



Faculty of Economics and Business

**Financial Stability and Efficiency in selected Asian Countries: The
impact of Governance Quality, Environmental and Social Sustainability
and the mediating role of Financial Inclusion.**

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Financial Stability and Efficiency in selected Asian Countries: The impact of
Governance Quality, Environmental and
Social Sustainability and the mediating role of Financial Inclusion

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DECLARATION

I declare that the work in this thesis 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 thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



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Signature

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Date : 15 - October - 2023

DEDICATION

To

My Parents, Wife, Brother, sister, and my (little angel) daughter Inshirah.

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ABSTRACT

Financial institutions in any country play a vital role in the economic system as they mobilize and allocate capital for productive purposes. Financial efficiency and stability of a country are determined by how efficiently financial institutions utilize capital to increase profitability while ensuring stability. Efficiency and stability are highly dependent on the use of financial services by the population (financial inclusion). Financial inclusion (FI) aims to ensure that all individuals and businesses have access to basic financial services, including loans and insurance. It is also imperative to consider that poor governance, environmental risks, and an unsustainable social system (ESG) can undermine the FI and hence the profitability and stability. Using stakeholder theory, this study focuses on the Asian region. Although Asia is the most populous and fastest-growing region economically, it also has the poorest population (lack of social sustainability). Moreover, despite tremendous economic progress in the last decade, nearly one billion Asians still face the dearth of FI, and lack of ESG. This means that policymakers, individuals, businesses, and all entities within the region have a stake in ensuring the financial stability and efficiency of the region. To ensure financial efficiency (FEF) and financial stability (FST), stakeholders should work in a close framework to ensure ESG and FI. In this wake this study examined the impact of ESG on FI, FEF, and FST in selected Asian countries between 2009 and 2021 using a generalized method of moments regression. Using principal component analysis (PCA), the study created composite indices for ESG, FI, FEF, and FST. The mediating role of FI was also examined. It was found that good ESG in a country increases FI while maintaining FST at country level. ESG has an adverse impact on FEF due to the loss of existing customers associated with carbon-intensive enterprises and an increase in operational costs. In all

relationships, the mediating role of FI was supported by the findings of the study. The study suggested that Asian governments should prioritize ESG strategies in their policies to reduce financial, environmental, and social risks in the region. Furthermore, Asian policy makers can also increase FI through better ESG practices. Despite some negative impacts on FEF, better ESG ensures the sustainability of the sector. Similarly, an increase in FI will increase the number of customers of the financial sector, which will offset the temporary losses incurred by the financial sector. Previously, these relationships were never studied at country level, hence the findings add their contribution to the literature. Methodologically, none of the studies have developed composite indicators for environmental and social sustainability that have been contributed by this study.

Keywords: Environmental sustainability, financial inclusion, financial stability, governance quality, social sustainability

Kestabilan dan Kecekapan Kewangan di Negara Asia Terpilih: Impak Kualiti Tadbir Urus, Kelestarian Alam Sekitar dan Sosial serta Peranan Pengantara Inklusi Kewangan

ABSTRAK

Institusi kewangan di mana-mana negara memainkan peranan penting dalam sistem ekonomi kerana institusi ini memobilisasikan dan memperuntukkan modal untuk tujuan yang produktif. Kecekapan dan kestabilan kewangan sesebuah negara ditentukan oleh kecekapan institusi kewangan menggunakan modal untuk meningkatkan keuntungan di samping memastikan kestabilan. Kecekapan dan kestabilan bergantung tinggi kepada penggunaan perkhidmatan kewangan oleh populasi (inklusi kewangan). Inklusi kewangan (FI) bertujuan untuk memastikan semua individu dan perniagaan mempunyai akses kepada perkhidmatan kewangan asas, termasuk pinjaman dan insurans. Terdapat kepentingan untuk mempertimbangkan kesan buruk tadbir urus yang lemah, risiko alam sekitar dan sistem sosial (ESG) yang tidak mampan kepada FI, keuntungan serta kestabilan. Kajian ini menggunakan teori pihak berkepentingan dan meletakkan fokus kepada rantau Asia. Walaupun Asia adalah rantau yang mempunyai penduduk paling ramai dan paling pesat berkembang dari segi ekonomi, rantau ini juga mempunyai populasi yang paling miskin (kurang kelestarian sosial). Selain itu, walaupun terdapat kemajuan ekonomi yang pesat dalam dekad yang lepas, hampir satu bilion penduduk Asia masih berhadapan dengan FI dan ESG yang rendah. Ini bermakna penggubal dasar, individu, perniagaan dan semua entiti di rantau ini mempunyai kepentingan dalam memastikan kestabilan dan kecekapan kewangan di rantau ini. Untuk memastikan kecekapan kewangan (FEF) dan kestabilan kewangan (FST), pihak berkepentingan harus bekerja dalam sebuah kerangka kerja yang erat untuk memastikan ESG dan FI. Menyedari akan hal ini, kajian ini mengenalpasti impak ESG ke atas FI, FEF dan FST di beberapa negara Asia yang terpilih antara tahun 2009 dan

2021 menggunakan regresi kaedah momen umum. Menggunakan analisis komponen utama (PCA), kajian ini menghasilkan indeks komposit untuk ESG, FI, FEF dan FST. Peranan pengantara FI juga dikaji. Hasil kajian mendapati ESG yang baik dalam sesebuah negara meningkatkan FI dan mengekalkan FST pada peringkat negara. ESG mempunyai kesan buruk terhadap FEF disebabkan kehilangan pelanggan sedia ada yang dikaitkan dengan perusahaan intensif karbon dan peningkatan dalam kos operasi. Hasil kajian juga mendapati FI memainkan peranan pengantara dalam semua hubungan. Kajian ini mencadangkan agar kerajaan-kerajaan di Asia mengutamakan strategi ESG dalam dasar mereka untuk mengurangkan risiko kewangan, alam sekitar dan sosial di rantau ini. Selain itu, para penggubal dasar di Asia juga boleh meningkatkan FI melalui amalan ESG yang lebih baik.

Walaupun terdapat beberapa kesan negatif terhadap FEF, ESG yang lebih baik dapat memastikan kelestarian sektor tersebut. Selain itu, peningkatan FI akan meningkatkan jumlah pelanggan sektor kewangan, yang akan mengimbangi kerugian sementara yang ditanggung oleh sektor tersebut. Sebelum ini, hubungan ini tidak pernah dikaji di peringkat negara, justeru penemuan ini menyumbang kepada literatur sedia ada. Dari segi metodologi, belum ada kajian terdahulu yang membangunkan indikator komposit untuk kelestarian alam sekitar dan sosial seperti yang disumbangkan oleh kajian ini.

Kata kunci: Kelestarian alam sekitar, inklusi kewangan, kestabilan kewangan, kualiti tadbir urus, kelestarian social.

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LIST OF ABBREVIATIONS

BCB	Bank Credit to Bank Deposits Percentage
BZB	Bank Z-Score
ESG	Composite Variable of Governance Quality, Environmental and Social Sustainability
FEF	Composite Index of Financial Efficiency
FI	Financial Inclusion
FST	Composite Index of Financial Stability
LAD	Liquid Assets to Deposits and Short-Term Funding Percentage
NIM	Bank Net Interest Margin
PCA	Principal Component Analysis
ROA	Return on Asset
ROE	Return on Equity

CHAPTER 1

INTRODUCTION

1.1 Introduction

Following the Asian financial crisis in 1997 and the global financial crisis in 2007, researchers have studied the factors that affect the stability and efficiency of the financial system (Apostolakis & Papadopoulos, 2019). To facilitate economic growth, policymakers throughout the world place a great deal of emphasis on the development of an efficient and stable financial system. In spite of this, it is difficult to identify the factors that ensure that the financial system operates smoothly. As a result of worldwide economic crises occurring in 1980 (savings and loans crisis), 1997 (Asian financial crisis), and 2007 (global financial crisis), the framework for maintaining a stable and efficient financial system has been modified over time (Siddik & Kabiraj, 2018).

A smooth functioning financial system requires the effective allocation of resources, the assessment and management of financial risks, the maintenance of employment levels at or near their natural level, and the elimination of relative price fluctuations, which affect monetary stability and employment. Stability and efficiency are achieved when endogenous and unforeseen imbalances in the financial system are dissipated. Efficient and stable economic systems absorb shocks primarily through self-correcting mechanisms, which prevent adverse events from disrupting the real economy or the financial system as a whole. The financial system plays a critical role in the growth of the economy since most transactions are conducted within it (The World Bank, 2020).

Furthermore, according to the European Central Bank, a strong financial system is able to withstand shocks, disruptions in the market, and the unwinding of financial imbalances. Therefore, the risk of severe disruptions in the financial intermediation process is reduced, thus enhancing the efficiency of the allocation of savings to profitable investments (European Central Bank, 2012).

As Schinasi (2004) points out, financial stability, in general, is interdependent with various parts of the financial system such as financial markets, financial institutions, and infrastructure. A broader view of the financial system may include both private and public sectors. The infrastructure of the financial system is composed of rules and regulations, official supervision, and surveillance, for instance. Monetary policy and monetary system are the two main components of the financial system. Keeping financial stability requires governments to borrow money from markets, implement monetary policy through markets. Moreover, financial institutions operate in the market and help to ensure smooth financial transactions. There is a strong interconnection between all segments of the financial system, and any disruption in any segment can result in financial instability.

Further discussing the various components of the financial system, it can be said that the critical part is financial institutions with an inherently risky business model due to their high levels of leverage. Moreover, different sectors rely on financial institutions for funding their investments and working capital. The importance of financial institutions in financial stability cannot be overstated, since any crisis in the financial sector could have wide repercussions.

Moreover, financial institutions must also be efficient enough to be able to absorb shocks and to counter adverse events that may occur. Savings are held in trust by banks,

which are responsible for safeguarding and investing them (Isik & Uygur, 2021). Consequently, both the financial and real sectors benefit from the loans and projects created by these funds if they can put them to their most productive use. It should also be noted, that if the funds are misappropriated by banks, it will not only result in the collapse of families and industries, but it would also affect a country's economy as well (Isik & Uygur, 2021).

It is reported by the Asian Development Bank that Asian financial systems have a tendency to inefficiently allocate capital. This is largely due to the fact that they are dominated by banks that heavily rely on foreign currency financing and foreign exchange. The vast amount of excess savings available can be invested in more productive investments (ADB, 2017). Therefore, it is necessary to improve the efficiency of Asian financial institutions. The Asian region has already suffered from severe financial crises in the past.

The Asian Financial Crisis of 1997, for instance, also had a global impact. After the U.S. economy recovered from a recession in the mid-1990s, the Federal Reserve raised interest rates in order to combat inflation. The higher interest rate attracted hot money from Asian countries, causing the U.S. dollar to appreciate. Export growth was also hampered by the appreciation of currencies pegged to the U.S. dollar (CFI, 2022). A shock to exports and foreign investment collapsed asset prices, which had been heavily leveraged. Foreign investors began withdrawing their money in panic. There was a decline in international investment and lending to developing countries around the world, not just in Asia. The crisis also caused oil prices to fall. Some major oil industry mergers and acquisitions took place to achieve economies of scale (CFI, 2022).

Lehman Brothers in the United States is a recent example of the devastating effects of the financial crisis on financial sectors, such as banks. Lehman Brothers' collapse in 2008

sparked the Global Financial Crisis. The collapse of the banking industry marked the beginning of the Global Financial Crisis of 2007-2008, which spread worldwide afterwards. Considering this perspective, it can be stated that financial institutions, in particular the banking sector, are vital to a country's financial stability. As a result of disruptions in the financial system's function, the flow of funds is also reduced, which impedes the investment of productive resources in an economy and contributes to financial instability (Phan et al., 2020).

When the financial system is experiencing a crisis, it is evident that governments will ultimately need to step in and provide assistance to institutions. Governments are the primary stakeholders in the stability and efficiency of a country's financial system. Governments are responsible for ensuring that policies and regulations are implemented in a country and for promoting better institutional development by facilitating ease of doing business and anticorruption policies. In this way, the quality of government governance influences both stability and efficiency in the financial sector. Firstly, when a country has better governance, both local and foreign investors will be attracted to invest there (Lucke & Eichler, 2016; Owusu-Nantwi, 2019). Capital inflows will be increased in a country as a result of these investments. As capital inflows increase, financial institutions will also gain a larger customer base, resulting in a greater amount of financial inclusion. When a financial institution has a larger customer base, it is more likely to generate greater returns or be more efficient (Malik, bin Md Isa, Jais, Rehman, & Khan, 2021).

Secondly, the country will be able to accumulate a substantial number of foreign reserves as a result of capital inflows. It is significant to note that an increase in foreign

investment also leads to an increase in employment opportunities¹, all of which contribute to financial stability. In this respect, the overall governance quality of a country can have a significant impact on financial inclusion and financial stability (Malik, bin Md Isa, Jais, Rehman, & Khan, 2021).

The study by Aibai, Huang, Luo and Peng (2019) suggests that investment inflows can contribute to financial stability and efficiency. According to the study, foreign direct investment, also referred to as capital inflow, contributes positively to economic development of a country. It also contributes to financial development in countries with good institutions, a better legal system, and a lower level of corruption. Second, these capital inflows are essential for the development and promotion of the country's financial sector. As a result, financial inclusion, stability, and efficiency will increase. Additionally, they noted that capital inflows improve financial sectors' functionality, quantity, and quality of development.

It has been previously discussed that the governance quality of a country contributes to the confidence that investors have in governments and financial institutions in a particular country that increases financial inclusion, stability, and efficiency. Furthermore, to retain financial stability and economic prosperity in the long term, sustainable development efforts are required. To achieve sustainable development, health and education must be improved, inequality must be reduced, and economic growth must be stimulated (UNDP, 2021). The

¹ Investing in any country, for instance, will also require the organization to purchase materials, engage in labor, to hire staff in that particular country. The host country will benefit from this process in a win-win manner.

United Nations Development Programme (UNDP) in 2015 adopted “The 2030 Agenda for Sustainable Development” for the prosperity and peace of the planet and people by protecting the planet and ending poverty (UNDP, 2021).

For this reason, only effective governance cannot guarantee the long-term efficiency and stability of the financial system. It is necessary to eliminate other potential risks that may disrupt the financial system. Socially unsustainable societies and climate change are the most prominent risks that have not been adequately addressed in order to ensure an efficient and stable financial system.

Environmental sustainability involves not only the preservation of resources, but also the preservation of economic and social resources (Ford & Despeisse, 2016). Sustainability encompasses almost all aspects of human life (Beier et al., 2017). Sustainability, according to the United Nations, refers to the movement that ensures sustainable development and well-being for humankind, including future generations, and aims to address the perpetual, universal problems of pollution, environmental degradation, climate change, peace, inequality, injustice, and poverty (Ghobakhloo, 2020). Despite that sustainability is a relatively new concept, it has its roots in history, such as socio-economic justice and conservationism (Caradonna, 2014).

There is a large body of literature that contributes to, materializes, and conceptualizes social and environmental sustainability (Ford & Despeisse, 2016; Kamble et al., 2018; Khuntia et al., 2018). Sustainability is the process of identifying and managing the negative as well as the positive effects of technological, environmental, economic, and business developments on people (Ghobakhloo, 2020).

Achieving social sustainability means establishing an environment in which all human beings have equal rights, access to basic necessities, healthcare, security, and universal human rights (Dempsey et al., 2011; Ghobakhloo, 2020). In contrast, environmental sustainability means balancing consumption and replenishment of natural resources, maintaining equilibrium of the earth's environmental system (Ghobakhloo, 2020).

Furthermore, sustainable environmental and social practices contribute to long-term financial stability and efficiency. A key component of social sustainability is literacy or education. According to Ozatac, Taspinar, El Rifai, and Eren (2018), literacy is one of the most important components of the economy. It is closely related to economic growth on both a micro and macro level. The authors argue that after World War II, nations realized that investing in education would be the most profitable investment since it produces the most skilled labor and contributes substantially to the economy. As Amin (2020) points out, a society in which citizens are not socially developed (such as lack of education, equal rights, income inequality, poverty, lack of health facilities, and no access to basic necessities) will suffer deterioration in economic growth.

Additionally, individuals who are not socially developed do not participate in the national economy since they have difficulty providing for their daily needs, which include food, water, wages, etc. (Amin, 2020). Further, in a society that is socially developed, the use of formal financial services is also higher than in a society that is less socially developed (Kabakova & Plaksenkov, 2018). Thus, it may be argued that a greater level of social sustainability will lead to a greater level of financial inclusion.

On the other hand, the relationship between environmental sustainability, financial inclusion, financial stability and financial efficiency can be either positive or adverse (Le et

al., 2020). In order for the economy to grow and financial activities to take place, industrial operations are essential. In addition, it is reported that worldwide industries account for 21 percent of greenhouse gas emissions (EPA, 2020). In this context, it can be said that the relationship between environmental sustainability (indirectly) and financial inclusion, financial stability, and financial efficiency is negative. Nieto (2017), for example, argues that the abrupt introduction of new policies aimed at achieving environmental sustainability may create uncertainty in a given geographic area. The uncertainty could lead to a slowing down in investments, depreciating fossil fuel reserves, obsoleting capital stocks, and impairment in firms' market value, which are involved in carbon-intensive businesses. Further, as a result of this uncertainty, banks will be adversely affected in many ways. As an example, banks will initially be affected by impaired GDP (as a result of regional uncertainty). As a result, banks will face impaired financial assets and reduced profits due to environmental risk arising from the enactment of legislation that encourages sustainable environmental practices to halt carbon-intensive ventures.

A total of 17 sustainable development goals (SDGs) have been established by the United Nations Development Program (UNDP) to achieve the goals of the 2030 Agenda for sustainable development. All countries (developed and developing) are encouraged to work together to achieve the Sustainable Development Goals (SDGs). It is imperative that strategies be implemented that improve health, education, reduce inequality, and stimulate economic growth in order to alleviate poverty and other deprivations. The SDGs will be discussed briefly in this chapter, and more details will be provided in Chapter 3. This study uses environmental, social, and governance (ESG) indicators provided by the World Bank. All 17 UNDP SDGs have been incorporated into the ESG framework. It is believed that ESG

contains essential factors for assessing the outcomes of policies and investments and their contribution to sustainable development (The World Bank, 2019).

The importance of an efficient and stable financial system should not be underestimated, nor should the inclusion of a population in the formal financial system be overlooked. Financial inclusion is ensuring that businesses and individuals have access to basic financial services and products, including transactions, payments, insurance, credit, and savings, delivered responsibly and sustainably (The World Bank, 2018).

The concept of financial inclusion refers to households and businesses having access to and using financial services (Sahay et al., 2015). In other words, it can be said that how much population, including businesses and firms uses formal financial channel for their daily routine transactions. Financial inclusion includes but is not limited to the use of credit facilities, buying, and purchasing, and moving of funds in any manner through a proper formal financial medium such as banks or any other financial institutions.

Moving on to a discussion about any possible relation between financial inclusion, financial stability and efficiency, Morgan and Pontines (2017) emphasize that the increase in financial inclusion supports financial stability and efficiency. In support of this assertion, they stated that increased financial inclusion would reduce the number of non-performing loans, thereby reducing the likelihood of financial institutions defaulting. Since a rise in financial inclusion will lead to an increase in customers, financial institutions will be able to diversify their portfolios, resulting in lower non-performing loan rates and increased returns. Feghali, Mora and Nassif (2021) explain that by introducing previously excluded individuals to the financial system can strengthen and diversify the deposit base and lending portfolio of the banking system . Banks in developing economies can also reduce their dependence on

volatile external finance by attracting more domestic depositors (Feghali, Mora, & Nassif, 2021).

Vo, Van, Vo and Mcaleer (2019) describe the critical role of financial inclusion as a source of finance to maintain financial stability and efficiency², as small and medium-size companies receive the required funding for their working capital, the businesses will operate more efficiently and smoothly. Schinasi (2004) previously explained about the interconnection of different factors in the financial system that are rules and regulations, official supervision, surveillance, governments, monetary policy, and system are essential for overall financial stability and efficiency.

On the other hand, environmental sustainability practices can be good for financial inclusion and financial stability and efficiency if new rules and regulations are introduced to subsidize the green industries to support a sustainable environment in a region. Countries would witness the inflow of new industrial and technological investments such as solar and other green industries (IPA, 2017; Le et al., 2020). According to Asian Development Bank (2017), Asia is the most vulnerable region to climate change. From 1996 to 2015, ten countries in the world were most affected in terms of economic losses and fatalities by climate change, and six countries were from Asia. The affected Asian countries were Bangladesh, Myanmar, Pakistan, the Philippines, Thailand, and Vietnam (ADB, 2017). Therefore, the impact of environmental sustainability on financial inclusion, financial

² The more the population becomes integrated into formal financial inclusion, the easier it will be for them to get access to a source of finance on competitive terms compared to an informal means of obtaining finance which can be costly and characterized by difficult terms and conditions. As a result of increased customer numbers, financial institutions are able to generate substantial returns.

stability, and financial efficiency can either be negative or positive, as this study examines in the context of Asia.

Furthermore, firms at the individual level also strive to maintain a sustainable social and environmental environment. Organizations and institutions aspiring to develop long-term stakeholder value may execute business strategies that take into account environmental, societal, economic, and ethical factors when conducting their business. Sustainability, as defined by UN Global Compact, is “a company’s delivery of long-term value in an ethical, environmental, social and financial terms” (United Nations Global Compact, 2015). “Corporate social sustainability is to manage and highlight organization operations impact on people, whether that is positive and negative. Businesses’ social license to operate depends greatly on their social sustainability efforts. In addition, a lack of social development, including poverty, inequality, and the weak rule of law, can hamper business operations and growth” (United Nations Global Compact, 2020), that would ultimately foster financial inclusions, stability and efficiency.

Numerous studies have found a positive relationship between sustainable environmental and social performance and financial efficiency (Zadek & Robins, 2015; Weber, 2017). In addition, sustainability regulations have been enforced by their respective authorities in the financial sector, such as the Chinese Green Credit Guidelines, which have been issued for organizations in China. Several countries, such as Bangladesh, Brazil, and Nigeria, have also initiated guidelines and regulations for the banking sector's impact on the environment and sustainable progress (Zadek & Robins, 2015; Weber, 2017). These initiatives taken by several governments in the form of regulations have been introduced as a testament to the fact that sustainability performance and financial performance of

organizations move in tandem, and so sustainability will lead to an efficient and stable financial system (Weber, 2017).

By supporting sustainable businesses, financial inclusion can be promoted. The concept can be derived from Weber's (2008) study. A company may be able to increase its revenues by implementing sustainable practices. Sustainability initiatives are an important component of building a positive brand image and attracting customers to an organization. Additionally, introducing socially responsible products could also boost sales (Weber, 2008).

Thus, environmental, social, and governance (ESG) factors play an important role in the development of a country. According to the International Monetary Fund (2019), both borrowers and investors are becoming increasingly interested in environmental, social, and governance (ESG) issues. It is important to note that these factors have a significant impact on the performance of the financial sector as well as on the stability of its operations. If a system is not designed to accommodate ESG issues, it may result in environmental risks, socially unsustainable societies, and informal, unstable, and inefficient financial systems in the region.

1.2 Background of the Study

A brief discussion of the possible relationship between financial stability, governance quality, environmental and social sustainability, and financial inclusion was presented in section 1.1, which will be explored further in chapter 2 through a review of the literature. It can therefore be concluded that if the overall ESG of a country is higher, investors throughout the world are more likely to trust its system. The purpose of this section is to provide a brief overview of the overall financial stability and efficiency, the quality of

government, the sustainability of social and environmental systems, and the financial inclusion of Asian countries. Asia has one of the fastest-growing economies in the world, and there are several significant projects underway, including the Belt and Road Initiative (BRI), which require careful evaluation of the financial stability of Asian countries.

1.2.1 Financial Stability of Financial Systems in Asia

In literature, it is commonly believed that financial stability and financial instability are binary events. According to literature pertaining to the identification of early warning indicators for financial crises, a company's resilience to financial crises depends on determining whether financial market conditions are stable or in crisis (Drehmann & Juselius, 2014). Siddik and Kabiraj (2018) state that no common definition of financial stability has been agreed upon due to the complexity of the financial system (Siddik & Kabiraj, 2018). Consequently, it is imperative to continuously monitor the factors that may affect financial stability in order to prevent any serious event that may result in a financial crisis. In most cases, systemic crises are the result of isolated events without any connection to a specific market. However, it is also challenging to understand the post-crisis effects on the real economy in order to take the necessary steps to restore macro-financial stability (Drehmann & Juselius, 2014).

Asia is the largest continent with the most populous countries in the world (Annamdas, Bhalla, & Soh, 2017). There are approximately 4.5 billion people in Asia, which is almost 60 percent of the total world population. Unsaturated and crowded markets make Asia the fastest growing economic region in the world with some top economies such as China, Japan, India, South Korea, Indonesia, etc. So Asian countries must take necessary measures to avoid financial crises.

During the 1997-1998 Asian Financial Crisis, Asian economies were severely affected. In response to the Asian Financial Crisis, policymakers in several countries implemented policy reforms to ensure financial markets are protected. These reforms protected Asian Financial Markets from the direct ramifications of the financial system collapse in 2007-2008. While the region as a whole was resilient to those financial crises, there was still slow economic growth and an increase in unemployment following the Global Financial Crisis (Hans, 2017).

It is pertinent to note that different indicators are used by researchers to assess financial stability (Goodhart, 2006; Hanning & Jansen, 2010; Aduda & Kalunda, 2012; Creel et al., 2015; Ahamed & Mallick, 2019). Indicators of financial stability are primarily designed to assess the stability of the financial sector. Evaluation of the ability of financial institutions to absorb shocks is an important component of the analysis of the financial system's resilience. Financial soundness indicators are a preferred approach for measuring the financial system's stability (Gersl & Hermanek, 2007).

It has been demonstrated that when financial inclusion is increasing in a certain region, banks are able to attract a larger customer base. This allows them to receive deposits from those who have excess funds and from those who are in need of funds. Through financial institutions, lenders and borrowers are linked, and in this intermediation process, borrowers receive funds and provide interest to financial institutions; financial institutions receive profits for the intermediation process, and lenders receive profits for the amount they lend. This creates a win-win situation for all parties and circulates money in an economy, and according to Morgan and Pontines (2014; 2018) and Morgan and Zhang (2018) greater

financial inclusion also reduce non-performing loans of financial institutions by diversifying its portfolio. This overall process helps maintain financial stability.

Hans (2017) stresses the importance of learning from financial instabilities in the past. The continuous fluctuations in the global financial landscape present new challenges that must be considered and incorporated into future decisions and policies. These continuous challenges are due to the rise in globalization and integration of financial markets. This raises the chances of transmission of shocks and policy spillover through one region to another that may carry the risk of financial stability.

Domestic investment in Asia has weakened during 2019 because of a more rigid external trade environment, with the global downturn in electronics, slow economic activity, and global trade and trade war between the United States and the People's Republic of China (Asian Development Bank, 2019). In this scenario, Asia's financial stability is more vulnerable, since two major economies are engaged in a trade war, and both countries have significant investments and influence in the region.

Additionally, China is developing infrastructure and investing in approximately 70 countries in Asia, Africa, and Europe as part of its Belt and Road Initiative (BRI). Under the BRI project, China aims to connect its underdeveloped remote areas and hinterland with European countries by using routes from other Asian countries (Huang, 2016). It is estimated that the BRI will involve investments of approximately \$8 trillion in more than 65 countries. The majority of these investments in all countries are, however, funded by Chinese banks (Hurley et al., 2019). Any adverse effect on one economy can have repercussions throughout Asia; it must be analyzed how Asian economies are financially stable to absorb shocks.

1.2.2 Financial Efficiency

With the liberalization of domestic financial markets and capital accounts in recent years, financial markets have become increasingly integrated. After the 1997 financial crisis in Asian developing economies, private banking institutions began to participate more in local banking sectors as part of the larger process of financial globalization (Lin, Doan, & Doong, 2016). As a result of reviewing the extensive literature on financial globalization, several studies concluded that the evidence is mixed, contrary to early theoretical predictions in favor of economic growth (Abraham & Schmukler). Several studies found that globalization of financial markets has generated an increase in risks, including macroeconomic instability, financial crises, and spillover effects (Abraham & Schmukler). The financial institutions in a region should be efficient enough to absorb shocks and survive during periods of crisis in order to counter the risks of financial crises, economic instability, and spillover effects.

Financial efficiency of a financial institution is determined by income it generates from investment options. The efficiency of a country's financial system is determined by the positive effects of financial institution investments on the economy (FEIS, 2022). Efficiency measures how effectively the financial system performs its functions and is often regarded as one of the critical components of financial development (Olgu, 2014). A larger finance sector is likely to be more efficient because financial services are characterized by increasing returns on scale (Dekle & Pundit, 2016).

Several empirical studies have been conducted in Asian countries to shed light on the factors that contribute to this level of efficiency. Southeast Asia's bank efficiency was negatively influenced by restructuring after the 1997 crisis, according to Gardener,

Molyneux, and Hoai (2011). Sun and Chang (2011) found that measuring risks significantly affected bank efficiency in emerging Asian countries both at the level and variability of the crisis. Studies conducted in single countries have recently shown that bank efficiency alone influences stock price changes (Sufian, Majid, & Zulkhibri, 2007). On the basis of these studies, it has become apparent that the financial efficiency of Asian financial institutions is not only significant for the financial sector, but also for other sectors, which collectively contribute to economic growth.

It is also pertinent to note that there are numerous other relevant studies that have highlighted various important aspects that affect the efficiency of financial institutions in different Asian economies, including Hong Kong (Lim & Randhawa, 2005), Korea (Park & Weber, 2006), Taiwan (Kao & Liu, 2009), Thailand (Chansarn, 2008), Malaysia (Sufian, 2009), and Indonesia (Margono, Sharma, & Melvin, 2010). These studies generally find that risk, governance, and bank restructuring are important for banks' effectiveness, and may differ between nations for different reasons (Lin, Doan, & Doong, 2016).

According to the Asian Development Bank, inefficiently allocated capital remains a hallmark of Asian financial systems. These systems are primarily based on banks, heavily dependent on foreign currency funding, and foreign exchange. It would be better to invest in more productive investments with the vast amounts of excess savings available. It is estimated that Asia's pension funds hold approximately \$4.4 trillion, insurers hold \$5.1 trillion, and there are several large social security and public pension reserve funds (ADB, 2017). Many of these potential investors, nevertheless, refrain from investing due to political risk, inadequate regulatory systems and legal enforcement, governance standards, potential currency fluctuations, and the underdeveloped capital market. It could be more efficient to

allocate regional savings and move liquidity through financial systems to real sectors if the banking and financial markets were better developed and regionally integrated. As a result, poor households and small businesses have better access to financial services (Park, Lee, & Villafuerte, 2017).

By offering new financial products, improving the financial market infrastructure, and strengthening regulatory and supervisory capacities, a broader investor base can be reached. In addition to improving market efficiency, expanding investor bases, and deepening secondary markets, local currency bond markets must integrate regionally to meet the region's financing needs (ADB, 2017). In conclusion, there is sufficient evidence to believe that the financial efficiency of Asian economies is not up to standards and there is a great deal of room for improvement. Thus, this study attempts to identify the determinants associated with the financial efficiency of financial institutions, which would assist policymakers in formulating appropriate strategies.

1.2.3 Governance Quality of Country

“Governance is the systems and processes that ensure the overall effectiveness of an entity whether a business, government or multilateral institution” (United Nations Global Compact, 2020). Furthermore, the World Bank (1992) defines that sound economic policies are complemented by sound governance. Efficiency of markets and governments is boosted by efficient, accountable, and transparent public sector management, and this leads to economic development.

As a result of a stable political environment, the performance of the government affects overall growth in a country, which in turn contributes to financial stability and efficiency. In a country, the government is responsible for regulating the overall operation

of the state. Through its governance, the government implements rules and regulations, maintains law and order, provides a conducive environment for foreign and domestic investors, ensures ease of doing business, and controls corruption. Therefore, it is impossible to assess a country's financial stability without considering its governance system. The reason behind this logic is, to ensure the stability of the financial market, financial institutions should be able to operate smoothly without facing hurdles in terms of:

1. As a result of the rule of law, the overall accountability process is excellent and is capable of dealing with fraud and corruption. Furthermore, where law is followed, chances of violence and terrorism are less.
2. The stability of political systems facilitates the functioning of financial markets; as a result, investors are confident in the markets and in financial institutions.
3. It is important for a country to have favorable rules and regulations that make doing business easier.

In order to evaluate the quality of governance in any country, the World Bank defines six dimensions and provides data on the same. Among these factors are voice and accountability, political stability, absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption (Kaufmann, Kraay & Mastruzzi, 2011).

The World Bank publishes statistics to provide information about governance quality. An illustration of the World Bank's estimates can be found in Figure 1.1. Based on the range of data, a performance of -2.5 indicates weak performance, while a performance of 2.5 indicates strong performance.

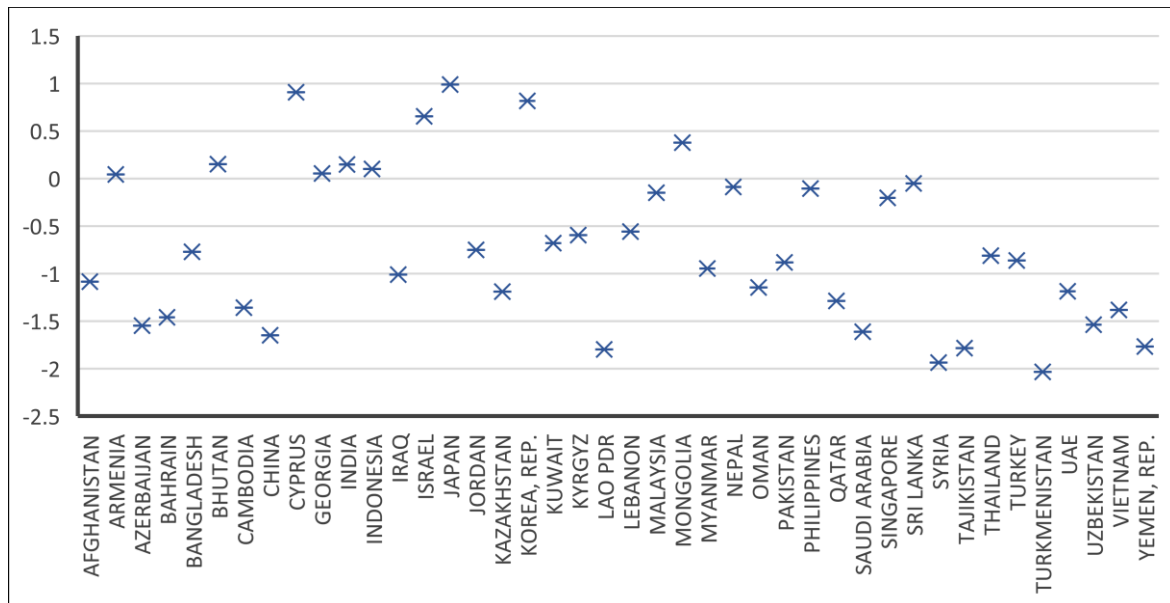


Figure 1.1: Voice and Accountability in Asian Countries

Source: The World Bank (2021)

Based on the results of the voice and accountability data provided by the World Bank (Figure 1.1), only Cyprus and Japan are performing at the highest level in Asia. Turkmenistan ranks the lowest among all countries in Asia, followed by Syria and Yemen.

