDUSTRIAL PRODUCTS & SERVICES
116	CREST BUILDER HOLDINGS BERHAD	CRESBLD	CONSTRUCTION
117	CRESCENDO CORPORATION BERHAD	CRESNDO	PROPERTY
118	CSC STEEL HOLDINGS BERHAD	CSCSTEL	INDUSTRIAL PRODUCTS & SERVICES
119	CTOS DIGITAL BERHAD	CTOS	TECHNOLOGY
120	CUSCAPI BERHAD	CUSCAPI	TECHNOLOGY
121	COUNTRY VIEW BERHAD	CVIEW	PROPERTY
122	CWG HOLDINGS BERHAD	CWG	CONSUMER PRODUCTS & SERVICES
123	CYBERJAYA EDUCATION GROUP BERHAD (MINDA GLOBAL BERHAD)	CYBERE	CONSUMER PRODUCTS & SERVICES
124	CYL CORPORATION BERHAD	CYL	INDUSTRIAL PRODUCTS & SERVICES
125	CYPARK RESOURCES BERHAD	CYPARK	INDUSTRIAL PRODUCTS & SERVICES
126	D & O GREEN TECHNOLOGIES BERHAD	D&O	TECHNOLOGY
127	DANCOMECH HOLDINGS BERHAD	DANCO	INDUSTRIAL PRODUCTS & SERVICES
128	DATAPREP HOLDINGS BERHAD	DATAPRP	TECHNOLOGY
129	DAYANG ENTERPRISE HOLDINGS BERHAD	DAYANG	ENERGY
130	DELEUM BERHAD	DELEUM	ENERGY
131	DFCITY GROUP BERHAD	DFCITY	INDUSTRIAL PRODUCTS & SERVICES
132	DIALOG GROUP BERHAD	DIALOG	ENERGY
133	DIGISTAR CORPORATION BERHAD	DIGISTA	TECHNOLOGY
134	DKLS INDUSTRIES BERHAD	DKLS	CONSTRUCTION
135	DKSH HOLDINGS (MALAYSIA) BERHAD	DKSH	CONSUMER PRODUCTS & SERVICES
136	DUTCH LADY MILK INDUSTRIES BERHAD	DLADY	CONSUMER PRODUCTS & SERVICES
137	DAGANG NEXCHANGE BERHAD	DNEX	TECHNOLOGY
138	D'NONCE TECHNOLOGY BERHAD	DNONCE	INDUSTRIAL PRODUCTS & SERVICES
139	DOLPHIN INTERNATIONAL BERHAD	DOLPHIN	INDUSTRIAL PRODUCTS & SERVICES
140	DOMINANT ENTERPRISE BERHAD	DOMINAN	INDUSTRIAL PRODUCTS & SERVICES
141	DUOPHARMA BIOTECH BERHAD	DPHARMA	HEALTH CARE
142	DPS RESOURCES BERHAD	DPS	PROPERTY
143	DRB-HICOM BERHAD	DRBHCOM	CONSUMER PRODUCTS & SERVICES
144	DATASONIC GROUP BERHAD	DSONIC	TECHNOLOGY
145	DUFU TECHNOLOGY CORP. BERHAD	DUFU	INDUSTRIAL PRODUCTS & SERVICES
146	DUTALAND BERHAD	DUTALND	PLANTATION
147	DXN HOLDINGS BERHAD	DXN	CONSUMER PRODUCTS & SERVICES
148	EASTERN & ORIENTAL BERHAD	E&O	PROPERTY
149	ECOFIRST CONSOLIDATED BERHAD	ECOFIRS	PROPERTY
150	ECOBUILT HOLDINGS BERHAD	ECOHLDS	TELECOMMUNICATIONS & MEDIA

Table A1: continued

151	ECOMATE HOLDINGS BERHAD	ECOMATE	CONSUMER PRODUCTS & SERVICES
152	ECONPILE HOLDINGS BERHAD	ECONBHD	CONSTRUCTION
153	ECO WORLD DEVELOPMENT GROUP BERHAD	ECOWLD	PROPERTY
154	EDARAN BERHAD	EDARAN	TECHNOLOGY
155	EDEN INC. BERHAD	EDEN	UTILITIES
156	UEM EDGENTA BERHAD	EDGENTA	INDUSTRIAL PRODUCTS & SERVICES
157	EFFICIENT E-SOLUTIONS BERHAD	EFFICEN	INDUSTRIAL PRODUCTS & SERVICES
158	EXCEL FORCE MSC BERHAD	EFORCE	TECHNOLOGY
159	EG INDUSTRIES BERHAD	EG	INDUSTRIAL PRODUCTS & SERVICES
160	ESTHETICS INTERNATIONAL GROUP BERHAD	EIG	CONSUMER PRODUCTS & SERVICES
161	EITA RESOURCES BERHAD	EITA	INDUSTRIAL PRODUCTS & SERVICES
162	EKOVEST BERHAD	EKOVEST	CONSTRUCTION
163	EKSONS CORPORATION BERHAD	EKSONS	INDUSTRIAL PRODUCTS & SERVICES
164	ELSOFT RESEARCH BERHAD	ELSOFT	TECHNOLOGY
165	EONMETALL GROUP BERHAD	EMETALL	INDUSTRIAL PRODUCTS & SERVICES
166	EMICO HOLDINGS BERHAD	EMICO	CONSUMER PRODUCTS & SERVICES
167	ENCORP BERHAD	ENCORP	PROPERTY
168	ENG KAH CORPORATION BERHAD	ENGKAH	CONSUMER PRODUCTS & SERVICES
169	ENGTEX GROUP BERHAD	ENGTEX	INDUSTRIAL PRODUCTS & SERVICES
170	ENRA GROUP BERHAD	ENRA	PROPERTY
171	EP MANUFACTURING BERHAD	EPMB	INDUSTRIAL PRODUCTS & SERVICES
172	EUPE CORPORATION BERHAD	EUPE	PROPERTY
173	EURO HOLDINGS BERHAD	EURO	CONSUMER PRODUCTS & SERVICES
174	EUROSPAN HOLDINGS BERHAD	EUROSP	CONSUMER PRODUCTS & SERVICES
175	EVERGREEN FIBREBOARD BERHAD	EVERGRN	INDUSTRIAL PRODUCTS & SERVICES
176	EWEIN BERHAD	EWEIN	PROPERTY
177	ECO WORLD INTERNATIONAL BERHAD	EWINT	PROPERTY
178	FRASER & NEAVE HOLDINGS BERHAD	F&N	CONSUMER PRODUCTS & SERVICES
179	FACB INDUSTRIES INCORPORATED BERHAD	FACBIND	INDUSTRIAL PRODUCTS & SERVICES
180	FAJARBARU BUILDER GROUP BERHAD	FAJAR	CONSTRUCTION
181	FAR EAST HOLDINGS BERHAD	FAREAST	PLANTATION
182	FARLIM GROUP (MALAYSIA) BERHAD	FARLIM	PROPERTY
183	FAVELLE FAVCO BERHAD	FAVCO	INDUSTRIAL PRODUCTS & SERVICES
184	FCW HOLDINGS BERHAD	FCW	CONSUMER PRODUCTS & SERVICES
185	FARM FRESH BERHAD	FFB	CONSUMER PRODUCTS & SERVICES
186	FGV HOLDINGS BERHAD	FGV	PLANTATION
187	FIAMMA HOLDINGS BERHAD	FIAMMA	CONSUMER PRODUCTS & SERVICES
188	FIBON BERHAD	FIBON	INDUSTRIAL PRODUCTS & SERVICES
189	FEDERAL INTERNATIONAL HOLDINGS BERHAD	FIHB	CONSUMER PRODUCTS & SERVICES
190	FIMA CORPORATION BERHAD	FIMACOR	INDUSTRIAL PRODUCTS & SERVICES
191	FITTERS DIVERSIFIED BERHAD	FITTERS	INDUSTRIAL PRODUCTS & SERVICES
192	FOCUS LUMBER BERHAD	FLBHD	INDUSTRIAL PRODUCTS & SERVICES
193	FM GLOBAL LOGISTICS HOLDINGS BERHAD	FM	TRANSPORTATION & LOGISTICS
194	FOCUS POINT HOLDINGS BERHAD	FOCUSP	CONSUMER PRODUCTS & SERVICES
195	FOUNDPAC GROUP BERHAD	FPGROUP	INDUSTRIAL PRODUCTS & SERVICES
196	FORMOSA PROSONIC INDUSTRIES BERHAD	FPI	CONSUMER PRODUCTS & SERVICES
197	FRONTKEN CORPORATION BERHAD	FRONTKN	TECHNOLOGY
198	G3 GLOBAL BERHAD	G3	CONSUMER PRODUCTS & SERVICES
199	GADANG HOLDINGS BERHAD	GADANG	CONSTRUCTION
200	GAMUDA BERHAD	GAMUDA	CONSTRUCTION
201	GAS MALAYSIA BERHAD	GASMSIA	UTILITIES
202	GABUNGAN AQRS BERHAD	GBGAQRS	CONSTRUCTION
203	G CAPITAL BERHAD	GCAP	TRANSPORTATION & LOGISTICS
204	GUAN CHONG BERHAD	GCB	CONSUMER PRODUCTS & SERVICES
205	GRAND CENTRAL ENTERPRISES BERHAD	GCE	CONSUMER PRODUCTS & SERVICES
206	GDB HOLDINGS BERHAD	GDB	CONSTRUCTION
207	GDEX BERHAD	GDEX	TRANSPORTATION & LOGISTICS
208	GENETEC TECHNOLOGY BERHAD	GENETEC	TECHNOLOGY
209	GENTING MALAYSIA BERHAD	GENM	CONSUMER PRODUCTS & SERVICES
210	GENTING PLANTATIONS BERHAD	GENP	PLANTATION
211	GENTING BERHAD	GENTING	CONSUMER PRODUCTS & SERVICES
212	GE-SHEN CORPORATION BERHAD	GESHEN	INDUSTRIAL PRODUCTS & SERVICES
213	GHL SYSTEMS BERHAD	GHLSYS	TECHNOLOGY
214	GIIB HOLDINGS BERHAD	GIIB	INDUSTRIAL PRODUCTS & SERVICES
215	GEORGE KENT (MALAYSIA) BERHAD	GKENT	CONSTRUCTION
216	GOLDEN LAND BERHAD	GLBHD	PLANTATION
217	GLOMAC BERHAD	GLOMAC	PROPERTY
218	GLOBALTEC FORMATION BERHAD	GLOTEC	INDUSTRIAL PRODUCTS & SERVICES
219	GROMUTUAL BERHAD	GMUTUAL	PROPERTY
220	GLOBAL ORIENTAL BERHAD	GOB	PROPERTY
221	GOPENG BERHAD	GOPENG	PLANTATION
222	GREEN PACKET BERHAD	GPACKET	TELECOMMUNICATIONS & MEDIA
223	GOLDEN PHAROS BERHAD	GPHAROS	INDUSTRIAL PRODUCTS & SERVICES
224	GREATECH TECHNOLOGY BERHAD	GREATEC	TECHNOLOGY
225	GREENYIELD BERHAD	GREENYB	CONSUMER PRODUCTS & SERVICES
226	GLOBETRONICS TECHNOLOGY BERHAD	GTRONIC	TECHNOLOGY
227	GUH HOLDINGS BERHAD	GUH	INDUSTRIAL PRODUCTS & SERVICES
228	GUOCOLAND (MALAYSIA) BERHAD	GUOCO	PROPERTY
229	HANDAL ENERGY BERHAD	HANDAL	ENERGY
230	HAP SENG CONSOLIDATED BERHAD	HAPSENG	INDUSTRIAL PRODUCTS & SERVICES

Table A1: continued

231	HARBOUR-LINK GROUP BERHAD	HARBOUR	TRANSPORTATION & LOGISTICS
232	HARRISONS HOLDINGS (M) BERHAD	HARISON	CONSUMER PRODUCTS & SERVICES
233	HARN LEN CORPORATION BERHAD	HARNLEN	PLANTATION
234	HARTALEGA HOLDINGS BERHAD	HARTA	HEALTH CARE
235	HCK CAPITAL GROUP BERHAD	HCK	PROPERTY
236	HEINEKEN MALAYSIA BERHAD	HEIM	CONSUMER PRODUCTS & SERVICES
237	HEKTAR REAL ESTATE INVESTMENT TRUST	HEKTAR	REAL ESTATE INVESTMENT TRUSTS
238	HENGYUAN REFINING COMPANY BERHAD	HENGYUAN	ENERGY
239	HEVEABOARD BERHAD	HEVEA	INDUSTRIAL PRODUCTS & SERVICES
240	HEXTAR HEALTHCARE BERHAD	HEXCARE	HEALTH CARE
241	HEXTAR RETAIL BERHAD	HEXRTL	CONSUMER PRODUCTS & SERVICES
242	HEXTAR GLOBAL BERHAD	HEXTAR	INDUSTRIAL PRODUCTS & SERVICES
243	HEXTAR TECHNOLOGIES SOLUTIONS BERHAD (COMPLETE LOGISTIC SERVICES BERHAD)	HEXTECH	TRANSPORTATION & LOGISTICS
244	HEXZA CORPORATION BERHAD	HEXZA	INDUSTRIAL PRODUCTS & SERVICES
245	HIAP TECK VENTURE BERHAD	HIAPTEK	INDUSTRIAL PRODUCTS & SERVICES
246	HIBISCUS PETROLEUM BERHAD	HIBISCS	ENERGY
247	KUMPULAN H & L HIGH-TECH BERHAD	HIGHTEC	INDUSTRIAL PRODUCTS & SERVICES
248	HIL INDUSTRIES BERHAD	HIL	INDUSTRIAL PRODUCTS & SERVICES
249	HONG LEONG INDUSTRIES BERHAD	HLIND	CONSUMER PRODUCTS & SERVICES
250	HOMERITZ CORPORATION BERHAD	HOMERIZ	CONSUMER PRODUCTS & SERVICES
251	HONG SENG CONSOLIDATED BERHAD	HONGSENG	TECHNOLOGY
252	HPMT HOLDINGS BERHAD	HPMT	INDUSTRIAL PRODUCTS & SERVICES
253	HAP SENG PLANTATIONS HOLDINGS BERHAD	HSPLANT	PLANTATION
254	HSS ENGINEERS BERHAD	HSSEB	INDUSTRIAL PRODUCTS & SERVICES
255	HEITECH PADU BERHAD	HTPADU	TECHNOLOGY
256	HUA YANG BERHAD	HUAYANG	PROPERTY
257	HUBLINE BERHAD	HUBLINE	TRANSPORTATION & LOGISTICS
258	HUME CEMENT INDUSTRIES BERHAD	HUMEIND	INDUSTRIAL PRODUCTS & SERVICES
259	HUP SENG INDUSTRIES BERHAD	HUPSENG	CONSUMER PRODUCTS & SERVICES
260	HWA TAI INDUSTRIES BERHAD	HWATAI	CONSUMER PRODUCTS & SERVICES
261	HO WAH GENTING BERHAD	HWGB	INDUSTRIAL PRODUCTS & SERVICES
262	I-BERHAD	IBHD	PROPERTY
263	IBRACO BERHAD	IBRACO	PROPERTY
264	ICON OFFSHORE BERHAD	ICON	ENERGY
265	ICONIC WORLDWIDE BERHAD	ICONIC	CONSUMER PRODUCTS & SERVICES
266	IDEAL CAPITAL BERHAD	IDEAL	PROPERTY
267	IGB BERHAD	IGBB	PROPERTY
268	IGB COMMERCIAL REAL ESTATE INVESTMENT TRUST	IGBCR	REAL ESTATE INVESTMENT TRUSTS
269	IGB REAL ESTATE INVESTMENT TRUST	IGBREIT	REAL ESTATE INVESTMENT TRUSTS
270	INFRAHARTA HOLDINGS BERHAD (VERTICE BERHAD)	IHB	CONSTRUCTION
271	IHH HEALTHCARE BERHAD	IHH	HEALTH CARE
272	IJM CORPORATION BERHAD	IJM	CONSTRUCTION
273	ILB GROUP BERHAD	ILB	TRANSPORTATION & LOGISTICS
274	IMASPRO CORPORATION BERHAD	IMASPRO	INDUSTRIAL PRODUCTS & SERVICES
275	INARI AMERTRON BERHAD	INARI	TECHNOLOGY
276	INCH KENNETH KAJANG RUBBER PUBLIC LIMITED COMPANY	INCKEN	PLANTATION
277	INGENIEUR GUDANG BERHAD	INGENIEU	INDUSTRIAL PRODUCTS & SERVICES
278	INNATURE BERHAD	INNATURE	CONSUMER PRODUCTS & SERVICES
279	INNOPRISE PLANTATIONS BERHAD	INNO	PLANTATION
280	INTA BINA GROUP BERHAD	INTA	CONSTRUCTION
281	IOI CORPORATION BERHAD	IOICORP	PLANTATION
282	IOI PROPERTIES GROUP BERHAD	IOIPG	PROPERTY
283	IQ GROUP HOLDINGS BERHAD	IQGROUP	CONSUMER PRODUCTS & SERVICES
284	ITMAX SYSTEM BERHAD	ITMAX	TECHNOLOGY
285	INDUSTRONICS BERHAD	ITRONIC	TECHNOLOGY
286	ISKANDAR WATERFRONT CITY BERHAD	IWCITY	PROPERTY
287	JADI IMAGING HOLDINGS BERHAD	JADI	CONSUMER PRODUCTS & SERVICES
288	JAKS RESOURCES BERHAD	JAKS	CONSTRUCTION
289	JASA KITA BERHAD	JASKITA	INDUSTRIAL PRODUCTS & SERVICES
290	JAYCORP BERHAD	JAYCORP	CONSUMER PRODUCTS & SERVICES
291	JCBNEXT BERHAD	JCBNEXT	INDUSTRIAL PRODUCTS & SERVICES
292	KUMPULAN JETSON BERHAD	JETSON	INDUSTRIAL PRODUCTS & SERVICES
293	JF TECHNOLOGY BERHAD	JFTECH	TECHNOLOGY
294	JHM CONSOLIDATION BERHAD	JHM	TECHNOLOGY
295	JIANKUN INTERNATIONAL BERHAD	JIANKUN	PROPERTY
296	JKG LAND BERHAD	JKGLAND	PROPERTY
297	JOE HOLDING BERHAD	JOE	INDUSTRIAL PRODUCTS & SERVICES
298	JENTAYU SUSTAINABLES BERHAD	JSB	INDUSTRIAL PRODUCTS & SERVICES
299	JAYA TIASA HOLDINGS BERHAD	JTIASA	PLANTATION
300	JCY INTERNATIONAL BERHAD	JYC	TECHNOLOGY
301	KINERGY ADVANCEMENT BERHAD (KEJURUTERAAN ASASTERA BERHAD)	KAB	INDUSTRIAL PRODUCTS & SERVICES
302	KAMDAR GROUP (M) BERHAD	KAMDAR	CONSUMER PRODUCTS & SERVICES
303	KAREX BERHAD	KAREX	CONSUMER PRODUCTS & SERVICES
304	KARYON INDUSTRIES BERHAD	KARYON	INDUSTRIAL PRODUCTS & SERVICES
305	KAWAN FOOD BERHAD	KAWAN	CONSUMER PRODUCTS & SERVICES
306	KEIN HING INTERNATIONAL BERHAD	KEINHIN	INDUSTRIAL PRODUCTS & SERVICES
307	KEN HOLDINGS BERHAD	KEN	PROPERTY
308	KERJAYA PROSPEK GROUP BERHAD	KERJAYA	CONSTRUCTION
309	KESM INDUSTRIES BERHAD	KESM	TECHNOLOGY
310	KEY ASIC BERHAD	KEYASIC	TECHNOLOGY