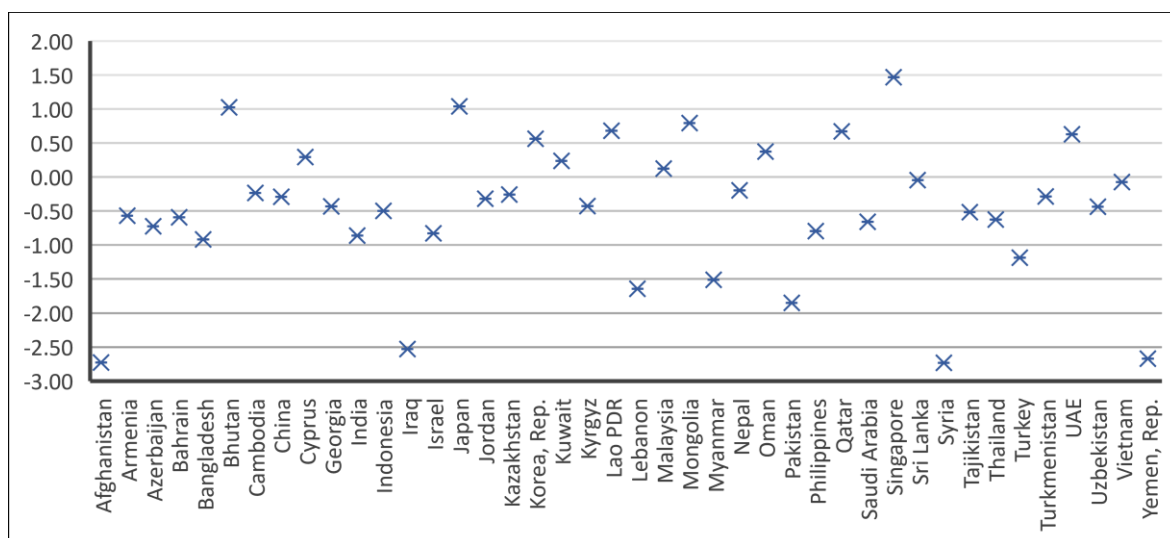


Figure 1.2: Political Stability and Absence of Violence/Terrorism in Asian Countries

Source: The World Bank (2021)

Figure 1.2 represents data provided by the World Bank regarding political stability in Asia. Only Singapore, followed by Japan, has a good level of political stability and lack of violence. However, Iraq, Syria, and Yemen are the three countries with the worst conditions in the region.

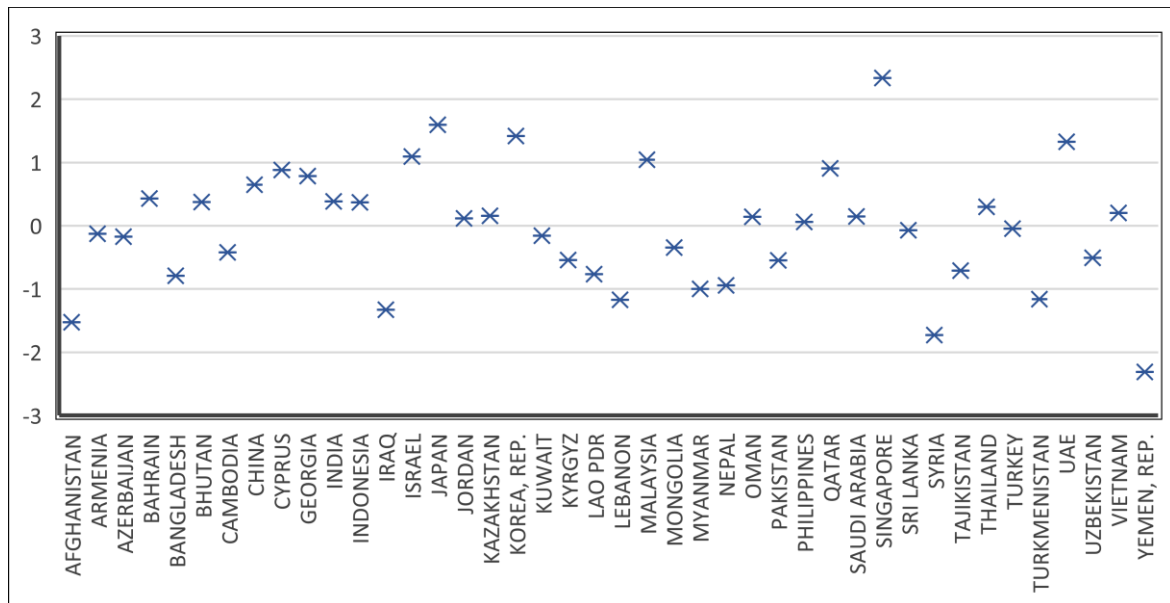


Figure 1.3: Government Effectiveness in Asian Countries

Source: The World Bank (2021)

Singapore authorities perform better than any other authorities in Asia when it comes to government effectiveness (Figure 1.3). At the other end, Yemen is the weakest performer, followed by the Syrian authorities in terms of government effectiveness.

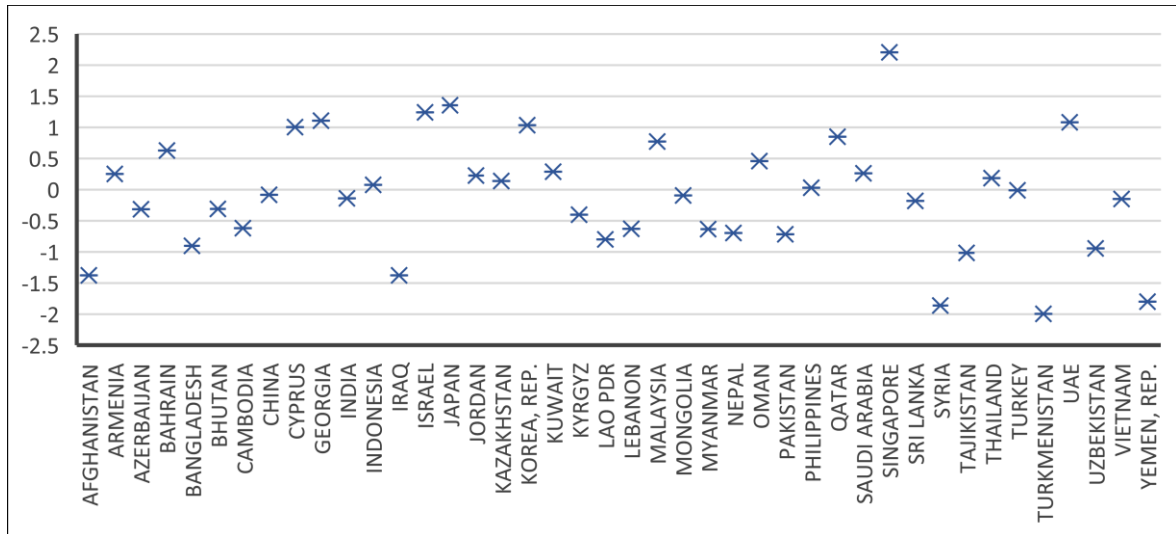


Figure 1.4: Regulatory Quality in Asian Countries

Source: The World Bank (2021)

The data provided by the World Bank illustrated in Figure 1.4 indicate that only Singapore has the best regulatory quality in Asia, whereas there are no other countries that are even close to Singapore in terms of regulatory quality.

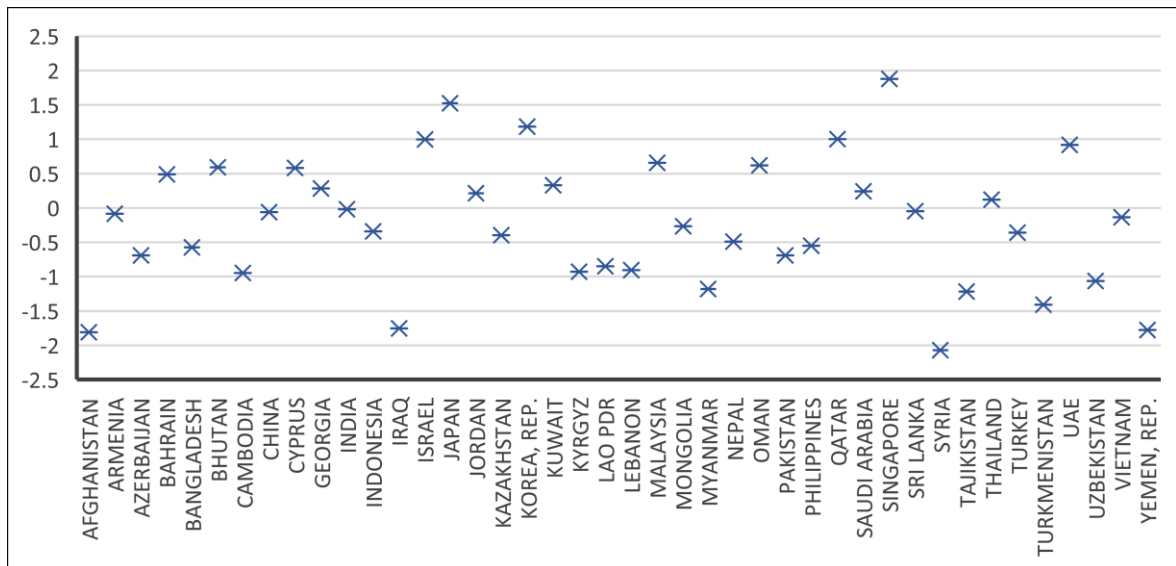


Figure 1.5: Rule of Law in Asian Countries

Source: The World Bank (2021)

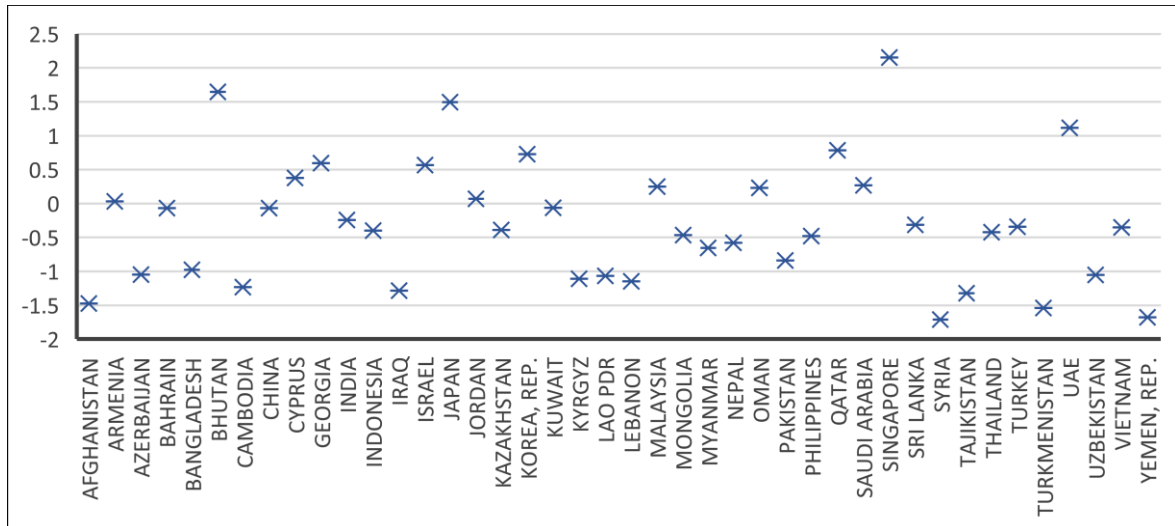


Figure 1.6: Control of Corruption in Asian Countries

Source: The World Bank (2021)

Based on statistics, Singapore has the best rule of law environment in Asia, followed by Japan (Figure 1.5). However, in controlling corruption (Figure 1.6), Singapore has the best performance in Asia, followed by Bhutan. As can be seen from the above figures, the overall state of governance in Asia is not so favorable, with the exception of Singapore. Generally, a government or state is considered prosperous if its residents are provided with economic security, physical security, and social services. A robust governance structure, however, would mitigate social vulnerability in an ideal scenario (The World Bank, 2014). As a result of socio-political risk, any sudden change in management or political structure may also adversely affect a community.

1.2.4 Environmental Sustainability

With the advent of the industrial revolution, the production and distribution of industrial goods has created a number of environmental issues, such as hazardous waste, water pollution, global warming, and climate change. Moreover, the economic development of the world has caused environmental damage as well. Furthermore, environmental

damages have been greatly increased due to increased urbanization caused by economic growth which further signifies the precariousness of natural ecosystems (Sarkis & Zhu, 2018).

Under the United Nations framework convention on climate change, held on 12 December 2015, 196 countries signed a legally binding treaty known as the Paris Agreement. This treaty's main objective is that nations undertake ambitious efforts to counter climate change and limit global warming to 1.5 degrees Celsius through a joint strategy (UNCC, 2015; Nieto, 2017).

Having the most dynamic economies, Asia is the fastest-growing region globally (Le, Le & Taghizadeh-Hesary, 2020). The Asian region also has the world's poorest population and is highly exposed to climate change (ADB, 2017). Moreover, over the last decade, Asia has been the highest CO₂ emitter in the world, as illustrated in Figure 1.7. Asian countries are at higher risk of the disastrous impact of greenhouse gases and climate change, requiring immediate actions for rectifying and mitigating adverse impacts (Le et al., 2020).

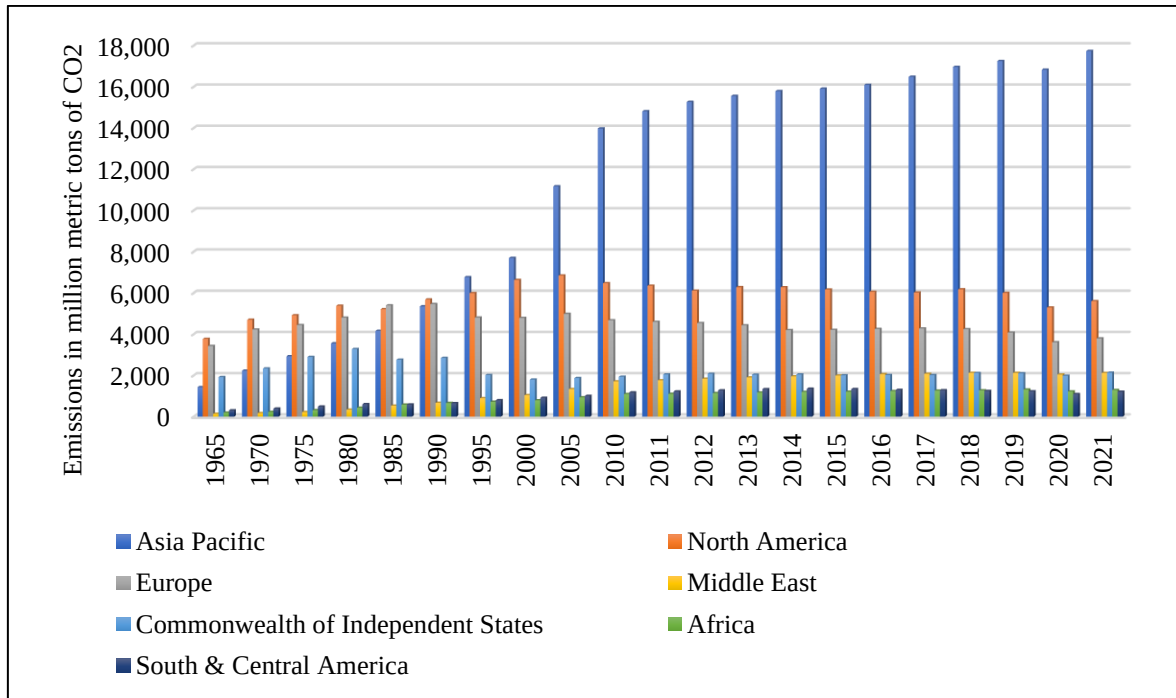


Figure 1.7: World CO₂ Emissions

Source: Statista (2022)

It is for this reason that industries have played a very important role in the financial and economic development of the country. While the industries' greenhouse gas emissions are damaging the environment and causing global warming, they are also causing financial losses to Asia as a result of the change in climate. For example, floods and storms resulting from climate change also shatter crop fields that threaten food security.

The dry spells in Australia, Russia, and the United States, typhoons, and floods in the Philippines and Thailand respectively in the recent decade have prompted production losses and caused a sharp increase in prices of various products, including wheat (ADB, 2017). According to the Asian Development Bank, climate change could lead to loss of agricultural, fishing, and tourism industries in Southeast Asia and end up reducing its GDP by 11 percent (IMF, 2018). Therefore, environmental sustainability is crucial to economic growth.

1.2.5 Social Sustainability

This section will discuss social sustainability and related literature that explains its critical aspects. Social sustainability concept encompasses the performance of a country and its ability to fulfil the basic necessities of the population. This includes poverty reduction, investing in human capital and productivity, and managing equity and societal issues. (The World Bank, 2019).

The social sustainability concept works towards a framework that encourages the efforts of improving the quality of an individual's life. Although there no generally accepted definition of social sustainability, different authorities have given different definitions (Stender & Walter, 2019). However, most literature has provided definitions of social sustainability that are aligned to the United Nations report that defines “development that meets the needs of the present without compromising the ability of future generations to meet their needs” (UN World Commission on Environment and Development, 1987, p. 41).

Social sustainability is generally associated with social equity, such as equal opportunities for all individuals, equitable distribution of welfare (Dempsey et al., 2011; Murphy, 2012). Moreover, various studies suggested a basic framework for social sustainability (Hogberg, 2015). The critical elements in an urban context that focus on factors of social equity include human rights, income, jobs, education, and housing (Stender & Walter, 2019). The recent studies based on social cohesion add different elements under a ceiling of social sustainability that includes quality of life, health, empowerment, wellbeing, safety, identity and affiliation to a place, social mixing, and social competence (Hogberg, 2015; Stender & Walter, 2019).

The most straightforward and mutually agreed concept of social sustainability is to improve the quality of life and to meet human needs (Chiu, 2003). As a matter of fact, people who have access to income opportunities are able to meet their basic needs and improve their quality of life. However, according to statistics from the World Bank presented in Figure 1.8, unemployment remains the primary issue in Asia. In countries such as Armenia, Georgia, Jordan, Lebanon and Yemen, there is a high rate of unemployment.

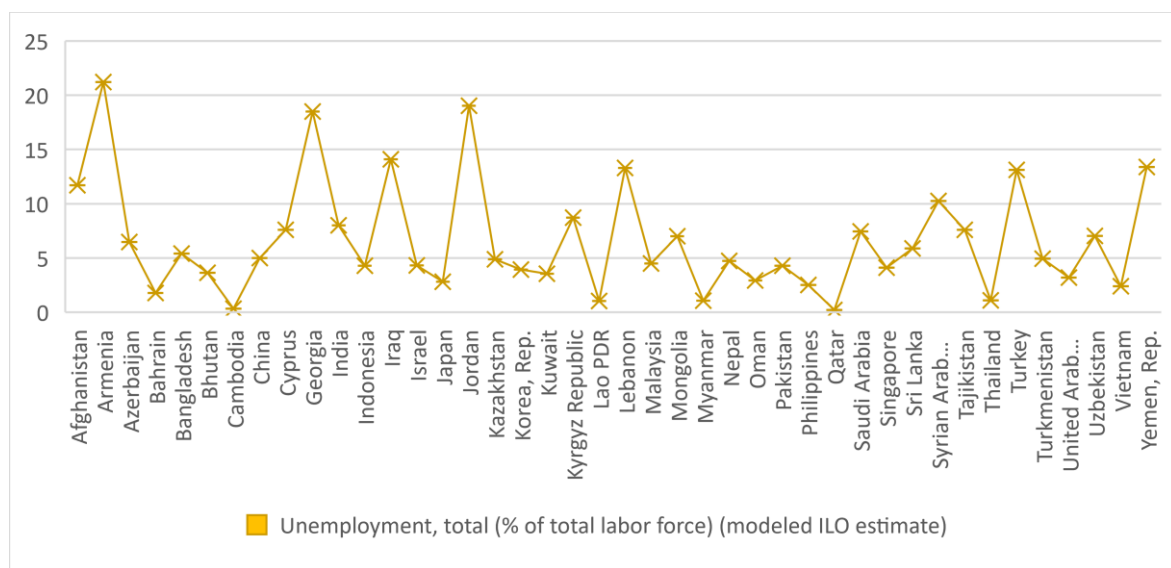


Figure 1.8: Unemployment in Asian Countries (Percent of Total Labour Force)

Source: The World Bank (2021)

According to the World Health Organization, children are at a significantly higher risk of death and illness due to a lack of access to adequate drinking water services. Increasing the quality of drinking water has a significant impact on reducing under-five mortality and morbidity, and it has been shown that higher levels of drinking water services have a significant impact. Water is a fundamental human right that is available for personal and domestic use at a reasonable price for those who need it (World Health Organization, 2022). Seventy one percent of the world's population used clean water in 2017. A total of 3.4 billion people use safe sanitation services around the world, which is 45 percent of the

global population (World Health Organization, 2022). A summary of the data provided by the World Health Organization can be found in Figure 1.9, which demonstrates that countries such as Bahrain, Iraq, Saudi Arabia, and Singapore have better access to drinking water and sanitation facilities. This data shows that these countries have invested more in water and sanitation infrastructure and have taken steps to ensure that their citizens have access to clean drinking water and sanitation facilities. Whereas other countries have not allocated the same level of financial and political resources to ensure access to clean water and sanitation.

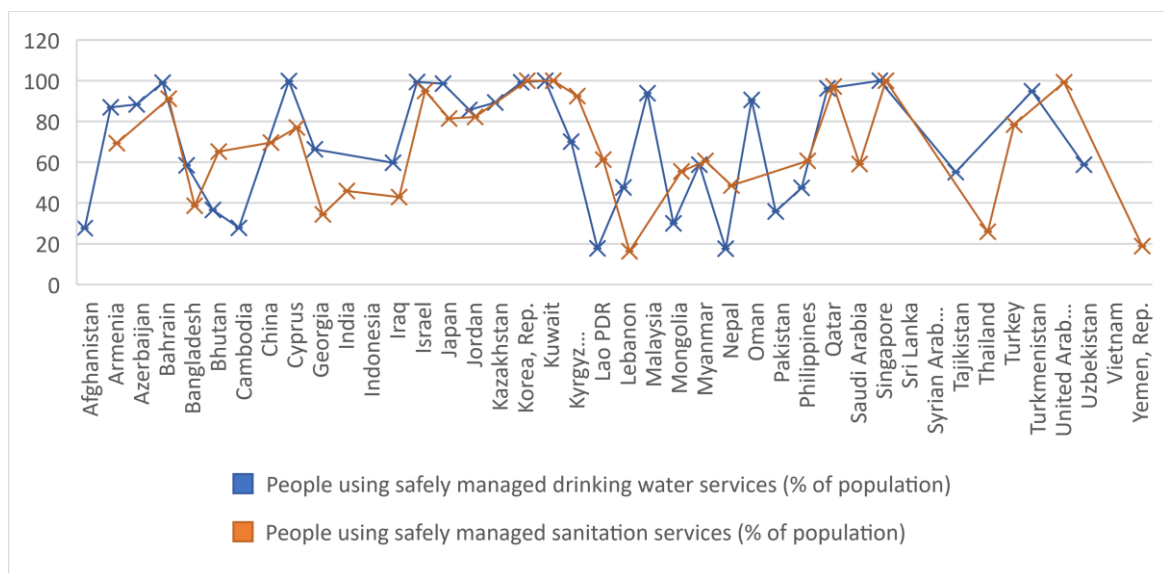


Figure 1.9: Percentage of People Using Safely Managed Drinking-Water Services

Source: The World Bank (2021)

An additional indicator of social sustainability is the life expectancy of humans at birth and the mortality rate of children at age five (Figure 1.10). These factors provide an indication of the level of access to quality healthcare, nutrition, and other resources available to children, and the overall health status of the population. A high life expectancy and a low mortality rate are strong indicators of a socially sustainable society. Asia has a mortality rate

of 37 for children at age five, meaning 1 in 27 children die before reaching age five (World Health Organization, 2022).

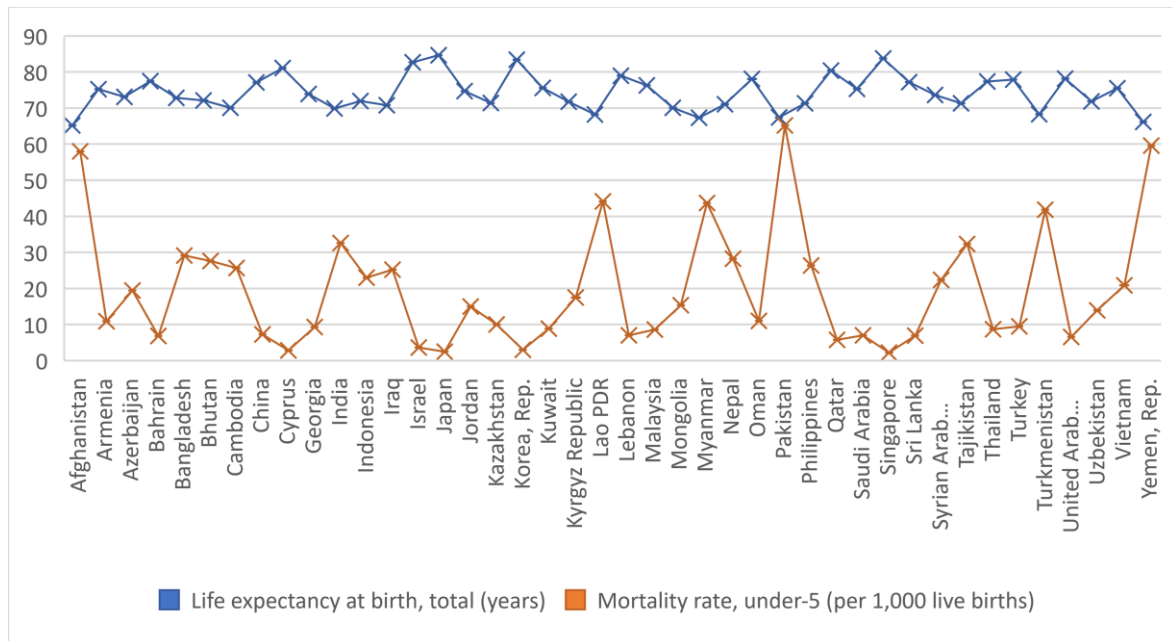


Figure 1.10: Life Expectancy and Mortality Rates in Selected Asian Countries

Source: The World Bank (2021)

Along with the efforts of authorities and policymakers, firms contribute to the social sustainability of society as well. As a well-known concept, corporate social responsibility is seen as a self-imposed or regulated business model by which corporations/companies are held accountable to all stakeholders (not just shareholders). To enhance social sustainability, corporations/companies are concerned while doing their core business about any impact of their operations on the environment, social, or economic aspects. Performing philanthropic and volunteer activities for society fulfills corporate social responsibility. By engaging in philanthropic activities, companies can demonstrate to their stakeholders that they are aware of their impact on society and are taking steps to mitigate it. These activities can also help

to build relationships with their customers and the local community, which can in turn help to boost their reputation and generate more business.

The concept of ‘sustainability’ emerged in the 1980s due to continuous development for several years. The first significant effort was in the form of the first global summit in the 1972 UN Conference on the Human-Environment at Stockholm to contemplate the impacts of humans on the environment. After that, in 1987, the UN World Commission on Environment and Development published its report, also known as the Brundtland Report. This report emphasizes “What is needed now is a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable” (Purvis et al., 2019).

According to the UN Global Compact “Social sustainability is about identifying and managing business impacts, both positive and negative, on people. The quality of a company’s relationships and engagement with its stakeholders is critical. Directly or indirectly, companies affect what happens to employees, workers in the value chain, customers and local communities, and it is important to manage impacts proactively” (United Nations Global Compact, 2020).

Asia has highly diversified economies with different scales and levels of development with a highly diversified mix of companies. In terms of economic, environmental, and social dimensions, the average score for Asia in the year 2018 is distinct from the world average. Organizations in Asia seem to pay similar attention to economic, environmental, and social issues as they do in other parts of the world. The most impressive part is that they have taken sustainability seriously as a core objective, not just as window dressing. This attitude will lead them towards a competitive advantage. There were however

differences in approaches to sustainability among countries (Robecosam, 2018). Despite these differences, most Asian countries are well aware that sustainability initiatives can bring significant benefits. As a result, they have been investing heavily in initiatives that increase their capacity to adopt sustainable practices.

RobecoSam is a global investment company that focuses on investments in sustainable organizations and publishes sustainability reports with scores assigned based on compliance with sustainability. Robecosam (2018) reported that Asia outperformed the global average in overall sustainability management by 40 points. However, Europe leads by 51 points. The overall situation is well defined in Figure 1.11 below. This highlights the importance of sustainability compliance in achieving success on the global market and shows the performance of different regions in comparison to the global average.

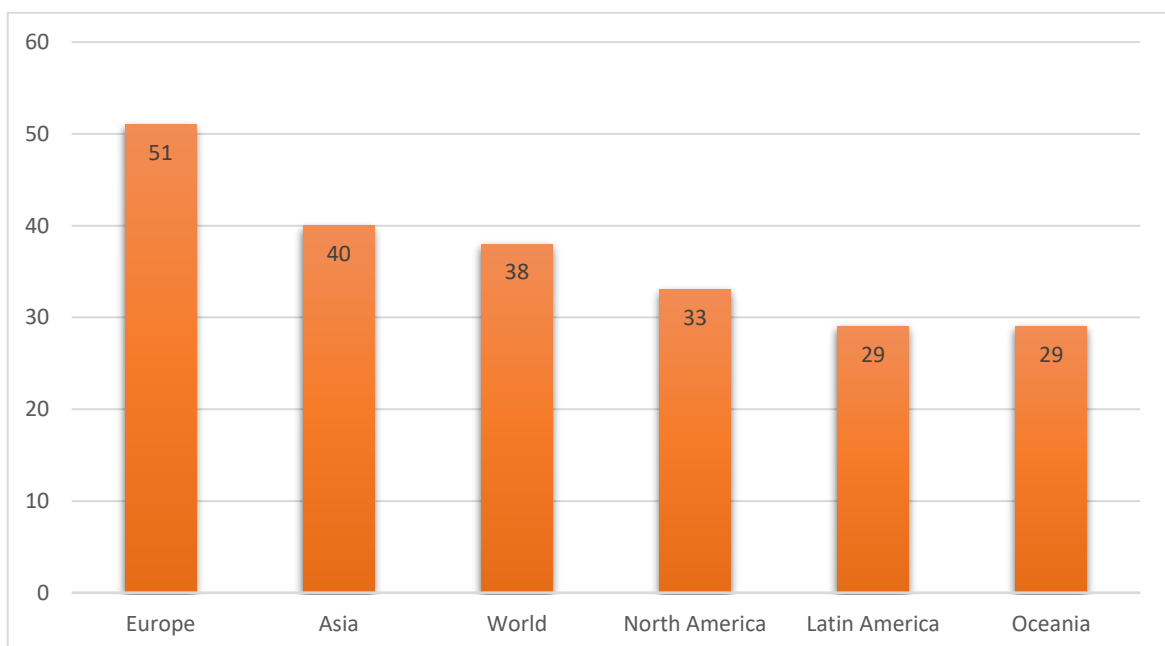


Figure 1.11: Average Sustainability Scores by Geographical Region

Source: Robecosam (2018)

Using the social development capital as a measure in the Robecosam (2018) report, it is evident that Asian companies are underperforming in human development capital, as illustrated in Figure 1.12. The main reason for this underperformance is that Asian companies fail to disclose the proper information regarding the training and development of their employees.

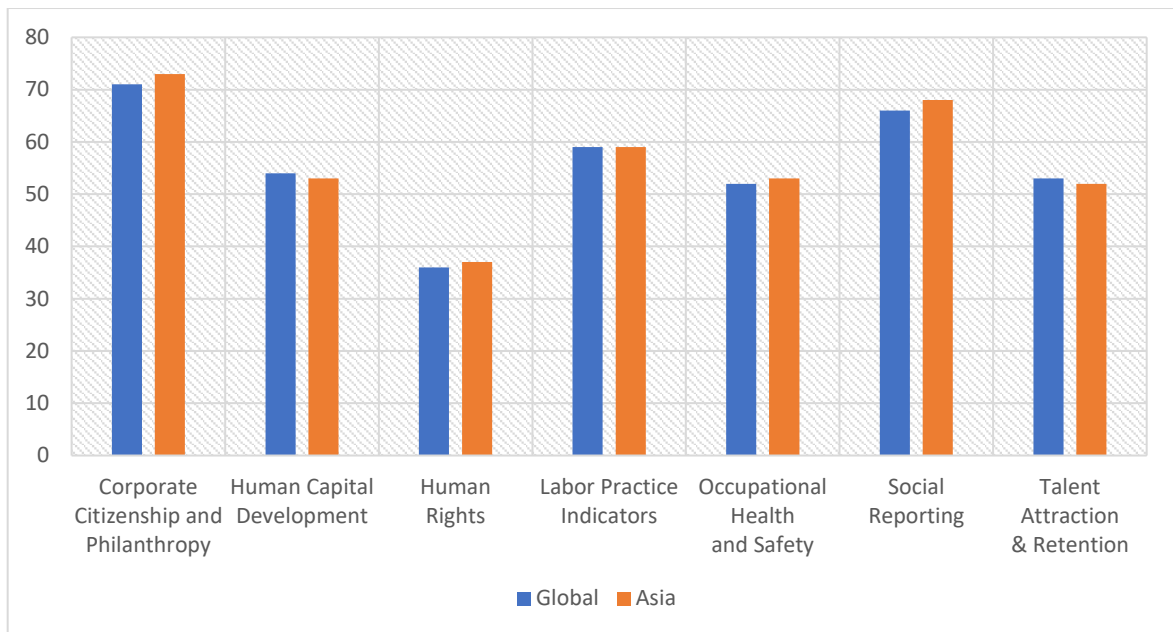


Figure 1.12: Performance in Social Conduct

Source: Robecosam (2018)

Human capital and development are essential for society. Excellent corporate social performance creates a positive reputation for the firm and improves its financial performance. When companies' financial performance is improved, this brings overall financial stability to a country.

1.2.6 Financial Inclusion

In Section 1.1, it was mentioned that financial inclusion refers to how many people or businesses in the population have access to formal financial services easily, at affordable

cost and terms, especially among low-income segments of society. Various organizations, such as the World Bank, the International Monetary Fund, as well as regulators in countries around the world are working to increase financial inclusion. Those who promote financial inclusion claim that members of the formal financial system will have easier access to financial services. People or firms will be able to access formal financial services without discrimination or unfair treatment.

To maintain financial stability and ensure economic growth, regulators assess the overall financial system. Being in the formal financial system would help individuals be part of the growth process because lack of financial access causes income inequalities and restrains economic growth (Zulfiqar et al., 2016) which also causes financial instability. Governments around the globe have committed to bringing reforms to increase their citizens' access to formal financial systems (The World Bank, 2018).

After Global Financial Crises during 2007-2009, researchers (Morgan & Pontines, 2018; Ahamed & Mallick, 2019; Vo et al., 2019) are trying to investigate factors that ensure the overall financial stability of an economy and whether financial inclusion is a major factor in providing an improved situation of financial stability. Since the last decade, the increased efforts for financial inclusion have been observed worldwide. The main purpose of financial inclusion is to provide affordable and quality financial products to all segments of society, such as businesses, private and public sectors, and individuals particularly underserved.

Despite global efforts to promote financial inclusion through having bank accounts, there are more than two billion adults in the world who do not have a basic bank account and are still underserved by financial institutions. Financially underserved people are those who do not have access to credit, savings, and insurance. Studies show that achieving

financial inclusion is critical in the reduction of poverty and economic growth (Neamie & Gaysset, 2017; Jindra & Vaz, 2019; Erlando et al., 2020). Furthermore, financial inclusion facilitates individuals to set up new or expand their current businesses, funding education, absorb financial shocks or manage risks (Patwardhan, 2018).

There are several justifications in support of greater financial inclusion. Such as poor populations usually lack cash resources and updated or advanced sources to handle their cash efficiently, and regularized consumption can have a good influence on their welfare. Dependency on cash transactions will lead to several risks, and costs, such as cash-based transactions, always have a higher risk of safety. The studies have pointed out that marginal return to SME's is large when SME's face capital scarcity (Demirguc-Kunt & Klapper, Measuring Financial Inclusion: Explaining Variation in Use of Financial Services across and within Countries, 2013).

Financial inclusion may lead to greater financial stability and more effective monetary policy. Increasing financial inclusion can also assist governments in controlling corruption and money laundering by facilitating trust in cash transfer programs (Yoshina & Morgan, 2017).

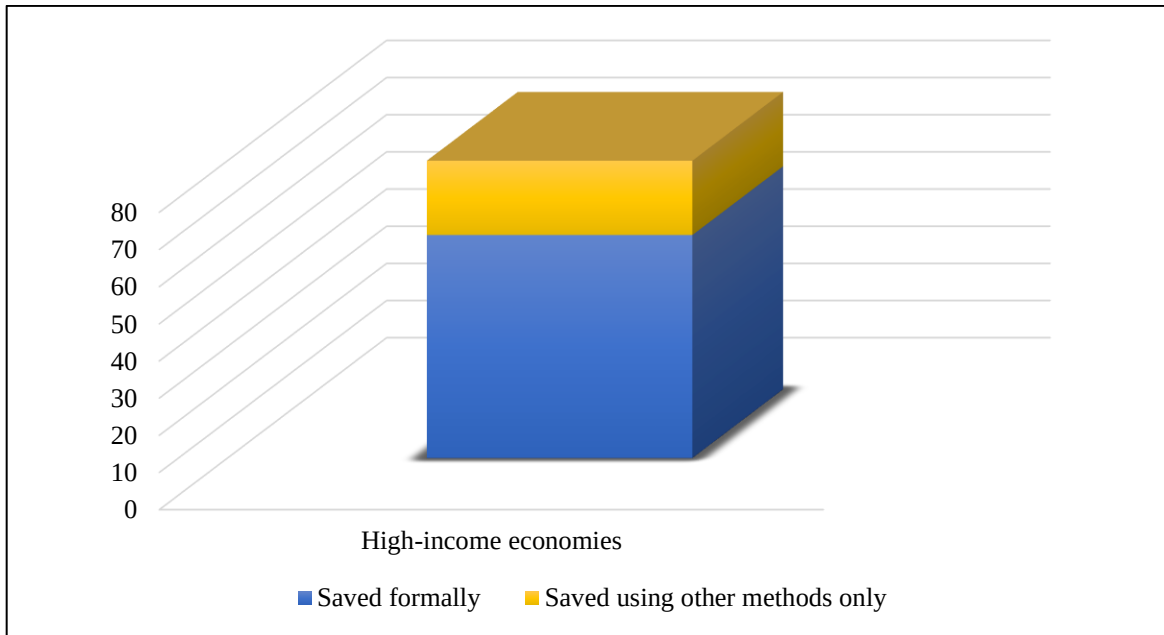


Figure 1.13: Pattern of Saving Channels in High-income Economies

Source: The Global Findex Database (2017)

When people have access to formal financial services, they can save their excess income in proper formal institutions. When they need credit, they can get it from the same formal financial institutions. This will allow them to benefit from those institutions' expertise when they lack the knowledge to invest. They will get credit on competitive and standardized terms and conditions unlike informal entities or persons. In Figure 1.13 and Figure 1.14, the World Bank shows the patterns of the population saving their incomes and their dependence on borrowing.

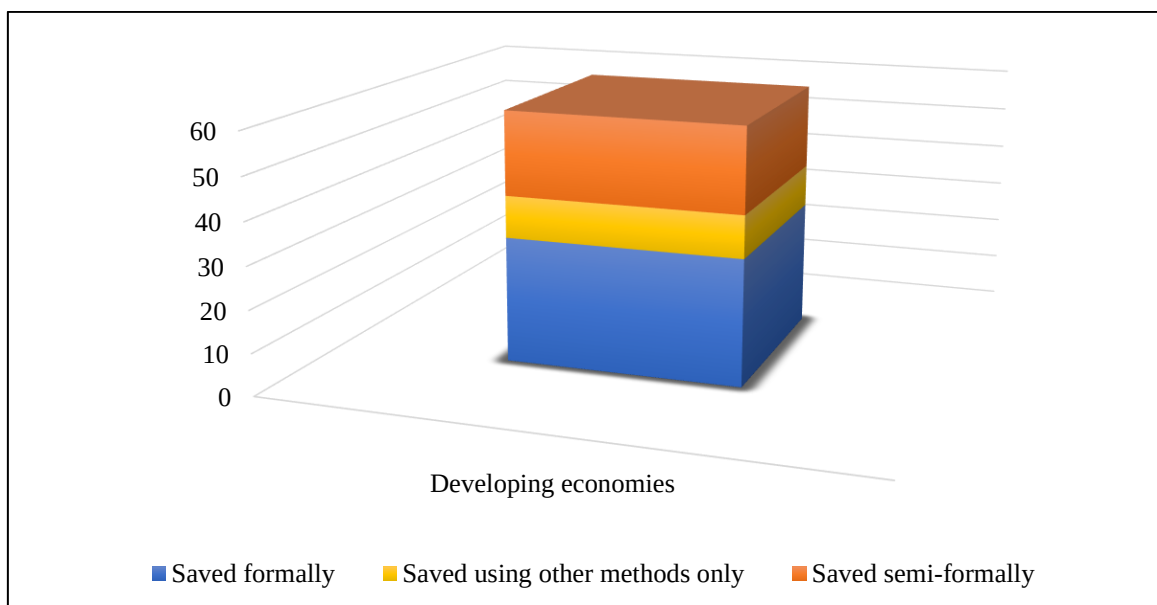


Figure 1.14: Pattern of Saving Channels in Developing Economies

Source: The Global Findex Database (2017)

According to Figure 1.13, provided by the World Bank, people in developed nations save their money in formal institutions, while the situation is different in developing countries (Figure 1.14). It is possible for people to lose money if they choose non-formal institutions for their savings, or at least they may not be able to obtain valuable and more affordable financial services or products. It is also clear from the above figure that the population of developing countries does not have access to formal financial services. Thus, in developing countries, borrowers usually obtain loans from informal sources, which can be expensive.

The focus of different authorities in the world has increased towards financial inclusion, as a still significant portion of the population lacks formal transactions due to not having a formal bank account. The World Bank uses more than 850 country-level indicators for measuring financial inclusion across the world in more than 140 economies. Level of inclusiveness indicators are aggregated overall adults and then bifurcated by demography,

genders, age, education, income, and urban and rural residencies. Furthermore, the World Bank stated that at the end of 2017, more than 1.7 billion adults still did not have a bank account (The World Bank, 2018).

A number of factors contribute to the concerns of countries' authorities and researchers regarding the expansion of financial inclusion. As a result of financial inclusion, financial stability and economic growth can be enhanced. The first reason is that if financial inclusion increases, more consumers will have access to the formal financial system, increasing their savings in formal financial systems, which in turn will result in positive long-run economic growth (Aghion et al., 2010). Secondly, financial inclusion advances dispersion of credit, and hence it increases aggregated economic activity (Bayoumi & Melander, 2008). Lastly, a higher level of financial inclusion will lead to the use of interest rates as the main policy tool (Cecchetti & Kharroubi, 2012).

The word 'financial exclusion' or 'financially excluded' is used as an opposite to financial inclusion or financially included people for those who are not in a formal financial system. The first basic criterion for deciding whether someone is financially included or excluded is having a bank account. The World Bank provides a chart defining people not having formal bank accounts.

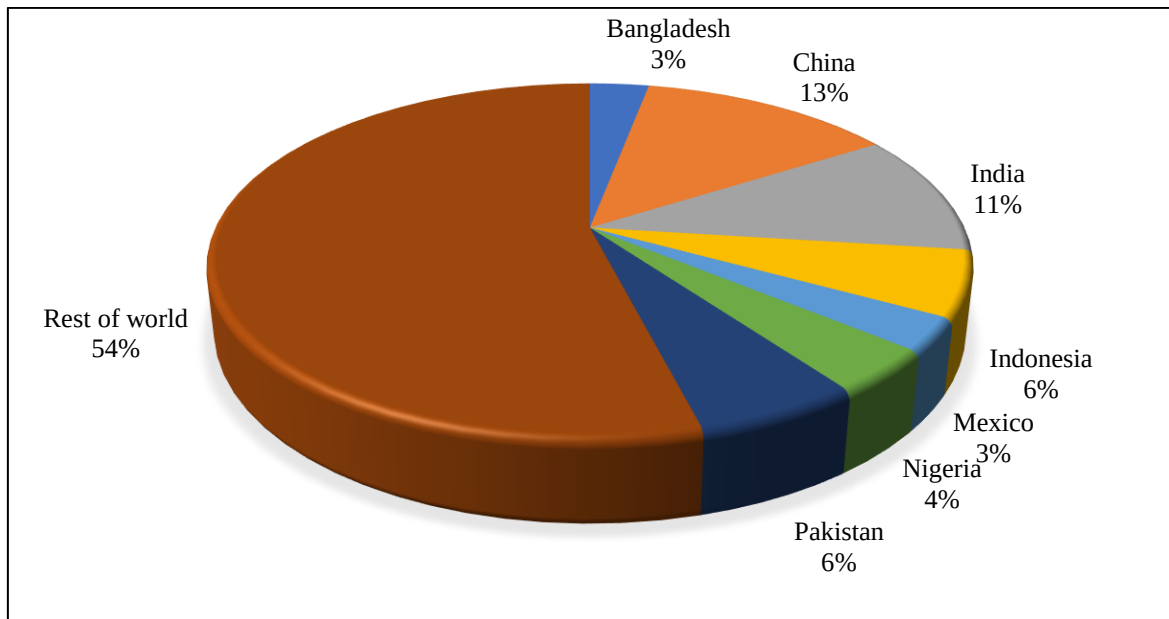


Figure 1.15: Most Unbanked Adults Belong to Countries

Source: The Global Findex Database (2017)

According to Figure 1.15, nearly half of the unbanked population lives in only seven countries, namely Bangladesh, China, India, Indonesia, Mexico, Nigeria, and Pakistan (Demirguc-Kunt et al., 2018). This indicates that Asia has a large number of unbanked population members, which makes Asian economies more vulnerable. This is further compounded by the fact that these countries have a large unbanked population, and lack of access to formal banking services can exacerbate financial instability.

When people use informal financial channels for their transactions, there is always the possibility of losing their money. Secondly, if they need credit, they can get expensive rates; through informal channels, they cannot get insurance or easy term loans to set up their small businesses that are essential for the overall economy. As a result, many people resort to expensive payday loans, which trap them in a cycle of debt. This limits their ability to generate the income needed to start a business and contribute to the economy.

1.3 Statement of Problem

It is the role of the financial system to facilitate the movement of capital through financial institutions, and the process of financial intermediation to ensure an efficient allocation of resources between lenders and borrowers. Thus, financial institutions are an important component of a country's economic growth.

The intensity of Asian financial crises in 1997-1998 and global financial crises in 2007-2008, however, has demonstrated that global financial markets are not only interconnected with other sectors within a country, but also with other financial markets around the world due to increased globalization. Consequently, any crisis that occurs in one region can spread to others (Vo et al., 2019). This phenomenon came into prominence after the recent global financial crisis of 2007-2008 that originated from financial institutions in the United States after Lehman Brothers collapse and evolved into the international financial crisis.

After numerous studies and proposals, policymakers, researchers, and experts have identified different factors affecting financial institutions' profitability (efficiency) and stability (Babar et al., 2019). Phan et al. (2020) explain that when the financial system's functions are disturbed and the flow of funding is decreased, it hinders productive investments in an economy and causes financial instability.

It should be noted that, despite the numerous factors identified by researchers that influence the profitability and stability of financial institutions, governments remain the primary responsible and stakeholder for the smooth operation of financial institutions in a country. Accordingly, stakeholder theory can be used to understand the role of governance quality in a country in financial stability and efficiency.

By implementing policies through regulators, the government maintains financial stability in a country and ensures that financial institutions are efficient enough to generate profits. In addition, the efficiency and effectiveness of government-owned institutions and regulators, which are involved in making and implementing policies, are determined by how effectively the government governs itself. Therefore, the stakeholder theory is an advocate for addressing the concerns of all stakeholders, and for the government to introduce policies and facilities to benefit the population and organizations that are members of society's stakeholder class (Flak & Rose, 2005). Institutional performance in a country is influenced by the quality of governance in the country. In only a few studies has stakeholder theory been applied to the assessment of government policies (Nie et al., 2019). In addition, only a small number of studies have investigated the importance of a country's governance quality for its financial stability and efficiency (Malik et al., 2021). For instance, some studies use a single proxy such as the Corruption Perception Index (Duuren, Haan, & Kerkhoff, 2020).

There have also been some studies that investigate the effects of governance quality on the financial development of the financial sector (Khan, Khan, & Zuojun, 2022). The literature, however, does not provide evidence that studies have examined how the different aspects of governance quality impact the ability of financial institutions to absorb shocks during crisis periods. As discussed in this study, when financial institutions are efficient and stable, they are more likely to absorb shocks. An institution's efficiency is determined by the effectiveness with which it allocates its capital in order to generate profits.

A measure of financial stability takes into consideration how likely it is for financial institutions to default based on the buffer provided by the banking system (capital and returns) and their volatility. In the crux, it can be contended that the governance at macro

level can results in better stability and efficiency of the financial market at general. In the contemporary world, the governance quality of institutions cannot yield sustainability in vacuum. To foster stability and efficiency the institutes must also bring the environmental and social sustainability in an economy.

Moreover, it is also necessary for the smooth operation of financial institutions to mitigate all types of risks. There is a possibility that financial institutions may face systemic risk as a result of increasing regulations pertaining to environmental and social sustainability. As Gangi, Meles, D'Angelo and Daniele (2019) describe, bank administration authorities are concerned about unforeseen climate change as it may weaken banks' lending portfolios, causing a systemic threat to financial stability and efficiency.

A set of environmental sustainability regulations have recently been introduced by the International Finance Corporation for banks. The government of Bangladesh, China, and other countries has also introduced regulations, including green lending policies for banks, which discourage banks from lending to industries that cause pollution and encourage them to withdraw funds from certain industries that are involved in ecological controversies or noncompliance with environmental regulations. Regulations of this kind have a negative impact on financial institutions by reducing their profitability. As a result of non-compliance with environmental regulations, environmental risk can also be incorporated into credit risk (Cui et al., 2018).

As a result of climate change, Asia is considered to be one of the most vulnerable regions (ADB, 2017). The fact that Asia continues to be the largest emitter of greenhouse gases in the last decade makes it more susceptible to climate change (Le et al., 2020). Additionally, six of the ten countries most affected by climate change in terms of casualties

and economic losses hail from Asia. Due to the climate change, countries such as Australia, the United States, Russia, Thailand, and the Philippines have already experienced droughts, typhoons, and floods that have resulted in production losses and significant increases in wheat prices (ADB, 2017). In recent years, several Asian countries, including Bangladesh, China and Pakistan, have been severely affected by natural disasters associated with climate change. According to the World Bank, in Pakistan alone, a total of USD 30 billion has been lost as a result of flood damage, and USD 16 billion has been needed for reconstruction (The World Bank, 2022).

Additionally, the International Monetary Fund estimates that climate change could reduce Southeast Asia's GDP by approximately 11 percent by affecting its tourism, agricultural, and fishing industries (IMF, 2018). Sustainability of the environment is therefore crucial in determining financial stability and efficiency, as well as economic prosperity in the region. Another aspect of environmental risk that can have a detrimental effect on financial sectors is pointed out by Nieto et al. (2017). A number of financial institutions lend money to firms that have a high carbon footprint, for example. Risks associated with carbon-intensive firms may affect the assets (the amounts lent to risky companies) of financial sectors, ultimately harming financial stability. Alternatively, environmental sustainability practices may lead companies to invest in environmentally friendly technologies, for which they would need funds. In addition, financing the adoption of environmentally friendly technologies could create an opportunity for the financial sector to enhance financial inclusion in a region. This can make environmental sustainability practices effective in maintaining financial stability, improving financial efficiency, and promoting financial inclusion.

It is noteworthy that Asia accounts for 66 percent of the world's poor population (ADB, 2017). It is estimated that about 70 million people will be living in extreme poverty in 2020 as a result of the COVID-19 pandemic, essentially halting poverty reduction efforts around the world. The pandemic also had a negative impact on countries in Asia (The World Bank, 2022). Socially unsustainable societies face issues of illiteracy, unemployment, income inequality and low skill labor (Aasland & Flotten, 2001; Amin, 2019). Individuals residing in unsustainable societies do not contribute to the nation's economy (Peleah & Ivanov, 2013; Amin, 2020). Moreover, such people neither comply with laws nor follow social norms (Amin, 2019). The implications of this are that societies with socially unsustainable practices are not likely to contribute to economic growth, and they create uncertainty in the region (Bayar & Gavriltea, 2018; Amin, 2019) that could have a negative effect on the financial system.

Additionally, socially less developed individuals avoid participating in formal financial systems, while countries with lower socio-demographic characteristics have fewer bank accounts (Dev, 2006; Kabakova & Plaksenkov, 2018). Social sustainability thereby generates prosperity in the region, which enhances financial stability and efficiency, and enhances financial inclusion by engaging socially underdeveloped segments of society in the financial system. Furthermore, it is anticipated that environmental and social sustainability is crucial for Asia to continue its journey of economic growth in a sustainable way.

On the other hand, studies like Platonova et al. (2018); Fijalkowska et al. (2018) and Javed et al. (2020) established firm's contribution towards environmental and social sustainability has a positive impact on the reputation of firms. Platonova et al. (2018) further added that banks' positive image could attract new customers and increase deposits. The

improved reputation will lead financial institutions to get new clients, and overall financial inclusion will be increased.

As discussed in the preceding lines of this section, governance quality can bring financial stability and financial efficiency in an economy. This study further contends that the governing bodies may also consider different instruments to cultivate financial efficiency and stability, and that can be devised through financial inclusion (providing access to financial services). Banks as the financial intermediary perform as the main provider of the funds. If the banks are flourishing, and have a sound customer base, they can foster their financial intermediary process. In other words, a lucrative financial inclusion can yield a greater level of financial efficiency and stability. For financial institutions to ensure stability, efficiency, and profitability, it is therefore essential to expand their customer base. Expanding the use of financial services and products by households and businesses is known as financial inclusion. It has been demonstrated in numerous studies that financial inclusion plays an instrumental role in reducing poverty and ensuring financial stability of countries (Cihak et al., 2016; Morgan & Zhang, 2018; Ahamed & Mallick, 2019). This is in light of the fact that it offers formal means of financing to poor individuals who may wish to start their own business, or who may wish to be insured against natural disasters, such as agricultural insurance. However, Ahamed and Mallick (2019) argue that in regions where the governance system is strong, the positive effect of financial inclusion on financial stability is greater than in other regions. Besides Ahamed and Mallick (2019), a limited number of works of literature have considered the role of governance quality of a country on financial inclusion. Nevertheless, their research did not take into account the simultaneous impact of governance quality on financial inclusion, financial stability, and financial efficiency.

The focus of this study is on the Asian continent because it is the most diversified region that accommodates the world's fastest rising economies in the world (Bhardwaj et al., 2018). It is the fact that Asian households and firms would need formal sources of financing, in order to support economic growth. However, despite the efforts of policymakers to promote financial inclusion, a large segment of the Asian population still lacks access to formal financial services. The number of adults without a formal account with a financial institution is estimated to be 73 percent (Bhardwaj et al., 2018). Approximately 67 percent of firms lack access to a line of credit or loan (Bhardwaj et al., 2018).

Several studies have shown that financial inclusion improves financial stability and efficiency by diversifying the portfolios of financial institutions and lowering their default risks as well as increasing the growth of small businesses by providing financing (Morgan & Pontines, 2018; Ahamed & Mallick, 2019). However, very few studies have examined the impact of the governance quality of a country on financial inclusion, financial stability, and efficiency (Malik et al., 2021). In addition, none of the studies examined the possibility that financial inclusion might play a mediating role between the quality of governance in a country and its financial stability and efficiency (Malik et al., 2021).

It has been mentioned earlier that to maintain financial stability and increase financial efficiency, it is necessary for the intermediation process of financial institutions to run smoothly and without disruption. Considering the fact that financial institutions are involved in the intermediation process, their performance is a prerequisite for the stability and efficiency of the financial system. Additionally, several sectors in a region depend heavily on financial institutions because they require funds for investments, working capital, payments involved in imports and exports, etc. Thus, it is critical to understand that any

disturbance in the financial sector will have an effect on all other sectors, resulting in a financial crisis.

On the similar nerves, the environmental and social sustainability can be considered nurturing the financial inclusion in an economy. As evidenced by previous research (Maqbool & Zameer, 2018; Platonova et al., 2018; Cooper et al., 2019), an individual firm's efforts to promote environmental and social sustainability have a positive effect on the financial performance of financial institutions.

Socially less developed individuals avoid participating in formal financial systems, while countries with lower socio-demographic characteristics have fewer bank accounts (Dev, 2006; Kabakova & Plaksenkov, 2018). Social sustainability thereby generates prosperity in the region, which enhances financial stability and efficiency, and enhances financial inclusion by engaging socially underdeveloped segments of society in the financial system. Furthermore, it is anticipated that environmental and social sustainability is crucial for Asia to continue its journey of economic growth in a sustainable way.

On the other hand, studies like Platonova et al. (2018); Fijalkowska et al. (2018) and Javed et al. (2020) established firm's contribution towards environmental and social sustainability has a positive impact on the reputation of firms. Platonova et al. (2018) further added that banks' positive image could attract new customers and increase deposits. The improved reputation will lead financial institutions to get new clients, and overall financial inclusion will be increased. Nevertheless, a review of the literature indicates that none of the studies assess the contribution of environmental, social, and governance (ESG) quality to financial inclusion, financial stability, and efficiency.

Aforementioned discussion is recursive on the logic that governance quality can directly bring financial efficiency and stability by incorporating progressive policies and strategies. They can also devise tools to spur up the financial inclusion that will in-turn lead to the same objectives of financial stability and efficiency. It is critical to note that the literature shows studies examining the impact of financial inclusion on financial stability and efficiency with different conclusions (Morgan & Pontines, 2018; Morgan & Zhang, 2018; Le, Chuc, & Taghizadeh-Hesary, 2019a). In light of the different conclusions drawn by these studies, it appears that financial inclusion may be influenced by a variety of factors. Aiming to identify these factors that influence the relationship between financial inclusion and financial stability, this study attempts to identify those factors. In addition, some studies indicated that a variety of factors may have an impact on the level of financial inclusion. Baron and Kenny (1986) describe the rules that indicate a mediating role for any variable. Thus, taking advantage of this opportunity, this study identifies a number of factors that may have significant impacts on financial inclusion as well as financial stability and efficiency. Due to this, this study took into consideration the mediating effect of financial inclusion in accordance with the Baron and Kenny (1986) approach.

In light of the discussion, it has been determined that this study contributes to the literature on stakeholder theory by examining the relationship between governance quality, environmental and social sustainability (ESG), financial inclusion (FI), financial efficiency (FEF), and financial stability (FST) at the national level. Many studies have developed narrow measurements of ESG based on a variety of variables (Grohmann et al., 2018; Park and Mercado, 2018; Ozili, 2020b). Unlike previous studies that relied on narrow indicators, this study examines a wide range of key indicators in order to develop a comprehensive measurement of ESG. The contribution of this study is therefore significant, given the fact

that no study has examined the association between ESG, FI, FEF and FST on a country level. In addition, fewer research studies have explored the mediating effects of FI.

1.4 Research Questions

In order to narrow down the study's purpose, it is imperative to establish research questions. An effective research question specifies what questions will be answered and predicts what will be erudite in that research (Creswell & Creswell, 2017). In the study, the dependent variables were divided into FST and FEF. This is because FEF can be defined as the efficiency with which financial institutions allocate their capital to make profits. On the other hand, in order to determine FST, a banking system buffer (capital and returns) along with the volatility of financial institutions is considered. Below are the research questions the study tried to answer.

RQ1: What is the relationship between ESG and FST in Asia?

RQ2: What is the relationship between ESG and FI in Asia?

RQ3: What is the relationship between FI and FST in Asia?

RQ4: Does FI mediate between the ESG and FST in Asia?

RQ5: What is the relationship between ESG and FEF in Asia?

RQ6: What is the relationship between FI and FEF in Asia?

RQ7: Does FI mediate between the ESG and FEF in Asia?

1.5 General Objective(s) of the Study

The study's general objective is to examine the impact of governance quality, environmental sustainability, and social sustainability in a country on financial inclusion and financial efficiency and stability of financial institutions in Asian countries.

1.5.1 Specific Objective(s) of the study

RQ1: To investigate the relationship between ESG and FST in Asia.

RQ2: To examine the relationship between ESG and FI in Asia.

RQ3: To analyze the association between FI and FST in Asia.

RQ4: To investigate whether FI mediates between the ESG and FST in Asia.

RQ5: To investigate the relationship between ESG and FEF in Asia.

RQ6: To analyze the relationship between FI and FEF in Asia.

RQ7: To examine whether FI mediates between the ESG and FEF in Asia.

1.6 Scope of the Study

The scope of the study was the Asian region. Based on data availability for a timeline of 2009-2021, forty-two countries were selected. As part of the scope of this study, variables of governance quality, environmental and social sustainability (ESG), financial inclusion (FI), financial stability (FST) and financial efficiency (FEF) were focused. The impact of ESG was tested on the performance of financial institutions in the Asian region. There were two categories of dependent variables in the study. In the first category of variables, the FST of financial institutions in Asian countries was described. While other variables of FEF explain how efficient financial institutions in Asia are at earning profits.

1.7 Significance of the Study

A study is being conducted that examines the financial stability of a country and how it can be maintained. This study will first discuss how governance quality affects financial stability and efficiency in a country and whether a country's improved governance quality can increase financial inclusion. Good governance involves the management of the public

sector, law enforcement institutions, and other institutions in a country. For example, when there are fair law and order situations, an effective justice system, anti-corruption policies, and good consumer and investor protection systems, these factors attract the population to invest in such a country. In addition to creating job opportunities, increased investment in a country will also result in the growth of related industries and businesses. In the long run, this will contribute to the efficiency and stability of the financial system.

Furthermore, as established in past literature, environmental and social unsustainable practices have inherent risks for society's growth in general and economic growth in particular. This study examines how environmental and social sustainability contribute to a country's financial efficiency and stability. In addition, Asia has the world's poorest population and the fastest-growing economies at the same time. This study discusses whether environmental and social sustainability can lead to greater financial inclusion. Moreover, whether financial inclusion mediates between environmental and social sustainability, and whether financial inclusion leads to financial efficiency and stability of country.

The purpose of this study was to aggregate the individual variables of governance quality, environmental and social sustainability (ESG) through principal component analysis in order to obtain conclusive results. This study assessed the impact of ESG on financial efficiency and stability as well as financial inclusion. Financial inclusion and financial efficiency and stability have already been examined and were found to be positively related (Inoue, 2018; Morgan & Pontines, 2018; Ozili, 2018; Lenka & Barik, 2018; Vo et al., 2019; Malik et al., 2021). In addition to these studies, this study will investigate whether financial inclusion mediates between the country's environmental, social, and governance (ESG) factors and financial efficiency and stability. The study will assess all possible associations

between variables through stakeholder theory, which has been utilized in very few studies to date.

1.8 Organization of the Study

This thesis consists of five chapters, with a general overview and introduction in Chapter 1. The second chapter presents a review of the literature regarding financial stability, financial efficiency, governance quality in a country, environmental sustainability, social sustainability, financial inclusion, and their possible relationship. There is a discussion of theoretical framework, empirical testing, and empirical evidence in chapter 2. In addition, the hypotheses are developed on the basis of past studies and theoretical frameworks. Chapter 3 discusses the research philosophy, research design, data description, methodology and statistical techniques used in this study. Chapter 4 presents the analysis and empirical results, followed by a discussion. Lastly, Chapter 5 elaborates the study's conclusion with some recommendations and policies, and in the final section, references are provided.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter outlines a review of previous studies that have been conducted in relation to financial stability and efficiency, governance quality within a country, environmental and social sustainability, and financial inclusion. Thereafter, a conceptual framework is presented supported by relevant theoretical arguments. Finally, the relationship between variables will be discussed, and a hypothesis will be developed.

2.2 Empirical Studies

The purpose of this section is to provide an overview of past works of literature which are relevant to this study. Additionally, this thesis discusses how other studies have defined and measured the variables that are part of this research.

2.2.1 Financial Stability

A majority of western economists blamed structural weaknesses in Asian economies and financial systems during and immediately following the Asian financial crisis of 1997–1998, led by staff at the International Monetary Fund (IMF); accordingly, they suggested policies that addressed these problems. As the efficient markets hypothesis holds sway in the policy community, policymakers in the affected economies say volatile and destabilizing capital flows are a contributing factor (Bayoumi & Gagnon, 2018).

Furthermore, the 1997 Asian Financial Crisis led to significant changes in the nature of companies' corporate governance and the structure of the banking industry in Asia. Additionally, bank consolidations or mergers and acquisitions have been rising steadily in

Asian countries (Soedarmono, Machrouh, & Tarazi, 2011). According to Berger and Mester (2003), banks gain market strength following consolidation that increases their ability to expand their activities into different products and across international borders, relevant to the consequences of rescuing failing financial institutions through consolidation. However, this study contends that the expansion of cross-border operations exposes financial institutions to risks of spillover effects. As a result, it is essential to establish what financial stability is.

It is important to note that different authors have provided different definitions and explanations of financial stability. Financial stability, however, refers to the ability of the financial system to function effectively and efficiently without any disruption (Babar et al., 2019). Tomilova and Valenzuela (2018) propose several definitions for financial stability such as “Financial stability is a state in which the financial system, i.e., the key financial markets and the financial institutional system is resistant to economic shocks and is fit to smoothly fulfill its basic functions: the intermediation of financial funds, management of risks and the arrangement of payments.” Additionally, they define “The term financial stability broadly describes a steady state in which the financial system efficiently performs its key economic functions, such as allocating resources and spreading risk as well as for settling payments and is able to do so even in the event of shocks, stress situations and periods of profound structural change.”

In the first instance, it is necessary to establish a clear distinction between monetary stability and financial stability. Monetary stability is the absence of inflation or deflation or the general level of prices. However, financial stability may be defined as the smooth functioning of the financial system, financial institutions, and financial markets. The stability

of the monetary system is closely related to the stability of the financial system. Stability in one can facilitate stability in others. In addition, there may be some common factors that can disrupt the stability of the price stability and the fragility of the financial system. As a result, both cannot be considered to be the same (Crockett, 1996).

Unfortunately, financial stability is notoriously strenuous to define or measure. Narrow definitions define a stable financial system “as stable in the absence of excessive volatility, stress or crisis” (Gadanecz & Jayaram, 2008). Crockett (1996) explains that in an economy, the majority of firms are dependent on financial institutions for their funding investments. Any crisis in financial sectors will lead to having wider repercussions that will not be limited to one sector. Due to this severity, the stability of financial institutions is an important factor for regulators.

Babar, Latief, Ashraf and Nawaz (2019) endorse that banking is the main driving force of the complex economic system of the world as they mobilize and allocate scarce resources. Hence, for financial stability, the competent financial system is an essential part that promotes sustainable economic growth. Bank stability is linked with the financial stability of the financial sector that further leads to the financial stability of the country. Ahamed and Mallick (2019) explain that banks are induced by the financial sector to provide funds to small firms that require more external finance to ensure overall growth. For bank stability, Ahamed and Mallick (2019) use z-score as they claimed that this z-score is a complete and unbiased measure for stability and is commonly used in past studies.

Thach, Oanh and Chuong (2019) explain that numerous financial markets operating in the different national financial system have different indices. So, it is a complex process to calculate those indices. In concluding remarks, they stated that to construct aggregate

financial stability index to measure financial stability is a reasonable process, that is also proved by past empirical studies. The consensus on measurement and definition of financial stability has not been made due to the interdependence of several elements in the financial system. There are also interactions between those elements and with the real economy parallelly (Gadanecz & Jayaram, 2008).

Vo, Van, Vo and McAleer (2019) discuss that bankruptcy risk and abnormal risks for firms could be reduced by micro-prudential policies; on the other hand, systemic risk and financial crisis for the entire economy can be mitigated by macroeconomic policies. The remarkable thing is that different studies have used innumerable measures for financial instability by not relying on previous research only, but also by introducing their own measures developed from factor analyses such (PCA) principal component analysis. They introduced their own measures, notwithstanding there are various measures such as disposable income per capita, GPD per capita, consumption per capita, etc. Largely, the pragmatic results divulge negative impacts of financial instability on economic performances.

Dhiman (2018) in a systematic review of studies that were published from 1991 to 2015 on financial stability, concludes that for the purpose of getting an idea about the soundness of the financial sector, the financial stability indicators are used. Further, he adds that the banking sector is the most important part of assessing the stability of the financial system. The bank profitability, loan to deposit ratio and pre-tax profit as a percentage of average equity, foreign currency loans, and deposits as a percentage of foreign currency loans as a percentage of total loans, capital adequacy ratio, non-performing loans as a

percentage of total loans, after-tax profit as a percentage of average equity are also the common ratios among the studies to measure financial stability.

Due to the high importance of having aggregate prudential ratios, adequate efforts and resources have been utilized nationally and internationally to define and compile financial soundness indicators (FSIs). These indicators are the package of aggregated prudential measures in the purpose of measuring the healthiness and capability to absorb the shocks by the financial institutions and their other counterparts (Sundararajan et al., 2002) in order to measure how much stable; they are to absorb any shock to the financial sector.

According to Cihak and Schaeck (2010), in their analysis by using FSIs produce interesting results. They explain that many aggregate ratios in their study showed beneficial results, and those can be used to highlight weaknesses in the banking system, the buildup of banking problems, and banking turmoil.

Nasreen, Anwar and Ozturk (2017) emphasize that financial soundness indicators proposed by IMF can be used to measure financial fragility as it also used by various financial institutions (Goodhart et al., 2006; Caballero & Krishnamurthy, 2009; Gennaioli et al., 2012) IMF explains that FSI can be a good measure of financial stability for the following reasons:

1. It can be assessed how the financial sectors are vulnerable to absorb the shocks.
2. The actual condition for the non-financial sector can be assessed.
3. The vulnerability which arises from market risks, liquidity risks, and credit risks can be assessed for the financial sector.
4. By measuring capital adequacy, the financial sector's potential to absorb any possible shocks and losses can be monitored. Such as by analyzing micro-financial linkages,

early warnings can be obtained for effect on debt sustainability, macroeconomic conditions, or any impairment in intermediation capability of the financial sector.

Restoy (2017) states that the indicators for financial soundness of the systems highlights the potential weaknesses that can be mitigated by micro or macro-prudential policies, show the overall condition of health national and global financial systems. Hence, these indicators are frequently used for national risk evaluation standards to input into the national financial stability.