Table A1: continued

311	KEYFIELD INTERNATIONAL BERHAD	KEYFIELD	ENERGY
312	KUMPULAN FIMA BERHAD	KFIMA	INDUSTRIAL PRODUCTS & SERVICES
313	KELINGTON GROUP BERHAD	KGB	INDUSTRIAL PRODUCTS & SERVICES
314	KHIND HOLDINGS BERHAD	KHIND	CONSUMER PRODUCTS & SERVICES
315	KIA LIM BERHAD	KIALIM	INDUSTRIAL PRODUCTS & SERVICES
316	KIM HIN INDUSTRY BERHAD	KIMHIN	INDUSTRIAL PRODUCTS & SERVICES
317	KIMLUN CORPORATION BERHAD	KIMLUN	CONSTRUCTION
318	KIP REAL ESTATE INVESTMENT TRUST	KIPREIT	REAL ESTATE INVESTMENT TRUSTS
319	KUMPULAN KITACON BERHAD	KITACON	CONSTRUCTION
320	KKB ENGINEERING BERHAD	KKB	INDUSTRIAL PRODUCTS & SERVICES
321	KLCC REAL ESTATE INVESTMENT TRUST	KLCC	REAL ESTATE INVESTMENT TRUSTS
322	KUALA LUMPUR KEPONG BERHAD	KLK	PLANTATION
323	KLUANG RUBBER CO (MALAYSIA) BERHAD	KLUANG	PLANTATION
324	KIM LOONG RESOURCES BERHAD	KMLOONG	PLANTATION
325	KNUSFORD BERHAD	KNUSFOR	INDUSTRIAL PRODUCTS & SERVICES
326	KOBAY TECHNOLOGY BERHAD	KOBAY	INDUSTRIAL PRODUCTS & SERVICES
327	KOMARKCORP BERHAD	KOMARK	INDUSTRIAL PRODUCTS & SERVICES
328	KOSSAN RUBBER INDUSTRIES BERHAD	KOSSAN	HEALTH CARE
329	KOTRA INDUSTRIES BERHAD	KOTRA	HEALTH CARE
330	KPJ HEALTHCARE BERHAD	KPJ	HEALTH CARE
331	KERJAYA PROSPEK PROPERTY BERHAD	KPPROP	PROPERTY
332	KUMPULAN PERANGSANG SELANGOR BERHAD	KPS	INDUSTRIAL PRODUCTS & SERVICES
333	KPS CONSORTIUM BERHAD	KPSCB	INDUSTRIAL PRODUCTS & SERVICES
334	KRETAM HOLDINGS BERHAD	KRETAM	PLANTATION
335	KECK SENG (MALAYSIA) BERHAD	KSENG	INDUSTRIAL PRODUCTS & SERVICES
336	KSL HOLDINGS BERHAD	KSL	PROPERTY
337	K. SENG SENG CORPORATION BERHAD	KSSC	INDUSTRIAL PRODUCTS & SERVICES
338	KIM TECK CHEONG CONSOLIDATED BERHAD	KTC	CONSUMER PRODUCTS & SERVICES
339	KUB MALAYSIA BERHAD	KUB	INDUSTRIAL PRODUCTS & SERVICES
340	KYM HOLDINGS BERHAD	KYM	INDUSTRIAL PRODUCTS & SERVICES
341	LAND & GENERAL BERHAD	L&G	PROPERTY
342	L&P GLOBAL BERHAD	L&PBHD	INDUSTRIAL PRODUCTS & SERVICES
343	LAGENDA PROPERTIES BERHAD	LAGENDA	PROPERTY
344	LANDMARKS BERHAD	LANDMRK	CONSUMER PRODUCTS & SERVICES
345	LAY HONG BERHAD	LAYHONG	CONSUMER PRODUCTS & SERVICES
346	LB ALUMINIUM BERHAD	LBALUM	INDUSTRIAL PRODUCTS & SERVICES
347	LBI CAPITAL BERHAD	LBICAP	PROPERTY
348	LBS BINA GROUP BERHAD	LBS	PROPERTY
349	LOTTE CHEMICAL TITAN HOLDING BERHAD	LCTITAN	INDUSTRIAL PRODUCTS & SERVICES
350	LEBTECH BERHAD	LEBTECH	CONSTRUCTION
351	LEE SWEE KIAT GROUP BERHAD	LEESK	CONSUMER PRODUCTS & SERVICES
352	LEON FUAT BERHAD	LEONFB	INDUSTRIAL PRODUCTS & SERVICES
353	LEONG HUP INTERNATIONAL BERHAD	LHI	CONSUMER PRODUCTS & SERVICES
354	LIEN HOE CORPORATION BERHAD	LIENHOE	PROPERTY
355	LII HEN INDUSTRIES BERHAD	LIIHEN	CONSUMER PRODUCTS & SERVICES
356	LION INDUSTRIES CORPORATION BERHAD	LIONIND	INDUSTRIAL PRODUCTS & SERVICES
357	LION POSIM BERHAD	LIONPSIM	INDUSTRIAL PRODUCTS & SERVICES
358	LEADER STEEL HOLDINGS BERHAD	LSTEEL	INDUSTRIAL PRODUCTS & SERVICES
359	LTKM BERHAD	LTKM	CONSUMER PRODUCTS & SERVICES
360	LUXCHEM CORPORATION BERHAD	LUXCHEM	INDUSTRIAL PRODUCTS & SERVICES
361	LYSAGHT GALVANIZED STEEL BERHAD	LYSAGHT	INDUSTRIAL PRODUCTS & SERVICES
362	MARINE & GENERAL BERHAD	M&G	TRANSPORTATION & LOGISTICS
363	MAGMA GROUP BERHAD (IMPIANA HOTELS BERHAD)	MAGMA	CONSUMER PRODUCTS & SERVICES
364	MAGNA PRIMA BERHAD	MAGNA	PROPERTY
365	MAGNI-TECH INDUSTRIES BERHAD	MAGNI	CONSUMER PRODUCTS & SERVICES
366	MAGNUM BERHAD	MAGNUM	CONSUMER PRODUCTS & SERVICES
367	MAH SING GROUP BERHAD	MAHSING	PROPERTY
368	MALAKOFF CORPORATION BERHAD	MALAKOF	UTILITIES
369	MALPAC HOLDINGS BERHAD	MALPAC	PLANTATION
370	MALTON BERHAD	MALTON	PROPERTY
371	MARCO HOLDINGS BERHAD	MARCO	CONSUMER PRODUCTS & SERVICES
372	MALAYSIA STEEL WORKS (KL) BERHAD	MASTEEL	INDUSTRIAL PRODUCTS & SERVICES
373	MASTER-PACK GROUP BERHAD	MASTER	INDUSTRIAL PRODUCTS & SERVICES
374	MATRIX CONCEPTS HOLDINGS BERHAD	MATRIX	PROPERTY
375	MAXIM GLOBAL BERHAD	MAXIM	PROPERTY
376	MAXIS BERHAD	MAXIS	TELECOMMUNICATIONS & MEDIA
377	MAXLAND BERHAD (PRICEWORTH INTERNATIONAL BERHAD)	MAXLAND	INDUSTRIAL PRODUCTS & SERVICES
378	MAYBULK BERHAD	MAYBULK	TRANSPORTATION & LOGISTICS
379	MAYU GLOBAL GROUP BERHAD	MAYU	INDUSTRIAL PRODUCTS & SERVICES
380	MUAR BAN LEE GROUP BERHAD	MBL	INDUSTRIAL PRODUCTS & SERVICES
381	MBM RESOURCES BERHAD	MBMR	CONSUMER PRODUCTS & SERVICES
382	META BRIGHT GROUP BERHAD	MBRIGHT	CONSUMER PRODUCTS & SERVICES
383	MCE HOLDINGS BERHAD	MCEHLDG	INDUSTRIAL PRODUCTS & SERVICES
384	MALAYAN CEMENT BERHAD	MCEMENT	INDUSTRIAL PRODUCTS & SERVICES
385	MEDIA PRIMA BERHAD	MEDIA	TELECOMMUNICATIONS & MEDIA
386	MELATI EHSAN HOLDINGS BERHAD	MELATI	CONSTRUCTION
387	MELEWAR INDUSTRIAL GROUP BERHAD	MELEWAR	INDUSTRIAL PRODUCTS & SERVICES
388	MENANG CORPORATION (M) BERHAD	MENANG	PROPERTY
389	MENTIGA CORPORATION BERHAD	MENTIGA	INDUSTRIAL PRODUCTS & SERVICES
390	MERCURY INDUSTRIES BERHAD	MERCURY	CONSTRUCTION

Table A1: continued

391	MERIDIAN BERHAD	MERIDIAN	PROPERTY
392	MESB BERHAD	MESB	CONSUMER PRODUCTS & SERVICES
393	MESTRON HOLDINGS BERHAD	MESTRON	INDUSTRIAL PRODUCTS & SERVICES
394	METROD HOLDINGS BERHAD	METROD	INDUSTRIAL PRODUCTS & SERVICES
395	MEGA FIRST CORPORATION BERHAD	MFCB	UTILITIES
396	MALAYAN FLOUR MILLS BERHAD	MFLOUR	CONSUMER PRODUCTS & SERVICES
397	MALAYSIA MARINE AND HEAVY ENGINEERING HOLDINGS BERHAD	MHB	ENERGY
398	MHC PLANTATIONS BERHAD	MHC	PLANTATION
399	MI TECHNOVATION BERHAD	MI	TECHNOLOGY
400	MICROLINK SOLUTIONS BERHAD	MICROLN	TECHNOLOGY
401	MIECO CHIPBOARD BERHAD	MIECO	INDUSTRIAL PRODUCTS & SERVICES
402	MILUX CORPORATION BERHAD	MILUX	CONSUMER PRODUCTS & SERVICES
403	MINETECH RESOURCES BERHAD	MINETEC	INDUSTRIAL PRODUCTS & SERVICES
404	MINHO (M) BERHAD	MINHO	INDUSTRIAL PRODUCTS & SERVICES
405	MISC BERHAD	MISC	TRANSPORTATION & LOGISTICS
406	MITRAJAYA HOLDINGS BERHAD	MITRA	CONSTRUCTION
407	MAJUPERAK HOLDINGS BERHAD	MJPERAK	PROPERTY
408	MKH BERHAD	MKH	PROPERTY
409	MKH OIL PALM (EAST KALIMANTAN) BERHAD	MKHOP	PLANTATION
410	MK LAND HOLDINGS BERHAD	MKLAND	PROPERTY
411	MMS VENTURES BERHAD	MMSV	TECHNOLOGY
412	MOBILIA HOLDINGS BERHAD	MOBILIA	CONSUMER PRODUCTS & SERVICES
413	MPHB CAPITAL BERHAD	MPHBCAP	PROPERTY
414	MALAYSIAN PACIFIC INDUSTRIES BERHAD	MPI	TECHNOLOGY
415	MPIRE GLOBAL BERHAD	MPIRE	CONSUMER PRODUCTS & SERVICES
416	MALAYSIAN RESOURCES CORPORATION BERHAD	MRCB	PROPERTY
417	MR D.I.Y. GROUP (M) BERHAD	MRDIY	CONSUMER PRODUCTS & SERVICES
418	MALAYSIA SMELTING CORPORATION BERHAD	MSC	INDUSTRIAL PRODUCTS & SERVICES
419	MSM MALAYSIA HOLDINGS BERHAD	MSM	CONSUMER PRODUCTS & SERVICES
420	MESINIAGA BERHAD	MSNIAGA	TECHNOLOGY
421	MST GOLF GROUP BERHAD	MSTGOLF	CONSUMER PRODUCTS & SERVICES
422	METRONIC GLOBAL BERHAD	MTRONIC	INDUSTRIAL PRODUCTS & SERVICES
423	MUDA HOLDINGS BERHAD	MUDA	INDUSTRIAL PRODUCTS & SERVICES
424	MUDAJAYA GROUP BERHAD	MUDAJAYA	CONSTRUCTION
425	MULTI-USAGE HOLDINGS BERHAD	MUH	PROPERTY
426	MUHIBBAH ENGINEERING (M) BERHAD	MUHIBAH	CONSTRUCTION
427	MALAYAN UNITED INDUSTRIES BERHAD	MUIIND	CONSUMER PRODUCTS & SERVICES
428	MUI PROPERTIES BERHAD	MUIPROP	PROPERTY
429	MULPHA INTERNATIONAL BERHAD	MULPHA	CONSUMER PRODUCTS & SERVICES
430	MYCRON STEEL BERHAD	MYCRON	INDUSTRIAL PRODUCTS & SERVICES
431	MY E.G. SERVICES BERHAD	MYEG	TECHNOLOGY
432	MYNEWS HOLDINGS BERHAD	MYNEWS	CONSUMER PRODUCTS & SERVICES
433	MYTECH GROUP BERHAD	MYTECH	INDUSTRIAL PRODUCTS & SERVICES
434	NAIM HOLDINGS BERHAD	NAIM	PROPERTY
435	NATIONGATE HOLDINGS BERHAD	NATGATE	INDUSTRIAL PRODUCTS & SERVICES
436	NCT ALLIANCE BERHAD	NCT	PROPERTY
437	NESTLE (MALAYSIA) BERHAD	NESTLE	CONSUMER PRODUCTS & SERVICES
438	NEXTGREEN GLOBAL BERHAD	NGGB	INDUSTRIAL PRODUCTS & SERVICES
439	NEW HOONG FATT HOLDINGS BERHAD	NHFATT	CONSUMER PRODUCTS & SERVICES
440	NICHE CAPITAL EMAS HOLDINGS BERHAD	NICHE	CONSUMER PRODUCTS & SERVICES
441	NI HSIN GROUP BERHAD	NIHSIN	CONSUMER PRODUCTS & SERVICES
442	NOTION VTEC BERHAD	NOTION	TECHNOLOGY
443	NOVA WELLNESS GROUP BERHAD	NOVA	HEALTH CARE
444	NPC RESOURCES BERHAD	NPC	PLANTATION
445	NEGRI SEMBILAN OIL PALMS BERHAD	NSOP	PLANTATION
446	NTPM HOLDINGS BERHAD	NTPM	CONSUMER PRODUCTS & SERVICES
447	NYLEX (MALAYSIA) BERHAD	NYLEX	INDUSTRIAL PRODUCTS & SERVICES
448	OCB BERHAD	OCB	CONSUMER PRODUCTS & SERVICES
449	OCK GROUP BERHAD	OCK	TELECOMMUNICATIONS & MEDIA
450	OCEANCASH PACIFIC BERHAD	OCNCASH	CONSUMER PRODUCTS & SERVICES
451	OCR GROUP BERHAD	OCR	CONSTRUCTION
452	ORIENTAL FOOD INDUSTRIES HOLDINGS BERHAD	OFI	CONSUMER PRODUCTS & SERVICES
453	ORIENTAL INTEREST BERHAD	OIB	PROPERTY
454	OKA CORPORATION BHD	OKA	INDUSTRIAL PRODUCTS & SERVICES
455	OLYMPIA INDUSTRIES BERHAD	OLYMPIA	CONSUMER PRODUCTS & SERVICES
456	OMESTI BERHAD	OMESTI	TECHNOLOGY
457	OPENSYS (M) BERHAD	OPENSYS	TECHNOLOGY
458	OPTIMAX HOLDINGS BERHAD	OPTIMAX	HEALTH CARE
459	ORIENTAL HOLDINGS BERHAD	ORIENT	CONSUMER PRODUCTS & SERVICES
460	ORNAPAPER BERHAD	ORNA	INDUSTRIAL PRODUCTS & SERVICES
461	OSK HOLDINGS BERHAD	OSK	PROPERTY
462	ONLY WORLD GROUP HOLDINGS BERHAD	OWG	CONSUMER PRODUCTS & SERVICES
463	P.A. RESOURCES BERHAD	PA	INDUSTRIAL PRODUCTS & SERVICES
464	PADINI HOLDINGS BERHAD	PADINI	CONSUMER PRODUCTS & SERVICES
465	PANASONIC MANUFACTURING MALAYSIA BERHAD	PANAMY	CONSUMER PRODUCTS & SERVICES
466	PANSAR BERHAD	PANSAR	INDUSTRIAL PRODUCTS & SERVICES
467	PANTECH GROUP HOLDINGS BERHAD	PANTECH	INDUSTRIAL PRODUCTS & SERVICES
468	PAOS HOLDINGS BERHAD	PAOS	CONSUMER PRODUCTS & SERVICES
469	PARAGON UNION BERHAD	PARAGON	CONSUMER PRODUCTS & SERVICES
470	PARAMOUNT CORPORATION BERHAD	PARAMON	PROPERTY