FSIs indicate the financial soundness and health of the country's financial institutions that include aggregated individual institutions data and market indicators in which these financial institutions operate. These indicators are circulated and calculated to brace macroprudential analysis. The financial sector has a continuous threat of liquidity risks that usually arises because of funding long-term assets by short-term liabilities or sometimes due to insufficient capital shield to absorb unexpected losses. If these exposures are not monitored, the consequences can be faced in the form of full-sized economic crisis (International Monetary Fund, 2019).

Vo, Nguyen, Quang-Ton and Pham (2019) examine the determinant of financial instability. They proxied financial stability with credit growth. They further added that financial stability means that the financial system is operating under usual circumstances, such as the presence of shocks and vulnerabilities. Hence, financial stability is not where there is no vulnerability or any threat of shocks to the financial system. In a nutshell, financial stability can be explained as where payment services and financial intermediation system is operating smoothly and efficiently without any disruption irrespective of external or internal shocks (Babar et al., 2019).

A number of researchers have focused on different measures to examine financial stability. Cihak, Demirguc-Kunt, Feyen and Levine (2013) endorse that bank z-score is a common measure of financial stability. Morgan and Pontines (2014; 2018) use the bank z-score (that is an indicator of the probability of country's banking system default) along with non-performing loan ratios, the ratio of bank liquid asset to deposit and short-term funding and bank regulatory capital to risk-weighted assets ratio (FSIs) from GFDD³.

The bank z-score is an unbiased and broad indicator of financial institution riskiness. It also commonly used in literature (Ahamed & Mallick, 2019). The higher the z-score is, the more stable bank is (Laeven & Levine, 2009; Bai et al., 2020). The bank z-score has been widely used as a proxy for FS in the past studies (Cihak & Hesse, 2010; Morgan & Pontines, 2014; Morgan & Pontines, 2018; Ahamed & Mallick, 2019; Bai et al., 2020; Vo et al., 2020; Rashid, 2021). Further, in addition to the bank z-score, for financial stability, this thesis also used the bank credit to bank deposits (% percentage of GDP) and liquid assets to deposits and short-term funding (% of GDP). Both indicators may signify the threats to the financial system's stability (Shen & Chen, 2014). Hence, induction of these variables is beneficial to enhance the explanatory power of the model.

It should be noted that this study is different from previous studies in that it utilizes three proxies in order to measure FST. This is in contrast to previous studies that relied on a limited number of proxies. As a proxy for FST, the bank z-score, bank credit to bank deposits (% percentage of GDP), and liquid assets to deposits and short-term funding (% percentage of GDP), when combined by principal component analysis (PCA), would enhance the

³ Available at World Bank website: <https://databank.worldbank.org/source/world-development-indicators>

explanatory power of the variable. This combination may result in more efficient results compared to previous studies.

This study has separately measured financial efficiency from financial stability. Literature suggests that the stability of the financial system depends on avoiding episodes of systemic failure that disrupt its functioning (crises) (The World Bank, 2020). Financial systems need to be resilient to stress as well. While the financial system can absorb shocks and avoid the failure of financial markets, payment system and financial institution, it can be referred to as financial stability (Motelle & Biekpe, 2015; Le et al., 2019a).

On other hand, an efficient financial system facilitates the efficient and productive allocation of economic resources (Dodge, 2006). There is a more detailed discussion about financial efficiency in the next section, which will be addressed in more detail. Financial efficiency is further discussed in the next section.

2.2.2 Financial Efficiency

A financial institution's financial efficiency is defined as its ability to generate income from the money invested in each alternative. The financial efficiency of a country is determined by the extent to which the investments of financial institutions produce positive effects on the economy as a whole (FEIS, 2022). Often referred to as a critical component of financial development, financial efficiency refers to the extent to which the financial system fulfills its functions (Olgu, 2014). Although financial efficiency has been considered to be one of the critical parameters when comparing the financial development of different countries, it has been neglected in financial development comparisons, partially due to a lack of the necessary data to make such an assessment (Le, Chuc, & Taghizadeh-Hesary, 2019a).

As a result of increasing numbers of studies on the effectiveness of financial institutions, which apply parametric and non-parametric frontier techniques, the amount of research in this area has grown rapidly in recent years. It should be noted that most of the studies addressing banking efficiency have been focused on the US banking sector (Sufian & Habibullah, 2009). There have also been a lot of studies on Asian banks. Compared to their private bank peers, Sathye (2003); Shanmugam and Das (2004) find that public banks and foreign owned banks are more technically efficient in India.

Among the banks in Pakistan, Iimi (2004) indicates that the privatized banks are the most efficient, followed by the foreign and the private banks, and the public banks are the least efficient. Throughout the period from 1981 to 1998, Hardy and di Patti (2001) investigated how financial reforms in the Pakistan banking sector affected the profitability, cost, and revenue efficiency of the sector. Based on their findings, financial liberalization impacts the performance of banks in a positive way. Secondly, in order to examine the cost and profit efficiency of Pakistani commercial banks from 1981-2002, di Patti and Hardy (2005) examine the cost and profit efficiency of Pakistani commercial banks. They find that the first round of financial reform, which occurred between 1991 and 1992, led to higher bank profitability.

Anwar, Hussain Kamarudin, Sufian, Zainal and Wong (2021) examined the efficiency of micro financial institutions in Thailand and the Philippines. It was discovered that these financial institutions were exploiting resources in order to achieve FE, which resulted in marginally inefficient operations. Siddique, Masood, Javaria, and Huy (2020) conducted a comparative study for banks operating in developing and developed nations in Asia. They found that banks in both Asian developing countries and developed countries

have significant negative effects on their FE when it comes to non-performing loans and cost efficiency ratios. Moreover, FE had significant positive relationships with capital adequacy ratios in Asian developing and developed countries. The study conducted by Isik and Uygur (2021) examined Turkish banks on the basis of different measures of their efficiency. According to the results, bank efficiencies tend to decline before financial crises, and they reach their lowest point during these crises. A study has also shown that the more efficient a bank is, the greater its survival rate (Isik & Uygur, 2021).

Based on the literature review presented in this section, it has been determined that authors have mixed opinions regarding the efficiency of banks. It is possible that the differing opinions on financial efficiency are due to different approaches and factors being examined. By taking advantage of the literature gap, this study measures the FE of Asian banks through country-level data. Moreover, this study examines other regional influences on the performance of financial institutions, such as the environment, social conditions, and governance quality.

Hence, financial institutions' efficiency is proxied by the bank net interest margin (%), bank return on assets (% after-tax), and bank return on equity (% after-tax) aggregated at the country level where the data is provided by the World Bank database. The purpose of these indicators is to measure the profitability of financial institutions. Accordingly, these indicators may be related to the solvency risk and performance of financial institutions (Aisen & Franken, 2010; Le et al., 2019a).

2.2.3 Governance Quality

The institution of the organized political community that is legal and formal is called as state or government. Furthermore, the institution that has absolute power in a specific

geographical area to enforce rules of social conduct is also called government (Nag, 2018). The use of power to fulfill the needs of the population and sustain order within a particular domain is called governance. The main objective of governance is to advise, direct, and control the activities of its citizen by the government through its power in the best interest of the public (Keping, 2018). Perry et al. (2014) defines as “good governance is that which contributes to the good of society” (p.27). The quality of governance or good governance always has good consequences for citizens (Paanakker et al., 2020).

Huque and Jongruck (2018) describe in the broader term that governance can be defined as the best possible mixture of all desired attributes that promote the uninterrupted progress in modern states. Better governance facilitates reparations for past inaccuracies and shortfalls in the political, social, and economic systems and, at the same time, ensures ongoing improvements. Definition for governance given by World Bank is "the manner in which power is exercised in the management of a country's economic and social resources for development" (Kaufmann et al., 2011, p. 3).

To measure governance effectiveness or quality of good governance, the World Bank provides the indicators that are used by several researchers. These indicators are known as Worldwide Governance Indicators (WGI) measured by six different dimensions. These indicators are consisting of broad dimensions described as follows:

1. Voice and Accountability
2. Political Stability
3. Absence of Violence / Terrorism
4. Government Effectiveness

5. Regulatory Quality
6. Rule of Law and Control of Corruption.

Kaufmann et al. (2011) describe the abovementioned six broad categories, defined governance as “the traditions and institutions by which authority in a country is exercised”. This includes,

- (a) the process by which governments are selected, monitored and replaced (covers ‘Voice and Accountability and Political Stability and Absence of Violence/Terrorism’);
- (b) the capacity of the government to effectively formulate and implement sound policies (covered by ‘Government Effectiveness and Regulatory Quality’); and
- (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them (covered by ‘Rule of Law and Control of Corruption’).

Sabir, Rafique and Abbas (2019) describe the Worldwide Governance Indicators that when voice and accountability conditions are favorable for population, they have freedom of expression, association, and media is operated freely in that country. Hence, the population has the right to reject corrupt governments. Furthermore, the stable political system and the absence of violence and terrorism attract foreign investors; otherwise, investors switch their investments in risk-free countries. The proxy of government effectiveness measures the extent of independence of civil and public services from any political interference. The ability of the government to design and implement policies that support the financial and economic development is measured by the proxy of regulatory quality. The rule of law and control of corruption proxies measure how the system is active

in discouraging the misuse of public power for individual gains and minimizing the risk by halting market unfriendly policies.

International aid agencies use WGI to assess the country's policy and institutional assessment for the allocation of development aid. Because WGI measures to what extent the country's institutional framework and policies support sustainable growth (The World Bank, 2014). Umar, Derashid, Ibrahim and Bidin, (2019) support the use of the World Bank's six governance indicators known as Worldwide Governance Indicators (WGI) to measure governance quality in a country. They argue that critics of WGI do not provide any alternate solution for measurement of governance; however, Kaufmann et al. (2010) have responded suitably.

The number of researchers has used these indicators as independent variables say for example (Neumayer, 2002) use WGI to examine whether democracies show strong commitment towards environmental issues as compared to non-democracies power. Numerous authors have used WGI for their studies. For instance, Asongu and Nnanna (2019a) investigate the association between instability in foreign aid on governance quality (proxied by WGI). Asongu and Odhiambo (2019b) also examine relationship between governance (proxied by WGI) and social media.

Worldwide Governance Indicators are provided by the World Bank to measure government effectiveness are prepared by collecting data through a consistent methodology, hence using these indicators are beneficial because they provide comparable data across countries (Murphy, 2019). The researchers and foreign aid donors, such as the United States, regularly use these WGI for their research to allocate hundreds of millions of dollars aid packages (Thomas, 2010).

Thomas (2010) further explains that these indicators are also used by policymakers such as in the case of the United States, Millennium Challenge Account (MCA) launched by American president George W. Bush. The purpose of this campaign was to allocate hundreds of millions of dollars grants to countries that are performing well in governance. To measure governance, the United States government opted for five indicators from WGI.

Civil societies, the academic communities, national governments, and international agencies around the world have focused and emphasized the necessity of good governance. Countries face appreciation or criticism based on the presence or lacking governance mechanism, respectively. Due to internationally acceptance of these governance rankings as a benchmark, these indicators are widely used by authorities (Huque & Jongruck, 2018).

Huque and Jongruck (2018) further added that the World Bank's Worldwide Governance Indicators (WGI) are of high importance for developing countries as they are mostly dependent on World Bank assistance. Despite some limitations, WGI is the best tool for measuring the deviations in certain features of the state of governance state in a country.

These Worldwide Governance Indicators by the World Bank has extensively been used in the literature of governance such as (Andres et al., 2015; Ahamed & Mallick, 2019; Asongu & Nwachukwu, 2019; Bilan et al., 2019; Henry et al., 2019; Asongu & Odhiambo, 2020a; Asongu & Odhiambo, 2020b).

2.2.4 Environmental Sustainability

The initial dominance of the phrase sustainable appeared in 1980 when the International Union for Conservation of Nature (IUCN), along with the UN Environment Programme (UNEP) and World Wildlife Fund (WWF), published a report (IUCN, 1980).

The concept of sustainability is driven from the necessity of economic development by consideration of social and economic factors (Purvis, Mao & Robinson, 2019).

The primary cause of environmental damages by several countries are the emission of heat-trapping gases in the environment. The main reason for the damage is that most of the countries are underdeveloped or emerging economies. To boost their economic activities, such countries compromise environmental quality and prefer economic growth over environmental sustainability (Usman et al., 2021). In fact, economic activities are essential for the survival of a state. However, there is a need to create a mechanism so that economic activities are not achieved at the expense of environmental sustainability.

There are various schools of thought that explain the different reasons for environmental damages. For example, the proponents of the “environmental Kuznets Curve” hypothesis believe that developed countries are supposed to have a favorable impact on the environment. The main reason behind this notion is that in contrast to economically developed nations, the underdeveloped or developing countries rely on pollution-intensive outdated technologies to achieve economic growth (Majeed & Tauqir, 2020). On other hand, “pollution haven hypothesis” asserts that increase in trading activities and foreign direct investments in developing countries leads to environmental degradation due to weak environmental regulations in such countries (Majeed & Tauqir, 2020).

The increase in greenhouse gases causing environmental damage has grabbed policymakers' attention to articulate such strategies that would minimize the impact on the environment by opting for green practices (Sharif et al., 2020). To tackle increasing pressure due to rising world population, a growing pattern of resource consumption, environmental deprivation, and climate change, it is highly essential to take steps for sustainable

development in the world, for achieving United Nation's (UN) Millennium Development Goals (Lam & Yap, 2019).

To gauge the environmental footprints, various studies have used different proxies. For instance, Le, Le and Taghizadeh-Hesary (2020) use CO₂ emissions to indicate greenhouse gasses. The environmental damages cannot be reverted without swift reductions in CO₂ emissions (Le, et al., 2020). Nizam, Ng, Dewandaru, Nagayev and Nkoba (2019) adopt environmental and social sustainability ratings as a proxy for environmental sustainability provided by the MSCI ESG Research database. However, these data cover selected entities in a country and do not exhibit an overall country's overall situation of the environment.

Furthermore, Bhattacharya, Churchill and Paramati (2017) consider CO₂ emission, renewable energy consumption (as a sum of solid, liquid and gaseous biofuel-derived energy, wind, solar, hydro, geothermal, and marine waste, measured in Terajoules) and non-renewable energy consumption (as a sum of oil, gas, and coal in Quadrillion Btu). Moreover, Saidi and Omri (2020) use CO₂ emissions, renewable energy consumption (REC) proxied by combustible renewable and waste percentage of total energy for environmental footprints. On the other hand, for environmental quality, Salahuddin et al. (2020) use energy intensity, aggregate national savings, and CO₂ emissions.

Unlike various studies that relied upon CO₂ emission and few indicators only, this thesis used a novel proxy of environment sustainability based on an index created on 17 various indicators provided by the World Bank, which is discussed later in Chapter 3.

2.2.5 Social Sustainability

The concept of social sustainability emerged in the 1987 Brundtland Report, *Our Common Future*. The report emphasized that sustainable development can be achieved by wellbeing of human livelihood through economic development (Vallance et al., 2011). The report further defines sustainability as “meets the needs of the present without compromising the ability of future generations to meet their own needs” (Vallance et al., 2011).

Sustainable communities as “places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all” (Office of the Deputy Prime Minister, 2003, p. 5). This definition stresses the necessity of social justice and equity by highlighting humans' basic needs and their well-being (Eizenberg & Jabareen, 2017).

To define social sustainability, various authors associated social sustainability with different factors. For instance, according to Jabareen (2006), social sustainability can be achieved through urban planning by providing sustainable transport, passive solar design, density, mixed land uses, and passive solar design. Dempsey, Bramley, Power and Brown (2011) define social sustainability is the process of managing and recognizing the adverse and buoyant business, environmental, technological, economic impacts on human lives.

After the industrial revolution in the 18th century, the world has been in the race of producing more and more goods to meet the consumers' demand from depleting and limited natural resources that is negatively impacting environmental and social sustainability (Beier et al., 2017; Muller et al., 2018).

Social sustainability is still an emerging area and lacks a clear definition (Ahman, 2013). Moreover, the selection of the indicators for social sustainability is not based on the theoretical ground; instead, it is used by researchers and policymakers according to a practical understanding of current political agendas and discretion (Littig & Griebler, 2004). It is a wide-ranging concept that addresses the utmost aspects of the human world (Beier et al., 2017). In a nutshell, for social sustainability, it is ensured that the population in a region has access to basic human necessities such as education, access to clean fuels for cooking, access to electricity, medical facilities, employment, etc.

There are various steps of bringing social sustainability to a region. Government spending on education is considered one of the most profitable investments in the long-term for society's social sustainability. The government expenditure on education includes maintaining and building schools and universities, salaries for teachers, supplying technical and physical tools to education institutions, and supporting scientific research development. Governments in developed countries heavily invest in education sectors; for example, France spends almost 2.24% of its GDP on education which leads it to the 12th highest spending on research and development in the world (Ozatac et al., 2018).

Further, government spending on education can increase growth in literacy rate that is also a crucial part of social sustainability. For example, in advanced economies, insurance is considered as a significant part of the society (Brokesova et al., 2014). Moreover, insurance is also considered an essential tool for human wellbeing and the economy (Lee et al., 2018). In this context Lee et al., (2018) strong and positive relationship between literacy rate and demand for insurance.

Access to clean fuel for cooking is another aspect that is necessary for human wellbeing and a better environment (Hishan et al., 2019). Introducing and providing modern technological instruments to a population for cooking purposes can shift them from unhealthy cooking fuels to healthy and environmentally friendly alternatives (Murshed, 2020).

Providing safely managed drinking water and sanitation is also the central aspect of social sustainability. In September 2015, the UN General Assembly for the 2030 agenda established an objective for Sustainable Development Goal (SDG) no. 6 of sanitation and drinking water. The SDG 6.2 clearly states that clean drinking water and safely managed drinking water is a fundamental human right (Bain et al., 2018). Hence, it can be said that providing basic human needs is essential for social sustainability in a region. For economic growth, a country must provide necessities to its population that will have positive results in the long-term.

Many economic, social, and environmental problems continue to plague Asian economies. A substantial portion of the population, almost 40%, lives below the poverty line in South Asia (USD 1.25 per day). Furthermore, approximately 20% of the population does not have access to clean drinking water. Furthermore, it consumes the least energy per person worldwide (Younis & Chaudhary, 2017). According to the report by Economic and Social Commission for Asia and the Pacific, a substantial number of poor people still reside in the Asia-Pacific region despite leading the world in poverty reduction. Approximately 400 million people lived in extreme poverty in 2013, according to the latest estimates. In the same time frame, it was observed that the percentage of those deemed to be in a vulnerable condition were making less than \$3.10 per day (ESACP UN, 2017).

Despite the fact that poverty has declined significantly in Asia and the economy has grown steadily, the richest people have disproportionately benefited, leading to an increase in inequality. At present, income inequality varies greatly from country to country. Kazakhstan and Pakistan, for example, have income shares that are six times that of the poorest. In Malaysia, however, income shares that are almost 20 times that of the poorest. This means that the wealthiest 10 per cent of Malaysians own 35 per cent of the country's income, whereas the poorest have less than 2 per cent (ESACP UN, 2017).

By considering a wide range of crucial indicators for a sustainable society, the present study develops a broader measurement of social sustainability in contrast to previous studies that relied on narrow indicators. This study evaluated social sustainability using a variety of indicators and measured it via alternative proxy measures, since it has a wide range of indicators in its scope.

2.2.6 Financial Inclusion

Financial inclusion can be referred to as having access to affordable financial services offered by sound and sustainable organizations. The financial services include but not limited to, insurance, investments, saving, and borrowing offered to financially underserved segments. The financially underserved segment is referred to those who do not have a bank account (Patwardhan, 2018). Jahan et al. (2019) defines financial inclusion “as the broadening of access to and usage of financial services, particularly within segments of the population who have traditionally faced formal or informal restrictions”.

Various studies show that financial inclusion is necessary for poverty alleviation, aiding entrepreneurs to start or expand businesses, enabling youth to invest in their education. Additionally, impacts by financial inclusion on consumption, employment status,

mental health, and income were found to be positive. The promoters of financial inclusion claim that usually, individuals who do not have a bank account rely on informal financial channels for savings, credits. Those informal financial sources are expensive and not flexible as compared to formal financial services (Patwardhan, 2018).

Several studies on financial inclusion, especially on cross country studies, have used different proxies to measure financial inclusion. Typically, the majority of authors measured financial inclusion by bifurcating proxies into three categories that are accessibility, availability, and usage of banking services. Sarma (2008); Sarma and Pais (2011) compute the index of financial inclusion using these previously mentioned three dimensions. Accessibility was measured by ‘number of bank accounts per 1000 population. For the availability of banking services, they used ‘number of bank branches and ATMs per 100,000 people’. Usage was measured through a ‘volume of credit and deposits relative to GDP.’

Patwardhan (2018) argues that although a number of bank account ownership is a better measurement for financial inclusion. However, it is not a true measurement for policymakers to assess exact amount of people that are unbanked. Sarma and Pais (2011) explain that only the number of a bank account doesn’t show an exact picture of financial inclusion; more importantly, it is also necessary to assess whether banking services are adequately utilized.

Vo, Van, Vo and McAleer (2019), in their study, measure financial inclusion by a supply-side⁴ factor that was ‘number of bank branches over 100,000 adults. Number of bank

⁴ Usually, scholars divide proxies of financial inclusion into two categories that are demand-side and supply-side factors. Example of supply-side dimensions is banking penetration, availability of banking services, and usage. Furthermore, the demand side factors include the socio-economic characteristics such as income, education, age and gender from the demand

branches to measure access and number of bank accounts to measure usage of banking services were used by (Inoue, 2018).

Furthermore, Babych, Grigolia and Keshelava (2018) bifurcate financial inclusion into three categories. For access to financial services, they used ‘number ATM bank branches per 1000 adults and the number of Payment Service Providers branches. For ‘usage’ of financial services, they use ‘number of credit and debit accounts, the volume of deposits and credits to households, and small-medium enterprises. Moreover, for the ‘outreach’ of banking services, they use ‘demographical and geographical penetration of financial services.

Lenka and Barik (2018) calculate the financial inclusion index for SAARC countries using three dimensions. In their study, dimension-1 was ‘geographic penetration’ calculated by the number of ATMs per and the number of bank branches 1000 Km². Dimension-2 was ‘demographic penetration’ proxied by the number of ATMs and the number of bank branches per 100,000 adults. Lastly, dimension-3 that is ‘banking usage penetration’, was measured by the volume of deposits and credit in the private sector as a percentage of GDP.

Wang and Guan (2017) and Tu et al. (2019) argue that dimensions to measure financial inclusion proposed by Beck, Demirguc-Kunt and Peria (2007) are comprehensive measurement. However, such dimensions will only give useful information or true picture when those are used together. On the other hand, Wang and Guan (2017); and Tu et al. (2019) further assert that three dimensions of accessibility, availability, and usage of banking services given by Sarma (2008) to measure financial inclusion, has its own major drawback,

side. On the other hand, supply-side factors include individual attitudes and perceptions which influence the decision to use financial services.

for example, two dimensions of accessibility and availability may possibly have an issue of multicollinearity because both dimensions are almost same. The detailed discussion for measurement of financial inclusion is presented in Chapter 3.

2.3 Conceptual Framework

This section covers the fundamental theoretical underpinning which shapes the origin of this study. The theories describe the several characteristics of human conduct or execution. These theories arrange and deliver notions to scrutinize and to explicate relationships between concepts.

This study is anchored by a stakeholder theory proposed by (Freeman, 1984) which discusses the concerns, stakes and demands of all stakeholders to the entities. Following Flak and Rose (2005), Nie et al. (2019), Lam and Yap (2019) this study will use stakeholder theory in the broader term, which is on macro level.

2.3.1 Stakeholder Theory

Freeman (1984, p.46) defines “A stakeholder is (by definition) any group or individual who can affect or is affected by the achievement of the organization’s objectives.” Consequently, stakeholder theory has been considered and studied from a variety of perspectives. However, few studies have applied stakeholder theory to the governance quality of a country and how it impacts firm and institutional performance.

By implementing regulations and policies, a government's effectiveness or, in other words, good governance, can contribute to a country's financial efficiency and stability. As well as attracting foreign investors, good governance in a country can also led to the creation of jobs and investment inflows that can support financial stability. Governments are

constantly concerned about maintaining a stable and efficient financial system in a country and ensuring the smooth functioning of its financial institutions for a variety of reasons. In most countries, governments run welfare programs (which are also essential to financial stability) through banks in order to develop their populations, such as health insurance, programs to alleviate poverty, loans to small and medium-sized businesses, microfinance, etc.

A majority of industries and sectors in an economy depend on financial institutions, especially banks, for their working capital and investment needs. In the event of a financial crisis, all sectors and industries will be affected, which in turn will lead to a financial crisis in the country as a whole. Babar, Latief, Ashraf and Nawaz (2019) also endorse that banking is the main driving force of the complex economic system of the world as they mobilize and allocate scarce resources. Therefore, a stable and efficient financial system promotes sustainable economic growth (Babar et al., 2019). Therefore, governments are interested in maintaining financial stability and efficiency by improving the performance of financial institutions. On the other hand, financial institutions also have a stake in governments to run their operations smoothly and profitably.

In real life, the collapse of Lehman Brothers caused a financial crisis in the US markets after which the world witnessed a financial crisis throughout a number of countries. In September 2008, when Lehman Brothers filed for bankruptcy, the global financial crisis reached its peak (King, 2019). Thus, in order to maintain financial stability in a country, the financial sector requires continuous supervision and government support.

In 2008, a bailout package of \$2.7 trillion from the US government (18% of 2008 US GDP) and \$1.5 trillion from the UK government (69% of 2008 UK GDP) demonstrated the

relevance of stakeholder theory to governments' concerns regarding financial stability and smooth running of financial institutions (King, 2019). In this way, the government has always had an interest in the financial stability of a country through its financial institutions. Heath and Norman (2004) state that it is “astounding how seldom” the government is debated in the literature about the practical implications of stakeholder theory. Therefore, many scholars emphasize that governments as a stakeholder should ensure continuous involvement in their economic and financial system to avoid a similar financial crisis in the future (Dahan et al., 2015).

Additionally, through branch banking, the government has a wide and deep reach into rural areas, sometimes requiring banks to offer loans for agricultural and infrastructure development. Meanwhile, governments administer welfare programs through banks; for this reason, they are also concerned with increasing financial inclusion in a country so that they can reach out to untouched segments of their population using banks. Considering stakeholder theory, it can be said that governments have a stake in the stability of financial institutions in order to conduct development programs in underdeveloped areas.

Qazi and Khushk (2019) explain that governments, through microfinance, focus the population where the banking system is not developed due to relatively high banking costs, low population density, and illiteracy⁵, for this reason, branchless banking is introduced. Microcredit programs can be successful in the delivery of financial services by adopting digitalization and automation. Moreover, banks are also working to increase financial

⁵ For example, in rural areas where there is no basic infrastructure, people live in far distant regions from where services are available and have a low rate of literacy. Banks do not operate in such areas due to high banking costs relative to the population's income, and due to minimum education, people are reluctant to use banking facilities voluntarily.

inclusion and to increase their customer base. Hence, financial inclusion is increased when banks get more customers through government-run programs. Increase in financial inclusion has a positive impact on financial stability (Morgan & Pontines, 2014; 2018).

It is true that the quality of government can affect the economic and financial stability of any regime in a number of ways, including managing stock exchanges, foreign reserves, exchange rates, creating business opportunities, implementing poverty alleviation programs, constructing infrastructure, etc. Meanwhile, the government plays an important role in financial stability as a stakeholder and regulator, since it regulates the financial institutions in a specific manner. Therefore, the smooth operation of financial institutions is beneficial to the health of the financial system and will contribute to the stability of the economy and financial system.

The financial sectors are highly regulated in any country. As a stakeholder, governments can affect the financial sector through legislation and can exert pressure on financial institutions by regulators. Any policy implication can affect the stability of the financial sector. At the same time, destabilization in the financial sector can affect governments by causing the financial crisis. Hence, it can be said that governments and financial institutions are stakeholders to each other.

The stakeholder theory can be used in the context of the governments and their policies, performance, and effectiveness. Flak and Rose (2005) endorse that governments can also be considered as a business entity with stakeholders (that are its population) in mind. They further argued that the government's institutions and agencies are also run as business entities because they strive to make decisions that are in the best interest of their stakeholders. Nie, Ibrahim, Mustapha and Mokhtar (2019) as well use stakeholder theory in

their study by considering government agencies and institutions as a firm and people who are affected by policies of government as stakeholders. Lam and Yap (2019) conduct a stakeholder analysis for port cities of China. They considered the government as a stakeholder in the form of the port regulator or port operator. Therefore, there is no theoretical differences between stakeholder theory and the government's motive of introducing policies and facilities for its population and organizations society's stakeholder (Flak & Rose, 2005).

The other context in which the stakeholder theory is extensively used in the literature is society's environmental and social sustainability (Hussain et al., 2018; Freudenreich et al., 2020). To achieve higher economic growth, the world has witnessed an unprecedented consumption of natural resources that have negatively affected environmental sustainability in the form of climate change. Due to climate change, many countries have been affected by natural disasters such as floods, typhoons, droughts, and other catastrophes. These natural adversities have not only affected society in economic terms but also caused causalities. Hence, authorities, policymakers, and society as stakeholders, in general, need to work for environmental sustainability that would ensure the sustainable economic growth of the country (Saidi & Omri, 2020) and increased financial inclusion (IPA, 2017; Baulch et al., 2018).

Moreover, social sustainability aims at the well-being of human life. For social sustainability, the necessary measures are taken that are associated with the quality of human life. The stakeholder theory is related to those who can affect or be affected by the entity (Hussain et al., 2018). Hence, this study sheds light on the importance of a socially sustainable society that is crucial for the country's prosperity. For instance, Amin (2020)

argues that a socially underdeveloped society (where the population lacks education, health facilities, income equality and basic human needs) weakens the country's economic growth, and such individuals do not participate in the economy. Therefore, when the society is socially sustainable, the individuals contribute and participate in the national economy and formal financial system that will ultimately increase financial inclusion in a country and maintain financial stability through economic prosperity.

The stakeholder theory is also relevant for environmental and social sustainability on a firm-level as it advocates that organizations operating and consuming the resources from society must return to society, and it also supports the concept of value creation not for only shareholders but society as a whole. The value creation can be in the form of corporate social responsibility and sustainability initiatives. The stakeholder theory is the crucial concept that is discussed in environmental and social sustainability issues (Tapaninaho & Kujala, 2019). It is the modern theory in this era that enables to redefine and understanding the role of organizations and value creation in society (Tapaninaho & Kujala, 2019). Cooper, Henderson and Kish (2019) argue that literature for firm's environmental and social sustainability is based on stakeholder theory that states that firms must address the interest of the wider group of stakeholders.

Eventually, this theory advocates that financial performance and social performance of the firms are positively correlated. Javed, Rashid, Hussain and Ali (2020) claim that the stakeholder theory supports the narrative of the positive effect of organization's environmental and social sustainability on reputation and the financial performance of the firm. Stakeholder theory proposes that by implementing socially responsible practices an organization can have a competitive advantage over other competitors by having reduced

operating costs and attracting more stockholders (Manrique & Marti-Ballester, 2017; Siueia et al., 2019). Hence, corporation's environmental and social sustainability practices may increase financial inclusion as banks will gain more customers.

The European financial regulators are considering the vulnerability of banks to climate risks (Hook, 2018). They are also introducing regulations such as carbon stress tests for banks to mitigate environmental risks that can affect the financial system. Gangi, Meles, D'Angelo and Daniele (2019) point out that there are no doubt bank administration authorities are apprehensive about unanticipated climate change that can create a systemic risk to financial stability by weakening bank's lending portfolios. Furthermore, when banks design their lending policy by considering environmental sustainability, they will be able to cope with non-performing loans. Cui, Geobey, Weber and Lin (2018) studies China's green credit policy and found that green loans⁶ reduce non-performing loan ratios for Chinese banks.

As previously argued, banks are a vital factor for the financial stability of any country because all other sectors and industries are dependent on banks for their funds. Hence it can be said that for the financial stability of the country, it is necessary that the financial sector of that country, especially the banks, should also focus on the contribution to the environmental and social sustainability. Siueia, Wang and Deladem (2019) by applying

⁶ Green loans or green credit policy are referred about sustainability practices followed by banks in which they lend loans on discounted rates to companies that qualified for such loans. Pollution control facilities, environmental protection and infrastructure, renewable energy, circular economics, and environmentally friendly agriculture all qualify for loans with reduced interest rates under the policy. Loans to polluting industries are to be limited and even withdrawn when environmental controversies or regulatory non-compliance occur.

stakeholder theory find significantly positive relationship between firm's sustainability practices and financial performance of banks.

Consideration of banks for contributing to environmental and social sustainability will increase the financial performance that is good for financial stability, and at the same time, it will improve their reputation that will increase their customer base; in other words, it can be asserted that increase in the customer base of banks will result in an increase in financial inclusion. Bose et al. (2017) design their study of financial inclusion on stakeholder theory and explain that products and services offered by the banks (considering betterment of society by offering easy loans) can attract new customers and may have a positive and significant impact on the unbanked population for example loans offered to farmers (which is not affordable by farmer otherwise).

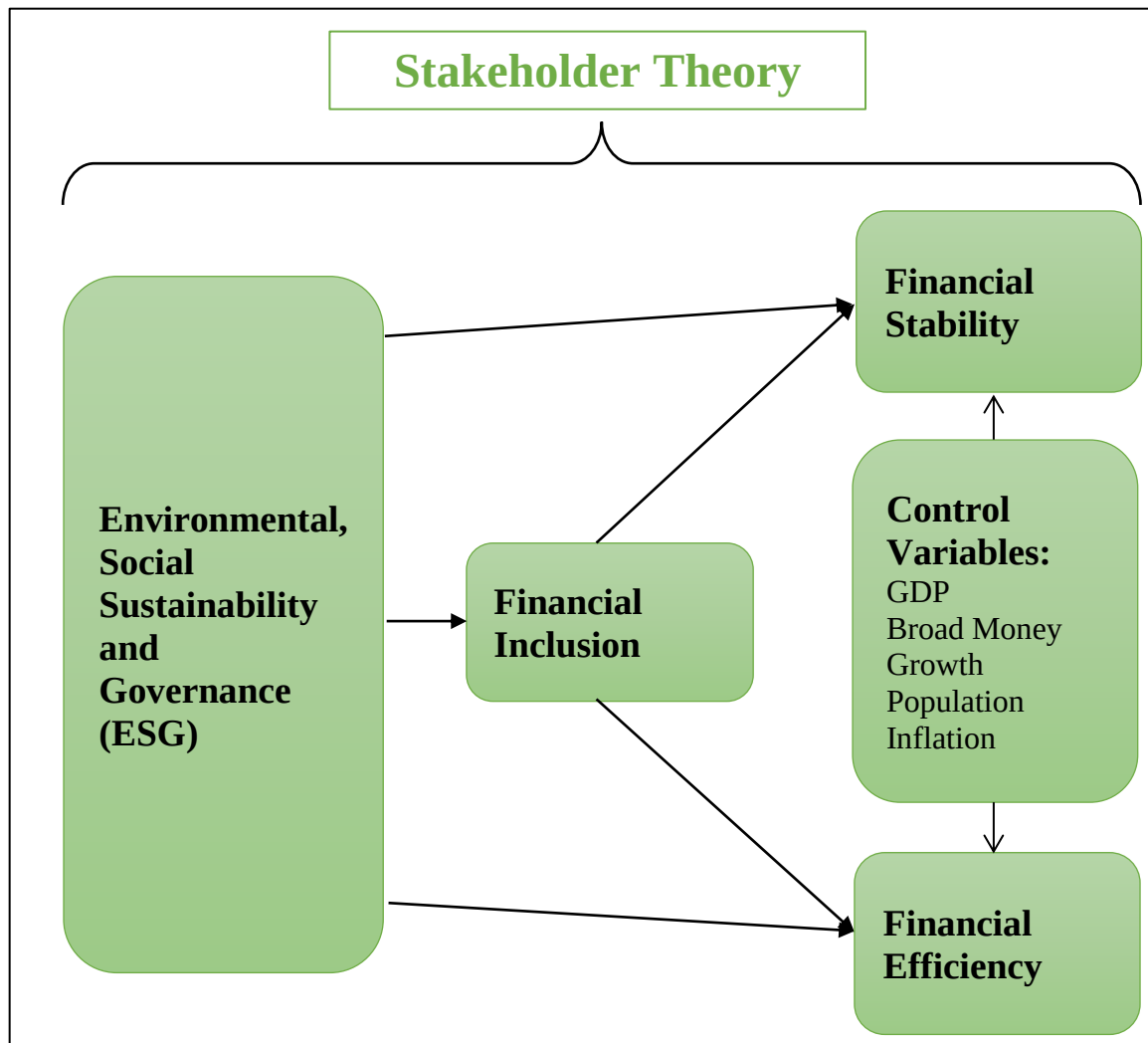


Figure 2.1: Conceptual Framework

2.3.1.1 Summary of Stakeholder Theory in the Context of the Present Study

Since the financial system is interconnected with other sectors, ensuring smooth operation of financial institutions is essential for the financial system's stability. A variety of sectors in any economy are dependent on financial institutions for their investments, working capital, and other needs, including line of credit, line of credit, etc. It is important to acknowledge that the government has a significant stake in the stability of the financial

system in a country and that the government can contribute to financial stability by implementing policies and regulations through central banks and other government agencies.

A well-functioning government will, at one end, result in financial stability and attract more investments that will result in more job opportunities. Additionally, when the government administers welfare programs through financial institutions, these institutions will be able to attract more customers, thus increasing their financial inclusion. Environmental measures, such as reducing carbon emissions or promoting renewable energy, can reduce climate change risks and enhance financial stability. The promotion of diversity, fair labor practices, and consumer protection can help improve societal well-being, public trust, and ultimately, financial stability. ESG plays an important role in promoting responsible and sustainable business practices in the financial sector.

Stakeholder theory can contribute to improved financial stability and efficiency by considering environmental, social and governance factors (ESG) in the financial sector. Financial inclusion serves as a mediating mechanism, facilitating the influence of environmental, social, and governance factors on the financial sector. As countries integrate ESG considerations into their decision-making processes and foster financial inclusion, they can create a financial system that is more resilient, sustainable, and inclusive.

2.4 Hypothesis Development

A review of literature from the past will be presented in this section to confirm the existence of possible relationships between the variables of this study and to propose hypotheses. According to Mourougan and Sethuraman (2017), problem statements and research questions are reformulated and clarified into hypotheses. By investigating further, a hypothesis can be tested to determine whether it accounts for a set of facts. Hypotheses are

statements that express the relationship between multiple variables. To test the proposed relationships, hypotheses should have clear implications (Mourougan & Sethuraman, 2017).

2.4.1 ESG and Financial Stability

This section explores the relationship between governance quality, environmental and social sustainability (ESG), and financial stability (FST) of a country. Individual variables are discussed along with their relationship to financial stability. Section 2.4.1.1 examines the relationship between governance quality and FST, whereas section 2.4.1.2 examines the relationship between environmental sustainability and FST. While section 2.4.1.3 reviews the literature explaining the relationship between social sustainability and FST.

2.4.1.1 Governance Quality of Country and Financial Stability

It was well described in previous sections that for the financial stability of any country, the financial stability of financial institutions is mandatory due to their interconnectivity with other sectors of the country. This section will cover the study supporting the argument that efficient governance in a country aids financial stability in the country.

As a measure of governance quality, Cieslik and Goczek (2018) find that the World Bank governance indicator (WGI) has a positive and statistically significant effect on the investment ratio and real GDP per capita. They describe in their study how a lack of good governance in a country contributes to corruption and adversely affects growth as investors divert their investments elsewhere. Thus, a decrease in return on investment (ROI) and a reduction in private investments will cause a decline in job creation, financial growth, and sustainable development, leading to an increase in poverty. Nevertheless, their study did not

take into account the factors of governance that may have an impact on FST in the financial sector.

Sayilir, Dogan and Soud (2018) assess the relation between governance (measured through Worldwide Governance Indicator) (WGI) and financial development. The study discusses aggregated energy and its consumption, that is, the relative role the different energy sources may play in explaining movement in output. Yet there is no discussion about financial and economic growth. According to them, financial development significantly contributes to the financial stability of countries by increasing the efficiency and effectiveness of financial markets and the intermediation process, which results in the expansion and deepening of access to capital and financial services. According to their findings, there is a significant positive relationship between the level of governance in a country and its level of financial development. Therefore, a country's financial stability can be improved through good governance or effective government. Nevertheless, Sayilir et al. (2018) limited their study to the year 2012 and did not examine the long-term relationship between variables.

Francis (2004) use WGI for their studies and concluded that not only investment volatility is decreased by good governance, but their results suggested that in comparison to macroeconomic measures such as inflation, etc. these governance indicators are capable of explaining better results to examine any threat to financial stability. The study has discussed the relationship of governance quality with investment volatility, as a proxy for the disability, while the research has been unable to explain this relationship with other proxies for instance the bank Z Score or the profitability.

Transparency is considered an important part of good governance (Tavares & da Cruz, 2020). The paper's objective is to ascertain whether transparency is mainly driven by leadership, capacity and other political traits. Kaufmann and Kraay (2002) claim that good quality governance and income per capita are correlated positively across countries. This confirms the narrative that for economic development, good governance is highly important. Furthermore, they added that improvement in governance was observed in the absence of virtuous circles.

The governance quality is measured through six dimensions of voice and accountability, political stability and absence of violence, control of corruption, the rule of law, regulatory quality, and government effectiveness, also known as Worldwide Governance Indicators (WGI) proposed by the International Monetary Funds. Voice and accountability ensure that foreign and local investors are provided protection from any threat in a country. Furthermore, theoretically, political stability and control of corruption, the rule of law; and investments inflows have a significantly positive relationship, in case of political instability or presence of violence, investors skim out their investments to other regions with better governance conditions (Sabir et al., 2019). The author does not explore alternative approaches to measuring governance quality or discuss the limitations of the WGI. In this they do not mention any criticisms of the WGI or its dimensions, such as its limited ability to capture informal practices or its heavy reliance on quantitative data.

Additionally, a country's good governance can play a significant role in attracting foreign investors, which will result in increased foreign direct investment, as well as encouraging local investors to invest in their own country, thereby contributing to the development of the infrastructure of the country (Andres et al., 2015). They do not discuss

potential limitations or criticisms of this relationship, such as the complexity of the investment decision-making process or the possible influence of other factors, such as market size or natural resources.

In their study, Saber et al. (2019) investigate the impact of good governance on the inflow of foreign direct investments (FDIs). They explain that FDI is the main ingredient for financial and economic growth as due to an increase in globalization, FDI facilitates technological transfers to developing countries from developed countries, and this phenomenon will aid in the increase in industrialization, job creations, and the inflow of funds to financial institutions. They found that sound governance impacts FDI.

In their study, Cieslik and Goczek (2018) use the 'Control of Corruption' variable from the World Bank WGI. The researchers conclude that corruption reduces the return on investment; however, it increases its variance; as a result, investment is discouraged. Additionally, it was found that controlling corruption increased the investment ratio, as well as the growth rate of real per capita GDP. According to their study, corruption is also responsible for the destabilization of the financial system. As a result, a country that has good governance will be able to attract investment.

Good governance has been studied extensively with the nexus of other variables other than economic growth, such as democratic stability, etc. (Rothstein & Teorell, 2008). They do not provide any further details or examples of these studies, nor does they discuss the implications of these studies for the relationship between governance and economic growth. However, an effective governance system or good governance can also be assessed by the economic growth of a country. In this context, economic growth will lead to the improvement of the well-being of the population and their better life (Woo, 2018).

Helliwell, Huang, Grover and Wang (2018) study the relationship between good governance and national well-being. In their concluding remarks, they state that due to a change in governance quality, there are more substantial results in the form of an improved economy. When any country has better regulatory quality, institutions in that country operate effectively, and the quality of institutions, whether they belong to the public or private sector, are improved. Better regulatory quality leads to better institutions in a country, and better institutions lead to attracting foreign direct investments (FDI) that are the backbone of financial stability. They have to discuss the broader implications of the study for policy and practice, such as the importance of improving governance quality for economic and financial stability. It was also witnessed by Benassy-Quere, Coupet and Mayer (2007) while studying on impact of institutional quality on FDI; they find that bureaucracy and corruption have a negative impact on FDI. Furthermore, they added that better quality institutions always raise the amount of FDI.

A study conducted by Jindra and Vaz (2019) examines the relationship between good governance and poverty. The authors explain that good governance facilitates the development of a private sector in a country, which in turn leads to economic growth and poverty reduction. It was concluded that governance reforms are one of the most important ingredients for the reduction of poverty.

As a result of the review of the literature, it can be concluded that when the quality of governance in a country improves, it contributes positively to the financial development of the country (Cieslik & Goczek, 2018). In parallel, good governance contributes to enhanced efficiency of the financial markets and the intermediation process (Sayilir et al., 2018) as well as to the smooth flow of funds in the region (Andres et al., 2015; Sabir et al.,

2019). A smooth flow of funds may further facilitate the financing of high-yielding projects through financial intermediation and allow lenders and borrowers to allocate resources more efficiently (Malik, bin Md Isa, Jais, Rehman, & Khan, 2021).

2.4.1.2 Environmental Sustainability and Financial Stability

It is important to note that environmental sustainability encompasses a wide range of issues, including greenhouse gas emissions, climate change, waste, deforestation, pollution, and exploitation of natural resources (Taliento et al., 2019). There have been numerous studies that have demonstrated the relationship between environmental sustainability, economic growth and financial stability (Saidi & Omri, 2020). For instance, Sari, Ewing and Soytas (2008), in their study for the United States, state that renewable energy, which is crucial for the environment, plays a vital role in fostering economic and financial growth. The study discusses aggregated energy and its consumption, that is, the relative role the different energy sources may play in explaining movement in output. Yet there is no discussion about financial and economic growth.

In addition, Lin and Moubarak (2014) examine the relationship between renewable consumption and economic growth in China. It was shown that there is a two-way causal relationship between Chinese growth and renewable energy consumption in the long run. An analysis of the Portuguese region, Leitaó (2014), examines the relationship between greenhouse gas emissions, economic growth, and the use of renewable energy. The results of generalized methods of moments (GMM) indicated a positive association between the variables. Additionally, Khoshnevis Yazdi and Shakouri (2017) examined the relationship between economic growth, renewable energy consumption, globalization, energy, and urbanization, and found long-term relationships.

Regarding the financial sector, few studies have examined the relationship between environmental sustainability and financial stability (Kamran et al., 2020). Kamran et al. (2020) investigate the impact of climate change on the stability of financial institutions in ASEAN countries and find that climate change adversely affects the stability of financial institutions. Additionally, green financing enhances the stability of banks⁷.

To promote sustainability, the Chinese government introduced Green Credit Policy for its financial sector in 2007. According to Cui, Geobey, Weber, and Lin (2018), this policy has reduced the credit risk of Chinese banks. Furthermore, they state that this policy also contributes to the financial and environmental performance of Chinese banks.

As companies lead environmental sustainability practices, they benefit both themselves and society at large (Kim & Kim, 2014). It enhances competitiveness and efficiency, enhances corporate reputation, reduces operating costs and financial risks, and enhances consumer confidence, for example (Flammer, 2015; Taliento et al., 2019).

Meanwhile, some researchers have expressed concern over the sudden shift in policies and regulations relating to low-carbon economies in favor of environmental sustainability. It is argued by Nieto (2017) that if environmental sustainability policies are implemented in a rapid manner, it will give the impression that an economy is uncertain. This would result in sudden depreciation of fossil reserves, rise in energy costs, economic

⁷ Green financing/Green lending/loans or green credit policy are referred to as sustainability practices followed by banks in which they lend loans on discounted rates to companies that qualified for such loans. In order to qualify for the lower interest rates loan under the green loans/lending policies, the loan must be acquired for environmentally friendly agriculture, circular economics, renewable energy, environmental infrastructure and protection, and pollution control facilities. Moreover, in the case of regulatory non-compliance and environmental controversies, the loan must be withdrawn or limited to polluting industries.

obsolescence of capital stocks and other investments, and the market value of organizations will be revalued downward with regard to their exposure to carbon-intensive technology and resources. Furthermore, this will have an adverse impact in the long term in many ways like (a) due to changes in the cost of capital, demand for products, and increase in costs associated with the supply chain, GDP growth could be impeded, and (b) the decrease in value of such financial assets that are dependent on usage or extraction of combustible products such as coal, natural gas, or oil (this can be said as environmental risk).

Therefore, it can be said that the financial sector would be a victim of financial risks due to the unsystematic transition to environment sustainability policy. Banks would be affected by systemic risk in two ways. Firstly, their assets that are exposed to elevated environmental risk would be devalued and secondly, by impaired GDP growth. As of December 2014, European banks' lending of €1.35 trillion pertained to the sector that is involved in the exploitation of oil and gas (Nieto, 2017).

As a result, the impact of environmental sustainability on FS and FI is proposed on the basis of studies that emphasize the link between environmental sustainability and economic growth of a region (Sari et al., 2008; Lin & Moubarak, 2014). As reported by Khoshnevis Yazdi and Shakouri (2017), renewable energy usage in a country is positively correlated with economic growth in the long run. Furthermore, Cui et al. (2018) report that a policy of green credit in China has significantly reduced the financial institution's credit risk. Accordingly, financial stability will be enhanced when environmental sustainability is adopted as a policy at the firm and national levels. Moreover, the commitment of firms to switch towards environment-friendly technologies would also increase the customers of

financial institutions (that need funds from financial institutions to finance their switching costs) which could increase their profitability.

2.4.1.3 Social Sustainability and Financial Stability

Individuals who are living without basic facilities such as clean fuel for cooking, safe drinking water, good medical facilities, access to electricity, access to the internet, education, and food for nourishment are considered socially excluded, as they do not have a good quality of life. It is impossible for an economy to grow exponentially if a large portion of its population does not have access to basic human needs. Bayar, Sezgin, Ozturk and Sasmaz (2017) explain that factors such as technological progress, institutional development, financial development, infrastructure development, capital stock, and human capital are significant determinants of sustainable economic growth. In this context, literacy may have a significant impact on economic growth through savings and financial sector development (Bayar et al., 2017).

Social exclusion is primarily a result of low schooling, inadequate infrastructure, such as a lack of access to basic facilities, and underdeveloped financial systems. There is a lack of time and willingness to participate in the national economy by those who are socially excluded⁸ (Amin, 2020). Social exclusion is not limited to income inequality in society; it becomes even more serious when certain segments of society experience a number of difficulties, including low skills, unemployment, low incomes, poor housing, discrimination, family breakdown, undernutrition, low life expectancy, and mortality rates (Aasland & Fleet, 2001 ; Amine, 2019). In addition to not participating in the political, economic, and social

⁸ As a socially excluded segment of the population always make efforts to deal with daily challenges such as the search for water, wages, food, etc. to fulfill their basic needs.

processes (Peleah & Ivanov, 2013), these excluded persons are unlikely to adhere to social norms and laws, and are likely to violate them (Amin, 2019). This can create uncertainty in society which is also the main hurdle to economic growth.

On the other hand, social sustainability is related to society's betterment and human beings' livelihood. This is the ultimate responsibility of the government. However, in some countries, due to the absence of social regulations, firms operating in such regions realize that governments are not providing adequate social services to their citizens (Khan et al., 2019). Therefore, firms commence the social responsibilities for society in different areas such as healthcare, research, and development education, and training in order self-empowerment of the individuals who do not receive any support from governments (Khan et al., 2019).

Moreover, when organizations in different sectors in any country perform well in terms of efficiency and profitability, this ensures the smooth running of overall business operations. Therefore, as a result, this phenomenon helps to maintain overall financial stability, especially in the financial sector. By working for sustainable development, organizations also develop goodwill in society. A positive reputation attracts potential customers; hence, this enhances their customer base, and again leads to an increase in profitability. For example, Fijalkowska et al. (2018) argue that significant studies have proved that corporate social responsibility and sustainability commitment has a positive relationship with bank financial results. They further explain that the positive impact of following corporate social responsibility and sustainability on bank performance is not only observed in countries like the United States but also in countries like Jordan and Ghana.

Generally, corporate social responsibility and sustainability are marketed as a way to provide an organization with an advantage internally and externally by presenting a positive

image. Numerous research studies have explored the relationship between financial performance and corporate social responsibility by promoting the viewpoint that by engaging more in, organizations will achieve better market and financial performance. As far as literature in this area is concerned, there is not much conclusive evidence. Researchers are divided on this issue. According to Cooper et al., 2019, some studies have found a positive relationship between two variables, while others have found negative and insignificant relationships between the variables.

Cooper et al. (2019) examine the impact of corporate social responsibility on the financial performance of the banking industry that receives a troubled asset relief program (TARP). They matched banks that received TARP with corporate social responsibility by performing multivariate and univariate analyses. They found that the capital ratios of banks that are highly active in corporate social activities as compared to other banks that are not and reinforced the idea that it created financial stability in the banking sector.

Xie, Nozawa, Yagi, Fujii and Managi (2019) investigate whether there is a relationship between corporate sustainability and corporate efficiency, and whether firms are complying with social, environmental and governance practices, as well as being efficient and profitable. In their study, the authors found a positive relationship between the efficiency of an organization and its disclosure of social, environmental, and governance issues. Thus, it can be concluded that by implementing corporate social responsibility and sustainability practices, financial institutions will be able to increase their efficiency, thereby improving their financial stability.

A further study conducted by Maqbool and Zameer (2018) examined the corporate social responsibility and sustainability of Indian listed commercial banks as well as their performance. They claim that their study shows that corporate social responsibility has a

positive impact on bank profitability, as well as on bank stock returns. In addition, they state that corporate social responsibility is a scarce and valuable resource that can be utilized to gain competitive advantage, and when corporate social responsibility is integrated into operations, social and financial objectives can be achieved easily, leading to improved financial performance and sustainable success.

The purpose of this study is to establish a narrative that advocates bringing social sustainability to the national level in order to promote economic and financial growth and financial stability. Secondly, following corporate social responsibility and sustainability by the organizations, the financial institutions' financial performance will be improved. This will lead to financial sector stability and further towards the country's financial stability.

Financial and economic prosperity are based on the well-being of the people and society of any country. The development of human capital is one of the most important factors for bringing economic and financial stability to the region, among other factors such as the development of institutions and infrastructure (Bayar & Gavriltea, 2018). In a socially unsustainable society, individuals with low literacy and no access to basic facilities are not capable of contributing to the national economy (Amin, 2020). Therefore, social sustainability may bring financial stability and increase the financial efficiency of financial institutions in the region.

The stakeholder theory provides a valuable perspective for understanding and predicting how a country's Environmental, Social, and Governance (ESG) performance affects its financial stability. Stakeholder theory acknowledges that ESG factors can significantly impact the economy of a country by taking into consideration the interests and concerns of a variety of stakeholders, such as investors, communities, and regulatory bodies. Stakeholder mapping and analysis allows identification of the specific ESG dimensions

relevant to each stakeholder group and assessment of their potential impact on financial stability.

Based on the previous studies discussed in sections 2.4.1.1, 2.4.1.2 and 2.4.1.3, the present study concludes that governance quality, environmental sustainability, and social sustainability may be associated with financial stability in Asia. Thus, the following hypothesis is proposed.

H₁: ESG has a significant and positive relationship with FST in Asia.

2.4.2 ESG and Financial Inclusion

This section examines the relationship between governance quality, environmental and social sustainability (ESG), and financial inclusion (FI) in a given country. Each variable is discussed along with its relationship to FI. Section 2.4.2.1 evaluates governance quality in relation to FI, whereas in section 2.4.2.2, environmental sustainability is evaluated in relation to FI. A review of literature on the relationship between social sustainability and financial stability is presented in section 2.4.2.3.

2.4.2.1 Governance Quality of Country and Financial Inclusion

Financial inclusion is "a process that ensures ease of access, availability and usage of financial services for all members of society" (Sarma, 2008). In the previous section, several studies mentioned that efficient governance in a country has a significantly positive effect on foreign direct investment inflows into a country. Hence, investment inflows will increase financial inclusion. For example, banks will receive cash inflows; on the other hand, those FDI inflows are solely for investment in a country that will boost monetary activity in the form of industrialization, job opportunities, purchase of material and labor services, etc. This process will ensure payments through banking channels, and the bank will gain more

customers in the form of new account holders. Therefore, this phenomenon will increase financial inclusion and financial stability at the same time. Machasio (2018) also found a positive impact of foreign cash inflows on financial inclusion through financial sector development. He further explains that due to cash inflows and outflows internationally, individuals (whether sender or recipient) increase their use of financial services.

Sayilir, Dogan and Soud (2018) suggest that for the development of the financial sector of a country, good quality of governance system in a country is a pre-requisite. Countries with good governance and effective governance system that ensure the rule of law, political stability, respect for debtors, and creditor's rights will motivate the population to escalate towards financial institutions; hence that will increase financial inclusion in a country (Eldomiaty et al., 2020).

Ajide (2017) reveals that a country's good governance system has a significant impact on financial inclusion in his study examining determinants of financial inclusion. Alhassan, Li, Reddy, and Duppati (2021) study the factors that affect financial inclusion. The authors concluded that political instability (a measure of Worldwide Governance Indicators) in the MENA region adversely affects the development of the financial sector and economic growth, as well as financial inclusion. In their study, they did not address whether political instability would also affect the level of governance, which directly impacts the financial stability of the country. The study focused on the effect of economic conditions, but the implications for political stability and governance remain unclear. Further research is needed to explore this link and better understand the implications for financial stability.

Through the review of the literature in this section, it is observed that good governance in the region increases the economic and financial activities (Andres et al., 2015;

Machasio, 2018; Sabir et al., 2019). Moreover, better governance also aids in the development of the financial sectors (Sayilir et al., 2018) and increase the confidence to individuals to participate in the formal financial system (Eldomiaty et al., 2020). Thus, there are logical reasons to believe that better governance could increase the financial inclusion in the country.

Moreover, further studies also suggest the supportive role of financial inclusion for financial stability in the region. For instance, Morgan and Pontines (2018) describe that increase in financial inclusion also diversify portfolios of the financial institutions that reduces the systemic risks. Besides, financial inclusion also decreases the probability of non-performing loans by reducing the dependency of financial institutions on customers that are limited in numbers but huge in size (Tomilova & Valenzuela, 2018).

2.4.2.2 Environmental Sustainability and Financial Inclusion

Since greenhouse gas emissions have increased, policymakers have designed policies and strategies to reduce environmental damage (Sharif et al., 2020). Thus, it is essential to examine the impact of environmental sustainability efforts on financial inclusion (Usman et al., 2021).

Financial inclusion refers to businesses and individuals having access to financial products/services at an affordable cost (The World Bank, 2018). Casually the relationship between environmental sustainability and financial inclusion can be adverse or constructive (Le et al., 2020). A positive association can be established between the use of environmentally friendly products and financial inclusion. For example, individuals that do not possess the financial resources to purchase such products can be offered loans by a bank to help them purchase solar systems for their homes and businesses (Baulch et al., 2018). As

a result, green products can facilitate the growth of financial inclusion. Individuals and businesses will be able to acquire green products through affordable financial services, resulting in a positive impact on the environment and thus an increase in financial inclusion (IPA, 2017).

On the other hand, there is also a possibility that people in the sack of non-environmentally friendly products such as air-conditioners, automobiles, and refrigerators acquire financial services from lending institutions that will ultimately harm the environment and also increase financial inclusion (Le et al., 2020). There is a need to articulate a structured strategy to balance environmental sustainability and financial inclusion. This was highlighted by Majeed and Tauqir (2020), where they explain that banks, in efforts of promoting financial inclusion, offer easy and affordable loans to industries that already rely on old and pollution-intensive technologies or such startups that intend to invest in carbon-intensive businesses. Those businesses would harm the environment at the cost of increased financial inclusion (Majeed & Tauqir, 2020).

As opposed to all other cases, when businesses in their capacities align their business strategy with contributing to a sustainable environment, it creates a good image that can help them grow their customer base. Getting a positive response from customers in return for sustainability efforts can be seen in the case of IKEA, a furniture retailer. As compared to 2014, IKEA sold \$1.13 billion in sustainable home products, an increase of 58% (Ecowatch.com, 2015). Socially responsible and sustainable practices may lead to an increase in customer preferences (Luchs et al., 2010), the firm's market value (Luo & Bhattacharya, 2006), and positive purchase intentions and evaluations (Sen & Bhattacharya, 2001). According to Kim (2019), the corporate image of any organization is one of its most valuable intangible assets. The image of the organization has a direct impact on the behavior

of customers and stakeholders. The response from customers is positive when they find that a particular organization is taking steps to address its social responsibility and sustainability issues.

When banks offer products and services for society's betterment by following sustainability practices, financial inclusion can be increased. For example, Bose et al. (2017) state that banks by supplying services and products can positively affect the financially excluded population. For example, offering loans to farmers with low-interest rates will attract those farmers who cannot afford loans with higher rates and do not use any formal medium for their transactions⁹. Hence, financial inclusion will be increased by farmers who are attracted and encouraged to take out loans from banks.

When environmental sustainability is implemented on an individual, firm, and national level, increased financial inclusion may result from consumers' inclination to purchase environment-friendly products (Le et al., 2019a). Firms committed to bettering the climate, for instance, may upgrade outdated technologies to greener ones. It is possible for financial institutions to lend money to cover the necessary switching costs in order to increase the usage of financial products. As a result, financial inclusion will increase.

2.4.2.3 Social Sustainability and Financial Inclusion

As explained in previous sections, financial inclusion is defined extensively, and here it is emphasized that financially included populations are those with formal bank or mobile

⁹ The financially excluded population is those who are not in the formal financial system. Furthermore, there can be a non-voluntary or voluntary (self) financial exclusion). There could be several reasons for financial exclusion, such as an individual's economic conditions, lack of trust in financial institutions, gender, illiteracy, a long distance from financial institutions, etc.

accounts that are used for their daily routine transactions and actively participate in the formal financial system. It is a fact that social exclusion is the main obstacle to greater financial inclusion. It has been shown that people make financial decisions and behave in certain ways based on their level of social welfare (Cull et al., 2014).

The population of countries with less developed socio-demographic attributes avoids using formal financial services, according to plenty of studies. In such countries, bank accounts are also in small quantities and people prefer cash or even barter for their routine transactions (Dev, 2006; Kabakova & Plaksenkov, 2018). Moreover, countries need to align the complexity, quality, and range of financial services with social development (Kabakova & Plaksenkov, 2018).

Beck, Demirguc-Kunt and Peria (2007) study the cross-country factors that influence financial inclusion and find a strong association between the quality of institutional environments, economic development, and the development of banking infrastructure. As part of their study, Park and Mercado (2018) examined the factors influencing financial inclusion in Asia. The results confirmed that demographic factors and income per capita play a significant role in determining the level of financial inclusion in Asia (Park & Mercado, 2018). Moreover, financial inclusion is highly correlated with lower poverty. On the other hand, a significant relationship was found between lower income inequality and higher financial inclusion (Park & Mercado, 2018).

Sha'ban, Girardone and Sarkisyan (2020) also demonstrate the strong relationship between financial inclusion and human development, employment, internet usage, and GDP per capita. Policymakers around the world should prioritize the improvisation of education

and stimulate the use of technology to increase financial inclusion especially in countries with low incomes (Sha'ban et al., 2020).

On the other hand, individuals exposed to social exclusion are more likely to be affected by economic crises. Based on De Matteis (2015) findings, migrants in the EU were severely affected by the financial crisis in Italy due to social and financial exclusion. Moreover, in the study for Comoros, Ali (2019) revealed that disadvantaged women were unable to access Islamic financial services in Comoros. Furthermore, the main barriers for these disadvantaged women were either lack of knowledge of relevant financial services or lack of resources that hindered them to be part of formal financial inclusion (Ali, 2019).

Zins and Weill (2016) investigate factors affecting financial inclusion in 37 African countries. Interestingly, it was found that being a man, old, rich, and educated in Africa are significant determinants of greater financial inclusion (Zins & Weill, 2016). Furthermore, Chikalipah (2017) studied the factors influencing the financial inclusion of Sub-Saharan African countries and concluded that illiteracy is one of the most significant obstacles to financial inclusion.

Sinclair (2013) investigated the factors influencing financial inclusion in the United Kingdom. He discovered that low-income customers were facing problems on having access to formal financial services and further lacking the affordable and appropriate credit provision. Moreover, Corrado and Corrado (2015) also examine financial inclusion determinants in 18 Eastern and 5 Western European countries. Their data consisted of 25,000 European households based on socioeconomic and demographic information. They found that people who were without any assets to pledge, affected by income shocks, and unemployment were not using formal financial services (Corrado & Corrado, 2015). Several factors influence financial inclusion, including poverty, literacy, and other social factors

(Ozili, 2020). Therefore, it can be concluded that along with different factors, financial inclusion is also significantly influenced by social factors such as education, income level, gender equality, access to basic necessities.

As discussed in the previous section, firms contribute to the social sustainability of the region. This can also increase the level of financial inclusion within the region. As an example, financial institutions may increase financial inclusion by engaging in corporate social responsibility and sustainability activities in order to increase deposits by attracting new customers through improving their reputation through social activities. Hofenk et al. (2019) point out that corporate social responsibility and sustainability are being viewed as vital issues in society today. In the current economic, social, and environmental climate, many stakeholders, such as individuals, customers, governments, and corporations, are showing concern for the economic, social, and environmental aspects of society. According to Hofenk et al. (2019), when firms incorporate their social and sustainable activities into their business strategies, this leads to increased customer preferences due to a positive image of the organization.

There is a growing awareness among organizations that maximizing shareholder value and achieving sustainable business success cannot be achieved solely by increasing short-term profits. In fact, they may be able to do so by adopting a responsible market-oriented behavior towards society (Mahajan, 2011). In order to achieve sustainable development, organizations must ensure that their operations are managed in a manner that maximizes their competitiveness, enhances their economic growth, and promotes their social responsibility and customer interest (Fontaine, 2013).

The adoption of socially responsible and sustainable practices by financial institutions can, however, contribute to improving their performance and increasing financial

inclusion by attracting new customers, as new customers are always inclined to invest in well performing and stable financial institutions. According to Cui, Geobey, Weber and Lin (2018), the Chinese government has imposed a green credit lending¹⁰ policy that requires banks to use socially responsible and sustainable lending practices. They add that pressure from institutions on banks to follow social and sustainable practices has a positive effect on the performance of financial institutions. The ratio of non-performing loans has also been reduced.

According to Platonova et al. (2018), many financial institutions and banks have implemented socially responsible and sustainable policies. They added that banks from their traditional role of providing financial stability are also introducing new strategies and trends by offering products and services for customers as part of their commitment to socially responsible and sustainable practices, which increases financial inclusion. Getting more involved in socially responsible and sustainable activities will allow banks to increase their deposits from new customers, which will result in an increase in financial inclusion (Platonova et al., 2018).

Through the survey of literature, it can be concluded that financial inclusion is significantly influenced by the social sustainability of society. Moreover, when firms also contribute to society through social and sustainable practices, they receive positive responses

¹⁰ Green lending/loans or green credit policy are referred as sustainability practices followed by banks in which they lend loans on discounted rates to companies that qualified for such loans. In order to qualify for the lower interest rates loan under the green loans/lending policies, the loan must be acquired for environmentally friendly agriculture, circular economics, renewable energy, environmental infrastructure and protection, and pollution control facilities. Moreover, in the case of regulatory non-compliance and environmental controversies, the loan must be withdrawn or limited to polluting industries.

from existing and new customers. This is due to improved performance and reputation. Hence in the case of financial institutions, pursuing socially responsible and sustainable practices can build a good image, and financial institutions in return can receive a positive response. In this case, when the population reverts to financial institutions, financial inclusion can be increased.

With the literature review in this section, it is now clear that individuals with good education, income, health, and other social aspects are more likely to participate in the economy and use formal financial services. For example, an educated individual would not hesitate to use a formal bank account or even an internet banking account. Financial inclusion could be enhanced in a socially sustainable society.

The stakeholder theory can also be used to predict the relationship between an economy's environmental, social, and governance performance and its financial inclusion. ESG factors are important for promoting inclusive financial systems when they are viewed from the standpoint of stakeholders such as policymakers, financial institutions, communities, and citizens. Through stakeholder mapping and analysis, ESG aspects that contribute to financial inclusion can be identified, such as inclusive banking practices, fair lending policies, and social impact investing. By combining these models with scenario testing and stakeholder engagement, it is possible to predict the effects of ESG performance on financial inclusion outcomes, thereby enhancing financial inclusion through sustainable and socially responsible practices by formulating targeted policies and strategies.

In light of the discussion of past studies in sections 2.4.2.1, 2.4.2.2, and 2.4.2.3, this study proposes that when governance quality, environmental sustainability, and social sustainability increase in a region, the level of financial activity and quality of life improve as well. Thus, improved quality of life and increased financial activity will lead to increased

use of formal banking services and products. As a result, FI would rise in a region. This study proposes the following hypothesis.

H₂: ESG has a significant and positive relationship with FI in Asia.

2.4.3 ESG and Financial Efficiency

This section explores the literature explaining the relationship between governance quality, environmental and social sustainability (ESG), and financial efficiency (FE) of financial institutions in a country. The relationship between governance quality and FE is explored in section 2.4.3.1. Furthermore, section 2.4.3.2 outlines the relationship between environmental sustainability and FE. Similarly, section 2.4.3.3 discusses the relationship between social sustainability and FE.

2.4.3.1 Governance Quality of Country and Financial Efficiency

The country's financial efficiency may be heavily influenced by the quality of institutions in the region. Efficient governance ensures that a country has an effective system for generating revenue for governments and other institutions. There are several Asian and African countries with poor governance quality, resulting in huge shadow economies and heavy losses to different sectors including the government (Arvin, Pradhan, & Nair, 2021). This research focuses on low-income countries in the period 2005-2019. However, they are also considering the GFC period when LIC were in a low position, which may affect their results as well.

The quality of a country's institutions plays a crucial role in its economic development. Corruption, ineffective law enforcement, and ineffective regulation may lead to more ailing banks in countries with weak legal systems and governance/institutional settings (Levine, 1998; Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998).

In the past, numerous studies have examined institutional quality and bank stability (Tran, Nguyen, & Ngyuen, 2022). Few studies have examined the impact of governance quality on financial efficiency in a country. For instance, Chan, Koh, Zainir and Yong (2015) found that governance quality has a significant impact on the efficiency of financial institutions in ASEAN countries. However, in previous studies addressing financial institutions' efficiency, the focus was primarily on measuring the level of efficiency in financial sector operations, with scant attention paid to its causes (Berger, Hunter, & Timme, 1993). Berger et al. (1993) argue that the efficiency of firms has been influenced by several factors over the last few years. Berger et al. (1993) further emphasized that such factors can be divided into scale and scope determinants, agency problems and regulations, and organizational and legal structures. The author does not discuss the implications of the study for future research or explore alternative explanations for the relationship between these factors and firm efficiency.

It has been argued by Rajan and Zingales (2001) that the regulatory and legal structures of an economy, including its cultural, political, and legal structures could influence the progress of financial institutions, and thus the dominant role of regulation and legal structures is evident in the discourse. Similarly, Beck, Demirguc-Kunt, and Levine (2001) illustrated the legal theories of financial development by showing how government power and political systems influence the financial sector's dynamics.