Table A1: continued

471	PARKSON HOLDINGS BERHAD	PARKSON	CONSUMER PRODUCTS & SERVICES
472	PARKWOOD HOLDINGS BERHAD	PARKWD	PROPERTY
473	PASDEC HOLDINGS BERHAD	PASDEC	PROPERTY
474	PAVILION REAL ESTATE INVESTMENT TRUST	PAVREIT	REAL ESTATE INVESTMENT TRUSTS
475	PBA HOLDINGS BERHAD	PBA	UTILITIES
476	PCCS GROUP BERHAD	PCCS	CONSUMER PRODUCTS & SERVICES
477	PETRONAS CHEMICALS GROUP BERHAD	PCHEM	INDUSTRIAL PRODUCTS & SERVICES
478	PDZ HOLDINGS BERHAD	PDZ	TRANSPORTATION & LOGISTICS
479	PIMPINAN EHSAN BERHAD	PEB	CONSTRUCTION
480	PECCA GROUP BERHAD	PECCA	INDUSTRIAL PRODUCTS & SERVICES
481	PELIKAN INTERNATIONAL CORPORATION BERHAD	PELIKAN	CONSUMER PRODUCTS & SERVICES
482	PETRA ENERGY BERHAD	PENERGY	ENERGY
483	PENSONIC HOLDINGS BERHAD	PENSONI	CONSUMER PRODUCTS & SERVICES
484	PENTAMASTER CORPORATION BERHAD	PENTA	TECHNOLOGY
485	PERDANA PETROLEUM BERHAD	PERDANA	ENERGY
486	PERMAJU INDUSTRIES BERHAD	PERMAJU	CONSUMER PRODUCTS & SERVICES
487	PERUSAHAAN SADUR TIMAH MALAYSIA (PERSTIMA) BERHAD	PERSTIM	INDUSTRIAL PRODUCTS & SERVICES
488	PERTAMA DIGITAL BERHAD	PERTAMA	CONSUMER PRODUCTS & SERVICES
489	PESTECH INTERNATIONAL BERHAD	PESTECH	INDUSTRIAL PRODUCTS & SERVICES
490	PETRONAS DAGANGAN BERHAD	PETDAG	CONSUMER PRODUCTS & SERVICES
491	PETRONAS GAS BERHAD	PETGAS	UTILITIES
492	PETRON MALAYSIA REFINING & MARKETING BERHAD	PETRONM	ENERGY
493	PGF CAPITAL BERHAD	PGF	INDUSTRIAL PRODUCTS & SERVICES
494	PARAGON GLOBE BERHAD	PGLOBE	PROPERTY
495	PHARMANIAGA BERHAD	PHARMA	HEALTH CARE
496	PEGASUS HEIGHTS BERHAD	PHB	PROPERTY
497	PROGRESSIVE IMPACT CORPORATION BERHAD	PICORP	INDUSTRIAL PRODUCTS & SERVICES
498	P.I.E. INDUSTRIAL BERHAD	PIE	INDUSTRIAL PRODUCTS & SERVICES
499	PINEHILL PACIFIC BERHAD	PINEPAC	PLANTATION
500	PJBUMI BERHAD	PJBUMI	INDUSTRIAL PRODUCTS & SERVICES
501	PLB ENGINEERING BERHAD	PLB	PROPERTY
502	PLENITUDE BERHAD	PLENITU	PROPERTY
503	PLS PLANTATIONS BERHAD	PLS	PLANTATION
504	PMB TECHNOLOGY BERHAD	PMBTECH	INDUSTRIAL PRODUCTS & SERVICES
505	PAN MALAYSIA CORPORATION BERHAD	PMCORP	CONSUMER PRODUCTS & SERVICES
506	PRESS METAL ALUMINIUM HOLDINGS BERHAD	PMETAL	INDUSTRIAL PRODUCTS & SERVICES
507	PAN MALAYSIA HOLDINGS BERHAD	PMHLDG	CONSUMER PRODUCTS & SERVICES
508	PNE PCB BERHAD	PNEPCB	INDUSTRIAL PRODUCTS & SERVICES
509	POH KONG HOLDINGS BERHAD	POHKONG	CONSUMER PRODUCTS & SERVICES
510	POH HUAT RESOURCES HOLDINGS BERHAD	POHUAT	CONSUMER PRODUCTS & SERVICES
511	POS MALAYSIA BERHAD	POS	TRANSPORTATION & LOGISTICS
512	PPB GROUP BERHAD	PPB	CONSUMER PRODUCTS & SERVICES
513	PUBLIC PACKAGES HOLDINGS BERHAD	PPHB	INDUSTRIAL PRODUCTS & SERVICES
514	PRESTAR RESOURCES BERHAD	PRESTAR	INDUSTRIAL PRODUCTS & SERVICES
515	PRG HOLDINGS BERHAD	PRG	CONSUMER PRODUCTS & SERVICES
516	PROTASCO BERHAD	PRTASCO	CONSTRUCTION
517	PINTARAS JAYA BERHAD	PTARAS	CONSTRUCTION
518	PERAK TRANSIT BERHAD	PTRANS	CONSUMER PRODUCTS & SERVICES
519	PTT SYNERGY GROUP BERHAD	PTT	PROPERTY
520	PUNCAK NIAGA HOLDINGS BERHAD	PUNCAK	CONSTRUCTION
521	PWF CORPORATION BERHAD	PWF	CONSUMER PRODUCTS & SERVICES
522	POWER ROOT BERHAD	PWROOT	CONSUMER PRODUCTS & SERVICES
523	QES GROUP BERHAD	QES	INDUSTRIAL PRODUCTS & SERVICES
524	QL RESOURCES BERHAD	QL	CONSUMER PRODUCTS & SERVICES
525	QUALITY CONCRETE HOLDINGS BERHAD	QUALITY	INDUSTRIAL PRODUCTS & SERVICES
526	RADIUM DEVELOPMENT BERHAD	RADIUM	PROPERTY
527	RALCO CORPORATION BERHAD	RALCO	INDUSTRIAL PRODUCTS & SERVICES
528	RANHILL UTILITIES BERHAD	RANHILL	UTILITIES
529	RAPID SYNERGY BERHAD	RAPID	PROPERTY
530	REACH ENERGY BERHAD	REACH	ENERGY
531	REDTONE DIGITAL BERHAD	REDTONE	TELECOMMUNICATIONS & MEDIA
532	RENEUCO BERHAD	RENEUCO	CONSUMER PRODUCTS & SERVICES
533	RESINTECH BERHAD	RESINTC	INDUSTRIAL PRODUCTS & SERVICES
534	REVENUE GROUP BERHAD	REVENUE	TECHNOLOGY
535	REX INDUSTRY BERHAD	REX	CONSUMER PRODUCTS & SERVICES
536	RGB INTERNATIONAL BERHAD	RGB	CONSUMER PRODUCTS & SERVICES
537	RHONE MA HOLDINGS BERHAD	RHONEMA	CONSUMER PRODUCTS & SERVICES
538	RHONG KHEN INTERNATIONAL BERHAD	RKI	CONSUMER PRODUCTS & SERVICES
539	RESERVOIR LINK ENERGY BERHAD	RL	ENERGY
540	RIMBUNAN SAWIT BERHAD	RSAWIT	PLANTATION
541	RIVERVIEW RUBBER ESTATES BERHAD	RVIEW	PLANTATION
542	S & F CAPITAL BERHAD	S&FCAP	INDUSTRIAL PRODUCTS & SERVICES
543	SOUTHERN ACIDS (M) BERHAD	SAB	INDUSTRIAL PRODUCTS & SERVICES
544	SALCON BERHAD	SALCON	UTILITIES
545	SALUTICA BERHAD	SALUTE	CONSUMER PRODUCTS & SERVICES
546	SAM ENGINEERING & EQUIPMENT (M) BERHAD	SAM	INDUSTRIAL PRODUCTS & SERVICES
547	SAMAIDEN GROUP BERHAD	SAMAIDEN	INDUSTRIAL PRODUCTS & SERVICES
548	SAMCHEM HOLDINGS BERHAD	SAMCHEM	INDUSTRIAL PRODUCTS & SERVICES
549	SAPURA INDUSTRIAL BERHAD	SAPIND	INDUSTRIAL PRODUCTS & SERVICES
550	SAPURA RESOURCES BERHAD	SAPRES	PROPERTY

Table A1: continued

551	SASBADI HOLDINGS BERHAD	SASBADI	TELECOMMUNICATIONS & MEDIA
552	SAUDEE GROUP BERHAD	SAUDEE	CONSUMER PRODUCTS & SERVICES
553	SUNGEI BAGAN RUBBER COMPANY (MALAYSIA) BERHAD	SBAGAN	PLANTATION
554	SBC CORPORATION BERHAD	SBCCORP	PROPERTY
555	SOUTHERN CABLE GROUP BERHAD	SCGBHD	INDUSTRIAL PRODUCTS & SERVICES
556	SCGM BERHAD	SCGM	INDUSTRIAL PRODUCTS & SERVICES
557	SARAWAK CONSOLIDATED INDUSTRIES BERHAD	SCIB	INDUSTRIAL PRODUCTS & SERVICES
558	SCICOM (MSC) BERHAD	SCICOM	INDUSTRIAL PRODUCTS & SERVICES
559	SCIENTEX BERHAD	SCIENTX	INDUSTRIAL PRODUCTS & SERVICES
560	SCIENTEX PACKAGING (AYER KEROH) BERHAD	SCIPACK	INDUSTRIAL PRODUCTS & SERVICES
561	SCANWOLF CORPORATION BERHAD	SCNWOLF	INDUSTRIAL PRODUCTS & SERVICES
562	SUPERCOMNET TECHNOLOGIES BERHAD	SCOMNET	HEALTH CARE
563	SELANGOR DREDGING BERHAD	SDRED	PROPERTY
564	SDS GROUP BERHAD	SDS	CONSUMER PRODUCTS & SERVICES
565	SEAL INCORPORATED BERHAD	SEAL	PROPERTY
566	SEALINK INTERNATIONAL BERHAD	SEALINK	TRANSPORTATION & LOGISTICS
567	SEREMBAN ENGINEERING BERHAD	SEB	INDUSTRIAL PRODUCTS & SERVICES
568	SEE HUP CONSOLIDATED BERHAD	SEEHUP	TRANSPORTATION & LOGISTICS
569	SEG INTERNATIONAL BERHAD	SEG	CONSUMER PRODUCTS & SERVICES
570	7-ELEVEN MALAYSIA HOLDINGS BERHAD	SEM	CONSUMER PRODUCTS & SERVICES
571	EVERSENDAI CORPORATION BERHAD	SENDAI	CONSTRUCTION
572	SENG FONG HOLDINGS BERHAD	SENFONG	INDUSTRIAL PRODUCTS & SERVICES
573	SENHENG NEW RETAIL BERHAD	SENHENG	CONSUMER PRODUCTS & SERVICES
574	SENTRAL REIT	SENTRAL	REAL ESTATE INVESTMENT TRUSTS
575	SERN KOU RESOURCES BERHAD	SERNKOU	CONSUMER PRODUCTS & SERVICES
576	SHANGRI-LA HOTELS (MALAYSIA) BERHAD	SHANG	CONSUMER PRODUCTS & SERVICES
577	SIN HENG CHAN (MALAYA) BERHAD	SHCHAN	PLANTATION
578	SHH RESOURCES HOLDINGS BERHAD	SHH	CONSUMER PRODUCTS & SERVICES
579	SHL CONSOLIDATED BERHAD	SHL	PROPERTY
580	SIGNATURE INTERNATIONAL BERHAD	SIGN	CONSUMER PRODUCTS & SERVICES
581	SIME DARBY BERHAD	SIME	CONSUMER PRODUCTS & SERVICES
582	SIME DARBY PLANTATION BERHAD	SIMEPLT	PLANTATION
583	SIME DARBY PROPERTY BERHAD	SIMEPROP	PROPERTY
584	SENI JAYA CORPORATION BERHAD	SJC	TELECOMMUNICATIONS & MEDIA
585	SKB SHUTTERS CORPORATION BERHAD	SKBSHUT	INDUSTRIAL PRODUCTS & SERVICES
586	SKP RESOURCES BERHAD	SKPRES	INDUSTRIAL PRODUCTS & SERVICES
587	SKYWORLD DEVELOPMENT BERHAD	SKYWLD	PROPERTY
588	SLP RESOURCES BERHAD	SLP	INDUSTRIAL PRODUCTS & SERVICES
589	SOLARVEST HOLDINGS BERHAD	SLVEST	INDUSTRIAL PRODUCTS & SERVICES
590	SINMAH CAPITAL BERHAD	SMCAP	CONSUMER PRODUCTS & SERVICES
591	SOUTH MALAYSIA INDUSTRIES BERHAD	SMI	PROPERTY
592	SMIS CORPORATION BERHAD	SMISCOR	INDUSTRIAL PRODUCTS & SERVICES
593	SNS NETWORK TECHNOLOGY BERHAD	SNS	TECHNOLOGY
594	SENTORIA GROUP BERHAD	SNTORIA	PROPERTY
595	SOLID AUTOMOTIVE BERHAD	SOLID	CONSUMER PRODUCTS & SERVICES
596	SARAWAK OIL PALMS BERHAD	SOP	PLANTATION
597	SPRITZER BERHAD	SPRITZER	CONSUMER PRODUCTS & SERVICES
598	S P SETIA BERHAD	SPSETIA	PROPERTY
599	SPORTS TOTO BERHAD	SPTOTO	CONSUMER PRODUCTS & SERVICES
600	SOUTHERN STEEL BERHAD	SSTEEL	INDUSTRIAL PRODUCTS & SERVICES
601	STAR MEDIA GROUP BERHAD	STAR	TELECOMMUNICATIONS & MEDIA
602	SUBUR TIASA HOLDINGS BERHAD	SUBUR	INDUSTRIAL PRODUCTS & SERVICES
603	SUCCESS TRANSFORMER CORPORATION BERHAD	SUCCESS	INDUSTRIAL PRODUCTS & SERVICES
604	SUNWAY CONSTRUCTION GROUP BERHAD	SUNCON	CONSTRUCTION
605	SUNWAY REAL ESTATE INVESTMENT TRUST	SUNREIT	REAL ESTATE INVESTMENT TRUSTS
606	SUNSURIA BERHAD	SUNSURIA	PROPERTY
607	SUNWAY BERHAD	SUNWAY	INDUSTRIAL PRODUCTS & SERVICES
608	SUPERLON HOLDINGS BERHAD	SUPERLN	INDUSTRIAL PRODUCTS & SERVICES
609	SUPERMAX CORPORATION BERHAD	SUPERMX	HEALTH CARE
610	SURIA CAPITAL HOLDINGS BERHAD	SURIA	TRANSPORTATION & LOGISTICS
611	SWIFT HAULAGE BERHAD	SWIFT	TRANSPORTATION & LOGISTICS
612	SARAWAK PLANTATION BERHAD	SWKPLNT	PLANTATION
613	SWS CAPITAL BERHAD	SWSCAP	CONSUMER PRODUCTS & SERVICES
614	SYCAL VENTURES BERHAD	SYCAL	CONSTRUCTION
615	SHIN YANG GROUP BERHAD	SYGROUP	TRANSPORTATION & LOGISTICS
616	SYMPHONY LIFE BERHAD	SYMLIFE	PROPERTY
617	T7 GLOBAL BERHAD	T7GLOBAL	ENERGY
618	TA ANN HOLDINGS BERHAD	TAANN	PLANTATION
619	TAFI INDUSTRIES BERHAD	TAFI	CONSUMER PRODUCTS & SERVICES
620	TALAM TRANSFORM BERHAD	TALAMT	PROPERTY
621	TALIWORKS CORPORATION BERHAD	TALIWRK	UTILITIES
622	TAMBUN INDAH LAND BERHAD	TAMBUN	PROPERTY
623	TANCO HOLDINGS BERHAD	TANCO	PROPERTY
624	TAS OFFSHORE BERHAD	TAS	TRANSPORTATION & LOGISTICS
625	TASCO BERHAD	TASCO	TRANSPORTATION & LOGISTICS
626	TA WIN HOLDINGS BERHAD	TAWIN	INDUSTRIAL PRODUCTS & SERVICES
627	TAN CHONG MOTOR HOLDINGS BERHAD	TCHONG	CONSUMER PRODUCTS & SERVICES
628	TDM BERHAD	TDM	PLANTATION
629	TECK GUAN PERDANA BERHAD	TECGUAN	CONSUMER PRODUCTS & SERVICES
630	TECHBASE INDUSTRIES BERHAD	TECHBASE	CONSUMER PRODUCTS & SERVICES