Studies have been conducted in several jurisdictions examining factors that influence financial institutions' efficiency. It is often possible to categorize these factors as either macroeconomic factors or industry-specific factors (Abaidoo & Agyapong, 2022). According to Arora (2014), a panel of 54 banks was used to measure the efficiency of the

Indian banking industry using Data Envelopment Analysis. Among the findings, financial reform, ownership, and listing of banks have significant impacts on bank efficiency. However, a connection between efficiency and size was not conclusively established in the study (Arora, 2014).

In a study Mohd Noor, Wan Yusof, Mohd Noor and Zainal (2020) analyzed information from 108 Islamic banks in 26 countries and discovered that regulatory authority had a considerable beneficial impact on Islamic banks' effectiveness. Moreover, a study by Ab-Rahim, Md-Nor, Ramlee and Ubaidullah (2012) found that government ownership is one of several factors that affect financial institutions' efficiency in Malaysia. Abaidoo and Agyapong (2022) examined the impact of governance and regulatory structure on the efficiency of financial institutions in Sub-Saharan Africa. Based on the estimations, governance quality significantly affects the efficiency of financial institutions, indicating that the institutional governance structures of the financial sector should be strengthened to boost financial institution efficiency (Abaidoo & Agyapong, 2022). It is essential for them to explain how they handled data limitations and biases in their analysis, including how they addressed any limitations.

Considering the literature review in this section, this study found that several studies have investigated the relationship between various country-level and firm-level factors and financial efficiency. There have also been a few studies studying the impact of regulatory structure on financial efficiency. Yet, there are only a limited number of studies that examine the impact of country governance on financial efficiency. This includes voice and accountability, political stability, the absence of violence or terrorism, government effectiveness, regulatory quality, the rule of law, and corruption control.

2.4.3.2 Environmental Sustainability and Financial Efficiency

The impact of environmental performance on FEF has been examined in numerous studies. It is important to note, however, that most of these studies relied on firm-level data. In addition, various meta-analyses have attempted to analyze the findings of such studies (Caby, Ziane, & Lamraque, 2022). There have been several studies that conclude that improving ES performance¹¹ will also result in improved financial performance (Albertini, 2013; Endrikat, Guenther, & Hoppe, 2014). Despite the fact that better environmental sustainability appears to have a favorable effect on financial performance, several studies point out that their results were heavily affected by methodological choice, environmental and financial performance measures, time horizons, firm sizes, and national and industry contexts (Caby, Ziane, & Lamraque, 2022).

Tang, Walsh, Lerner, Fitza and Li (2018) in their study on China state that green product innovation and green process innovation both play an imperative role in financial performance. A study by Jo, Kim, and Park (2015) revealed that it takes at least a year or two to increase return on assets after reducing environmental costs. Financial services firms, particularly in well-developed markets, will benefit from reducing environmental costs sooner and more significantly. The authors also suggest that sustainable practices should not only focus on manufacturing, but also on the financial services sector.

It is argued in this study that if eco-friendly practices are followed in this region, the performance of the financial sector will also improve. The findings of a number of studies

¹¹ To put it simply, environmental sustainability is the act of being responsible in interaction with the planet. This is done to prevent the depletion of natural resources and to ensure the wellbeing of future generations. By improving ES performance, entities are proactively working toward a sustainable environment.

conducted in the past support this argument. For instance, a study by Bose, Khan, and Monem (2021) found that green banking positively impacts Bangladeshi banks' financial performance. According to the researchers, green banks achieve this result primarily through cost-efficient operations.

Furthermore, environmental regulations may also influence a competitive environment in a region by promoting innovation so that entities operating in that region can increase their efficiency and competitiveness (Esty & Porter, 1998; Hang, Geyer-Klingenberg, & Rathgeber, 2019). Based on a study conducted by Jo, Kim and Park (2015), it usually takes at least one or two years before environmental costs can be reduced and returns on assets can be increased. Financial services firms, especially in well-developed financial markets, perform more effectively when environmental costs are reduced. In addition, it is also suggested that sustainability management should be included in the financial services sector, rather than concentrating solely on the manufacturing sector (Jo, Kim, & Park, 2015). This implies that the financial performance of financial institutions in a region are also influenced by environmental performance.

Nieto et al. (2017) suggest that environmental sustainability threats could undermine financial institution profitability. Since financial institutions lend money to industries with carbon emissions and other environmental concerns. Threats to these industries may impact financial institutions' assets (such as outstanding loans), affecting their FEF. As Newell et al. (2014) found, resource limitations, economic obsolescence, environmental degradation, and stock market degradation may all contribute to a sudden devaluation of fossil reserves, further reducing their market value. Due to the fact that all of these variables could have a

significant impact on financial institutions' profitability, it is reasonable to believe that environmental sustainability and FEF should have a positive relationship.

This study identifies that several studies have investigated the impact of environmental performance on the financial performance of firms. However, this is only one of a small number of studies that have investigated this relationship at a country-level. For example, what is the performance of financial institutions when environmental sustainability practices are followed by every entity in the region? Additionally, there were no previous studies that identified the channels through which the environmental sustainability impacts the FST of the region (Nizam, Ng, Dewandaru, Nagayev, & Nkoba, 2019).

2.4.3.3 Social Sustainability and Financial Efficiency

People's behavior and decision-making in the financial markets are influenced by their social wellbeing, which is thought to be the primary barrier to people not having a bank account (Park & Mercado, 2018; Ali A. E., 2019; Cicchiello, Kazemikhasragh, Monferrá, & Girón, 2021). There is no doubt that people in countries with less developed socio-demographic characteristics tend to neglect formal financial services. In their regular dealings, they prefer cash or barter whenever possible. Additionally, these nations have fewer bank accounts (Dev, 2006; Kabakova & Plaksenkov, 2018). Therefore, financial institutions, including banks, that operate in societies that are less socially sustainable will have fewer customers than those that operate in societies that are more socially developed. When financial institutions have fewer customers, their profitability is also affected.

As Ali (2019) discovered in Comoros, underprivileged women were not permitted to access financial services from financial institutions. Moreover, a lack of information about relevant financial services or a lack of resources were the main obstacles for poor women to

access formal financial services (Ali, 2019). Studies conducted on Asia indicate that income per capita has a significant impact on the level of customers using formal financial services in Asia (Park and Mercado, 2018). Furthermore, Park and Mercado (2018) found a strong correlation between lower income inequality and the customers. Literature has also recommended that education innovation and technology use be given priority to enhance the customer base of financial institutions, particularly in low-income countries (Sha'ban et al., 2020). Based on Chikalipah's (2017) observations, the main barrier to financial institutions growing their customer base in Sub-Saharan African countries is illiteracy.

Identifying and understanding factors that prevent people from opening bank accounts is crucial. The impact of social factors on the banking industry's customer base was also pointed out by Ozili (2020b). From a sociological perspective, a community with a high level of social development promotes more institutional trust among its citizens. Therefore, financial institutions are trusted by the people living in these communities. Consumers' willingness to use formal financial services encourages other members of society to do so, and this leads to a domino effect that could improve FI (Ozili, 2020b). Based on the research assessment in this section, there is compelling reason to believe that some socially related factors may have an impact on FE of financial institutions.

In the present study, the gap in the literature has been identified through the examination of several studies, including a number of recent studies that examined some potential social factors that might affect the customer base of financial institutions. There has, however, been no study conducted on the impact of these social factors on Asian financial institutions' efficiency.

In order to increase a country's financial efficiency, stakeholder theory provides a valuable framework for predicting what effect ESG performance will have on its financial performance. Stakeholder theory acknowledges the interdependency between ESG factors and financial outcomes by considering the interests and concerns of stakeholders such as investors, regulators, businesses, and communities. Using stakeholder analysis, it is possible to identify good governance practices, responsible investment strategies, and environmental sustainability. Policymakers will be able to anticipate the potential impact of ESG performance on financial efficiency, which in turn will allow them to develop targeted policies and strategies to enhance the efficiency and sustainability of financial markets.

Based on the discussion of previous studies in sections 2.4.3.1, 2.4.3.2, and 2.4.3.3, this study suggests that when governance quality, environmental sustainability, and social sustainability increase in a region, the clientele of financial institutions also expands because of increased economic and financial activities in the region. Financial institutions are also more efficient. Thus, to address these questions, the following hypothesis is proposed in this study.

H₃: ESG has a significant and positive relationship with FEF in Asia.

2.4.4 Impact of Financial Inclusion on Financial Stability and Financial Efficiency

Increasing access to and usage of financial services can be viewed as a means of promoting financial inclusion. Inclusion of households and firms in formal financial services is called financial inclusion, according to the International Monetary Fund. Tomilova and Valenzuela (2018) propose definitions, including “Financial stability means smooth and continuous functioning of financial institutions, financial markets, and payment systems

enabling to perform functions of the financial intermediation even in conditions of financial imbalances and shocks.”

Yangdol and Sarma (2019) explain the role of financial inclusion in bringing financial and economic stability to a society. They describe that providing loans to a poor or financially excluded segment of the population is also an effort to include them in the formal financial system. In the long run, the loan will contribute towards reducing poverty by creating job opportunities. Giving them access to a basic saving bank account enables them to save their earnings. Conversely, insurance services can be provided to the same economically excluded population solely to facilitate their protection against accidents or crop failures. So, in general, including these financially excluded populations in the formal system will enable them to use formal financial services properly. This will provide them with opportunities to generate income, save extra earnings and mitigate risks. Additionally, offering financial services to all segments of society, and more exclusively to poorer segments of society, will contribute towards income equality and increase their economic welfare. This is an important factor for financial stability that results in the form of a healthy economy. The document does not provide a comprehensive analysis of the challenges that may arise when implementing financial inclusion initiatives, including the lack of infrastructure, high transaction costs, and lack of trust among the financially excluded population in formal financial institutions.

By an increase in financial inclusion, the financial sector will get more diversified portfolios in its customer base and stable retail deposits. This will lead to financial institutions' stability. In the same manner, financial inclusion may help financial institutions to lessen their dependency on large institutional borrowers. It may also mitigate credit risk,

and diversify their loan portfolio which will reduce their risk (Tomilova & Valenzuela, 2018). In this study, the authors are required to discuss the relationship between financial inclusion and other factors that may affect the stability of financial institutions, such as economic development, regulatory framework, and competition in the industry. Financial stability will be achieved in a region when financial institutions' risk and instability are reduced.

Morgan and Zhang (2017) measure financial inclusion and financial stability in 19 emerging Asian economies. They measure financial stability by bank z-score and non-performing loans ratio to total loans. They concluded that the increase in financial inclusion (through mortgage lending) by the banks positively leads to financial stability, as it lowers the probability of default by banks and also decreases the ratio of non-performing loans. As the study relies on cross-sectional data, it may not portray the dynamic relationship between financial inclusion and financial stability over time.

The Global Financial Crisis (GFC) began in 2007, and it was immediately observed that these crises were accompanied by systematic financial risks. As a result, regulators and policymakers have been striving to maintain financial stability (Cihak et al., 2016; Morgan & Pontines, 2018). Before the GFC, all banks in developed and emerging countries offered loans to high-risk borrowers. Adverse effects of expanding financial accessibility could be a significant trigger for the collapse of the financial system (Vo et al., 2019).

There was, however, a counter argument made by Hanning and Jansen (2010) that the risk caused by financial inclusion is not systemic since low-income populations are likely to maintain their financial conduct instead of experiencing financial crashes. Deposits are received by investors, and loans are repaid by borrowers.

In addition, Vo, Van, Vo and McAleer (2019) point out that financial inclusion enhances financial services to all segments of the population. There is evidence that by expanding the right to use deposits, the deposit base will be diversified, thereby strengthening the overall financial system and improving the stability of the national economy. It was further argued that there may be some ideal level of financial inclusion that augments financial and economic stability that has not yet been examined in the existing literature.

There is a mixed opinion regarding the impact of financial inclusion on financial stability. According to some authors, financial inclusion is negatively related to macroeconomic stability because it increases financial risks. Khan (2011) argues that lowering standards and requirements and increasing borrowers leads to higher financial risks. Furthermore, if lending to micro-finance institutions is increased without adequate regulations, it can increase the risk in the financial system by impairing national regulations. According to Mehrotra and Yetman (2015), extreme access to credit may worsen credit conditions and accelerate credit growth unrestrained.

Alternatively, literature supports the assertion that financial inclusion facilitates financial stability. Financial inclusion offers a wider continuum of economic agents to financial institutions and provides economic optimism (Khan, 2011). Morgan and Pontines (2018) conclude their findings by asserting that an enhanced segment of small and medium-sized enterprises (SME's) lowers financial instability due to a reduction in the concomitant possibility of default or bankruptcy and non-performing loans. Cihak, Mare and Melecky (2016) argue that in an ideal situation where there is no crisis, financial inclusion is conducive to financial stability.

It has been observed that many studies have focused more on banks or financial stability than macroeconomic stability, since they believe that the financial stability of financial institutions is an integral part of the stability of the overall financial system. Ahamed and Mallick (2019) examine the impact of financial inclusion on bank stability by studying the performance of 2,600 international banks from 86 countries. They also conclude that higher levels of financial inclusion will result in greater financial stability.

According to Neamie and Gaysset (2017), the absence of financial inclusion adversely impacts poverty alleviation and economic growth, as poor individuals are unable to save their earnings or invest in projects from which they will be able to earn in the future. Additionally, they conducted a study on the impact of financial inclusion on financial stability, poverty, and income inequality in MENA countries. The results of their study demonstrate that financial inclusion reduces income inequality and promotes financial stability.

In addition, there is literature supporting the idea that financial inclusion improves the efficiency of financial institutions as well. For the financial sector to grow and flourish, it is imperative that bank services, in the form of FI, are widely accessible to the general public. This is the prerequisite for the growth and efficiency of the sector. As a matter of fact, FI has been an issue of concern for academics, stakeholders, researchers, and financial institutions since the late 1990s (Collard, 2007; Leyshon & Thrift, 1995).

According to Kim, Yu, and Hassan (2018), FI leads to FEF, which is inextricably linked. In a globalized world where the quality of a bank's financial services is regarded as the primary metric by which bank efficiency is measured, it has taken on the most significant position of relevance to be considered in the discourse of globalization (Kim, Yu, & Hassan,

2018). Banking institutions with considerable and massive profitability and sustainability are those that offer a variety of services at extremely low and minimal service fees to their customers (Ahamed & Mallick, 2019). A key feature of financial inclusion is that it marks a significant increase in the number, quality, and efficiency of financial intermediary process (Le, Chuc, & Taghizadeh-Hesary, 2019a).

It is possible for all banks to achieve FEF if they broaden their offerings efficiently and effectively. Hence, because of FI, banking services are being extended to people from all different socioeconomic backgrounds so that there is a permanent flow of development (Demirguc-Kunt A. , Klapper, Singer, & Van, 2015) and the ability to forge very strong relationships with clients (Petersen & Rajan, 1995).

Yangdol and Sarma (2019) stress the positive impact of financial inclusion on financial stability. They explain that financial inclusion may alleviate poverty by providing sources of finance to businesses and facilitating businesses to grow and expand their activities. The increased business activities also create job opportunities and raise economic activities in the region, leading to an enhanced customer base and diversified portfolios of financial institutions. On the other hand, the increased customer base could increase profitability (FE), and a diversified portfolio may contribute to the stability of financial institutions (FS). In addition, Vo, Van, Vo, and Mcaleer (2019) emphasize that risky bank borrowers were one of the major reasons for the financial crisis of 2007. Consequently, financial inclusion improves and diversifies the banks' portfolios, which in turn reduces risk and increases profitability. In this context, the present study proposes hypotheses H₄ and H₅.

Providing a more comprehensive understanding and shaping of the impact of financial inclusion on both financial stability and financial efficiency is made possible by

stakeholder theory. In order to design and implement policies that support financial inclusion initiatives, it is essential to engage and collaborate with stakeholders and leverage the expertise and perspectives of a variety of stakeholders. It is possible to achieve greater financial stability and efficiency by aligning financial inclusion efforts with stakeholder interests and needs. This results in more inclusive and sustainable financial systems as a result.

H₄: FI significantly and positively impacts FST in Asia.

H₅: FI significantly and positively impacts FEF in Asia.

2.4.4.1 The Mediating Role of Financial Inclusion

To determine if a variable functions as a mediator or moderator, two criteria are used, one being eligibility criteria and the other being analytical criteria (Kraemer, Kiernan, Essex, & Kupfer, 2008). Based on temporal precedence and association, eligibility criteria determine whether a variable could be considered as a potential moderator (or mediator). A moderating or mediating analysis is intended to detect potential causal chains among variables (Kraemer, Kiernan, Essex, & Kupfer, 2008).

As part of the current study, the mediating role of financial inclusion is analyzed according to the methodology described by Baron and Kenny (1986). According to Hofmann, Curtiss and Hayes (2020) it is clear from several immediate benefits that Baron and Kenny's approach has become so popular. Analytical approaches are simple, clear, and applicable. An understanding of causal mechanisms that extends beyond mere correlations of change processes. Moderation and mediation are integrated into one model, supposedly distinguishing partial and full mediation. Ability to distinguish between socialization and

therapeutic concepts in the context of functionally significant pathways of change (Hofmann, Curtiss, & Hayes, 2020).

Baron and Kenny's mediation analysis requires statistical significance of the dependent and independent variables. The relation between ESG and FST, for instance, must be significant and positive. It is also necessary for the researcher to demonstrate that the relationship between the independent variables and the mediating variables is statistically significant. FI and ESG, for instance, must have a significant and positive relationship. After that, the researcher must demonstrate that the mediating variable is statistically significant in relation to the dependent variable. As an example, FI must have a positive relationship with FST (Baron & Kenny, 1986; Hofmann, Curtiss, & Hayes, 2020; Malik, bin Md Isa, Jais, Rehman, & Khan, 2021; Malik, Jais, Md Isa, & Rehman, 2022).

A number of previous studies have demonstrated that using mediation analysis applying GMM regression techniques can yield satisfactory results (Ali, Yuan, Ahmad, & Ali, 2021; Malik, Jais, Md Isa, & Rehman, 2022). GMM techniques have been applied by several researchers to integrate the strands of relevant statistical theories into the mediation analysis steps (Jiang & Turnbull, 2004; Gomez & Maicas, 2011; Malik, bin Md Isa, Jais, Rehman, & Khan, 2021; Rehman, Malik, Md Isa, & Jais, 2022). Despite the differences in their approaches, all these studies have one thing in common: they speculate that mediation regression can be analyzed using GMM models as a means of analysis (Malik et al., 2022).

The criteria to decide mediating role for any variable has been extensively discussed in the sections 2.4.4 and 2.4.4.1. This study has established that ESG has a relationship with FI and FST while FI has association with FST. Moreover, it was also established through the literature that ESG has relationship with FI and FEF, while FI also has an impact on the

FEF. Therefore, it is concluded that following Baron and Kenny (1986) approach there is strong evidence considering the literature that FI may have a mediating role between the ESG and FST and ESG and FEF. Furthermore, past studies have also established that FI can be used as a mediating role (Malik et al., 2021; Malik et al., 2022; Rehman et al., 2022). Hence, this study proposes the following hypotheses.

H₆: FI mediates between the ESG and FST in Asia.

H₇: FI mediates between the ESG and FEF in Asia.

2.5 Chapter Summary

The whole discussion in this chapter can be summarized by conceptualizing that good governance, environmental and social sustainability (ESG) positively impacts financial inclusion (FI), financial stability (FST) and financial efficiency (FEF). It was noted that good governance could increase the confidence of investors and individuals in the formal financial system. The increased confidence may boost the region's financial and economic activities, which may lead to an increase in financial inclusion. Moreover, studies by Cieslik and Goczek (2018), Sayilir, Dogan and Soud (2018) also reveal the positive impact of governance on the country's financial indicators. However, few studies have investigated the role of governance on FI, FST and FEF. Therefore, the current study takes up the opportunity to fill the gap by investigating the role of governance in enhancing financial inclusion and maintaining financial stability among Asian countries. Furthermore, it is worthy of investigating the mediating role of financial inclusion between governance and financial stability. The findings could discover that financial inclusion alone cannot benefit the financial system.

On the other hand, it is observed that following environment-friendly practices aids the economic growth in the region (Saidi & Omri, 2020). Moreover, the green credit policies have been fruitful for the financial sectors in Bangladesh, Brazil, and China (Zadek & Robins, 2015; Cui et al., 2018). Nevertheless, very few studies considered the impact of environmental sustainability practices on the stability of the financial sector in the country. Additionally, it is also worth investigating whether environmental sustainability practices may increase the usage of financial services and products. For instance, the commitment of the firms and individuals in the region towards environmental sustainability might convince them to adopt green and environment-friendly products and technologies. The adoption of green technology would require an investment financed by financial institutions, which may increase financial inclusion. Besides, the mediating role of financial inclusion is also investigated in the current study, which the previous studies have not assessed.

Moreover, through the literature survey, it was also discovered that a socially unsustainable society faces the problems of illiteracy, access to electricity, and access to basic human needs. The socially underdeveloped individuals in society do not contribute to the economy due to their exploration of the resources to fulfil their fundamental needs (Amin, 2019). Furthermore, such individuals do not follow the social norms and do not obey the laws (Amin, 2020). Hence, it can be assumed that socially underdeveloped people have no contribution to the country's economy and do not use any formal financial services. In this context, by taking the lead, the current study examines whether social sustainability in the region aids financial stability. Moreover, the impact of the increase in social sustainability on financial inclusion and whether financial inclusion mediates social sustainability and financial stability in Asia is also being investigated.

Lastly, this study employs stakeholder theory to examine the relationship between the variables. Plenty of studies use the stakeholder theory on the firm level to investigate the role of environmental and social sustainability. However, very few have applied this theory on the country level (Flak & Rose, 2005; Nie et al., 2019). Moreover, the current study applies the stakeholder theory to assess the role of a country's governance on financial inclusion and stability. Therefore, this study contributes to the literature by applying the stakeholder theory on the country level.

Based on the literature review and theory proposed in this chapter, seventeen hypotheses are developed. The developed hypotheses are summarized in Table 2.1. The proposed hypotheses follow the research objectives and questions of the present study, which examines the association of governance quality, environmental sustainability, social sustainability, financial inclusion, and financial stability.

Table 2.1: Research Hypotheses

Hypothesis	
H1	ESG has a significant and positive relationship with FST in Asia.
H2	ESG has a significant and positive relationship with FI in Asia.
H3	ESG has a significant and positive relationship with FEF in Asia.
H4	FI significantly and positively impacts FST in Asia.
H5	FI significantly and positively impacts FEF in Asia.
H6	FI mediates between the ESG and FST in Asia.
H7	FI mediates between the ESG and FEF in Asia.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This study examines whether there is any relationship between governance quality, environmental sustainability and social sustainability, financial stability and financial efficiency. It also examines financial inclusion's mediating role. All variables are discussed individually, with their measurements supported by the literature. In later sections, the model, data and sample description, analytical analysis, and statistical techniques used in this study are discussed.

3.2 Research Philosophy

This section is dedicated to describing research philosophy that provides an insight into the philosophical approach adopted for conducting the research in the present study. O’Gorman and MacIntosh (2015, p.52) explain, “in essence, the purpose of setting out your research philosophy is to help signal to other researchers those claims you might make in your findings and the basis on which you would make such claims. However, it is very likely that the same broad research question or objective could have been approached using a very different style of research. All that you are required to do is demonstrate that you engaged in a conscientious selection and defense of what you deemed to be the most suitable approach, given your chosen topic”. Saunders, Lewis, Thornhill and Bristow (2015, p.124) describe the term research philosophy “the system of assumptions and beliefs about the development of knowledge is referred to as research philosophy.” The assumptions underscore the strategies and methods adopted to conduct the research (Burrell & Morgan, 2017). Such assumptions are based on human knowledge (epistemological viewpoint),

actuality revealed during the process of research (ontological view), and how the study process was influenced by the researcher's own values (Saunders et al., 2015).

O’Gorman and MacIntosh (2015) provide the clarification “epistemology concerns the way in which we obtain valid knowledge. The methods map illustrates four epistemological positions: positivist, critical realist, action research and interpretivist. Although there are others, articulating your epistemological position in relation to these four allows you to define your own ideas about the way in which we decide what constitutes reliable knowledge”. They further explain the ontology “reality exists independently of our comprehension of it and that it is possible to establish and explain universal principles and facts through robust, replicable methods” and particularly ontology postulates that “our perceptions are what shape reality, and this is a belief expressed in large sections (though not all) of the social sciences. A subjective ontology sees facts as culturally and historically located and therefore subject to the variable behaviors, attitudes, experiences and interpretations – what we call the subjectivity – of both the observer and the observed. Subjective ontology approaches reality as multiple in the sense that each individual experiences his place and time in the world in a different way” (p. 57).

3.2.1 Positivism

According to MacDonald and Headlam (2008), positivism is “a paradigm that assumes human behavior is determined by external stimuli and that it is possible to use the principles and methods traditionally employed by the natural scientist to observe and measure social phenomena” (p. 67). Moreover, “a research philosophy that views reality as something that can be objectively ascertained and described through research” is called positivism (Hair et al., 2019).

Easterby-Smith, Jaspersen, Thorpe and Valizade (2021) offer a reasonable explanation that “positivist methods usually incorporate the assumption that there are true answers, and the job of the researcher is either to start with a hypothesis about the nature of the world, and then seek data to confirm or disconfirm it, or the researcher poses several hypotheses and seeks data that will allow selection of the correct one” (p. 69). It was argued by Saunders et al. (2009) that “the (positivist) assumption that objective facts offer the best scientific evidence is likely to result in the choice of quantitative research methods” (p. 127).

Based on the discussion, the present study adopts positivist epistemology. This study is underpinned on a solid theoretical base, which is aligned with the positivist philosophy. The positivism philosophy facilitates the researchers to predict the relationships based on the facts already been explained. The underpinned theory in the current study has already been established and tested adequately. Thus, no researcher intervention is required, which is another convincing justification for adopting positivist epistemology.

3.3 Research Design

The current study is designed to answer the questions presented in Section 1.4. A quantitative research approach was also used to test the hypotheses by obtaining secondary data. Creswell and Creswell (2017) explain that the quantitative research entails “an approach to test objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures” (p. 44).

3.3.1 Sample

In this study, the region of Asia was examined. Nevertheless, some countries were excluded from the sample due to missing data. Hong Kong, Iran, the Democratic Republic

of Korea, Macao, and Palestine were excluded from the sample due to the lack of available data for environmental and social sustainability variables. The countries of Brunei, Maldives, and Timor-Leste were removed from the sample due to the absence of data for financial efficiency and stability indicators. As a result, the sample was limited to 42 Asian countries, which were selected based on their availability of the data required to conduct the study. This ensured that the sample was representative and that the results of the study would be accurate.

An examination of the UN database and existing literature was conducted to determine if a country should be included in Asia on a geographical basis (Ahamed & Mallick, 2019; United Nations, 2023). As an example, the United Nations and literature recommended that Cyprus be included in Asia. In addition, the income level of each country was determined in accordance with the categorization by the World Bank (2023).

Table 3.1: List of Selected Asian Countries in the Sample of the Study

Low and lower-middle income countries			
Afghanistan	Indonesia	Nepal	Tajikistan
Bangladesh	Kyrgyz Republic	Pakistan	Uzbekistan
Bhutan	Lao PDR	Philippines	Vietnam
Cambodia	Mongolia	Sri Lanka	Yemen
India	Myanmar	Syrian Arab Republic	
Upper middle-income countries			
Armenia	Georgia	Kazakhstan	Thailand
Azerbaijan	Iraq	Lebanon	Turkey
China	Jordan	Malaysia	Turkmenistan
High-income countries			
Bahrain	Japan	Oman	Singapore
Cyprus	Korea, Rep.	Qatar	United Arab Emirates
Israel	Kuwait	Saudi Arabia	

3.3.2 Data

The analysis was conducted on yearly data from 2009 to 2021. The current study begins its analysis from 2009 as the period 2007-2008 is well known for the Global Financial Crisis (Ali et al., 2021). Hence, the inclusion of the period 2007-2008 in the analysis could produce misleading results (Ali et al., 2021). This is because during that period, the economy was in a recession. This means that the economic environment was very different from the rest of the years included in the analysis. Therefore, it is appropriate to exclude the period 2007-2008 to get a more accurate picture of the economic environment during the rest of the years. The dependent variable of financial stability (FST) and financial efficiency (FEF) were proxied by six different indicators obtained from the World Bank's Global Financial Development Database (GFDD) presented in Table 3.2 and Table 3.3 respectively. Moreover, the present study employed governance quality, environmental, and social sustainability (ESG) as a single independent variable. Meanwhile, financial inclusion was tested as the mediator variable.

The data for governance quality was gathered from the World Governance Indicators (WGI) database, provided by the World Bank (Table 3.4). While the data for the indicators of environmental sustainability (Table 3.5) and social sustainability (Table 3.6) were obtained from World Bank's Sovereign Environmental, Social and Governance (ESG) database. Besides, the indicators of financial inclusion were acquired from the Financial Access Survey (FAS) database provided by the International Monetary Fund. Further details of the variables are provided individually in section 3.4.

3.4 Variables Description

This section covers the description of the proxies and approaches adopted for the measurement of the variables used in this study. Each variable is defined individually with

the techniques and approaches applied to measure the variables with reference to past studies. It is also defined how these have been used in the present study.

3.4.1 Financial Stability

The dependent variable FST for this study has been proxied by three different indicators (Table 3.2). The bank z-score (BZB), bank credit to deposits as percentage of GDP (BCG) and liquid assets to deposits and short-term funding as percentage of GDP (LAD) explains the financial stability in terms of survival and ability of financial institutions to absorb shocks (Le et al., 2019a).

Data for all indicators for FST were obtained from global financial development database (GFDD) provided by the World Bank. Bank Z-score is unbiased and a broad indicator of financial institution riskiness. It is also commonly used in literature (Ahamed & Mallick, 2019). It is measured as follows (Equation 3.1).

$$BZB = \frac{ROA + EQA}{\sigma(ROA)} \quad \text{Equation 3.1}$$

Where;

ROA = The average annual return on end-year assets

EQA = The equity to asset ratio

$\sigma(ROA)$ = The standard ratio of ROA

Bank Z-score provided by the World bank exhibits the aggregate stability of the banking system (Han & Melecky, 2013). Higher the z-score is more stable the bank is (Laeven & Levine, 2009 and Bai et al., 2020). The greater score of bank z-score indicates the lower probability of bank's insolvency (Morgan & Zhang, 2018). The number of

deviations through which return on asset will fall to incur a loss is measured by bank z-score and it is inversely proportional to solvency of bank (Rashid, 2021).

Moreover, bank z-score has also been widely used in other studies to measure financial stability (Cihak & Hesse, 2010; Beck et al., 2013; Morgan & Pontines, 2014; Morgan & Pontines, 2018; Ahamed & Mallick, 2019; Bai et al., 2020; Rashid, 2021). The bank z-score indicates the probability of defaulting a country's banking system (Lepetit et al., 2021).

Table 3.2: Indicators for Financial Stability

Variables	Dimensions	Indicators
Financial Stability (FST)	Probability to default	Bank Z-Score
		Bank credit to bank deposits (%)
		Liquid assets to deposits and short-term funding (%)

Similarly, bank credit to deposits as percentage of GDP and liquid assets to deposits and short-term funding as percentage of GDP illustrate the ability of banks to absorb shocks and remain stable (Le et al., 2019a). Financial institutions advance funds to individuals and businesses as part of bank credit. Therefore, an increase in bank credit to deposits as a percentage of GDP results in an increase in financial institutions' assets. The liquid asset ratio is measured to assess the availability of liquidity to grapple with the cash outflows. Its level shows the ability to deal with idiosyncratic risk. Moreover, liquid assets to short term liabilities indicates that to what extent short-term liabilities can be met without any problem of liquidity. Usually, it catches the mismatch of the liabilities and assets (International Monetary Fund, 2019). The increase in liquid assets to deposits as well as short-term funding is therefore considered to be a positive development. This suggests that the bank's financial health is improving, and it is becoming more financially resilient.

3.4.2 Financial Efficiency

Another dependent variable of financial efficiency (FEF) was formed by bank net interest margin percentage (NIM), bank return on assets percentage after tax (ROA), and bank return on equity percentage after tax (ROE). These three indicators show how efficient financial institutions are (Le et al., 2019a) in using their existing resources to generate profits.

Table 3.3: Indicators for Financial Efficiency

Variables	Dimensions	Indicators
Financial Efficiency (FEF)	Profitability of financial institutions	Bank net interest margin (%)
		Bank return on assets (% , after tax)
		Bank return on equity (% , after tax)

Bank net interest margin percentage (NIM), bank return on assets percentage after tax (ROA) and bank return on equity percentage after tax (ROE) are added in the cluster of FEF to get more robust results. Addition of these indicators will increase the illustrative power of the dependent variable as these proxies may highlight the weaknesses of the financial institutions in a country (Shen & Chen, 2014; Le et al., 2019a).

The ROA illustrates to what extent of efficiency the assets are managed to foster their earnings or can be said yield on investments. The ROE is used to measure how efficiently capital is utilized. It also highlights the ability to increase retained earnings that are an internally generated source of funds in a country. Furthermore, NIM is used to measure the portion of interest income to outflow of interest (International Monetary Fund, 2019).

If the NIM, ROA, and ROE of the country's financial institutions continue to increase over time, then this indicates that the country's financial institutions are efficiently generating shareholder value. Alternatively, a decline in these variables can indicate that reinvesting capital in unproductive assets is poorly managed by the financial sector. As such, it is critical for financial institutions to assess their NIM, ROA, and ROE to ensure they are making sound decisions with regards to reinvesting their earnings because these earnings provide support to sustain shocks.

3.4.3 Composite Variable of Governance Quality, Environmental and Social Sustainability (ESG)

In previous sections, it has been discussed that this study used Principal Component Analysis (PCA) to create the single variable of governance quality, environmental and social sustainability (ESG). Section 3.7.1 contains detailed information about the process by which these indicators were aggregated into a single variable. The purpose of this section, however, is to provide information regarding individual indicators and their sources so that a greater understanding of the variables can be gained.

3.4.3.1 Governance Quality of a Country

The governance quality of a country measured by indicators given by the World Bank known as worldwide governance indicators (WGI) is available at World Bank's website. The (WGI) provide six different dimensions to measure governance quality. These indicators consist of broad dimensions (that will be elaborated further in this section) described as follows in Table 3.4.

Table 3.4: Indicators for Governance Quality

Variable	Dimensions	Indicators
Governance Quality	Political Governance	Voice and Accountability
		Political Stability and Absence of Violence / Terrorism
	Economic Governance	Regulatory Quality
		Government Effectiveness
	Institutional Governance	Rule of Law
		Control of Corruption

Kaufmann et al. (2011) explain what these six dimensions measures, that are described as follows.

- a) Voice and Accountability: To what extent the citizens have the right to select their governments, freedom of association, free media, and freedom of expression.
- b) Political stability and absence of violence/terrorism: To what extent the political system of the country is stable. Whether there is any threat to political stability by unconstitutional acts, violence, or terrorism.
- c) Government Effectiveness: What is the quality of civil and public services and whether it is provided without any political affiliation and pressure. It also represents the perception of the government's commitment towards the formulation and implementation of policies and its quality.
- d) Regulatory Quality: The government's ability to formulate and implementing wide-ranging regulations and policies that facilitates the growth of the private sector.
- e) Rule of Law: It represents the extent of the rules of society are respected and enforced by police and courts in protection of rights (ex. property rights, human rights, etc.)
- f) Control of Corruption: To what extent the power is exercised for personal interests including all forms of corruption.