Table A1: continued

631	TECHBOND GROUP BERHAD	TECHBND	INDUSTRIAL PRODUCTS & SERVICES
632	TEK SENG HOLDINGS BERHAD	TEKSENG	CONSUMER PRODUCTS & SERVICES
633	TELADAN GROUP BERHAD	TELADAN	PROPERTY
634	TENAGA NASIONAL BERHAD	TENAGA	UTILITIES
635	TEO SENG CAPITAL BERHAD	TEOSENG	CONSUMER PRODUCTS & SERVICES
636	TEXCHEM RESOURCES BERHAD	TEXCHEM	INDUSTRIAL PRODUCTS & SERVICES
637	TEO GUAN LEE CORPORATION BERHAD	TGL	CONSUMER PRODUCTS & SERVICES
638	THONG GUAN INDUSTRIES BERHAD	TGUAN	INDUSTRIAL PRODUCTS & SERVICES
639	THETA EDGE BERHAD	THETA	TECHNOLOGY
640	TH PLANTATIONS BERHAD	THPLANT	PLANTATION
641	THRIVEN GLOBAL BERHAD	THRIVEN	PROPERTY
642	TIEN WAH PRESS HOLDINGS BERHAD	TIENWAH	INDUSTRIAL PRODUCTS & SERVICES
643	TIME DOTCOM BERHAD	TIMECOM	TELECOMMUNICATIONS & MEDIA
644	TIMBERWELL BERHAD	TIMWELL	INDUSTRIAL PRODUCTS & SERVICES
645	TITIJAYA LAND BERHAD	TITIJAYA	PROPERTY
646	TUJU SETIA BERHAD	TJSETIA	CONSTRUCTION
647	TELEKOM MALAYSIA BERHAD	TM	TELECOMMUNICATIONS & MEDIA
648	TMC LIFE SCIENCES BERHAD	TMCLIFE	HEALTH CARE
649	TIONG NAM LOGISTICS HOLDINGS BERHAD	TNLOGIS	TRANSPORTATION & LOGISTICS
650	TOMEI CONSOLIDATED BERHAD	TOMEI	CONSUMER PRODUCTS & SERVICES
651	TOMYPAK HOLDINGS BERHAD	TOMYPAK	INDUSTRIAL PRODUCTS & SERVICES
652	TONG HERR RESOURCES BERHAD	TONGHER	INDUSTRIAL PRODUCTS & SERVICES
653	TOP GLOVE CORPORATION BERHAD	TOPGLOV	HEALTH CARE
654	TOYO VENTURES HOLDINGS BERHAD	TOYOVEN	INDUSTRIAL PRODUCTS & SERVICES
655	TRC SYNERGY BERHAD	TRC	CONSTRUCTION
656	TRIVE PROPERTY GROUP BERHAD	TRIVE	TECHNOLOGY
657	TROPICANA CORPORATION BERHAD	TROP	PROPERTY
658	TSH RESOURCES BERHAD	TSH	PLANTATION
659	TSR CAPITAL BERHAD	TSR	CONSTRUCTION
660	TURBO-MECH BERHAD	TURBO	INDUSTRIAL PRODUCTS & SERVICES
661	TURIYA BERHAD	TURIYA	TECHNOLOGY
662	TWL HOLDINGS BERHAD	TWL	PROPERTY
663	TOWER REAL ESTATE INVESTMENT TRUST	TWRREIT	REAL ESTATE INVESTMENT TRUSTS
664	UCHI TECHNOLOGIES BERHAD	UCHITEC	INDUSTRIAL PRODUCTS & SERVICES
665	UEM SUNRISE BERHAD	UEMS	PROPERTY
666	UNITED U-LI CORPORATION BERHAD	ULICORP	INDUSTRIAL PRODUCTS & SERVICES
667	UMEDIC GROUP BERHAD	UMC	HEALTH CARE
668	UNITED MALACCA BERHAD	UMCCA	PLANTATION
669	UMS HOLDINGS BERHAD	UMS	INDUSTRIAL PRODUCTS & SERVICES
670	UMS-NEIKEN GROUP BERHAD	UMSNGB	INDUSTRIAL PRODUCTS & SERVICES
671	UNIMECH GROUP BERHAD	UNIMECH	INDUSTRIAL PRODUCTS & SERVICES
672	UNISEM (M) BERHAD	UNISEM	TECHNOLOGY
673	UOA DEVELOPMENT BERHAD	UOADEV	PROPERTY
674	UPA CORPORATION BERHAD	UPA	CONSUMER PRODUCTS & SERVICES
675	UNITED PLANTATIONS BERHAD	UTDPLT	PLANTATION
676	UWC BERHAD	UWC	TECHNOLOGY
677	UZMA BERHAD	UZMA	ENERGY
678	VARIA BERHAD	VARIA	CONSTRUCTION
679	VELESTO ENERGY BERHAD	VELESTO	ENERGY
680	VELOCITY CAPITAL PARTNER BERHAD	VELOCITY	INDUSTRIAL PRODUCTS & SERVICES
681	VERSATILE CREATIVE BERHAD	VERSATL	INDUSTRIAL PRODUCTS & SERVICES
682	VITROX CORPORATION BERHAD	VITROX	TECHNOLOGY
683	VIZIONE HOLDINGS BERHAD	VIZIONE	CONSTRUCTION
684	V.S. INDUSTRY BERHAD	VS	INDUSTRIAL PRODUCTS & SERVICES
685	VSTECS BERHAD	VSTECS	TECHNOLOGY
686	WANG-ZHENG BERHAD	WANGZNG	CONSUMER PRODUCTS & SERVICES
687	WARISAN TC HOLDINGS BERHAD	WARISAN	CONSUMER PRODUCTS & SERVICES
688	WASCO BERHAD	WASCO	ENERGY
689	WATTA HOLDING BERHAD	WATTA	INDUSTRIAL PRODUCTS & SERVICES
690	WCE HOLDINGS BERHAD	WCEHB	CONSTRUCTION
691	WCT HOLDINGS BERHAD	WCT	CONSTRUCTION
692	WEGMANS HOLDINGS BERHAD	WEGMANS	CONSUMER PRODUCTS & SERVICES
693	WELLCALL HOLDINGS BERHAD	WELLCAL	INDUSTRIAL PRODUCTS & SERVICES
694	WILLOWGLEN MSC BERHAD	WILLOW	TECHNOLOGY
695	WMG HOLDINGS BERHAD	WMG	PROPERTY
696	WONG ENGINEERING CORPORATION BERHAD	WONG	INDUSTRIAL PRODUCTS & SERVICES
697	WOODLANDOR HOLDINGS BERHAD	WOODLAN	INDUSTRIAL PRODUCTS & SERVICES
698	WESTPORTS HOLDINGS BERHAD	WPRTS	TRANSPORTATION & LOGISTICS
699	WHITE HORSE BERHAD	WTHORSE	INDUSTRIAL PRODUCTS & SERVICES
700	WTK HOLDINGS BERHAD	WTK	INDUSTRIAL PRODUCTS & SERVICES
701	XIDELANG HOLDINGS LIMITED	XDL	CONSUMER PRODUCTS & SERVICES
702	XIN SYNERGY GROUP BERHAD	XIN	INDUSTRIAL PRODUCTS & SERVICES
703	XIN HWA HOLDINGS BERHAD	XINHWA	TRANSPORTATION & LOGISTICS
704	XL HOLDINGS BERHAD	XL	CONSUMER PRODUCTS & SERVICES
705	Y&G CORPORATION BERHAD	Y&G	PROPERTY
706	YB VENTURES BERHAD	YB	INDUSTRIAL PRODUCTS & SERVICES
707	YENHER HOLDINGS BERHAD	YENHER	CONSUMER PRODUCTS & SERVICES
708	YINSON HOLDINGS BERHAD	YINSON	ENERGY
709	YLI HOLDINGS BERHAD	YLI	INDUSTRIAL PRODUCTS & SERVICES
710	YNH PROPERTY BERHAD	YNHPROP	PROPERTY

Table A1: continued

711	YOONG ONN CORPORATION BERHAD	YOCB	CONSUMER PRODUCTS & SERVICES
712	YONG TAI BERHAD	YONGTAI	PROPERTY
713	Y.S.P. SOUTHEAST ASIA HOLDING BERHAD	YSPSAH	HEALTH CARE
714	YTL CORPORATION BERHAD	YTL	UTILITIES
715	YTL POWER INTERNATIONAL BERHAD	YTLPOWR	UTILITIES
716	YTL HOSPITALITY REIT	YTLREIT	REAL ESTATE INVESTMENT TRUSTS
717	ZECON BERHAD	ZECON	CONSTRUCTION
718	ZELAN BERHAD	ZELAN	CONSTRUCTION
719	ZHULIAN CORPORATION BERHAD	ZHULIAN	CONSUMER PRODUCTS & SERVICES

Table A2: List of Firms Excluded from the Study

NO	FIRM	REASON FOR EXCLUSION
1	ABF MALAYSIA BOND INDEX FUND	NON-TRADITIONAL SECTORS
2	ACO GROUP BERHAD	ACE MARKET FIRM
3	ADVANCE INFORMATION MARKETING BERHAD	ACE MARKET FIRM
4	ADVENTA BERHAD	PN17 CLASSIFICATION IN 2012-2022
5	AEMULUS HOLDINGS BERHAD	ACE MARKET FIRM
6	AEON CREDIT SERVICE (M) BERHAD	FINANCIAL SECTOR FIRM
7	AFFIN BANK BERHAD	FINANCIAL SECTOR FIRM
8	AGMO HOLDINGS BERHAD	ACE MARKET FIRM
9	AGRICORE CS HOLDINGS BERHAD	ACE MARKET FIRM
10	AGX GROUP BERHAD	ACE MARKET FIRM
11	AHB HOLDINGS BERHAD	PN17 CLASSIFICATION IN 2012-2022
12	AIMFLEX BERHAD	ACE MARKET FIRM
13	AIRASIA X BERHAD	PN17 CLASSIFICATION IN 2012-2022
14	ALAM MARITIM RESOURCES BERHAD	PN17 CLASSIFICATION IN 2012-2022
15	ALDRICH RESOURCES BERHAD (ORION IXL BERHAD)	ACE MARKET FIRM
16	ALLIANCE BANK MALAYSIA BERHAD	FINANCIAL SECTOR FIRM
17	ALLIANZ MALAYSIA BERHAD	FINANCIAL SECTOR FIRM
18	ALPHA OCEAN RESOURCES BERHAD	LEAP MARKET FIRM
19	AME REAL ESTATE INVESTMENT TRUST	NO FINANCIAL ACCOUNT DATA FOR 2012-2022
20	AMLEX HOLDINGS BERHAD	LEAP MARKET FIRM
21	AMMB HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
22	ANCOM LOGISTICS BERHAD	ACE MARKET FIRM
23	ANEKA JARINGAN HOLDINGS BERHAD	ACE MARKET FIRM
24	ANNUM BERHAD	PN17 CLASSIFICATION IN 2012-2022
25	APEX EQUITY HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
26	APPASIA BERHAD	ACE MARKET FIRM
27	ARTRONIQ BERHAD	ACE MARKET FIRM
28	ASDION BERHAD	ACE MARKET FIRM
29	ASIA POLY HOLDINGS BERHAD	ACE MARKET FIRM
30	ASTRAMINA GROUP BERHAD	LEAP MARKET FIRM
31	AT SYSTEMATIZATION BERHAD	ACE MARKET FIRM
32	AURORA ITALIA INTERNATIONAL BERHAD	LEAP MARKET FIRM
33	AUTOCOUNT DOTCOM BERHAD	ACE MARKET FIRM
34	AVALAND BERHAD (MCT BERHAD) (GW PLASTICS HOLDINGS BERHAD)	PN17 CLASSIFICATION IN 2012-2022
35	BABA ECO GROUP BERHAD	LEAP MARKET FIRM
36	BAHVEST RESOURCES BERHAD	ACE MARKET FIRM
37	BANK ISLAM MALAYSIA BERHAD	FINANCIAL SECTOR FIRM
38	BARAKAH OFFSHORE PETROLEUM BERHAD (VASTALUX ENERGY BERHAD)	PN17 CLASSIFICATION IN 2012-2022
39	BCM ALLIANCE BERHAD	ACE MARKET FIRM
40	BERTAM ALLIANCE BERHAD	PN17 CLASSIFICATION IN 2012-2022
41	BETAMEK BERHAD	ACE MARKET FIRM
42	BINASAT COMMUNICATIONS BERHAD	ACE MARKET FIRM
43	BINASTRA CORPORATION BERHAD (COMINTEL CORPORATION BERHAD)	PN17 CLASSIFICATION IN 2012-2022
44	BIOALPHA HOLDINGS BERHAD	ACE MARKET FIRM
45	BRITE-TECH BERHAD	ACE MARKET FIRM
46	BURSA MALAYSIA BERHAD	FINANCIAL SECTOR FIRM
47	BV LAND HOLDINGS BERHAD	LEAP MARKET FIRM
48	CABNET HOLDINGS BERHAD	ACE MARKET FIRM
49	CAPITAL A BERHAD (AIRASIA GROUP BERHAD)	PN17 CLASSIFICATION IN 2012-2022
50	CARLO RINO GROUP BERHAD (CRG INCORPORATED)	LEAP MARKET FIRM
51	CARZO HOLDINGS BERHAD	LEAP MARKET FIRM
52	CATCHA DIGITAL BERHAD	ACE MARKET FIRM
53	CC INTERNATIONAL BERHAD	LEAP MARKET FIRM
54	CE TECHNOLOGY BERHAD	LEAP MARKET FIRM
55	CEKD BERHAD	ACE MARKET FIRM
56	CENGILD MEDICAL BERHAD	ACE MARKET FIRM
57	CIMB GROUP HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
58	CLOUDARON GROUP BERHAD	LEAP MARKET FIRM
59	CLOUDPOINT TECHNOLOGY BERHAD	ACE MARKET FIRM
60	CN ASIA CORPORATION BERHAD	PN17 CLASSIFICATION IN 2012-2022

Table A2: continued

61	COMFORT GLOVES BERHAD (INTEGRATED RUBBER CORPORATION BERHAD)	PN17 CLASSIFICATION IN 2012-2022
62	CORAZA INTEGRATED TECHNOLOGY BERHAD	ACE MARKET FIRM
63	COSMOS TECHNOLOGY INTERNATIONAL BERHAD	ACE MARKET FIRM
64	CRITICAL HOLDINGS BERHAD	ACE MARKET FIRM
65	DAYTHREE DIGITAL BERHAD	ACE MARKET FIRM
66	DC HEALTHCARE HOLDINGS BERHAD	ACE MARKET FIRM
67	DESTINI BERHAD	PN17 CLASSIFICATION IN 2012-2022
68	DGB ASIA BERHAD	ACE MARKET FIRM
69	DIVFEX BERHAD	ACE MARKET FIRM
70	DPI HOLDINGS BERHAD	ACE MARKET FIRM
71	DS SIGMA HOLDINGS BERHAD	ACE MARKET FIRM
72	DSR TAIKO BERHAD	LEAP MARKET FIRM
73	DYNAFRONT HOLDINGS BERHAD	LEAP MARKET FIRM
74	E.A.TECHNIQUE (M) BERHAD	PN17 CLASSIFICATION IN 2012-2022
75	EA HOLDINGS BERHAD	ACE MARKET FIRM
76	ECA INTEGRATED SOLUTION BERHAD	ACE MARKET FIRM
77	ECM LIBRA GROUP BERHAD	FINANCIAL SECTOR FIRM
78	ECONFRAME BERHAD	ACE MARKET FIRM
79	ECOSCIENCE INTERNATIONAL BERHAD	ACE MARKET FIRM
80	EDELTEQ HOLDINGS BERHAD	ACE MARKET FIRM
81	EDUSPEC HOLDINGS BERHAD	ACE MARKET FIRM
82	ELK-DESA RESOURCES BERHAD	FINANCIAL SECTOR FIRM
83	ENEST GROUP BERHAD	LEAP MARKET FIRM
84	EPICON BERHAD (KONSORTIUM TRANSNASIONAL BERHAD)	PN17 CLASSIFICATION IN 2012-2022
85	EQUITIESTRACKER HOLDINGS BERHAD	LEAP MARKET FIRM
86	ES CERAMICS TECHNOLOGY BERHAD	ACE MARKET FIRM
87	EVD BERHAD	ACE MARKET FIRM
88	EVERGREEN MAX CASH CAPITAL BERHAD	ACE MARKET FIRM
89	EVERSAFE RUBBER BERHAD	ACE MARKET FIRM
90	FARM PRICE HOLDINGS BERHAD	ACE MARKET FIRM
91	FAST ENERGY HOLDINGS BERHAD	ACE MARKET FIRM
92	FIBROMAT (M) BERHAD	LEAP MARKET FIRM
93	FINTEC GLOBAL BERHAD	ACE MARKET FIRM
94	FLEXIDYNAMIC HOLDINGS BERHAD	ACE MARKET FIRM
95	FOCUS DYNAMICS GROUP BERHAD	ACE MARKET FIRM
96	FSBM HOLDINGS BERHAD	PN17 CLASSIFICATION IN 2012-2022
97	GAGASAN NADI CERGAS BERHAD	ACE MARKET FIRM
98	GFM SERVICES BERHAD (ASIAEP RESOURCES BERHAD)	PN17 CLASSIFICATION IN 2012-2022
99	GLOSTREXT BERHAD	ACE MARKET FIRM
100	GO INNOVATE ASIA BERHAD (ACE INNOVATE ASIA BERHAD)	LEAP MARKET FIRM
101	GPP RESOURCES BERHAD	LEAP MARKET FIRM
102	GREEN OCEAN CORPORATION BERHAD	ACE MARKET FIRM
103	HAILY GROUP BERHAD	ACE MARKET FIRM
104	HARVEST MIRACLE CAPITAL BERHAD	ACE MARKET FIRM
105	HB GLOBAL LIMITED	PN17 CLASSIFICATION IN 2012-2022
106	HE GROUP BERHAD	ACE MARKET FIRM
107	HEXTAR CAPITAL BERHAD	ACE MARKET FIRM
108	HEXTAR INDUSTRIES BERHAD	ACE MARKET FIRM
109	HHRG BERHAD (HENG HUAT RESOURCES GROUP BERHAD)	ACE MARKET FIRM
110	HIAP HUAT HOLDINGS BERHAD	ACE MARKET FIRM
111	HLT GLOBAL BERHAD	ACE MARKET FIRM
112	HO HUP CONSTRUCTION COMPANY BERHAD	PN17 CLASSIFICATION IN 2012-2022
113	HONG LEONG BANK BERHAD	FINANCIAL SECTOR FIRM
114	HONG LEONG CAPITAL BERHAD	FINANCIAL SECTOR FIRM
115	HONG LEONG FINANCIAL GROUP BERHAD	FINANCIAL SECTOR FIRM
116	HPP HOLDINGS BERHAD	ACE MARKET FIRM
117	ICAPITAL.BIZ BERHAD	NON-TRADITIONAL SECTORS
118	ICT ZONE ASIA BERHAD	LEAP MARKET FIRM
119	IDB TECHNOLOGIES BERHAD	LEAP MARKET FIRM
120	IFCA MSC BERHAD	ACE MARKET FIRM
121	INFOLINE TEC GROUP BERHAD	ACE MARKET FIRM
122	INFOMINA BERHAD	ACE MARKET FIRM
123	INNITY CORPORATION BERHAD	ACE MARKET FIRM
124	INSAS BERHAD	FINANCIAL SECTOR FIRM
125	IQZAN HOLDING BERHAD	PN17 CLASSIFICATION IN 2012-2022
126	IREKA CORPORATION BERHAD	PN17 CLASSIFICATION IN 2012-2022
127	IRIS CORPORATION BERHAD	ACE MARKET FIRM
128	IVORY PROPERTIES GROUP BERHAD	PN17 CLASSIFICATION IN 2012-2022
129	JAG BERHAD	ACE MARKET FIRM
130	JATI TINGGI GROUP BERHAD	ACE MARKET FIRM

Table A2: continued

131	JISHAN BERHAD	LEAP MARKET FIRM
132	JM EDUCATION GROUP BERHAD	LEAP MARKET FIRM
133	JOHAN HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
134	KANGER INTERNATIONAL BERHAD	ACE MARKET FIRM
135	KAWAN RENERGY BERHAD	ACE MARKET FIRM
136	KENANGA INVESTMENT BANK BERHAD	FINANCIAL SECTOR FIRM
137	KEY ALLIANCE GROUP BERHAD	ACE MARKET FIRM
138	KGW GROUP BERHAD	ACE MARKET FIRM
139	KHEE SAN BERHAD	PN17 CLASSIFICATION IN 2012-2022
140	KIM HIN JOO (MALAYSIA) BERHAD	ACE MARKET FIRM
141	KJTS GROUP BERHAD	ACE MARKET FIRM
142	KNM GROUP BERHAD	PN17 CLASSIFICATION IN 2012-2022
143	K-ONE TECHNOLOGY BERHAD	ACE MARKET FIRM
144	KRONOLOGI ASIA BERHAD	ACE MARKET FIRM
145	K-STAR SPORTS LIMITED	INCONSISTENCIES IN THE FINANCIAL REPORTING
146	KTI LANDMARK BERHAD	ACE MARKET FIRM
147	KUCHAI DEVELOPMENT BERHAD	FINANCIAL SECTOR FIRM
148	LAMBO GROUP BERHAD	ACE MARKET FIRM
149	LEFORM BERHAD	ACE MARKET FIRM
150	LFE CORPORATION BERHAD	PN17 CLASSIFICATION IN 2012-2022
151	LGMS BERHAD	ACE MARKET FIRM
152	LIM SEONG HAI CAPITAL BERHAD	LEAP MARKET FIRM
153	LKL INTERNATIONAL BERHAD	ACE MARKET FIRM
154	LOTUS KFM BERHAD (KUANTAN FLOUR MILLS BERHAD)	PN17 CLASSIFICATION IN 2012-2022
155	LPI CAPITAL BERHAD	FINANCIAL SECTOR FIRM
156	LUSTER INDUSTRIES BERHAD	PN17 CLASSIFICATION IN 2012-2022
157	LYC HEALTHCARE BERHAD	ACE MARKET FIRM
158	M & A EQUITY HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
159	M N C WIRELESS BERHAD	ACE MARKET FIRM
160	MAA GROUP BERHAD	FINANCIAL SECTOR FIRM
161	MAG HOLDINGS BERHAD	ACE MARKET FIRM
162	MALAYAN BANKING BERHAD	FINANCIAL SECTOR FIRM
163	MALAYSIA BUILDING SOCIETY BERHAD	FINANCIAL SECTOR FIRM
164	MALAYSIAN GENOMICS RESOURCE CENTRE BERHAD	ACE MARKET FIRM
165	MANAGEPAY SYSTEMS BERHAD	ACE MARKET FIRM
166	MANFORCE GROUP BERHAD	LEAP MARKET FIRM
167	MANULIFE HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
168	MASTER TEC GROUP BERHAD	ACE MARKET FIRM
169	MATANG BERHAD	ACE MARKET FIRM
170	MATRIX PARKING SOLUTION HOLDINGS BERHAD	LEAP MARKET FIRM
171	MCLEAN TECHNOLOGIES BERHAD	ACE MARKET FIRM
172	MCOM HOLDINGS BERHAD	LEAP MARKET FIRM
173	MERCURY SECURITIES GROUP BERHAD	ACE MARKET FIRM
174	METRO HEALTHCARE BERHAD	LEAP MARKET FIRM
175	MGB BERHAD (ML GLOBAL BERHAD) (VTI VINTAGE BERHAD)	PN17 CLASSIFICATION IN 2012-2022
176	MIKRO MSC BERHAD	ACE MARKET FIRM
177	MINOX INTERNATIONAL GROUP BERHAD	ACE MARKET FIRM
178	MLABS SYSTEMS BERHAD	ACE MARKET FIRM
179	MMAG HOLDINGS BERHAD	ACE MARKET FIRM
180	MMIS BERHAD	LEAP MARKET FIRM
181	MMM GROUP BERHAD (ASIA MEDIA GROUP BERHAD)	PN17 CLASSIFICATION IN 2012-2022
182	MN HOLDINGS BERHAD	ACE MARKET FIRM
183	MNRB HOLDINGS BERHAD	FINANCIAL SECTOR FIRM
184	MQ TECHNOLOGY BERHAD	ACE MARKET FIRM
185	MTAG GROUP BERHAD	ACE MARKET FIRM
186	MTOUCHE TECHNOLOGY BERHAD	ACE MARKET FIRM
187	MYMBN BERHAD	ACE MARKET FIRM
188	N2N CONNECT BERHAD	ACE MARKET FIRM
189	NESTCON BERHAD	ACE MARKET FIRM
190	NETX HOLDINGS BERHAD	ACE MARKET FIRM
191	NEXGRAM HOLDINGS BERHAD	ACE MARKET FIRM
192	NOVA MSC BERHAD	ACE MARKET FIRM
193	NOVA PHARMA SOLUTIONS BERHAD	LEAP MARKET FIRM
194	NOVELPLUS TECHNOLOGY BERHAD	LEAP MARKET FIRM
195	OCEAN VANTAGE HOLDINGS BERHAD	ACE MARKET FIRM
196	ONE GLOVE GROUP BERHAD (GETS GLOBAL BERHAD)	PN17 CLASSIFICATION IN 2012-2022
197	ONETECH SOLUTIONS HOLDINGS BERHAD	LEAP MARKET FIRM
198	OPPSTAR BERHAD	ACE MARKET FIRM
199	ORGABIO HOLDINGS BERHAD	ACE MARKET FIRM
200	OSK VENTURES INTERNATIONAL BERHAD	ACE MARKET FIRM

Table A2: continued

201	OVERSEA ENTERPRISE BERHAD	ACE MARKET FIRM
202	PACIFIC & ORIENT BERHAD	FINANCIAL SECTOR FIRM
203	PANDA ECO SYSTEM BERHAD	ACE MARKET FIRM
204	PAPPAJACK BERHAD	ACE MARKET FIRM
205	PARLO BERHAD	ACE MARKET FIRM
206	PASUKHAS GROUP BERHAD	ACE MARKET FIRM
207	PEKAT GROUP BERHAD	ACE MARKET FIRM
208	PERAK CORPORATION BERHAD	PN17 CLASSIFICATION IN 2012-2022
209	PESONA METRO HOLDINGS BERHAD (MITHRIL BERHAD)	PN17 CLASSIFICATION IN 2012-2022
210	PETERLABS HOLDINGS BERHAD	ACE MARKET FIRM
211	PINEAPPLE RESOURCES BERHAD	ACE MARKET FIRM
212	PLYTEC HOLDING BERHAD	ACE MARKET FIRM
213	POLYDAMIC GROUP BERHAD	LEAP MARKET FIRM
214	POWERWELL HOLDINGS BERHAD	ACE MARKET FIRM
215	PRIVASIA TECHNOLOGY BERHAD	ACE MARKET FIRM
216	PROLINTAS INFRA BUSINESS TRUST	NON-TRADITIONAL SECTORS
217	PROPEL GLOBAL BERHAD (DAYA MATERIALS BERHAD)	PN17 CLASSIFICATION IN 2012-2022
218	PT RESOURCES HOLDINGS BERHAD	ACE MARKET FIRM
219	PUBLIC BANK BERHAD	FINANCIAL SECTOR FIRM
220	PUC BERHAD	ACE MARKET FIRM
221	RADIANT GLOBALTECH BERHAD	ACE MARKET FIRM
222	RAMSSOL GROUP BERHAD	ACE MARKET FIRM
223	RAY GO SOLAR HOLDINGS BERHAD	LEAP MARKET FIRM
224	RCE CAPITAL BERHAD	FINANCIAL SECTOR FIRM
225	RED IDEAS HOLDINGS BERHAD	LEAP MARKET FIRM
226	REKATECH CAPITAL BERHAD (MEGA SUN CITY HOLDINGS BERHAD)	ACE MARKET FIRM
227	REXIT BERHAD	ACE MARKET FIRM
228	RGT BERHAD (ASIA KNIGHT BERHAD)	PN17 CLASSIFICATION IN 2012-2022
229	RHB BANK BERHAD	FINANCIAL SECTOR FIRM
230	ROHAS TECNIC BERHAD (TECNIC GROUP BERHAD)	PN17 CLASSIFICATION IN 2012-2022
231	RTS TECHNOLOGY HOLDINGS BERHAD	LEAP MARKET FIRM
232	SAFETYWARE GROUP BERHAD	LEAP MARKET FIRM
233	SANCY BERHAD	LEAP MARKET FIRM
234	SANICHI TECHNOLOGY BERHAD	ACE MARKET FIRM
235	SAPURA ENERGY BERHAD	PN17 CLASSIFICATION IN 2012-2022
236	SARAWAK CABLE BERHAD	PN17 CLASSIFICATION IN 2012-2022
237	SBH MARINE HOLDINGS BERHAD	ACE MARKET FIRM
238	SC ESTATE BUILDER BERHAD	ACE MARKET FIRM
239	SCC HOLDINGS BERHAD	ACE MARKET FIRM
240	SCOMI ENERGY SERVICES BERHAD	PN17 CLASSIFICATION IN 2012-2022
241	SCOPE INDUSTRIES BERHAD	ACE MARKET FIRM
242	SEACERA GROUP BERHAD	PN17 CLASSIFICATION IN 2012-2022
243	SECUREMETRIC BERHAD	ACE MARKET FIRM
244	SEDANIA INNOVATOR BERHAD	ACE MARKET FIRM
245	SEERS BERHAD	LEAP MARKET FIRM
246	SERBA DINAMIK HOLDINGS BERHAD	PN17 CLASSIFICATION IN 2012-2022
247	SERSOL BERHAD	ACE MARKET FIRM
248	SFP TECH HOLDINGS BERHAD	ACE MARKET FIRM
249	SIAB HOLDINGS BERHAD	ACE MARKET FIRM
250	SILVER RIDGE HOLDINGS BERHAD	ACE MARKET FIRM
251	SINARAN ADVANCE GROUP BERHAD	INCONSISTENCIES IN THE FINANCIAL REPORTING
252	SIN-KUNG LOGISTICS BERHAD	ACE MARKET FIRM
253	SL INNOVATION CAPITAL BERHAD	LEAP MARKET FIRM
254	SMART ASIA CHEMICAL BERHAD	ACE MARKET FIRM
255	SMILE-LINK HEALTHCARE GLOBAL BERHAD	LEAP MARKET FIRM
256	SMRT HOLDINGS BERHAD	ACE MARKET FIRM
257	SMTRACK BERHAD	ACE MARKET FIRM
258	SNOWFIT GROUP BERHAD	LEAP MARKET FIRM
259	SOLUTION GROUP BERHAD	ACE MARKET FIRM
260	SPRING ART HOLDINGS BERHAD	ACE MARKET FIRM
261	SSF HOME GROUP BERHAD	ACE MARKET FIRM
262	STEEL HAWK BERHAD	LEAP MARKET FIRM
263	STRAITS ENERGY RESOURCES BERHAD	ACE MARKET FIRM
264	SUNMOW HOLDING BERHAD	LEAP MARKET FIRM
265	SUNVIEW GROUP BERHAD	ACE MARKET FIRM
266	SUNZEN BIOTECH BERHAD	ACE MARKET FIRM
267	SUPERGENICS BERHAD	LEAP MARKET FIRM
268	SUPREME CONSOLIDATED RESOURCES BERHAD	LEAP MARKET FIRM
269	SYARIKAT TAKAFUL MALAYSIA KELUARGA BERHAD	FINANCIAL SECTOR FIRM
270	SYNERGY HOUSE BERHAD	ACE MARKET FIRM

Table A2: continued

271	SYSTECH BERHAD	ACE MARKET FIRM
272	TASHIN HOLDINGS BERHAD	ACE MARKET FIRM
273	TCS GROUP HOLDINGS BERHAD	ACE MARKET FIRM
274	TECHNA-X BERHAD	PN17 CLASSIFICATION IN 2012-2022
275	TECHNODEX BERHAD	ACE MARKET FIRM
276	TEX CYCLE TECHNOLOGY (M) BERHAD	ACE MARKET FIRM
277	TFP SOLUTIONS BERHAD	ACE MARKET FIRM
278	TOPVISION EYE SPECIALIST BERHAD	LEAP MARKET FIRM
279	TOTAL DYNAMIC HOLDINGS BERHAD	LEAP MARKET FIRM
280	TPC PLUS BERHAD	PN17 CLASSIFICATION IN 2012-2022
281	TRADEPLUS S&P NEW CHINA TRACKER	NON-TRADITIONAL SECTORS
282	TRI-MODE SYSTEM (M) BERHAD	ACE MARKET FIRM
283	TSA GROUP BERHAD	ACE MARKET FIRM
284	TT VISION HOLDINGS BERHAD	ACE MARKET FIRM
285	TUNE PROTECT GROUP BERHAD	FINANCIAL SECTOR FIRM
286	UCI RESOURCES BERHAD	LEAP MARKET FIRM
287	UCREST BERHAD	ACE MARKET FIRM
288	UNI WALL APS HOLDINGS BERHAD	LEAP MARKET FIRM
289	UNIQUE FIRE HOLDINGS BERHAD	ACE MARKET FIRM
290	UNITRADE INDUSTRIES BERHAD	ACE MARKET FIRM
291	VESTLAND BERHAD	ACE MARKET FIRM
292	VINVEST CAPITAL HOLDINGS BERHAD	ACE MARKET FIRM
293	VISDYNAMICS HOLDINGS BERHAD	ACE MARKET FIRM
294	VOLCANO BERHAD	ACE MARKET FIRM
295	VSOLAR GROUP BERHAD	ACE MARKET FIRM
296	WAJA KONSORTIUM BERHAD	ACE MARKET FIRM
297	WELLSPIRE HOLDINGS BERHAD	ACE MARKET FIRM
298	WENTEL ENGINEERING HOLDINGS BERHAD	ACE MARKET FIRM
299	WIDAD GROUP BERHAD	ACE MARKET FIRM
300	XOX BERHAD	ACE MARKET FIRM
301	XOX NETWORKS BERHAD (MACPIE BERHAD)	ACE MARKET FIRM
302	XOX TECHNOLOGY BERHAD	ACE MARKET FIRM
303	YBS INTERNATIONAL BERHAD	ACE MARKET FIRM
304	YEW LEE PACIFIC GROUP BERHAD	ACE MARKET FIRM
305	YGL CONVERGENCE BERHAD	ACE MARKET FIRM
306	YX PRECIOUS METALS BERHAD	ACE MARKET FIRM
307	ZANTAT HOLDINGS BERHAD	ACE MARKET FIRM
308	ZEN TECH INTERNATIONAL BERHAD	ACE MARKET FIRM