The data for all six dimensions of governance can be directly downloaded from the World Bank's website¹². To measure the governance quality of a country, this study will use principal component analysis (PCA) to integrate these different dimensions into one variable. This approach was followed by number latest studies that used governance indicators for their studies see (Asongu & Nnanna, 2019; Asongu & Odhiambo, 2019a; Asongu & Odhiambo, 2019b; Asongu & Odhiambo, 2019c; Asongu & Nwachukwu, 2019d; Asongu & Odhiambo, 2020a; Asongu & Odhiambo, 2020b). All these studies found high correlation between the six dimensions of governance, furthermore they explained that PCA technique is a factor analysis technique that is designed for data where variables are linearly related with each other to converge them into an uncorrelated set of variables, moreover it can be used for interval data as well as for ordinal data.

3.4.3.2 Environmental Sustainability

Most of the studies to measure environmental sustainability focus on micro level data acquired through content analysis of firms' disclosures in their annual and sustainability reports. Furthermore, many prestigious organizations, such as the Dow Jones Sustainability Group Index, the FTSE4Good, and the Domini Social Index, have developed indexes that provide information about environmental and social sustainability in the country followed by firms. The main purpose is to illustrate potential investors that how a certain organization is following sustainability practices that may create long-term value for shareholders (Lopez et al., 2007). However, Myskova and Hajek (2018) argue that these sustainability assessment approaches depend on expert knowledge. Furthermore, they claim that the major drawback

¹² <https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators>

of these sustainability assessment systems is that instead of quantitative, they are mostly based on qualitative information.

The World Bank has also provided several indicators to measure environmental, social and governance (ESG) quality of the country. The environmental pillar comprehends the environmental sustainability of a country by managing and supplying the risks factors and mitigation of those risks caused by natural hazards and climate change, and endowment of natural resources (The World Bank, 2019). The data for environmental sustainability was gathered from the World Bank's Environmental, Social and Governance (ESG) database.

Table 3.5: Indicators of Environmental Sustainability

Main Pillar	Subcategory	Indicators
Environment Sustainability	Emissions & pollution	CO2 emissions (metric tons per capita)
		Methane emissions (metric tons of CO2 equivalent per capita)
		Nitrous oxide emissions (metric tons of CO2 equivalent per capita)
		PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)
	Natural capital endowment and management	Adjusted savings: natural resources depletion (% of GNI)
		Adjusted savings: net forest depletion (% of GNI)
		Forest area (% of land area)
		Terrestrial and marine protected areas (% of total territorial area)
	Energy use & security	Electricity production from coal sources (% of total)
		Energy imports, net (% of energy use)
		Energy intensity level of primary energy (MJ/\$2011 PPP GDP)
		Energy use (kg of oil equivalent per capita)
		Fossil fuel energy consumption (% of total)
		Renewable electricity output (% of total electricity output)
		Renewable energy consumption (% of total final energy consumption)
	Food Security	Agricultural land (% of land area)
		Agriculture, forestry, and fishing, value added (% of GDP)
		Food production index (2004-2006 = 100)

The environmental pillar focuses on environmental factors as a result of economic activities, food security, and green energy, all of which are vital to the country's economic growth (The World Bank, 2019). Table 3.5 summarizes the indicators for environmental sustainability provided by the World Banks.

The advantage of using these indicators is that they provide a comprehensive picture of environmental sustainability practices in a country, rather than focusing on only a few companies as presented by index providers. These indicators would be part of the aggregated ESG variable using principal component analysis (PCA). In the section dedicated to PCA, the technique will be discussed in detail.

3.4.3.3 Social Sustainability

There are several guidelines and frameworks developed in the past decades for entities that need to embed social sustainability into their strategy. Examples of such a framework are Global Reporting Initiatives (GRI), United Nations Global Compact (UNGC) principles, and National Voluntary Guidelines (NVGs), (Weber et al., 2014; Kumar & Prakash, 2019).

The study uses indicators under the social pillar provided by the World Bank's Environmental, Social and Governance (ESG) database. This pillar assesses the country's economic accomplishments and efficacy in poverty reduction, human capital investments and productivity, managing equity and social issues and meeting other basic necessities of its population. It also covers demographic issues crucial for long-term economic sustainability (The World Bank, 2019). All indicators of social sustainability would be converted into composite ESG variables using principal component analysis. Table 3.6 presents the indicators under SS hierarchy.

Table 3.6: Indicators of Social Sustainability

Main Pillar	Dimensions	Indicators
Social Sustainability	Education & skills	Government expenditure on education, total (% of government expenditure).
		Literacy rate, adult total (% of people ages 15 and above).
		School enrolment, primary (% gross).
		Labor force participation rate, total (% of total population ages 15-64)
		Unemployment, total (% of total labor force)
	Demography	Fertility rate, total (births per woman).
		Life expectancy at birth, total (years).
	Access to Basic Services	Hospital beds (per 1,000 people).
		Mortality rate, under-5 (per 1,000 live births).
		Prevalence of overweight (% of adults).
		Prevalence of undernourishment (% of population).
		Access to clean fuels and technologies for cooking (% of population).
		Access to electricity (% of population).
		People using safely managed drinking water services (% of population).
		People using safely managed sanitation services (% of population).

3.4.4 Financial Inclusion

Financial inclusion (FI) refers to the availability and accessibility of affordable and timely financial services and products, to individuals and businesses. This study will follow Tu et al. (2019) who followed Wang and Guan (2017) by using two dimensions of “accessibility” and “usage” to measure FI. The data for these dimensions are already available on the IMF website known as the Financial Access Survey (FAS).

Wang and Guan (2017) and Tu et al. (2019) support their approach by stating that prior studies such as Beck, Demirguc-Kunt, and Martinez Peria (2007) propose indicators to measure financial inclusion across 160 countries. It is true that these indicators measure financial inclusion effectively; however, they can only accurately convey a true picture of financial inclusion when used in conjunction with one another.

Later, Sarma (2008) further developed the concept of financial inclusion by incorporating three dimensions referred to as 'accessibility', 'availability', and 'usage'. Specifically, there is a problem with this construct since 'accessibility' is close to 'availability', which may result in a highly multicollinear relationship between variables (Tu, et al., 2019; Wang & Guan, 2017). A recent attempt to summarize financial inclusion was made by Demirguc-Kunt and Klapper (2012). In 2011, they conducted a survey of 180 countries to create a global financial inclusion index. This data is published every three years, and the latest available data is 2017. The problem is that the data is only available for the years 2011, 2014 and 2017, so cross-country analyses cannot be performed.

Therefore, carrying forward the concept of Tu et al. (2019) and Wang and Guan (2017), based on the complete availability of the data this study will use indicators for FI following Le et al. (2019a). The data was obtained from the International Monetary Fund (IMF) database for Financial Access Survey (FAS) which is widely used in literature (Le et al., 2019a; Vo et al., 2019; Vo et al., 2020). Table 3.7 gives details of indicators.

Table 3.7: Indicators for Financial Inclusion

Variable	Dimensions	Indicators
Financial Inclusion (FI)	Accessibility	Automated Teller Machines (ATMs) per 100,000 adults
		Branches of commercial banks per 100,000 adults
		Institutions of commercial banks
	Usage	Outstanding deposits with commercial banks (% of GDP)
		Outstanding loans with commercial banks (% of GDP)

Following past studies, FI dimensions would be combined to create a composite variable by the factor analysis technique. This is widely used in the literature specifically for financial inclusion studies such as Sarma (2008), Gupte et al. (2012), Lyons and Contreras (2017), Ahamed and Mallick (2019), Yorulmaz (2018), Tu et al. (2019), Le et al. (2019a), Van, Nguyen and Vo (2020). This study will follow the same approach by using principal component analysis (PCA), one of the multivariate analysis techniques. PCA would be run after fulfilling its requirements, such as standardization of all dimensions.

3.4.5 Control Variables

Asia is the most diverse region globally, with a wide-ranging population and GDP per capita (Bhardwaj et al., 2018). In this context, GDP per capita growth rate (GDPR) was taken as a control variable since it might impact FS (Le et al., 2019a; Sharma, 2016) and demonstrates the economic development that is indispensable for financial stability (Ahamed & Mallick, 2019; Han & Melecky, 2013; Morgan & Pontines, 2018; Morgan & Zhang, 2018). Additionally, the control variable of broad money (M2) growth annual (BMG) was employed as a proxy for the size of the financial sector (Pham & Doan, 2020).

Furthermore, population growth annual percentage (PGP) was also incorporated in the model as a control variable (Han & Melecky, 2013; Morgan & Zhang, 2018) since an increase in the population size might increase the number of formal financial services users.

Table 3.8: List of Control Variables

Variables	Indicators
Control Variables	GDP per capita growth (annual %)
	Broad money growth (annual %)
	Population growth (annual %)
	Inflation, GDP deflator (annual %)
	Dummy Variable for Covid Pandemic

Inflation GDP deflator annual percentage (IGD) as a proxy for inflation was also chosen as a control variable because inflation and population are worth considering in times of financial crises (Han & Melecky, 2013). The data for these variables were obtained from the World Bank's World Development Indicators database.

Last but not least, the year 2020 is well known for the Covid-19 pandemic. A number of countries in the world were placed under lockdowns, which adversely affected economic activity throughout the world. This led to an unprecedented disruption of the global supply chain, bringing the world economy to a standstill. Globally, international trade declined by eight percent in 2020 as compared with 2019 because of the pandemic (Ugurlu & Jindrichovska, 2022).

Hence, to analyze the results better, this study used dummy variable of Covid pandemic (COV). The selection of the year and approach to use the dummy variables in the analysis was decided upon the literature review. Year 2020 is usually regarded as the year of the pandemic. Hence, number study has inducted the dummy variable in their analysis for

the pandemic in year 2020 (Fu & Shen, 2020; Curto & Serrasqueiro, 2022; Ugurlu & Jindrichovska, 2022). The value of the dummy variable is 1 if the year is 2020 (pandemic year) otherwise it is 0. This method allows researchers to account for the effect of the pandemic on the data (Fu & Shen, 2020; Curto & Serrasqueiro, 2022; Ugurlu & Jindrichovska, 2022).

3.5 Model

This research attempts to examine the role of governance quality environmental sustainability and social sustainability (ESG) of a country in maintaining financial stability (FST) and increasing financial efficiency (FEF) with other related control variables. The mediating role of financial inclusion (FI) is also considered in the study.

3.5.1 Function

Before describing the estimation models, the functions given below that are based on past studies and conceptual framework.

$FST_{i,t} = f(\text{ESG, financial inclusion mediating between ESG and FST, control variables}).$

$FEF_{i,t} = f(\text{ESG, financial inclusion mediating between ESG and FEF, control variables}).$

3.5.2 Estimation Model

A conceptual framework has been developed based on literature and theory to define that the FI is affected by independent variables, which are governance quality, environmental sustainability, and social sustainability (ESG). In addition, FEF and FST, which are dependent variables of this study, are affected by FI as well. Hence, according to Baron and

Kenny (1986) to prove mediation, three conditions (Shin, 2018; Iankova et al., 2019) mentioned below must be fulfilled.

- a) The independent variable affects the mediator primarily.
- b) A dependent variable must be impacted by an independent variable.
- c) The dependent variable should also be impacted by the mediator.

In this case FI meets all three conditions defined by Baron and Kenny (1986) to be defined as mediator. The mediating variable lies in between dependent and independent variables and passes the impact of the independent variable on the dependent variable (Creswell & Creswell, 2017).

To test the function presented in the previous section, the regression model in Equation 3.6, and Equation 3.11 are presented in this section. Before deriving final equations, four steps of Baron and Kenny (1986) were followed for mediations with each independent variable (Equations 3.2 to Equation 3.5 and Equation 3.7 to Equation 3.10) are shown as below:

$$FST_{i,t} = \beta_0 + \beta_1 FST_{i,t-1} + \beta_2 ESG_{it} + \varepsilon_{i,t} \quad \text{Equation 3.2}$$

$$FI_{i,t} = \beta_0 + \beta_1 FI_{i,t-1} + \beta_2 ESG_{it} + \varepsilon_{i,t} \quad \text{Equation 3.3}$$

$$FST_{i,t} = \beta_0 + \beta_1 FST_{i,t-1} + \beta_2 FI_{i,t} + \varepsilon_{i,t} \quad \text{Equation 3.4}$$

$$FST_{i,t} = \beta_0 + \beta_1 FST_{i,t-1} + \beta_2 ESG_{it} + \beta_2 FI_{i,t} + \varepsilon_{i,t} \quad \text{Equation 3.5}$$

$$FST_{i,t} = \beta_0 + \beta_1 FST_{i,t-1} + \beta_2 ESG_{it} + \beta_3 FI_{it} + \beta_4 GDPR_{it} + \beta_5 BMG_{it} + \beta_6 PGP_{it} + \beta_7 IGD_{it} + \beta_8 COV_{it} + \varepsilon_{it} \quad \text{Equation 3.6}$$

$$FEF_{i,t} = \beta_0 + \beta_1 FEF_{i,t-1} + \beta_2 ESG_{it} + \varepsilon_{i,t} \quad \text{Equation 3.7}$$

$$FI_{i,t} = \beta_0 + \beta_1 FI_{i,t-1} + \beta_2 ESG_{it} + \varepsilon_{i,t} \quad \text{Equation 3.8}$$

$$FEF_{i,t} = \beta_0 + \beta_1 FEF_{i,t-1} + \beta_2 FI_{i,t} + \varepsilon_{i,t} \quad \text{Equation 3.9}$$

$$FEF_{i,t} = \beta_0 + \beta_1 FEF_{i,t-1} + \beta_2 ESG_{it} + \beta_3 FI_{i,t} + \varepsilon_{i,t} \quad \text{Equation 3.10}$$

$$FEF_{i,t} = \beta_0 + \beta_1 FEF_{i,t-1} + \beta_2 ESG_{it} + \beta_3 FI_{it} + \beta_4 GDPR_{it} + \beta_5 BMG_{it} + \beta_6 PGP_{it} + \beta_7 IGD_{it} + \beta_8 COV_{it} + \varepsilon_{it} \quad \text{Equation 3.11}$$

Where:

FST = composite variable of financial stability (proxied by BZB, BCG and LAD) in a country *i* at year *t*

FEF = composite variable of financial efficiency (proxied by NIM, ROA and ROE) in a country *i* at year *t*

ESG = composite variable of based on economic, social and governance indicators in a country *i* at year *t*

FI = financial inclusion in a country *i* at year *t*

GDPR = control variable, GDP per capital growth annual (%) of a country *i* at year *t*

BMG = control variable, broad money growth (annual %) for country *i* at year *t*

PGP = control variable, population growth annual percentage of country *i* at year *t*

IGD = control variable, inflation GDP deflator annual percentage of a country *i* at year *t*

COV = control variable, dummy variable of Covid pandemic in a country *i* at year *t*

When the financial system is able to “absorb shocks without causing a collapse of financial institutions, financial markets and payment systems,” the system is considered financially stable (Mottele & Biekpe, 2015). In this regard BZB, BCG and LAD are good example to assess the ability of financial system to absorb shocks. So, this study also created a composite index of FST based on these three indicators. Hence, creating FST index

comprised of these three indicators would provide a fair view of the stability of the financial system (Le et al., 2019a).

Moreover, the financial system is considered efficient when it is less vulnerable to banking crises (Olgu, 2014). Therefore, the indicators of NIM, ROA and ROE that prominently highlight the profitability side of the financial system are better to assess separately to examine impacts on efficiency of the financial system Le et al. (2019a). Thus, the composite index of FEF was created to assess the impact on efficiency of the financial system.

3.6 Analytical Analysis

This section will comprise different sub-sections, including panel data analysis, principal component analysis, regression model, model specification and diagnostic tests that are necessary for optimizing regression in order to produce the most appropriate solution to solve the problems in this study.

3.6.1 Panel Data Analysis

As discussed in Section 3.3, this study is based on yearly observations from Asian countries between 2009 and 2021. In selecting the countries, consideration was given to the availability of data. The benefits and limitations of using panel data for statistical analysis include a significantly larger data set since panel data are multiple observations on the same sample. Thus, there are 42 countries in this study. As a result, there will be greater variability among the variables and less collinearity than in the case of cross-sectional or time-series data.

By stacking or pooling the observations across Asian countries, the variation in the data is increased, and collinearity is reduced. With additional and more informative data, one can get more reliable estimates and test more sophisticated behavioral models using less restrictive assumptions (Baltagi, 2011). Another advantage of panel data is their ability to control individual heterogeneity. Not controlling for these unobserved individual-specific effects leads to bias in the resulting estimates (Baltagi, 2011).

3.6.2 Principal Component Analysis

To create composite variables for governance quality, environmental and social sustainability, this study applied principal component analysis (PCA). The PCA technique is used for the reduction of dimensionality of a multivariate data set (Bartholomew et al., 2010) that enables a smaller number of variables to be representative of the larger set of data (Dray & Josse, 2015). PCA works on the method by which the correlation is attained from variable measured on a continuous scale. For example, variables like weight and length may be continuous, for convenience, it is better to treat these two variables in the same way and refer them collectively as metrical (Bartholomew et al., 2010). The PCA is also a useful tool for transformation of significantly correlated batch of variable into an uncorrelated set of variables (Asongu & Nnanna, 2019) without any loss of useful information (Banda & Kumarasamy, 2020).

Moreover, the composite variable from different set of indicators can be created by assigning weights according to their explanatory power. The assigned weights can be obtained with reference to previous literature that has used same indicators for same sample. On the other hand, weights can be obtained in a present by PCA. Thus, the composite variable because of assigning weights from PCA best summarizes the complete structure of

original variable (Song et al., 2013). Moreover, the uncorrelated set of indicators derived through PCA are known as principal components (PCs) (Paca et al., 2019; Njuguna et al., 2020). The technique to create a composite variable is illustrated in Equation 4.1.

Literature has defined the factors to be considered for the decision of retaining the number of components. According to Kaiser (1974) and Jolliffe (2002) the only PCs with eigenvalue more than one should be retained. However, Tripathi and Singal (2019a); Banda and Kumarasamy (2020) argue that in order to improve the quality of composite variable and identification of outliers, it is worthy to retain such PCs that have low variance.

All criteria defined in literature for retaining PCs are suggestive and can be adopted according to ideal situation (Banda & Kumarasamy, 2020). Particularly for cumulative percentage of variance, there is difference of opinions in literature. For instance, Jolliffe (2011) and Gradilla-Hernandez et al. (2020) suggest ranges between seventy percent to ninety percent and they mention that the values can be lesser or greater conditional to context of the dataset. While Tripathi and Singal (2019b) the minimum cumulative percentage of retained PCs should be sixty percent.

PCA reconstructs the compound multivariate dataset into a dataset with minimum possible factors without losing any important information (Jolliffe, 2011; Awomeso et al., 2020). While summarizing the data set, PCA also preserves the native pattern and structure of the data set at its maximum extent (OECD, 2008; Banda & Kumarasamy, 2020; Jahin et al., 2020). However, before proceeding towards the PCA of variables, there are some issues in a dataset that need to be resolved, such as polarity and normalization of the data. The polarity issue is further discussed in Section 3.6.2.1.

After the polarization of indicators, the normalization of the data is required. As shown in Table 3.2 to Table 3.8 and Table 4.1, the indicators used in this study are on different scales and have different units. Subsequently, PCA is the variance maximization process (Nadkarni & Neves, 2018) that will load severely on the high variances (Le et al., 2019a). Therefore, indicators must be normalized before running PCA (Le et al., 2019a; Vo et al., 2020). Thus, following Le et al. (2019a); Le et al. (2019b) and Le et al. (2020), this study normalized variables on softmax normalization technique that is also known as a normalized exponential function. The softmax technique can be demonstrated empirically as follows (Equation 3.12).

$$\text{Standardised variable by softmax} = \frac{1}{1 + \exp^{-V}} \quad \text{Equation 3.12}$$

Where:

$$V = \frac{X_i - \bar{X}}{SD}$$

$\bar{X}$ = the mean of the population.

SD = the standard deviation of the population.

In softmax normalization, the effect of outliers is minimized without eliminating them from the dataset, while the significance of the data is still well-maintained in the standard deviation of the mean (Le et al., 2019a; Le et al., 2019b).

In general, at the first step of PCA, the Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) is performed that validate the suitability of the dataset and adequacy of the sample respectively for running PCA (Le et al., 2019a; Banda & Kumarasamy, 2020). The value of KMO is acceptable equal and above 0.5, while values above 0.7 are considered exceptionally good (Banda & Kumarasamy, 2020; Patil et al., 2020; Ustaoglu et al., 2020).

After KMO and Bartlett's test of sphericity, the principal component analysis is conducted to extract and retain the larger set of data. Usually, the Kaiser (1974) and Jolliffe (2002) criteria are widely used to retain the components that have eigenvalue more than one. However, contrary to the traditional practice of disregarding the principal components (PCs) with low variance, sometimes it is worthy of considering the PCs with a low variance that enhances the explanatory power and quality of the data (Jolliffe, 2011). Preferably, the following criteria should be considered for retaining PCs to derive a reliable and decisive conclusion (Tripathi & Singal, Allocation of weights using factor analysis for development of a novel water quality index, 2019a; Banda & Kumarasamy, 2020).

- (i) Eigenvalues are higher than one ($1.0 < \text{eigenvalue}$).
- (ii) The percentage of variance for initial eigenvalues are higher than ten percent ($10 < \text{initial eigenvalue}$).
- (iii) Percentage of variance cumulatively is higher than sixty percent ($60\% < \text{cumulative percentage of variance}$).

Though, all criteria described in the literature are suggestions and can be regarded in certain situations. One should decide according to the ideal situation while considering the quality of the analysis (Banda & Kumarasamy, 2020). Some authors suggest a minimum cumulative percentage of sixty (Tripathi & Singal, 2019a), while some propose a range between seventy to ninety percent (Jolliffe, 2011; Gradilla-Hernandez et al., 2020).

3.6.2.1 Composite Variable for ESG

Based on the indicators in Table 3.4, Table 3.5, and Table 3.6, a composite variable was created for indicators of governance quality, environmental and social sustainability (ESG). Before running PCA, it is necessary to rectify the direction of the indicators.

Mazziotta and Pareto (2017) describe that polarity is the sign of an individual indicator that expresses the relationship between the phenomenon (that is to be measured) and individual factors. For instance, “infant mortality” possesses negative polarity and “life expectancy” maintains positive polarity while measuring development. In this case, before creating a composite variable or index for development, it is imperative to reverse the sign of “infant mortality” (that is negatively correlated to the ESG) (Mazziotta & Pareto, 2019).

It is necessary to invert the sign of the indicators with negative polarity when constructing a composite index since all the individual indicators should have positive polarity. The polarity of the data may be corrected before or after normalization. Nevertheless, the results are generally the same (Mazziotta & Pareto 2017).

In order to create the ESG composite variable, the study conducted PCA analysis after normalizing and rectifying the polarity. Kaiser-Meyer-Olkin's measure of sampling adequacy (KMO) and Bartlett's test of sphericity (BTS) (see Table 4.2) were used to verify the suitability of the data for PCA. Moreover, the rotation sums of squared loadings were used to determine the retention of components (Table 4.3). Once the retention of components was determined, all factors extracted were aggregated according to the method described in Equation 4.1.

3.6.2.2 Composite Variable for FI

The composite variable of financial inclusion (FI) was created based on the indicators presented in Table 3.7. Since all FI indicators had the same direction, PCA analysis was not affected by polarity issues. A further benefit of the initial testing of KMO and BTS was the confirmation of the appropriateness of the data for PCA. Hence, based on the results of the analysis presented in Table 4.5, all components of the study were retained.

3.6.2.3 Composite Variables for FST and FEF

As discussed previously, the study has two dependent variables of financial stability (FST) and financial efficiency (FEF). The composite variable of FST was based on the indicators exhibited in Table 3.2, while FEF contained the aggregated indicators presented in Table 3.3. Additionally, the initial testing of KMO and BTS confirmed that PCA could be performed correctly with the data. In FST, two components representing 100 percent of the variance were retained (see Table 4.7). However, in FEF, all three components were retained.

3.6.3 Regression Model Analysis

This study consists of Panel data that is characterized by repeated observations of same cross section over time (Bliese et al., 2020), covering the period from 2009 to 2021. A general panel data regression model is written as $Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it}$, where i is the cross-section dimension, t is the time-series dimension, Y_{it} is dependent variables, X_{it} is independent variables, β_0 and β_1 are parameters, and ε is a stochastic error.

The relationship between FST and FEF, FI, and ESG of a country is formed through linear regression. Between these variables, a reliable relationship is not established simply by performing regression. For getting reliable relationships between variables, the ordinary least squares (OLS) technique is required. It is the most accepted method of performing regression analysis and econometric estimation models. The reason for its acceptance is due to standard situations, which means the model meets the series of statistical assumptions, and it produces optimal results. To validate the claim that OLS produces best possible results, there is a well-known Gauss-Markov theorem, and its several assumptions must be

met. Assumptions are known as the classical linear regression model (CLRM) assumptions, defined as follows:

1. In other words, it can be stated that the parameters in the model are linear in coefficients, has an error term (ϵ) and it is correctly specified.
2. The variables ESG is not correlated with error term (ϵ).
3. The mean (average or expected value) for error is zero at any specific amount of an ESG. If the regression equation contains the constant term, this assumption will not be violated.
4. The variance of each error term is constant, or the model has no heteroscedasticity.
5. The error term doesn't show a systematic relationship over time, in other words, the model has no autocorrelation.
6. Normality of residual.
7. There is no multicollinearity such as the indicators of governance quality, environmental and social sustainability indicators do not express the linear function of each other.

By satisfying all CLRM assumptions, OLS can be considered as the best estimation technique; in other cases, CLRM may not be the best estimation technique. In contrast to this scenario, econometric allows modifying the OLS method if its assumptions are not met. For this study, to obtain a valid interpretation of regression estimates, classical assumptions made about ESG, and error terms are essential.

According to Gujarati (2012) the essence of the Gauss-Markov theorem that provides a theoretical justification of the method for least square states that, under assumed conditions, ordinary least square estimators are best, linear and unbiased estimators. Furthermore, he explains that:

1. Estimators must be linear to deal with a comparison with non-linear estimators, so far, linear functions are easy to understand. When estimators are linear, it means they are linear functions of the dependent variable Y .
2. To prove unbiasedness of estimators, the estimators must be equal to their real value when repeatedly method is applied.

To prove the linear unbiasedness of estimators, ordinary least square should have minimum variance. With the least possible uncertainty, actual parameter values can be estimated. Efficient estimators contain the quality of being unbiased estimator with the least variance.

3.6.4 Model Specification

Before running the panel data analysis, a model is to be selected from among three types of panel data. Those types are the pooled model, a random effect model, and the fixed-effect model. The pooled data uses all variations in the data and assumes that the slope and the intercept are constant across time and units.

The fixed-effect model is the most flexible model that allows the endogeneity of regressor and is used for variations in the data only. The fixed-effect model is used to control all omitted variables and it removes unobserved heterogeneity (Bailey, 2017; Bliese et al., 2020).

On the other hand, random effects model is an alternate to fixed effect model (Bliese et al., 2020). The weighted average of the between and within variation is used in the random effect model, and it can facilitate within unit serial correlation. So, two primary tests will be used to conclude the right decision for an estimator defined as follows.

3.6.4.1 The Breusch-Pagan, Lagrangian Multiplier Test

The first test for the model specification, the present study conducts Breusch-Pagan (BPL) test that is named after two researchers named Trevor Breusch and Adrian Pagan. This test is performed to test for conditional heteroscedasticity in the linear regression model, and with this test, it is also decided whether the Pooled Model or Random Effect Model will be used for the study. The Breusch-Pagan, Lagrangian Multiplier (BPL) test is distributed as chi-squared with one degree of freedom under the null hypothesis. The hypothesis for the test show as below:

$H_0: \sigma^2_{\lambda} = 0$ (Pooled Model)

$H_A: \sigma^2_{\lambda} > 0$ (Random Effects Model)

After the test by Stata, the p-value less than 0.05 leads the conclusion that the random effect model is more appropriate than the Pooled model. In other words, there are country-specific effects in the data.

3.6.4.2 The Hausman Specification Test

Secondly, this study conducts the Hausman specification test. This test is commonly used in applied data analysis, which seeks to conclude that whether the model for study would be the Random Effect Model or Fixed Effect Model. Hausman test assesses coefficient consistency between specification of random effect and fixed effect. Though significant test specifies fixed effects are ideal (Bliese et al., 2020). Hausman Specification Test is in conjunction with Hausman and McFadden (1984), this test is used to evaluate the significance of the estimators. The hypothesis for the Hausman Specification test show as below:

$H_0: \text{Cov}(\lambda_i, X_{it}) = 0$ (no correlation between λ_i and $X_{it} \rightarrow$ Random Effect Model)

$H_A: \text{Cov}(\lambda_i, X_{it}) \neq 0$ (correlation between λ_i and $X_{it} \rightarrow$ Fixed Effect Model)

If Hausman statistic has an asymptotic chi-squared distribution with k degrees of freedom under the null hypothesis of regressor-effect independence, therefore random effect model is more appropriate. However, if the p -value is less than 0.05, it indicates that the fixed effect estimator should be used. Besides, the model is considered to have no consistency problem if there is no systematic difference between the two estimators and vice versa (Hausman & McFadden, 1984).

3.6.5 Diagnostic Tests

After the model specification, the diagnostic tests are run to identify further problems in the model. For example, to validate that model has satisfied all OLS assumptions, diagnostic tests are run. The tests include, Hausman test, heteroscedasticity test, serial correlation test, and more tests as per data requirements (Zikmund et al., 2012). The validity of a model is assessed after passing the abovementioned regression diagnostic tests. In applied econometrics, through diagnostic tests, it is decided whether the estimated model in the study is suitable for explaining an economic phenomenon.

3.6.5.1 Multicollinearity Tests

Another test in this study will be conducted is multicollinearity test. Multicollinearity is a situation where variables are correlated in the model and give expendable information regarding the response. This check has to do with the interpretation of regression coefficients. By using the Stata, the variance inflation factors for each variance by the formula below:

$$VIF_j = 1 / (1 - R_j^2)$$

Where R^2 is the coefficient of determination for the model that includes all variances except j th variance. This condition for the test is if the mean of variance inflation factors (VIF) is greater than '10', then there is a problem with multicollinearity.

However, the limit of cutoff point for VIF considered to be high varies between literature (Linder et al., 2020). For instance, some studies contemplated multicollinearity when VIF is as higher than '20' (Griffiths et al., 1985; Greene, 2003). In contrast, some suggest the higher limit as '10' (Wooldridge, 2014), while some suggest as low as '5' (Rogerson, 2001).

3.6.5.2 Heteroscedasticity Test

To test whether there is heteroscedasticity this study will go for heteroscedasticity test using STATA. A test for heteroscedasticity is available for the fixed effect model using the STATA command `xttest3`, and the Modified Wald test is the detection. The hypothesis for the heteroscedasticity checks show as below:

H_0 : Constant Variance (Homoscedasticity)

H_A : Non-constant Variance (Heteroscedasticity)

If the result of the heteroscedasticity check obtains the p-value less than 0.05, the null hypothesis is rejected. It concludes there is heteroscedasticity in the model.

3.6.5.3 Autocorrelation Test

This test whether the regression residuals are not autocorrelated and observations are assumed ordered by time this study will run Wooldridge test in STATA. A Wooldridge test

for autocorrelation is available using the STATA command “xtserial”. The hypothesis for the Serial Correlation checks show as below:

H_0 : No serial correlation

H_A : first-order autocorrelation

If the result of the serial correlation checks obtains the p-value less than 0.05, the null hypothesis is rejected. It concludes the data does have the first-order autocorrelation.

According to Gujarati (2004) the most commonly used test for detecting serial correlation problems is after the name of two researchers Durbin and Watson. The test is known as Durbin Watson *d* statistic.

3.7 Generalized Method of Moments (GMM) Estimation Method

The panel data, due to its multifaceted nature, is normally infringed with the issues of endogeneity, simultaneity, and unobserved heterogeneity. Econometricians recommend using the Generalized Method of Moments (GMM) Estimation Method for confronting these issues. In the following line, the thesis introduces these issues and then puts forth the solution in the form of GMM.

3.7.1 Endogeneity

Endogeneity is a conditions condition where the model’s error term is related to the predictor or explanatory variable (also called as independent variable) (Bailey, 2017; Bliese et al., 2020). Endogeneity of the right-hand regressors is a severe problem in econometrics. This may be due to the omission of relevant variables, measurement error, sample selectivity, self-selection, or other reasons. Endogeneity causes inconsistency of the usual OLS estimates (Baltagi, 2011). This predicament often caused by variable omission may lead to

measurement error or simultaneity. In other words, this assumption states that the unobserved factors represented by the error term μ_i are not systematically related to the regressors or that the regressors are truly exogenous (Gujarati et al., 2012).

In the context of ordinary least squares (OLS) estimation, endogeneity is the most common term that is used for a situation where an independent variable (IV) has a correlation with the structural error term in the model (Wooldridge, 2002; Kennedy, 2008). In these scenarios, the estimation is inconsistent, and the error term is not random, this indicates that the IV's coefficient estimation is failed to meet the actual value of the coefficient in the population when the sample size is increased (Zaefarian et al., 2017).

When an IV is correlated with the error term, the coefficient estimate reflects the impact of IV over DV as well as all other unobserved factors that are correlated with IV and describe DV, hence altering its elucidation problematic or in some cases pointless (Antonakis et al., 2010; 2014). The estimated variable would be biased if the correlation of IV with error term is ignored, and it is known as endogeneity bias (Chintagunta et al., 2006).

3.7.2 Simultaneity

The simultaneity problem arises because some of the regressors are endogenous and are therefore likely to be correlated with the disturbance or error term. Therefore, a test of simultaneity is essentially a test of whether (an endogenous) regressor is correlated with the error term. If the simultaneity problem exists, in which case alternatives to OLS must be found; if it is not, one can use OLS. To find out which is the case in a concrete situation, we can use Hausman's specification error test (Gujarati, 2004). For example, there are many situations where such a unidirectional relationship between Y and the Xs cannot be maintained, for it is quite possible that some of the X affects Y, still, in turn, Y also affects

one or more Xs. In other words, there may be a feedback relationship between the Y and X variables (Gujarati et al., 2012).

3.7.3 Unobserved Heterogeneity

There may be correlation due to unobserved heterogeneity. This has been a pervasive problem in cross-sectional regression analysis. If characteristics that have a direct effect on both left and right-hand side variables are omitted, explanatory variables will be correlated with errors, and regression coefficients will be biased measures of the structural effects. Thus researchers have often been confronted with massive cross-sectional data sets from which precise correlations can be determined but that, nevertheless, had no information about parameters of policy interest. A major motivation for using panel data has been the ability to control for possibly correlated, time-invariant heterogeneity without observing it (Arellano, 2003).

Just as time-series data create their own unique problems (because of the stationarity issue), cross-sectional data to have their own issues, precisely the problem of heterogeneity (Gujarati, 2004) For example, if you collect data on wages in several firms in a given industry at the same point in time, heterogeneity arises because the data may contain small, medium, and large size firms with their characteristics (Gujarati et al., 2012).

The prevalent problem of heteroskedasticity arises in empirical work. Though in the presence of heteroskedasticity, the consistency of the independent variable coefficient is not affected, however, the standard independent variable estimates of the standard errors are not consistent that hinder the rational conclusion. In the presence of heteroskedasticity, the standard diagnostic tests for endogeneity and overidentification become worthless. The

Generalized Method of Moments (GMM) introduced by Hansen (1982) is used to tackle the unidentified heteroskedasticity problem.