Appendix B: Extraction from Stata 18.0 Panel Regression Analysis

```
. regress ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ
```

Source	SS	df	MS		
				Number of obs	= 7,516
				F(10, 7505)	= 24.33
Model	4.75969448	10	.475969448	Prob > F	= 0.0000
Residual	146.847854	7,505	.019566669	R-squared	= 0.0314
				Adj R-squared	= 0.0301
Total	151.607548	7,515	.020173992	Root MSE	= .13988

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
TDA	-.125657	.0115578	-10.87	0.000	-.1483135	-.1030006
GDP	-.020471	.0951526	-0.22	0.830	-.2069967	.1660547
GDP_TDA	.1520035	.6202693	0.25	0.806	-1.063898	1.367905
OPR	1.044439	.418008	2.50	0.012	.2250263	1.863852
OPR_TDA	-4.698356	2.722681	-1.73	0.084	-10.03557	.6388605
VOL	-.2185604	.1565453	-1.40	0.163	-.525433	.0883122
VOL_TDA	-.2196462	1.022367	-0.21	0.830	-2.223772	1.784479
SZE	.0269162	.0025761	10.45	0.000	.0218664	.031966
TAN	-.0183902	.0074263	-2.48	0.013	-.0329478	-.0038326
LIQ	.0008351	.0001952	4.28	0.000	.0004524	.0012178
_cons	-.1190163	.0151359	-7.86	0.000	-.1486869	-.0893457

Figure B1: Pooled OLS Regression (TDA)

```
. regress ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ
```

Source	SS	df	MS		
Model	3.24931932	10	.324931932	Number of obs	= 7,516
Residual	148.358229	7,505	.019767919	F(10, 7505)	= 16.44
				Prob > F	= 0.0000
Total	151.607548	7,515	.020173992	R-squared	= 0.0214
				Adj R-squared	= 0.0201
				Root MSE	= .1406

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
LDA	-.102893	.015658	-6.57	0.000	-.1335872	-.0721989
GDP	.0054997	.0957239	0.06	0.954	-.1821461	.1931454
GDP_LDA	-.4012434	.8126122	-0.49	0.621	-1.994191	1.191704
OPR	.8940467	.4206206	2.13	0.034	.0695124	1.718581
OPR_LDA	-1.614967	3.520908	-0.46	0.646	-8.516933	5.287
VOL	-.1979252	.1573388	-1.26	0.208	-.5063533	.110503
VOL_LDA	-.627869	1.363703	-0.46	0.645	-3.30111	2.045372
SZE	.0245248	.0026618	9.21	0.000	.0193069	.0297426
TAN	-.0216103	.007455	-2.90	0.004	-.0362243	-.0069964
LIQ	.0011551	.0001928	5.99	0.000	.0007773	.001533
_cons	-.1055751	.0156254	-6.76	0.000	-.1362052	-.074945

Figure B2: Pooled OLS Regression (LDA)

```
. regress ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ
```

Source	SS	df	MS		
Model	3.84364702	10	.384364702	Number of obs	= 7,516
Residual	147.763901	7,505	.019688728	F(10, 7505)	= 19.52
				Prob > F	= 0.0000
Total	151.607548	7,515	.020173992	R-squared	= 0.0254
				Adj R-squared	= 0.0241
				Root MSE	= .14032

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
SDA	-.1342602	.0163804	-8.20	0.000	-.1663703	-.1021501
GDP	-.0126792	.0957108	-0.13	0.895	-.2002992	.1749408
GDP_SDA	.9610214	.9776854	0.98	0.326	-.9555158	2.877559
OPR	1.045609	.4213313	2.48	0.013	.219682	1.871537
OPR_SDA	-8.769483	4.433019	-1.98	0.048	-17.45944	-.0795237
VOL	-.2207561	.1570979	-1.41	0.160	-.5287119	.0871997
VOL_SDA	.4406476	1.56683	0.28	0.779	-2.630778	3.512073
SZE	.0183531	.0024343	7.54	0.000	.0135812	.0231251
TAN	-.0199668	.0074414	-2.68	0.007	-.034554	-.0053796
LIQ	.0009867	.0001947	5.07	0.000	.000605	.0013683
_cons	-.0698156	.014352	-4.86	0.000	-.0979496	-.0416816

Figure B3: Pooled OLS Regression (SDA)

```
. xtreg ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, re

Random-effects GLS regression                   Number of obs     =      7,516
Group variable: FIRM                            Number of groups  =        719

R-squared:                                      Obs per group:
     Within  = 0.0184                                         min =          1
     Between = 0.0529                                         avg =       10.5
     Overall = 0.0309                                         max =         11

                                                Wald chi2(10)     =     167.66
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
TDA	-.1377983	.0150536	-9.15	0.000	-.1673029	-.1082938
GDP	-.0338777	.0858879	-0.39	0.693	-.2022149	.1344595
GDP_TDA	.1547891	.5637695	0.27	0.784	-.9501787	1.259757
OPR	1.239422	.3792798	3.27	0.001	.4960477	1.982797
OPR_TDA	-4.319918	2.505135	-1.72	0.085	-9.229893	.5900567
VOL	-.224507	.1410784	-1.59	0.112	-.5010156	.0520015
VOL_TDA	-.1656323	.9251555	-0.18	0.858	-1.978904	1.647639
SZE	.0276921	.0039709	6.97	0.000	.0199093	.0354748
TAN	-.0316804	.0107139	-2.96	0.003	-.0526792	-.0106815
LIQ	.0006378	.000228	2.80	0.005	.0001909	.0010847
_cons	-.1178761	.0232973	-5.06	0.000	-.1635379	-.0722143
sigma_u	.06118222					
sigma_e	.12553434					
rho	.19194124	(fraction of variance due to u_i)				

Figure B4: RE Regression (TDA)

```
. xtreg ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, re

Random-effects GLS regression                   Number of obs     =      7,516
Group variable: FIRM                            Number of groups  =        719

R-squared:                                      Obs per group:
     Within  = 0.0106                                         min =          1
     Between = 0.0352                                         avg =       10.5
     Overall = 0.0204                                         max =         11

                                                Wald chi2(10)     =     102.33
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
LDA	-.0901817	.0195751	-4.61	0.000	-.1285481	-.0518153
GDP	-.0052508	.0863016	-0.06	0.951	-.1743987	.1638971
GDP_LDA	-.2536757	.7389923	-0.34	0.731	-1.702074	1.194722
OPR	1.072011	.381062	2.81	0.005	.3251433	1.818879
OPR_LDA	-1.784161	3.239101	-0.55	0.582	-8.132682	4.564361
VOL	-.2034671	.1416636	-1.44	0.151	-.4811227	.0741885
VOL_LDA	-.1944659	1.234497	-0.16	0.875	-2.614036	2.225104
SZE	.0230517	.0040398	5.71	0.000	.0151338	.0309696
TAN	-.0384696	.0107322	-3.58	0.000	-.0595044	-.0174349
LIQ	.0008814	.000227	3.88	0.000	.0004365	.0013262
_cons	-.0903019	.0236883	-3.81	0.000	-.1367301	-.0438738
sigma_u	.06145666					
sigma_e	.12600215					
rho	.19217585	(fraction of variance due to u_i)				

Figure B5: RE Regression (LDA)

```
. xtreg ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, re

Random-effects GLS regression                   Number of obs     =      7,516
Group variable: FIRM                            Number of groups  =        719

R-squared:                                      Obs per group:
     Within  = 0.0168                                         min =          1
     Between = 0.0429                                         avg =       10.5
     Overall = 0.0244                                         max =         11

                                                Wald chi2(10)     =     144.69
corr(u_i, X) = 0 (assumed)                      Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
SDA	-.1640274	.0212956	-7.70	0.000	-.2057661	-.1222888
GDP	-.0332974	.0862775	-0.39	0.700	-.2023981	.1358033
GDP_SDA	.5559333	.8897633	0.62	0.532	-1.187971	2.299837
OPR	1.268968	.382073	3.32	0.001	.5201181	2.017817
OPR_SDA	-6.740224	4.066065	-1.66	0.097	-14.70957	1.229116
VOL	-.2331429	.1413438	-1.65	0.099	-.5101716	.0438857
VOL_SDA	-.1868097	1.4174	-0.13	0.895	-2.964864	2.591244
SZE	.0184142	.003806	4.84	0.000	.0109545	.0258739
TAN	-.0367183	.0106867	-3.44	0.001	-.0576638	-.0157728
LIQ	.0006918	.0002282	3.03	0.002	.0002445	.001139
_cons	-.0634485	.0223149	-2.84	0.004	-.107185	-.0197121
sigma_u	.06138271					
sigma_e	.12561174					
rho	.19276623	(fraction of variance due to u_i)				

Figure B6: RE Regression (SDA)

```
. xtreg ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, fe

Fixed-effects (within) regression               Number of obs      =      7,516
Group variable: FIRM                            Number of groups   =        719

R-squared:                                      Obs per group:
     Within  = 0.0193                                         min =          1
     Between = 0.0428                                         avg =       10.5
     Overall = 0.0277                                         max =         11

                                                F(10, 6787)        =      13.37
corr(u_i, Xb) = -0.1508                         Prob > F           =     0.0000
```

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
TDA	-.1562448	.0205135	-7.62	0.000	-.1964578	-.1160319
GDP	-.0707768	.0869028	-0.81	0.415	-.2411336	.0995799
GDP_TDA	.1760199	.5653735	0.31	0.756	-.9322895	1.284329
OPR	1.556599	.3930312	3.96	0.000	.7861349	2.327064
OPR_TDA	-4.376814	2.528467	-1.73	0.083	-9.333403	.5797743
VOL	-.2510322	.1415515	-1.77	0.076	-.5285175	.0264531
VOL_TDA	-.1201971	.9256335	-0.13	0.897	-1.934729	1.694335
SZE	.0396711	.008938	4.44	0.000	.0221498	.0571925
TAN	-.0673318	.0175788	-3.83	0.000	-.1017918	-.0328719
LIQ	.0003264	.0002798	1.17	0.244	-.0002222	.000875
_cons	-.1761055	.0518905	-3.39	0.001	-.2778272	-.0743838
sigma_u	.07644159					
sigma_e	.12553434					
rho	.27049651	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(718, 6787) = 3.53                     Prob > F = 0.0000
```

Figure B7: FE Regression (TDA)

```
. xtreg ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, fe

Fixed-effects (within) regression               Number of obs      =      7,516
Group variable: FIRM                            Number of groups   =        719

R-squared:                                      Obs per group:
     Within  = 0.0120                                         min =          1
     Between = 0.0195                                         avg =       10.5
     Overall = 0.0146                                         max =         11

                                                F(10, 6787)        =       8.25
corr(u_i, Xb) = -0.1474                         Prob > F           =     0.0000
```

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
LDA	-.075445	.0250282	-3.01	0.003	-.1245082	-.0263818
GDP	-.0370626	.0872287	-0.42	0.671	-.2080582	.1339331
GDP_LDA	-.1360142	.7409843	-0.18	0.854	-1.588576	1.316547
OPR	1.343341	.3940222	3.41	0.001	.5709338	2.115748
OPR_LDA	-2.226148	3.26793	-0.68	0.496	-8.632315	4.180018
VOL	-.2260987	.1420513	-1.59	0.112	-.5045637	.0523663
VOL_LDA	.0413484	1.235097	0.03	0.973	-2.37983	2.462526
SZE	.0303343	.0089556	3.39	0.001	.0127786	.04789
TAN	-.085528	.01751	-4.88	0.000	-.1198532	-.0512029
LIQ	.0004557	.0002804	1.63	0.104	-.0000939	.0010053
_cons	-.1178192	.0519548	-2.27	0.023	-.219667	-.0159715
sigma_u	.07723207					
sigma_e	.12600215					
rho	.27309655	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(718, 6787) = 3.56                     Prob > F = 0.0000
```

Figure B8: FE Regression (LDA)

```
. xtreg ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, fe

Fixed-effects (within) regression               Number of obs      =      7,516
Group variable: FIRM                            Number of groups   =        719

R-squared:                                      Obs per group:
     Within  = 0.0181                                         min =          1
     Between = 0.0313                                         avg =       10.5
     Overall = 0.0207                                         max =         11

                                                F(10, 6787)        =      12.52
corr(u_i, Xb) = -0.1867                         Prob > F           =     0.0000
```

ROA	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
SDA	-.1998802	.0285457	-7.00	0.000	-.2558388	-.1439216
GDP	-.075774	.0872926	-0.87	0.385	-.2468948	.0953468
GDP_SDA	.3083517	.8931155	0.35	0.730	-1.442435	2.059138
OPR	1.603338	.3960866	4.05	0.000	.826884	2.379792
OPR_SDA	-5.670928	4.098024	-1.38	0.166	-13.70434	2.362485
VOL	-.2641532	.1417536	-1.86	0.062	-.5420347	.0137283
VOL_SDA	-.5000203	1.418071	-0.35	0.724	-3.279885	2.279844
SZE	.0285364	.0087464	3.26	0.001	.0113907	.045682
TAN	-.0811909	.0172755	-4.70	0.000	-.1150564	-.0473254
LIQ	.0002888	.0002804	1.03	0.303	-.0002609	.0008385
_cons	-.1079762	.0506085	-2.13	0.033	-.2071847	-.0087678
sigma_u	.07728062					
sigma_e	.12561174					
rho	.27458062	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(718, 6787) = 3.59                     Prob > F = 0.0000
```

Figure B9: FE Regression (SDA)

```
. xtreg ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, fe vce(cluster FIRM)

Fixed-effects (within) regression               Number of obs     =      7,516
Group variable: FIRM                            Number of groups  =        719

R-squared:                                      Obs per group:
     Within  = 0.0193                                         min =          1
     Between = 0.0428                                         avg =       10.5
     Overall = 0.0277                                         max =         11

                                                F(10, 718)        =      15.08
corr(u_i, Xb) = -0.1508                         Prob > F          =     0.0000

                                 (Std. err. adjusted for 719 clusters in FIRM)
------------------------------------------------------------------------------
             |               Robust
         ROA |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         TDA |  -.1562448   .0287099    -5.44   0.000    -.2126103   -.0998794
         GDP |  -.0707768   .0836633    -0.85   0.398    -.2350309    .0934772
     GDP_TDA |   .1760199   .5172174     0.34   0.734    -.8394193    1.191459
         OPR |   1.556599    .451147     3.45   0.001     .6708743    2.442324
     OPR_TDA |  -4.376814   2.438958    -1.79   0.073    -9.165156    .4115276
         VOL |  -.2510322   .1193438    -2.10   0.036    -.4853367   -.0167276
     VOL_TDA |  -.1201971   .8535241    -0.14   0.888    -1.795898    1.555504
         SZE |   .0396711   .0209895     1.89   0.059    -.0015371    .0808793
         TAN |  -.0673318   .0215723    -3.12   0.002    -.1096841   -.0249796
         LIQ |   .0003264   .0021331     0.15   0.878    -.0038615    .0045142
       _cons |  -.1761055   .1214409    -1.45   0.147    -.4145272    .0623162
-------------+----------------------------------------------------------------
     sigma_u |  .07644159
     sigma_e |  .12553434
         rho |  .27049651   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Figure B10: FE Regression with Robust and Clustered Standard Errors (TDA)

```
. xtreg ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, fe vce(cluster FIRM)

Fixed-effects (within) regression               Number of obs     =      7,516
Group variable: FIRM                            Number of groups  =        719

R-squared:                                      Obs per group:
     Within  = 0.0120                                         min =          1
     Between = 0.0195                                         avg =       10.5
     Overall = 0.0146                                         max =         11

                                                F(10, 718)        =      13.10
corr(u_i, Xb) = -0.1474                         Prob > F          =     0.0000

                                 (Std. err. adjusted for 719 clusters in FIRM)
------------------------------------------------------------------------------
             |               Robust
         ROA |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         LDA |   -.075445   .0267449    -2.82   0.005    -.1279526   -.0229375
         GDP |  -.0370626   .0859523    -0.43   0.666    -.2058104    .1316852
     GDP_LDA |  -.1360142   .5710224    -0.24   0.812    -1.257087     .985059
         OPR |   1.343341   .4662555     2.88   0.004     .4279538    2.258728
     OPR_LDA |  -2.226148   2.448398    -0.91   0.364    -7.033023    2.580727
         VOL |  -.2260987    .119819    -1.89   0.060    -.4613361    .0091387
     VOL_LDA |   .0413484   .8820947     0.05   0.963    -1.690445    1.773141
         SZE |   .0303343    .022683     1.34   0.182    -.0141985    .0748672
         TAN |   -.085528   .0223373    -3.83   0.000    -.1293822   -.0416739
         LIQ |   .0004557   .0020972     0.22   0.828    -.0036617     .004573
       _cons |  -.1178192   .1322195    -0.89   0.373    -.3774022    .1417637
-------------+----------------------------------------------------------------
     sigma_u |  .07723207
     sigma_e |  .12600215
         rho |  .27309655   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Figure B11: FE Regression with Robust and Clustered Standard Errors (LDA)

```
. xtreg ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, fe vce(cluster FIRM)

Fixed-effects (within) regression               Number of obs     =      7,516
Group variable: FIRM                            Number of groups  =        719

R-squared:                                      Obs per group:
     Within  = 0.0181                                         min =          1
     Between = 0.0313                                         avg =       10.5
     Overall = 0.0207                                         max =         11

                                                F(10, 718)        =      13.29
corr(u_i, Xb) = -0.1867                         Prob > F          =     0.0000

                                 (Std. err. adjusted for 719 clusters in FIRM)
------------------------------------------------------------------------------
             |               Robust
         ROA |      Coef.   Std. err.      t    P>|t|     [95% conf. interval]
-------------+----------------------------------------------------------------
         SDA |  -.1998802   .0528927    -3.78   0.000    -.303723   -.0960374
         GDP |   -.075774   .0815685    -0.93   0.353    -.2359152    .0843672
     GDP_SDA |   .3083517   .7993832     0.39   0.700    -1.261056     1.87776
         OPR |   1.603338   .4331173     3.70   0.000     .7530102    2.453666
     OPR_SDA |  -5.670928   3.987123    -1.42   0.155    -13.49874    2.156886
         VOL |  -.2641532   .1194464    -2.21   0.027    -.4986591   -.0296473
     VOL_SDA |  -.5000203   1.181302    -0.42   0.672    -2.819239    1.819199
         SZE |   .0285364   .0215175     1.33   0.185    -.0137083    .0707811
         TAN |  -.0811909   .0217067    -3.74   0.000    -.1238071   -.0385747
         LIQ |   .0002888   .0021501     0.13   0.893    -.0039323      .00451
       _cons |  -.1079762   .1247498    -0.87   0.387    -.3528942    .1369417
-------------+----------------------------------------------------------------
     sigma_u |  .07728062
     sigma_e |  .12561174
         rho |  .27458062   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

Figure B12: FE Regression with Robust and Clustered Standard Errors (SDA)

```
. xtgls ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, panels(heteroskedastic) corr(ar1) force
(note: 1 observations dropped because only 1 obs in group)

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.5528)

Estimated covariances      =       718          Number of obs     =      7,515
Estimated autocorrelations =         1          Number of groups  =        718
Estimated coefficients     =        11          Obs per group:
                                                              min =          3
                                                              avg =   10.46657
                                                              max =         11
                                                Wald chi2(10)     =     748.36
                                                Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
TDA	-.1059794	.004596	-23.06	0.000	-.1149874	-.0969715
GDP	.0349663	.0245633	1.42	0.155	-.013177	.0831096
GDP_TDA	-.1832155	.14992	-1.22	0.222	-.4770533	.1106223
OPR	.2175455	.1272526	1.71	0.087	-.0318651	.466956
OPR_TDA	.3567259	.7549099	0.47	0.637	-1.12287	1.836322
VOL	-.0987038	.0311075	-3.17	0.002	-.1596735	-.0377342
VOL_TDA	-.2392624	.1952308	-1.23	0.220	-.6219078	.1433831
SZE	.0134266	.001194	11.25	0.000	.0110864	.0157668
TAN	-.0170878	.0030858	-5.54	0.000	-.0231358	-.0110397
LIQ	.0001072	.0001728	0.62	0.535	-.0002315	.0004458
_cons	-.0341824	.0071937	-4.75	0.000	-.0482817	-.020083

Figure B13: GLS Regression (TDA)

```
. xtgls ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, panels(heteroskedastic) corr(ar1) force
(note: 1 observations dropped because only 1 obs in group)

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.5688)

Estimated covariances      =       718          Number of obs     =      7,515
Estimated autocorrelations =         1          Number of groups  =        718
Estimated coefficients     =        11          Obs per group:
                                                              min =          3
                                                              avg =   10.46657
                                                              max =         11
                                                Wald chi2(10)     =     409.97
                                                Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
LDA	-.0727164	.0053777	-13.52	0.000	-.0832566	-.0621762
GDP	.0447126	.0239427	1.87	0.062	-.0022143	.0916395
GDP_LDA	-.3180708	.1674955	-1.90	0.058	-.646356	.0102144
OPR	.0977863	.1248289	0.78	0.433	-.1468737	.3424464
OPR_LDA	2.249152	.8342167	2.70	0.007	.6141178	3.884187
VOL	-.0968774	.0299868	-3.23	0.001	-.1556504	-.0381044
VOL_LDA	-.1708884	.2228255	-0.77	0.443	-.6076183	.2658415
SZE	.0119736	.0012246	9.78	0.000	.0095734	.0143737
TAN	-.0199854	.0030939	-6.46	0.000	-.0260494	-.0139215
LIQ	.0006814	.0001653	4.12	0.000	.0003575	.0010053
_cons	-.028436	.0073976	-3.84	0.000	-.042935	-.013937

Figure B14: GLS Regression (LDA)

```
. xtgls ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, panels(heteroskedastic) corr(ar1) force
(note: 1 observations dropped because only 1 obs in group)

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        heteroskedastic
Correlation:   common AR(1) coefficient for all panels  (0.5553)

Estimated covariances      =       718          Number of obs     =      7,515
Estimated autocorrelations =         1          Number of groups  =        718
Estimated coefficients     =        11          Obs per group:
                                                              min =          3
                                                              avg =   10.46657
                                                              max =         11
                                                Wald chi2(10)     =     506.41
                                                Prob > chi2       =     0.0000
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
SDA	-.1073292	.0066826	-16.06	0.000	-.120427	-.0942315
GDP	.0455956	.0245459	1.86	0.063	-.0025135	.0937046
GDP_SDA	.272068	.2462322	1.10	0.269	-.2105382	.7546743
OPR	.2294788	.1272628	1.80	0.071	-.0199516	.4789092
OPR_SDA	-3.689825	1.258175	-2.93	0.003	-6.155803	-1.223846
VOL	-.0924598	.0311697	-2.97	0.003	-.1535514	-.0313683
VOL_SDA	-.1917123	.3140468	-0.61	0.542	-.8072327	.4238081
SZE	.0057065	.0011748	4.86	0.000	.0034039	.0080092
TAN	-.018045	.0032042	-5.63	0.000	-.0243253	-.0117648
LIQ	.000222	.0001709	1.30	0.194	-.0001129	.000557
_cons	.0096745	.0072285	1.34	0.181	-.0044932	.0238421

Figure B15: GLS Regression (SDA)

```
. xtpcse ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, pairwise corr(ar1)

Number of gaps in sample = 95
note: computations for rho restarted at each gap.
note: estimates of rho outside [-1,1] bounded to be in the range [-1,1].
note: at least one disturbance covariance assumed 0, no common time periods
      between panels.

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable:   FIRM                          Number of obs     =      7,516
Time variable:    YEAR                          Number of groups  =        719
Panels:           correlated (unbalanced)       Obs per group:
Autocorrelation:  common AR(1)                                min =          1
Sigma computed by pairwise selection                          avg =  10.453408
                                                              max =         11
Estimated covariances      =    258840          R-squared         =     0.0223
Estimated autocorrelations =         1          Wald chi2(10)     =     140.36
Estimated coefficients     =        11          Prob > chi2       =     0.0000
```

ROA	Coefficient	Panel-corrected std. err.	z	P>|z|	[95% conf.	interval]
TDA	-.1348773	.0173707	-7.76	0.000	-.1689233	-.1008313
GDP	-.0456258	.1445237	-0.32	0.752	-.328887	.2376354
GDP_TDA	.2658015	.6062511	0.44	0.661	-.9224289	1.454032
OPR	.3253545	.7352865	0.44	0.658	-1.115781	1.76649
OPR_TDA	-3.370778	2.852894	-1.18	0.237	-8.962347	2.220791
VOL	-.2683099	.1914012	-1.40	0.161	-.6434494	.1068297
VOL_TDA	-.0464523	.8474523	-0.05	0.956	-1.707428	1.614524
SZE	.0359595	.0042468	8.47	0.000	.027636	.0442831
TAN	-.0236285	.0144582	-1.63	0.102	-.0519661	.0047091
LIQ	.001534	.0011641	1.32	0.188	-.0007477	.0038157
_cons	-.1718623	.0237093	-7.25	0.000	-.2183317	-.1253929
rho	.5605028					

Figure B16: PCSE Regression (TDA)

```
. xtpcse ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, pairwise corr(ar1)

Number of gaps in sample = 95
note: computations for rho restarted at each gap.
note: estimates of rho outside [-1,1] bounded to be in the range [-1,1].
note: at least one disturbance covariance assumed 0, no common time periods
      between panels.

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable:   FIRM                          Number of obs     =      7,516
Time variable:    YEAR                          Number of groups  =        719
Panels:           correlated (unbalanced)       Obs per group:
Autocorrelation:  common AR(1)                                min =          1
Sigma computed by pairwise selection                          avg =  10.453408
                                                              max =         11
Estimated covariances      =    258840         R-squared         =     0.0176
Estimated autocorrelations =         1         Wald chi2(10)     =      62.92
Estimated coefficients     =        11         Prob > chi2       =     0.0000
```

ROA	Coefficient	Panel-corrected std. err.	z	P>|z|	[95% conf.	interval]
LDA	-.0990339	.0186136	-5.32	0.000	-.1355158	-.0625519
GDP	-.0150576	.1432414	-0.11	0.916	-.2958055	.2656903
GDP_LDA	-.2049328	.5656417	-0.36	0.717	-1.31357	.9037046
OPR	.1392325	.7309519	0.19	0.849	-1.293407	1.571872
OPR_LDA	.878622	2.536022	0.35	0.729	-4.091889	5.849133
VOL	-.2460462	.1873381	-1.31	0.189	-.6132222	.1211297
VOL_LDA	.0149153	.7453797	0.02	0.984	-1.446002	1.475833
SZE	.0324059	.004949	6.55	0.000	.022706	.0421058
TAN	-.0285745	.014999	-1.91	0.057	-.057972	.0008231
LIQ	.0017158	.0011405	1.50	0.132	-.0005195	.0039511
_cons	-.1508492	.0278674	-5.41	0.000	-.2054683	-.09623
rho	.564412					

Figure B17: PCSE Regression (LDA)

```
. xtpcse ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, pairwise corr(ar1)

Number of gaps in sample = 95
note: computations for rho restarted at each gap.
note: estimates of rho outside [-1,1] bounded to be in the range [-1,1].
note: at least one disturbance covariance assumed 0, no common time periods
      between panels.

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable:   FIRM                          Number of obs     =      7,516
Time variable:    YEAR                          Number of groups  =        719
Panels:           correlated (unbalanced)       Obs per group:
Autocorrelation:  common AR(1)                                min =          1
Sigma computed by pairwise selection                          avg =  10.453408
                                                              max =         11
Estimated covariances      =    258840         R-squared         =     0.0196
Estimated autocorrelations =         1         Wald chi2(10)     =     101.84
Estimated coefficients     =        11         Prob > chi2       =     0.0000
```

ROA	Panel-corrected Coefficient	std. err.	z	P>|z|	[95% conf.	interval]
SDA	-.1382636	.0293536	-4.71	0.000	-.1957955	-.0807316
GDP	-.029884	.1501216	-0.20	0.842	-.3241169	.2643489
GDP_SDA	.8043976	.9577475	0.84	0.401	-1.072753	2.681548
OPR	.2532892	.7718794	0.33	0.743	-1.259567	1.766145
OPR_SDA	-8.898831	4.942312	-1.80	0.072	-18.58558	.7879233
VOL	-.2634665	.1962695	-1.34	0.179	-.6481476	.1212147
VOL_SDA	-.2189037	1.405177	-0.16	0.876	-2.973001	2.535193
SZE	.0272296	.0043095	6.32	0.000	.0187832	.035676
TAN	-.0297316	.0152531	-1.95	0.051	-.0596272	.000164
LIQ	.0016122	.0011696	1.38	0.168	-.0006801	.0039045
_cons	-.1202986	.0248902	-4.83	0.000	-.1690825	-.0715147
rho	.5748731					

Figure B18: PCSE Regression (SDA)

```
. ivregress 2sls ROA (TDA = L_ROA GDP OPR VOL) GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ

Instrumental variables 2SLS regression          Number of obs   =      6,702
                                                Wald chi2(10)   =     111.96
                                                Prob > chi2     =     0.0000
                                                R-squared       =          .
                                                Root MSE        =     .31516
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
TDA	-2.207119	.2313455	-9.54	0.000	-2.660548	-1.75369
GDP	-.2528263	.2235172	-1.13	0.258	-.6909121	.1852594
GDP_TDA	5.30023	1.555342	3.41	0.001	2.251815	8.348645
OPR	2.395883	.9678797	2.48	0.013	.4988733	4.292892
OPR_TDA	-20.75035	6.434273	-3.22	0.001	-33.36129	-8.139405
VOL	-.0773306	.3762738	-0.21	0.837	-.8148137	.6601526
VOL_TDA	14.3828	2.971785	4.84	0.000	8.558208	20.20739
SZE	.188939	.0188333	10.03	0.000	.1520263	.2258517
TAN	.0474144	.0189513	2.50	0.012	.0102706	.0845581
LIQ	-.0066192	.0009401	-7.04	0.000	-.0084617	-.0047766
_cons	-1.045594	.1078318	-9.70	0.000	-1.256941	-.8342476

```
Endogenous: TDA
Exogenous:  GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ L_ROA
```

Figure B19: 2SLS Regression (TDA)

```
. ivregress 2sls ROA (LDA = L_ROA GDP OPR VOL) GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ

Instrumental variables 2SLS regression          Number of obs   =      6,702
                                                Wald chi2(10)   =      49.53
                                                Prob > chi2     =     0.0000
                                                R-squared       =          .
                                                Root MSE        =     .47294
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
LDA	-4.503487	.7077803	-6.36	0.000	-5.890711	-3.116263
GDP	.0475023	.3320718	0.14	0.886	-.6033465	.6983512
GDP_LDA	15.75278	3.828813	4.11	0.000	8.24844	23.25711
OPR	-1.055944	1.456476	-0.72	0.468	-3.910585	1.798696
OPR_LDA	-75.82706	16.75495	-4.53	0.000	-108.6662	-42.98796
VOL	.1083667	.565171	0.19	0.848	-.9993481	1.216082
VOL_LDA	31.61773	7.136176	4.43	0.000	17.63108	45.60437
SZE	.3351599	.0505915	6.62	0.000	.2360023	.4343175
TAN	.0330816	.0276706	1.20	0.232	-.0211518	.0873151
LIQ	-.0047908	.0011661	-4.11	0.000	-.0070764	-.0025052
_cons	-1.887997	.2902098	-6.51	0.000	-2.456798	-1.319196

```
Endogenous: LDA
Exogenous:  GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ L_ROA
```

Figure B20: 2SLS Regression (LDA)

```
. ivregress 2sls ROA (SDA = L_ROA GDP OPR VOL) GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ

Instrumental variables 2SLS regression          Number of obs   =      6,702
                                                Wald chi2(10)   =      59.06
                                                Prob > chi2     =     0.0000
                                                R-squared       =          .
                                                Root MSE        =     .43413
```

ROA	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
SDA	-4.401363	.6355733	-6.93	0.000	-5.647064	-3.155663
GDP	-.6523747	.3228598	-2.02	0.043	-1.285168	-.0195812
GDP_SDA	6.817153	3.271777	2.08	0.037	.4045884	13.22972
OPR	6.542063	1.567686	4.17	0.000	3.469455	9.614671
OPR_SDA	31.15616	15.03185	2.07	0.038	1.694286	60.61804
VOL	-.2755302	.5196571	-0.53	0.596	-1.294039	.742979
VOL_SDA	39.29806	7.868971	4.99	0.000	23.87516	54.72096
SZE	.0492046	.0091925	5.35	0.000	.0311876	.0672216
TAN	.0599448	.0267998	2.24	0.025	.0074182	.1124714
LIQ	-.0084613	.0015336	-5.52	0.000	-.0114672	-.0054555
_cons	-.241873	.0534719	-4.52	0.000	-.346676	-.1370699

```
Endogenous: SDA
Exogenous:  GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ L_ROA
```

Figure B21: 2SLS Regression (SDA)

```
. xtabond2 ROA L.ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, gmm(L.ROA, lag(2 .
> )) iv(GDP OPR VOL SZE TAN LIQ, eq(diff)) twostep robust cluster(FIRM) nolevel
Favoring speed over space. To switch, type or click on mata: mata set matafavor space, perm.
Warning: Two-step estimated covariance matrix of moments is singular.
  Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.
  Difference-in-Sargan/Hansen statistics may be negative.

Dynamic panel-data estimation, two-step difference GMM
------------------------------------------------------------------------------
Group variable: FIRM                            Number of obs      =      5903
Time variable : YEAR                            Number of groups   =       718
Number of instruments = 42                      Obs per group: min =         1
Wald chi2(0)  =         .                                      avg =      8.22
Prob > chi2   =         .                                      max =         9
                                  (Std. err. adjusted for clustering on FIRM)
------------------------------------------------------------------------------
             |               Corrected
         ROA |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ROA |
          L1.|   .5889841   .1461446     4.03   0.000      .302546    .8754222
             |
         TDA |  -.4671795   .6052579    -0.77   0.440    -1.653463    .7191042
         GDP |  -.0019944   .1594876    -0.01   0.990    -.3145843    .3105956
     GDP_TDA |  -3.315044   5.085972    -0.65   0.515    -13.28337    6.653278
         OPR |  -.8811134    .650868    -1.35   0.176    -2.156791    .3945645
     OPR_TDA |  -1.638622   26.05943    -0.06   0.950    -52.71417    49.43693
         VOL |  -.2657879   .1629063    -1.63   0.103    -.5850783    .0535025
     VOL_TDA |  -4.627667   6.236296    -0.74   0.458    -16.85058    7.595248
         SZE |   .0738691    .131677     0.56   0.575     -.184213    .3319512
         TAN |  -.0784737   .0815239    -0.96   0.336    -.2382576    .0813102
         LIQ |    .000385   .0024903     0.15   0.877    -.0044958    .0052658
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(GDP OPR VOL SZE TAN LIQ)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(2/10).L.ROA
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.68  Pr > z =  0.094
Arellano-Bond test for AR(2) in first differences: z =   1.64  Pr > z =  0.100
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(31)   =  42.88  Prob > chi2 =  0.076
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(31)   =  34.48  Prob > chi2 =  0.305
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  iv(GDP OPR VOL SZE TAN LIQ, eq(diff))
    Hansen test excluding group:     chi2(25)   =  26.97  Prob > chi2 =  0.357
    Difference (null H = exogenous): chi2(6)    =   7.51  Prob > chi2 =  0.276
```

Figure B22: Two-Step Diff-GMM Regression (TDA)

```
. xtabond2 ROA L.ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, gmm(L.ROA, lag(2 .
> )) iv(GDP OPR VOL SZE TAN LIQ, eq(diff)) twostep robust cluster(FIRM) nolevel
Favoring speed over space. To switch, type or click on mata: mata set matafavor space, perm.
Warning: Two-step estimated covariance matrix of moments is singular.
  Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.
  Difference-in-Sargan/Hansen statistics may be negative.

Dynamic panel-data estimation, two-step difference GMM
------------------------------------------------------------------------------
Group variable: FIRM                            Number of obs      =      5903
Time variable : YEAR                            Number of groups   =       718
Number of instruments = 42                      Obs per group: min =         1
Wald chi2(0)  =         .                                      avg =      8.22
Prob > chi2   =         .                                      max =         9
                                  (Std. err. adjusted for clustering on FIRM)
------------------------------------------------------------------------------
             |              Corrected
         ROA |  Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         ROA |
          L1.|   .5885061   .1567401     3.75   0.000     .2813012     .895711
             |
         LDA |  -.6776422   .7385868    -0.92   0.359    -2.125246    .7699613
         GDP |   .0784035   .1127049     0.70   0.487    -.1424941    .2993011
     GDP_LDA |  -6.799283   9.553333    -0.71   0.477    -25.52347    11.92491
         OPR |   -1.07724   .8827694    -1.22   0.222    -2.807436    .6529568
     OPR_LDA |  -21.56961   55.81472    -0.39   0.699    -130.9645    87.82523
         VOL |   -.215086   .1436048    -1.50   0.134    -.4965463    .0663743
     VOL_LDA |  -11.00538   14.90197    -0.74   0.460    -40.21271    18.20196
         SZE |   .0456977   .0966351     0.47   0.636    -.1437037     .235099
         TAN |   -.054404   .0872639    -0.62   0.533    -.2254381    .1166301
         LIQ |   .0008888   .0025182     0.35   0.724    -.0040467    .0058243
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(GDP OPR VOL SZE TAN LIQ)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(2/10).L.ROA
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.66  Pr > z =  0.097
Arellano-Bond test for AR(2) in first differences: z =   1.35  Pr > z =  0.178
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(31)   =  45.11  Prob > chi2 =  0.049
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(31)   =  31.48  Prob > chi2 =  0.442
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  iv(GDP OPR VOL SZE TAN LIQ, eq(diff))
    Hansen test excluding group:     chi2(25)   =  23.19  Prob > chi2 =  0.567
    Difference (null H = exogenous): chi2(6)    =   8.29  Prob > chi2 =  0.217
```

Figure B23: Two-Step Diff-GMM Regression (LDA)

```
. xtabond2 ROA L.ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, gmm(L.ROA, lag(2 .
> )) iv(GDP OPR VOL SZE TAN LIQ, eq(diff)) twostep robust cluster(FIRM) nolevel
Favoring speed over space. To switch, type or click on mata: mata set matafavor space, perm.
Warning: Two-step estimated covariance matrix of moments is singular.
  Using a generalized inverse to calculate optimal weighting matrix for two-step estimation.
  Difference-in-Sargan/Hansen statistics may be negative.

Dynamic panel-data estimation, two-step difference GMM
------------------------------------------------------------------------------
Group variable: FIRM                            Number of obs      =      5903
Time variable : YEAR                            Number of groups   =       718
Number of instruments = 42                      Obs per group: min =         1
Wald chi2(0)  =         .                                      avg =      8.22
Prob > chi2   =         .                                      max =         9
                                  (Std. err. adjusted for clustering on FIRM)
------------------------------------------------------------------------------
             |               Corrected
         ROA |  Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         ROA |
          L1.|   .5992617   .1448626     4.14   0.000     .3153363    .8831871
             |
         SDA |  -.1210576    .348551    -0.35   0.728     -.804205    .5620898
         GDP |   .1246017   .1246199     1.00   0.317    -.1196489    .3688522
     GDP_SDA |  -3.613226   8.437469    -0.43   0.668    -20.15036    12.92391
         OPR |   -1.57981   .6148454    -2.57   0.010    -2.784885   -.3747353
     OPR_SDA |  -16.68899   32.04803    -0.52   0.603    -79.50198     46.124
         VOL |  -.1467008   .1507244    -0.97   0.330    -.4421151    .1487136
     VOL_SDA |   -3.79798   8.469689    -0.45   0.654    -20.39826    12.80231
         SZE |  -.0189478   .0616434    -0.31   0.759    -.1397667     .101871
         TAN |  -.1306377    .042018    -3.11   0.002    -.2129914    -.048284
         LIQ |   .0005798   .0024643     0.24   0.814    -.0042501    .0054098
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(GDP OPR VOL SZE TAN LIQ)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(2/10).L.ROA
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.43  Pr > z =  0.153
Arellano-Bond test for AR(2) in first differences: z =   1.26  Pr > z =  0.209
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(31)   =  39.84  Prob > chi2 =  0.133
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(31)   =  33.12  Prob > chi2 =  0.364
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  iv(GDP OPR VOL SZE TAN LIQ, eq(diff))
    Hansen test excluding group:     chi2(25)   =  23.09  Prob > chi2 =  0.572
    Difference (null H = exogenous): chi2(6)    =  10.02  Prob > chi2 =  0.124
```

Figure B24: Two-Step Diff-GMM Regression (SDA)

```
. xtabond2 ROA L.ROA TDA GDP GDP_TDA OPR OPR_TDA VOL VOL_TDA SZE TAN LIQ, gmm(L.ROA, lag(2
> .)) gmmstyle(L.ROA, equation(level)) ivstyle(TDA GDP OPR VOL SZE TAN LIQ, equation(diff))
>  twostep robust cluster(FIRM)
Favoring speed over space. To switch, type or click on mata: mata set matafavor space, perm
> .
Warning: Two-step estimated covariance matrix of moments is singular.
  Using a generalized inverse to calculate optimal weighting matrix for two-step estimation
> .
  Difference-in-Sargan/Hansen statistics may be negative.

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: FIRM                            Number of obs      =      6702
Time variable : YEAR                            Number of groups   =       718
Number of instruments = 80                      Obs per group: min =         2
Wald chi2(11) =    185.47                                      avg =      9.33
Prob > chi2   =     0.000                                      max =        10
                                  (Std. err. adjusted for clustering on FIRM)
------------------------------------------------------------------------------
             |               Corrected
         ROA |  Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         ROA |
          L1.|   .5266524   .1085162     4.85   0.000     .3139645    .7393402
             |
         TDA |  -.1302019   .0379398    -3.43   0.001    -.2045625   -.0558413
         GDP |   .0506318   .0659668     0.77   0.443    -.0786608    .1799244
     GDP_TDA |   2.238244   2.973669     0.75   0.452     -3.59004    8.066528
         OPR |   -.775732   .5138554    -1.51   0.131     -1.78287    .2314061
     OPR_TDA |  -29.07386   20.75641    -1.40   0.161    -69.75567    11.60794
         VOL |  -.2204843   .0941575    -2.34   0.019    -.4050296    -.035939
     VOL_TDA |   1.374671   4.641499     0.30   0.767      -7.7225    10.47184
         SZE |   .0442555   .0347283     1.27   0.203    -.0238107    .1123217
         TAN |  -.0679202   .0380025    -1.79   0.074    -.1424037    .0065634
         LIQ |   .0003411   .0017499     0.19   0.845    -.0030885    .0037708
       _cons |  -.2261411   .2071283    -1.09   0.275    -.6321052    .1798229
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(TDA GDP OPR VOL SZE TAN LIQ)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(2/10).L.ROA
Instruments for levels equation
  Standard
    _cons
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    DL(1/9).L.ROA
    DL.L.ROA
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.40  Pr > z =  0.161
Arellano-Bond test for AR(2) in first differences: z =   1.19  Pr > z =  0.233
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(68)   = 108.15  Prob > chi2 =  0.001
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(68)   =  86.67  Prob > chi2 =  0.063
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  GMM instruments for levels
    Hansen test excluding group:     chi2(32)   =  38.19  Prob > chi2 =  0.209
    Difference (null H = exogenous): chi2(36)   =  48.47  Prob > chi2 =  0.080
  gmm(L.ROA, lag(2 .))
    Hansen test excluding group:     chi2(32)   =  38.12  Prob > chi2 =  0.211
    Difference (null H = exogenous): chi2(36)   =  48.55  Prob > chi2 =  0.079
  gmm(L.ROA, eq(level) lag(1 .))
    Hansen test excluding group:     chi2(32)   =  46.89  Prob > chi2 =  0.043
    Difference (null H = exogenous): chi2(36)   =  39.78  Prob > chi2 =  0.305
  iv(TDA GDP OPR VOL SZE TAN LIQ, eq(diff))
    Hansen test excluding group:     chi2(61)   =  79.73  Prob > chi2 =  0.054
    Difference (null H = exogenous): chi2(7)    =   6.94  Prob > chi2 =  0.435
```

Figure B25: Two-Step Sys-GMM Regression (TDA)

```
. xtabond2 ROA L.ROA LDA GDP GDP_LDA OPR OPR_LDA VOL VOL_LDA SZE TAN LIQ, gmm(L.ROA, lag(2
> .)) gmmstyle(L.ROA, equation(level)) ivstyle(LDA GDP OPR VOL SZE TAN LIQ, equation(diff))
>  twostep robust cluster(FIRM)
Favoring speed over space. To switch, type or click on mata: mata set matafavor space, perm
> .
Warning: Two-step estimated covariance matrix of moments is singular.
  Using a generalized inverse to calculate optimal weighting matrix for two-step estimation
> .
  Difference-in-Sargan/Hansen statistics may be negative.

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: FIRM                            Number of obs      =      6702
Time variable : YEAR                            Number of groups   =       718
Number of instruments = 80                      Obs per group: min =         2
Wald chi2(11) =    216.61                                      avg =      9.33
Prob > chi2   =     0.000                                      max =        10
                                  (Std. err. adjusted for clustering on FIRM)
------------------------------------------------------------------------------
             |               Corrected
         ROA |  Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         ROA |
          L1.|   .5615122   .1003238     5.60   0.000     .3648811    .7581432
             |
         LDA |   -.074413   .0452704    -1.64   0.100    -.1631413    .0143152
         GDP |   .0758543   .0680101     1.12   0.265     -.057443    .2091517
     GDP_LDA |  -3.199792   5.485775    -0.58   0.560    -13.95171    7.552129
         OPR |  -.8684798   .5856823    -1.48   0.138    -2.016396    .2794365
     OPR_LDA |  -9.970022   35.79772    -0.28   0.781    -80.13227    60.19222
         VOL |  -.2026076   .0898413    -2.26   0.024    -.3786933   -.0265219
     VOL_LDA |  -7.379586   9.418787    -0.78   0.433    -25.84007     11.0809
         SZE |   .0339835   .0319535     1.06   0.288    -.0286443    .0966112
         TAN |  -.0795474   .0356167    -2.23   0.026    -.1493549   -.0097398
         LIQ |   .0004095   .0015679     0.26   0.794    -.0026635    .0034826
       _cons |  -.1641127     .18813    -0.87   0.383    -.5328408    .2046154
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(LDA GDP OPR VOL SZE TAN LIQ)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(2/10).L.ROA
Instruments for levels equation
  Standard
    _cons
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    DL(1/9).L.ROA
    DL.L.ROA
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.41  Pr > z =  0.158
Arellano-Bond test for AR(2) in first differences: z =   1.24  Pr > z =  0.216
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(68)   = 111.23  Prob > chi2 =  0.001
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(68)   =  83.92  Prob > chi2 =  0.092
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  GMM instruments for levels
    Hansen test excluding group:     chi2(32)   =  33.85  Prob > chi2 =  0.378
    Difference (null H = exogenous): chi2(36)   =  50.07  Prob > chi2 =  0.060
  gmm(L.ROA, lag(2 .))
    Hansen test excluding group:     chi2(31)   =  36.55  Prob > chi2 =  0.227
    Difference (null H = exogenous): chi2(37)   =  47.37  Prob > chi2 =  0.118
  gmm(L.ROA, eq(level) lag(1 .))
    Hansen test excluding group:     chi2(33)   =  40.86  Prob > chi2 =  0.163
    Difference (null H = exogenous): chi2(35)   =  43.06  Prob > chi2 =  0.164
  iv(LDA GDP OPR VOL SZE TAN LIQ, eq(diff))
    Hansen test excluding group:     chi2(61)   =  77.41  Prob > chi2 =  0.076
    Difference (null H = exogenous): chi2(7)    =   6.51  Prob > chi2 =  0.481
```

Figure B26: Two-Step Sys-GMM Regression (LDA)

```
. xtabond2 ROA L.ROA SDA GDP GDP_SDA OPR OPR_SDA VOL VOL_SDA SZE TAN LIQ, gmm(L.ROA, lag(2
> .)) gmmstyle(L.ROA, equation(level)) ivstyle(SDA GDP OPR VOL SZE TAN LIQ, equation(diff))
>  twostep robust cluster(FIRM)
Favoring speed over space. To switch, type or click on mata: mata set matafavor space, perm
> .
Warning: Two-step estimated covariance matrix of moments is singular.
  Using a generalized inverse to calculate optimal weighting matrix for two-step estimation
> .
  Difference-in-Sargan/Hansen statistics may be negative.

Dynamic panel-data estimation, two-step system GMM
------------------------------------------------------------------------------
Group variable: FIRM                            Number of obs      =      6702
Time variable : YEAR                            Number of groups   =       718
Number of instruments = 80                      Obs per group: min =         2
Wald chi2(11) =    144.46                                      avg =      9.33
Prob > chi2   =     0.000                                      max =        10
                                  (Std. err. adjusted for clustering on FIRM)
------------------------------------------------------------------------------
             |               Corrected
         ROA |  Coefficient  std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         ROA |
          L1.|   .5373064   .1213454     4.43   0.000     .2994739     .775139
             |
         SDA |  -.1328845   .0659481    -2.01   0.044    -.2621404   -.0036286
         GDP |    .138688   .0948091     1.46   0.144    -.0471343    .3245104
     GDP_SDA |   5.239259   6.716583     0.78   0.435    -7.925002    18.40352
         OPR |  -1.488697   .5935667    -2.51   0.012    -2.652067   -.3253281
     OPR_SDA |   -58.9029   38.72712    -1.52   0.128    -134.8067    17.00086
         VOL |  -.1475857   .1242907    -1.19   0.235     -.391191    .0960196
     VOL_SDA |   6.830729   9.127771     0.75   0.454    -11.05937    24.72083
         SZE |    .021919   .0360378     0.61   0.543    -.0487138    .0925519
         TAN |  -.0636313   .0419153    -1.52   0.129    -.1457838    .0185212
         LIQ |   .0004725   .0018709     0.25   0.801    -.0031944    .0041394
       _cons |  -.0980403   .2175667    -0.45   0.652    -.5244631    .3283825
------------------------------------------------------------------------------
Instruments for first differences equation
  Standard
    D.(SDA GDP OPR VOL SZE TAN LIQ)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(2/10).L.ROA
Instruments for levels equation
  Standard
    _cons
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    DL(1/9).L.ROA
    DL.L.ROA
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -1.40  Pr > z =  0.162
Arellano-Bond test for AR(2) in first differences: z =   1.18  Pr > z =  0.238
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(68)   =  98.73  Prob > chi2 =  0.009
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(68)   =  81.01  Prob > chi2 =  0.134
  (Robust, but weakened by many instruments.)

Difference-in-Hansen tests of exogeneity of instrument subsets:
  GMM instruments for levels
    Hansen test excluding group:     chi2(32)   =  36.51  Prob > chi2 =  0.267
    Difference (null H = exogenous): chi2(36)   =  44.50  Prob > chi2 =  0.156
  gmm(L.ROA, lag(2 .))
    Hansen test excluding group:     chi2(30)   =  37.65  Prob > chi2 =  0.159
    Difference (null H = exogenous): chi2(38)   =  43.36  Prob > chi2 =  0.253
  gmm(L.ROA, eq(level) lag(1 .))
    Hansen test excluding group:     chi2(34)   =  43.09  Prob > chi2 =  0.136
    Difference (null H = exogenous): chi2(34)   =  37.92  Prob > chi2 =  0.295
  iv(SDA GDP OPR VOL SZE TAN LIQ, eq(diff))
    Hansen test excluding group:     chi2(61)   =  72.13  Prob > chi2 =  0.156
    Difference (null H = exogenous): chi2(7)    =   8.88  Prob > chi2 =  0.261
```

Figure B27: Two-Step Sys-GMM Regression (SDA)