If the error terms in the regression are correlated within groups, but not correlated across groups, then the consequences for IV estimation are similar to that of heteroskedasticity: the IV coefficient estimates are consistent, but their standard errors and the usual forms of the diagnostic tests are not.

3.7.4 Overidentification Restrictions

In work originating with Anderson and Rubin (1949) and Sargan (1958), and culminating in Hansen (1982), overidentification in the generalized method of moments (GMM) framework was equated with the number of unconditional moment restrictions exceeding the number of parameters of interest. Under mild regularity conditions, such a surplus of moment restrictions was shown to enable the construction of both more efficient estimators and model specification tests. It is hard to overstate the importance of this result, which has granted practitioners with an intuitive condition characterizing the existence of both efficiency gains and specification tests and has thus intrinsically linked both phenomena to the notion of overidentification.

CHAPTER 4

EMPIRICAL RESULTS AND DISCUSSION

4.1 Introduction

The relationship between governance quality, environmental and social sustainability (ESG), financial inclusion (FI), financial stability (FST) and financial efficiency (FEF) is analyzed in this chapter. The data are obtained from different databases provided by the World Bank. The years before 2009 were excluded from analysis, as the inclusion of such years contains the financial crisis-era that may produce abnormal results. The analysis was confined to 2009 to 2021 only to ensure the accuracy of the results. Hence, this study uses several analytical and statistical techniques to assess the relationships between the independent, mediator, and dependent variables, such as descriptive analysis, principal component analysis, panel regression analysis, and other diagnostic tests, to validate the regression analysis technique.

The central tendency and measures of the spread of the data are measured through descriptive analysis. Whereas principal component analysis (PCA) is used for dimension reduction of the variables that assist in creating composite variables from a larger set of data. Afterwards, multiple panel regression analysis is considered for the panel of this study. Finally, diagnostic tests are conducted to investigate the issues related to heteroscedasticity, serial correlation, and multicollinearity.

4.2 Descriptive Results

A description of the variables undertaken in this study with respect to Asian countries is provided in Table 4.1. Each variable is described in terms of its number of observations

(Obs), its mean value, its standard deviation, its minimum value, and its maximum value. A variable's number of observations is its total value. However, its mean is its measure of central tendency. This is calculated as a ratio between its sum of values and its number of values. The number of observations (Obs) for each variable ranges from 153 to 516, indicating a wide range of countries were involved in the collection of data. Further, the standard deviation is the variation from the mean and the minimum and maximum values depict the range of a particular variable.

Table 4.1: Descriptive Statistics Summary

Variable	Obs	Mean	Std. Dev.	Min	Max
Voice and Accountability	546	-0.71	0.82	-2.26	1.11
Political Stability	546	-0.52	1.04	-3.01	1.62
Government Effectiveness	546	-0.07	0.90	-2.31	2.34
Regulatory Quality	546	-0.15	0.88	-2.24	2.26
Rule of Law	546	-0.25	0.87	-2.09	1.88
Control of Corruption	546	-0.31	0.91	-1.71	2.22
GDP per capita growth (annual %)	546	1.89	5.13	-29.83	18.52
Broad money growth (annual %)	520	13.49	10.68	-9.10	72.74
Population growth (annual %)	546	1.67	1.73	-4.53	14.14
Inflation, GDP deflator (annual %)	546	5.55	11.37	-30.20	150.00
Bank Z-score	546	18.02	11.41	0.54	67.00
Bank credit to bank deposits (%)	520	103.57	101.54	18.30	867.94
Liquid assets to deposits and short-term funding (%)	545	35.27	19.97	6.71	148.50
Bank net interest margin (%)	546	3.94	3.05	0.07	56.11
Bank return on assets (% , after tax)	546	1.04	4.47	-70.30	28.73

Table 4.1 continued

Bank return on equity (%, after tax)	546	11.38	16.33	-116.20	259.01
CO2 emissions (metric tons per capita)	546	6.37	7.45	0.13	34.19
Methane emissions (metric tons of CO2 equivalent per capita)	546	2.12	2.85	0.22	14.36
Nitrous oxide emissions (metric tons of CO2 equivalent per capita)	546	0.39	0.59	0.09	4.31
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	544	41.43	22.20	11.10	100.78
Adjusted savings: natural resources depletion (% of GNI)	530	4.66	6.42	0.00	39.38
Adjusted savings: net forest depletion (% of GNI)	523	0.31	0.88	0.00	4.88
Forest area (% of land area)	519	22.41	22.63	0.00	73.61
Terrestrial and marine protected areas (% of total territorial area)	266	8.81	9.51	0.10	49.67
Electricity production from coal sources (% of total)	273	17.61	26.40	0.00	96.24
Energy imports, net (% of energy use)	235	-43.61	146.90	-545.21	97.93
Energy intensity level of primary energy (MJ/\$2017 PPP GDP)	462	5.37	2.97	1.76	21.67
Energy use (kg of oil equivalent per capita)	242	2794.77	3391.87	193.07	17922.70
Fossil fuel energy consumption (% of total)	224	78.93	22.88	11.04	100.00
Renewable electricity output (% of total electricity output)	310	27.31	34.01	0.00	100.00

Table 4.1 continued

Renewable energy consumption (% of total final energy consumption)	464	20.20	24.70	0.00	92.38
Agricultural land (% of land area)	420	37.91	23.67	0.93	80.77
Agriculture, forestry, and fishing, value added (% of GDP)	516	10.67	9.22	0.03	40.79
Food production index (2014-2016 = 100)	462	98.12	14.91	32.33	162.89
Government expenditure on education, total (% of government expenditure)	370	14.14	4.60	5.50	31.37
Literacy rate, adult total (% of people ages 15 and above)	153	88.43	14.68	31.45	100.00
School enrolment, primary (% gross)	394	103.97	10.50	75.40	149.96
Labour force participation rate, total (% of total population ages 15-64)	462	65.84	12.62	37.96	88.51
Unemployment, total (% of total labour force)	546	5.80	4.60	0.10	21.21
Fertility rate, total (births per woman)	504	2.46	0.84	0.84	6.18
Life expectancy at birth, total (years)	504	73.12	5.11	60.48	84.62
Hospital beds (per 1,000 people)	294	3.05	2.93	0.01	13.62
Mortality rate, under-5 (per 1,000 live births)	504	24.20	19.65	2.20	91.70
Prevalence of overweight (% of adults)	336	42.67	18.30	14.20	73.40
Prevalence of undernourishment (% of population)	396	9.00	8.53	2.50	46.60

Table 4.1 continued

Access to clean fuels and technologies for cooking (% of population)	492	73.26	30.43	3.30	100.00
Access to electricity (% of population)	504	92.99	12.96	31.10	100.00
People using safely managed drinking water services (% of population)	372	66.81	27.93	13.31	100.00
People using safely managed sanitation services (% of population)	357	61.08	26.02	12.38	100.00
Number of Institutions, Commercial banks	520	44.53	41.15	3.00	204.00
Number of ATMs per 100,000 adults	520	46.30	48.78	0.00	288.59
Number of commercial bank branches per 100,000 adults	517	14.69	12.94	1.49	71.23
Outstanding deposits with commercial banks (% of GDP)	520	65.34	47.29	6.41	299.86
Outstanding loans from commercial banks (% of GDP)	520	56.63	39.18	2.46	246.96

The mean value for voice and accountability is -0.71 with a standard deviation of 0.82 and a minimum value of -2.26 and a maximum value of 1.11. This suggests that the voice and accountability scores for Asian countries are generally negative, with values ranging from -2.26 to 1.11. Similarly, the mean value for political stability is -0.52, which suggests that on average, the level of political stability across Asian countries is low. The standard deviation of 1.04 shows the extent of variation in political stability in Asian countries. The minimum value of -3.01 and maximum value of 1.62 describe the range of values. The government effectiveness is based on 546 observations. The mean value for the

variable is -0.07, which means the average government effectiveness score for the 546 observations is -0.07. The standard deviation, which is 0.90, shows how much individual Asian countries differ from the mean. The minimum value is -2.31, meaning the lowest government effectiveness score in the selected Asian countries is -2.31. The maximum value is 2.34, meaning the best government effectiveness score in the sample is 2.34. Regulatory quality is based on 546 observations having a mean value of -0.15 indicates the average score of the regulatory quality variable in selected Asian countries. The standard deviation of 0.88 reflects the dispersion of the scores around the mean. A low standard deviation shows that the scores are clustered closely around the mean, while a high standard deviation indicates that the scores are spread out. The regulatory quality ranges between -2.24 and 2.26. The Rule of Law score ranges from -2.09 to 1.88, with a mean of -0.25 and a standard deviation of 0.87. The variable is a measure of the quality of rule of law in a country, with higher scores indicating higher quality and stronger rule of law. The Control of Corruption score ranges from -1.71 to 2.22, with a mean of -0.31 and a standard deviation of 0.91. The variable is a measure of the level of corruption in a country, with higher scores indicating lower corruption.

Bank Z-score is a measure of the financial stability of banks. It's calculated using a combination of factors. A high Z-score indicates that a bank is in sound financial health and less likely to declare bankruptcy. In this study, the mean Z-score of the banks was 18.02 with a standard deviation of 11.41. Bank credit to bank deposits (%) is the ratio of bank credit (loans given out) to bank deposits (money held in savings accounts). In this study, the mean ratio was 103.57% with a standard deviation of 101.54%. Liquid assets to deposits and short-term funding (%) is the ratio of liquid assets (assets that can easily be converted into cash) to deposits and short-term funding (money owed to depositors). In this study, the mean ratio

was 35.27% with a standard deviation of 19.97%. Bank net interest margin (%) is the difference between the interest income a bank earns on its loans and the interest it pays out on deposits, expressed as a percentage of total interest earning assets. In this study, the mean net interest margin was 3.94% with a standard deviation of 3.05%. Bank return on assets (% after tax) is a measure of a bank's profitability, calculated as net income after taxes divided by total assets. In this study, the mean return on assets was 1.04% with a standard deviation of 4.47%. Bank return on equity (% after tax) is a measure of a bank's profitability, calculated as net income after taxes divided by total equity. In this study, the mean return on equity was 11.38% with a standard deviation of 16.33%.

CO₂ emissions (metric tons per capita) is the amount of carbon dioxide (CO₂) emitted per person in a given area. In this study, the mean CO₂ emissions were 6.37 metric tons per capita with a standard deviation of 7.45. Methane emissions (metric tons of CO₂ equivalent per capita) is the amount of methane (a potent greenhouse gas) emitted per person, expressed in terms of CO₂ equivalent. In this study, the mean methane emissions were 2.12 metric tons of CO₂ equivalent per capita with a standard deviation of 2.85. PM_{2.5} air pollution, the mean annual exposure (micrograms per cubic meter) rate ranges from 11.10 to 100.78 micrograms per cubic meter, with a mean of 41.43 and a standard deviation of 22.20. The variable is a measure of the average annual exposure to PM_{2.5} air pollution, a type of particulate matter that is harmful to human health.

"Energy use per capita" has a mean value of 2794.77 kg of oil equivalent, with a standard deviation of 3391.87. The minimum value is 193.07 and the maximum value is 17922.70, indicating a wide range of energy consumption patterns across the countries in the sample. Prevalence of undernourishment (% of population). The mean of this variable is

9.00% with a standard deviation of 8.53% and a minimum of 2.50% and a maximum of 46.60%. This variable represents the percentage of the population who are undernourished.

The following six variables are related to the financial inclusion of a particular population. The "Institutions of Commercial Banks" and "Number of ATMs per 100,000 adults" variables indicate the number of commercial banks and ATMs available in the population respectively. The average number of commercial banks in the population is 44.53, while the average number of ATMs per 100,000 adults is 46.30. The standard deviation of both variables is relatively high, pointing to significant variability across the population in terms of access to financial institutions. The "Number of commercial bank branches per 100,000 adults" variable represents the number of branches of commercial banks per 100,000 adults in the population. The average value of this variable is 14.69, with a relatively high standard deviation of 12.94, indicating significant variability in access to commercial bank branches across the population. The final two variables, "Outstanding deposits with commercial banks (% of GDP)" and "Outstanding loans from commercial banks (% of GDP)", represent the outstanding deposits and loans with commercial banks as a percentage of the Gross Domestic Product (GDP) of the population. On average, 65.34% of GDP is held as outstanding deposits with commercial banks, while 56.63% of GDP is held as outstanding loans from commercial banks. The standard deviation of both variables is relatively high, indicating significant variability in the level of deposits and loans held with commercial banks across the population.

4.3 Principal Component Analysis (PCA)

This section explains the process and the techniques used for factor analysis called principal component analysis (PCA). A separate section is dedicated to describing how each

variable was computed and how composite variables were created by considering different criteria. PCA is a powerful tool that reveals the underlying structure of the data, making it an important tool for data analysis. It can be used to identify relationships between variables, identify outliers and reduce the number of variables in the data set.

4.3.1 PCA for ESG

Starting with the composite variable of governance quality, environmental and social sustainability (ESG), the KMO test result shows a value of 0.845, as reported in Table 4.2, which infer that sample adequacy is considerably good for indicators of ESG to run PCA. Moreover, Bartlett's test demonstrates that the suitability of the dataset for ESG indicators are also highly significant (Table 4.2). In this manner, the results of both tests confirm that the data and sample are suitable for running PCA (Hair et al., 2006; Tabachnick et al., 2007).

Table 4.2: KMO and Bartlett's Test for ESG

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.845
Bartlett's Test of Sphericity	Approx. Chi-Square	2965.35
	df	325
	Sig.	0.000

Following initial tests, PCA was applied to 46 indicators of ESG using varimax rotation. According to Table 4.3, nine principal components (PCs) have eigenvalues greater than one. Additionally, twelve of the components had an eigenvalue greater than 0.5. Thus, the study decided to retain the first twelve components for the ESG index. A total of 96 percent of the variance is accounted for by the retained components. This suggests that the components used in the analysis accounted for most of the variance in the data, making it a reliable analysis.

Table 4.3: Total Variance Explained for ESG

Total Variance Explained			
Principal Components	Rotation Sums of Squared Loadings		
	Total	% Of Variance	Cumulative %
1	7.22	27.75	27.75
2	6.24	23.98	51.74
3	2.21	8.48	60.22
4	2.06	7.92	68.13
5	1.18	4.55	72.68
6	1.14	4.39	77.07
7	1.10	4.21	81.28
8	1.09	4.18	85.46
9	1.06	4.06	89.51
10	0.60	2.32	91.84
11	0.60	2.31	94.14
12	0.57	2.20	96.35

The weighted mean of the factor's method proposed by Giudici and Avrini (2002); Mazziotta and Pareto (2017) are considered to create a composite index of ESG. This method accumulates indicators by the weighted mean of factor scores through weights according to the variance explained by the components (Mazziotta & Pareto, 2017). This method can be empirically demonstrated as follows (Equation 4.1).

$$C_i = \frac{\sum_{V=1}^F T_{iV} \lambda_V}{\sum_{V=1}^F \lambda_V} \quad \text{Equation 4.1}$$

Where F is the number of considered factors, T_{iV} is the value of factor V for unit i and λ_V is the percentage of variance explained by factor V . In this method, decreasing order of position is assigned to the factors as per their proportion of variance explained (Mazziotta & Pareto, 2017).

4.3.2 PCA for Financial Inclusion

KMO and Bartlett's test for FI also validated the adequacy of the sample to run the PCA. As reported in Table 4.4, results for KMO show the value of 0.734 and Bartlett's test demonstrates a high significance level.

Table 4.4: KMO and Bartlett's Tests for FI

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.617
Bartlett's Test of Sphericity	Approx. Chi-Square	793.643
	df	10
	Sig.	0.000

PCA was conducted on five indicators of financial inclusion (FI) as presented in Table 3.7 using varimax rotation. As demonstrated in Table 4.5, the first four PCs hold eigenvalues of more than one. The study retained all five PCs representing 100% variance. The retained factors were accumulated by the technique mentioned in Equation 4.1.

Table 4.5: Total Variance Explained for ESG

Total Variance Explained			
Principal Components	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	1.471	29.417	29.417
2	1.034	20.688	50.106
3	1.019	20.389	70.495
4	1.014	20.28	90.775
5	0.461	9.225	100

4.3.3 PCA for Financial Stability (FST)

Using the three indicators presented in Table 3.2, the composite variable of financial stability (FST) was constructed. KMO and Bartlett's test for FST also validated the adequacy

of the sample to run the PCA. As reported in Table 4.6, results for KMO show the value of 0.5 which is the acceptable level (Le et al., 2020a) and Bartlett's test demonstrates a high significance level.

Table 4.6: KMO and Bartlett's Tests for FST

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.5
Bartlett's Test of Sphericity	Approx. Chi-Square	0.396
	df	12
	Sig.	0.000

The PCA analysis indicates that the first two components have an eigenvalue greater than one, which accounts for 100 percent of the variance. Consequently, the study decided to retain the first two components to compute the composite variable of FST.

Table 4.7: Total Variance Explained for FST

Total Variance Explained			
Principal Components	Rotation Sums of Squared Loadings		
	Total	% Of Variance	Cumulative %
1	1	50	50
2	1	50	100

4.3.4 PCA for Financial Efficiency (FEF)

The composite variable of financial efficiency (FEF) was constructed by combining the three indicators presented in Table 3.3 with each other. KMO and Bartlett's test for FEF further validated the adequacy of the sample in order to run PCA and validated the quality of the data. In Table 4.8, it is reported that the KMO statistic shows a value of 0.543, which

is the acceptable level (Le et al., 2020a) and Bartlett's test has a significant level. Therefore, both tests confirmed the validity of PCA.

Table 4.8: KMO and Bartlett's Tests for FEF

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.543
Bartlett's Test of Sphericity	Approx. Chi-Square	143.031
	df	3
	Sig.	0.000

As all components of the FEF have eigenvalues greater than one or near one, the study retained all components of the FEF. According to Table 4.9, the components that were retained account for one hundred percent of the variance cumulatively.

Table 4.9: Total Variance Explained for FEF

Total Variance Explained			
Principal Components	Rotation Sums of Squared Loadings		
	Total	% Of Variance	Cumulative %
1	1.002	33.40	33.40
2	1.002	33.40	66.80
3	0.996	33.20	100

4.4 Model Specification based on Diagnostic Tests Results

This section demonstrates the results of tests conducted for the selection of the appropriate regression model. The basic tests for model specification in panel data are the Breusch-Pagan Lagrangian multiplier and Hausman specification tests. The variance inflation tests were also conducted to ensure that there is no issue of multicollinearity in the data.

4.4.1 Multicollinearity Tests

The variance inflation factor (VIF) is widely used in the literature to identify the problem of multicollinearity. As discussed in section 3.6.5.1 of the study, multicollinearity tests were conducted to identify a possible multicollinearity problem.

The results for multicollinearity tests are reported in Table 4.10. None of the variables has a variance inflation factor (VIF) far off from the minimum limit of 10 (Wooldridge, 2014) and some cases 5 (Rogerson, 2001). Furthermore, for the robustness of the results, a tolerance test was also conducted. As presented in Table 4.10, none of the variables has a value below the threshold level of 0.2. Therefore, it is concluded that there is no multicollinearity problem in the models. Moreover, multicollinearity between independent variables did not affect estimations on the regression in this study.

Table 4.10: Results for the Multicollinearity Tests

Variable	VIF	1/VIF (Tol)
ESG	1.84	0.54
FI	1.70	0.59
GDP per capita growth (annual %)	1.45	0.69
Dummy Variable for Covid Pandemic	1.28	0.78
Broad money growth (annual %)	1.27	0.79
Inflation, GDP deflator (annual %)	1.20	0.83
Population growth (annual %)	1.19	0.84
Mean VIF	1.42	
Multicollinearity Problem	No	

Notes: VIF is the variance inflation factor. Tol is tolerance test.

4.4.2 Heteroscedasticity Test

The fixed effect regression model was tested for groupwise heteroscedasticity in STATA using a modified Wald test. As discussed in Chapter 3, the study will use the Baron and Kenny (1986) approach to examine the mediating role of FI between ESG and FST and

FEF. In this context, the results are also reported for each step of Baron and Kenny (1986) approach for better understandability. This section is divided into three parts to demonstrate the results of all independent variables separately with different proxies of FS.

Moreover, the Breusch-Pagan Lagrangian multiplier (BPL) test is applied to differentiate between the random effect and pooled models. The null hypothesis BPL test validates the use of the ordinary least squared (OLS) model. For instance, if the null hypothesis is accepted, the OLS would be BLUE and hence, considered that there is no autocorrelation problem in the model. However, the BPL test also verify the presence of heteroscedasticity problem in the data (Uyanto, 2019; Vo et al., 2020; Malik et al., 2021).

4.4.2.1 Breusch-Pagan Lagrangian Test with Dependent Variable of FST

Results are presented in this section for heteroscedasticity tests using the Breusch-Pagan Lagrangian test between the composite variable of governance quality, environmental and social sustainability (ESG) and financial stability (FST), with financial inclusion (FI) as a mediating variable used in Equation 3.2 to Equation 3.5. Furthermore, Equation 3.6 represents all control variables as well.

Table 4.11: Results for BPL Test for Model With Dependent Variable FST

Equation 3.2 ESG→FST	Equation 3.3 ESG→FI	Equation 3.4 FI→FST	Equation 3.5 ESG+FI→FST	Equation 3.6 ESG+FI+CV→FST
Chi ² : 1147.44 Prob>chi ² : (0.000)	Chi ² : 1250.50 Prob>chi ² : (0.000)	Chi ² : 1105.90 Prob>chi ² : (0.000)	Chi ² : 1105.07 Prob>chi ² : (0.000)	Chi ² : 1010.68 Prob>chi ² : (0.000)

Table 4.11 presents the chi2 values and P-values for the Breusch and Pagan test of heteroscedasticity with the independent and composite variable of governance quality, environmental and social sustainability (ESG) and the dependent variable of financial stability (FST). The variable FI represents the variable of financial inclusion (used as a mediator in this study). The CV represents all control variables, including the dummy variable for the Covid pandemic.

Table 4.11 shows that in all models, results for BPL tests show the P-value (Prob>chi2) is significant at 1 percent. Thus, the results confirm the presence of heteroscedasticity in the models (Uyanto, 2019; Vo et al., 2020; Malik et al., 2021). This means that the variance of the errors in the models is not constant across all observations, which could lead to inaccurate results. Therefore, it is important to adjust the models to account for this heteroscedasticity, and the P-value confirms that this should be done.

4.4.2.2 Breusch-Pagan Lagrangian Test with Dependent Variable of FEF

This section presents the results for the heteroscedasticity test through the Breusch-Pagan Lagrangian test for the relationship between ESG and financial efficiency (FEF) with a mediating role of financial inclusion (FI) that have been empirically indicated by Equations 3.7 to 3.10. Results are presented in Equation 3.11 incorporating all control variables.

Table 4.12: Results for BPL Test for Model With Dependent Variable FEF

Equation 3.7 ESF→FEF	Equation 3.8 ESG→FI	Equation 3.9 FI→FEF	Equation 3.10 ESG+FI→FEF	Equation 3.11 ESG+FI+CV→FEF
Chi ² : 1139.77 Prob>chi ² : (0.000)	Chi ² : 1250.50 Prob>chi ² : (0.000)	Chi ² : 1142.98 Prob>chi ² : (0.000)	Chi ² : 1045.18 Prob>chi ² : (0.000)	Chi ² : 837.57 Prob>chi ² : (0.000)

Notes: Table 4.12 presents the chi2 values and P-values for the Breusch and Pagan test of heteroscedasticity with the independent and composite variable of governance quality, environmental and social sustainability (ESG) and the dependent variable of financial efficiency (FEF). The variable FI represents the variable of financial inclusion (used as a mediator in this study). The CV represents all control variables, including the dummy variable for the Covid pandemic.

As illustrated in Table 4.12, the results of BPL tests for models empirically demonstrated in Equations 3.7, Equation 3.8, Equation 3.9 and Equation 3.11 indicate that the P-value (Prob>chi2) is significant at 1 percent (0.000). Hence, it confirms the problem of heteroscedasticity in the data (Uyanto, 2019; Vo et al., 2020; Malik et al., 2021). This

means that the P-value associated with the four models tested is less than 0.01, which indicates that the data is significantly heteroscedastic. This implies that the variance of the errors in the data is not constant, which affects the validity of the results.

4.4.2.3 Modified Wald Test with Dependent Variable of FST

This section demonstrates results for heteroscedasticity test through modified Wald test for the relationship between ESG and FS with mediating role of FI that is for Equation 3.2 to Equation 3.5. Additionally, Equation 3.6 represents results with all control variables.

Table 4.13: Results for Heteroscedasticity Tests with Dependent Variables of FST

Equation 3.2 ESG→FST	Equation 3.3 ESG→FI	Equation 3.4 FI→FST	Equation 3.5 ESG+FI→FST	Equation 3.6 ESG+FI+CV→FST
Chi ² : 32494.45 Prob>chi ² : (0.000)	Chi ² : 25659 Prob>chi ² : (0.000)	Chi ² : 28464 Prob>chi ² : (0.000)	Chi ² : 9327 Prob>chi ² : (0.000)	Chi ² : 2984 Prob>chi ² : (0.000)

Note: Table 4.13 illustrates chi2 values and P-values for the heteroscedasticity test with ESG as an independent variable and FST as the dependent variable. All control variables, including the dummy variable for the Covid pandemic, are represented by the CV.

The results of the tests are included in Table 4.13, and the chi-square probability is less than 0.01 (1 percent). It therefore rejects the null hypothesis, which asserts the presence of homoscedasticity (constant variance). Therefore, it can be said that there is a problem with non-constant variance (heteroscedasticity), and there is a need for rectifying the regression. This means that the data is not normally distributed, and the results of the tests indicate that the variance of the data differs across the observations. As a result, the regression results will be biased, so it is necessary to adjust the regression to accurately reflect the underlying data.

4.4.2.4 Modified Wald Test with Dependent Variable of FEF

This section demonstrates results for the heteroscedasticity test for the relationship between environmental sustainability (ES), financial stability (FS) with mediating role of financial inclusion (FI) that is for Equation 3.4, Equation 3.7, Equation 3.8 and Equation 3.9. While Equation 3.10 represents results with control variables.

Table 4.14: Results for Heteroscedasticity Tests with Dependent Variables of FEF

Equation 3.7 ESG→FEF	Equation 3.8 ESG→FI	Equation 3.9 FI→FEF	Equation 3.10 ESG+FI→FEF	Equation 3.11 ESG+FI+CV→FEF
Chi ² : 3598	Chi ² : 25659	Chi ² : 4589	Chi ² : 7947	Chi ² : 9868
Prob>chi ² : (0.000)	Prob>chi ² : (0.000)	Prob>chi ² : (0.000)	Prob>chi ² : (0.000)	Prob>chi ² : (0.000)

Notes: Table 4.14 illustrates chi2 values and P-values for the heteroscedasticity test with ESG as an independent variable and FST as the dependent variable. All control variables, including the dummy variable for the Covid pandemic, are represented by the CV.

The results for tests are demonstrated in Table 4.14, and the chi-square probability is less than 0.01 (1 percent). Hence, it rejects the null hypothesis, which claims the presence of the constant variance problem (homoscedasticity). Therefore, it can be said that there is a problem of non-constant variance (heteroscedasticity), and there is a need for rectification for the regression.

4.4.3 Autocorrelation Test

To detect autocorrelation problems in the panel data, the Wooldridge test is conducted. The test is conducted with the null hypothesis with no serial correlation or autocorrelation problem. Same as Section 4.4.2, this section will also present results for each independent variable separately. Moreover, it is clarified that the study will use Baron and

Kenny (1986) method to examine the mediating role of FI between ESG, FEF and ESG. The results are also presented separately for each step.

4.4.3.1 Autocorrelation Test with Dependent Variable of FST

This section demonstrates results for the autocorrelation test for the relationship between ESG and FST, with mediating role of financial inclusion (FI) that is for Equation 3.2 to 3.5. Additionally, Equation 3.6 represents results with all control variables.

Table 4.15: Results for Autocorrelation Tests with Dependent Variable FST

Equation 3.2 ESG→FST	Equation 3.3 ESG→FI	Equation 3.4 FI→FST	Equation 3.5 ESG+FI→FST	Equation 3.6 ESG+FI+CV→FST
F: 41.20 Prob>F:(0.000)	F: 202.12 Prob>F: (0.000)	F: 36.32 Prob>F: (0.000)	F: 36.97 Prob>F: (0.000)	F: 39.9 Prob>F: (0.000)

Notes: In Table 4.15, the F-value and P-values for autocorrelation tests are presented. In order to determine the statistical significance level for the hypothesis test, Prob>F determines the P-values. The presence of autocorrelation in a model is considered to exist if the P-value is less than 0.05.

The results are shown in Table 4.15, which indicates a chi-square probability less than 0.01 (one percent) and statistical significance at one percent. This indicates that the observed values of the variables being studied are significantly different from what would be expected from chance alone, and that the differences are statistically significant.

4.4.3.2 Autocorrelation Test with Dependent Variable FEF

The results in this section relate to the autocorrelation test for the relationship between ESG, FST, and the mediating role of FI that is for Equations 3.7 to Equation 3.10. Equation 3.11 shows results for the control variables.

Table 4.16: Results for Autocorrelation Tests with Dependent Variable FEF

Equation 3.7 ESG00→FEF	Equation 3.8 ESG→FI	Equation 3.9 FI→FEF	Equation 3.10 ESG+FI→FEF	Equation 3.11 ESG+FI+CV→FEF
F: 52.89 Prob>F: (0.000)	F: 202.14 Prob>F: (0.000)	F: 40.95 Prob>F: (0.000)	F: 77.47 Prob>F: (0.000)	F: 56.88 Prob>F: (0.000)

Notes: Table 4.16 presents the F-value and P-values of autocorrelation tests. Prob>F demonstrate the P-values to find out the statistical significance level for a hypothesis test. A P-value less than 0.05 is considered that problem of autocorrelation exists in the models.

In Table 4.16, it is demonstrated that the chi-square probability is less than 0.01 (one percent) and is statistically significant at the level of one percent. With the FST at 5%, the chi-square probability is less than 0.05 (five percent), which is statistically significant. Thus, the results confirm the existence of an autocorrelation problem. This means that the data shows a strong correlation between the observed values and the expected values. This indicates that the data is not random but instead is structured in a way that suggests that the values are related to one another. This indicates that there is an autocorrelation problem present in the data.

4.4.4 Decision based on Diagnostic Test Results

A variety of diagnostic tests were conducted in this study in order to identify problems with the data. As a first step, the Breusch-Pagan Lagrangian multiplier (BPL) test confirmed the existence of heteroscedasticity in the data (Uyanto, 2019; Vo et al., 2020; Malik et al., 2021). Furthermore, all modified Wald tests demonstrated a chi-square probability of less than 1% for all models. Hence, it rejects the null hypothesis, alleging the constant variance problem (homoscedasticity). Consequently, it validates that the data is heteroscedastic in nature (Tran et al., 2020; Vo et al., 2020). Last but not least, results for

the Wooldridge test indicate a P-value less than 0.05. This confirms the presence of autocorrelation in the model (Tran et al., 2020; Vo et al., 2020).

A number of recent studies have employed GMM to address heteroscedasticity and autocorrelation issues (Sardo & Serrasqueiro, 2017; Anifowose et al., 2018; Vo, 2018; Haris et al., 2019; Vo et al., 2020; Malik et al., 2021). Following the literature and based on the results of diagnostic tests, this study decided to use the generalized method of moments (GMM) estimation method. GMM has become a popular estimation method due to its ability to address issues such as heteroscedasticity and autocorrelation. It also has the advantage of being able to incorporate a wide range of moment conditions, making it suitable for dealing with complex data sets. Furthermore, the method is relatively simple to implement and can be applied to a variety of models.

4.5 Generalized Method of Moments (GMM) Estimation Method

Endogeneity is a conventional problem in panel data analysis. For example, each country has its characteristics, and every country differs in various factors and structural relations. Therefore, panel data may raise the issue of endogeneity that can be caused by unobserved bias, measurement error, unobserved heterogeneity, or reverse causality (Dutta & Saha, 2021). Hence, due to endogeneity, the study can have biased results that may result in misleading conclusions (Ahamed & Mallick, 2019).

FST and FEF are affected by numerous factors that cannot be summarized in an equation, and the performance of financial institutions endure over time, resulting in a problem of unobserved heterogeneity. For instance, the current performance of the financial institutions may well be affected by the previous year's performance (Xu et al., 2019).

Moreover, reverse causality may arise if the problem in FST results in political instability (proxy of governance quality) (Dutta & Saha, 2021).

Furthermore, it is difficult to find good instrumental variables for the other endogenous variables (Dutta & Saha, 2021). On the other hand, GMM creates an instrumental variable internally that obliterates the need for an external instrumental variable (Malik et al., 2021). Tchamyou (2019;2020) describes various motivations to adopt GMM. Firstly, if the number of years is less than the number of countries, as in the case of this study ($t = 12$ and $n = 42$). Secondly, GMM effectively controls time-invariant omitted variables, reverse causality, and simultaneity issues through the instrumentation process. Additionally, GMM is efficient to control over-identification problems (proliferation of instruments) and cross-sectional dependence. Additionally, two-step GMM is preferred over one-step as two-step controls heteroscedasticity. Besides, one-step only controls homoscedasticity (Tchamyou, 2020).

This study also preferred system GMM over difference GMM because system GMM produces accurate results (Malik et al., 2021). Therefore, the problem of endogeneity, simultaneity, unobserved heterogeneity, homogeneity and overidentification restrictions cannot be fully resolved by a technique other than two-step system GMM (Sardo & Serrasqueiro, 2017; Anifowose et al., 2018; Vo, 2018; Haris et al., 2019; Shao, 2019; Xu et al., 2019; Tran et al., 2020; Dutta & Saha, 2021).

For further verification that GMM rectified the problems that existed in panel data, this study conducted the Sargan test of over-identification restriction and, Arellano and Bond autocorrelation test. Both tests are conducted to validate instrumental variables in GMM (Tran & Vo, 2020). Sargan test the hypothesis that exogenous instrumental variables are not

correlated with errors (Tran & Vo, 2020). While Arellano and Bond test identify that there was no autocorrelation in the residual (Asongu & Nnanna, 2019; Tchamyou, 2019; Tchamyou, 2020). The results for post estimation tests of Sargan and Arellano and Bond are discussed in the next section.

4.6 Findings

In Chapter 3, it was stated that this study would follow the steps of Baron and Kenny (1986) for the mediation analysis of FI. Consequently, this section is divided into three main subsections. Section 4.6.1 discusses the results for the relationship between ESG, FI, and FST, as well as Baron and Kenny's steps for mediation analysis (Equations 3.2 to Equation 3.6). The relationship between ESG, FI, and FEF is explored in Section 4.6.2 (Equations 3.7 to Equation 3.11). In order to analyze robustness and sensitivity, results with and without control variables were reported.

4.6.1 Results for Relationship Between ESG and FST by Mediation of FI

This section demonstrates the results of two-step GMM after creating a composite index of ESG from economic, social and governance indicators, while FST represents the composite index comprised of BZB, BCB and LAD. As a part of mediation analysis (Baron & Kenny, 1986), Table 4.17 demonstrates the results of each step. The second column shows the first step ($ESG \rightarrow FST$), the impact of ESG on FST is positively significant, which imply that better condition of ESG in a country will bring the stability in the financial sector (Ahmad et al., 2021; Kim & Li, 2021). It is determined that good governance quality in a country has a significant and positive impact on financial institutions' financial stability. The results can be supported by the literature such Law and Azman-Saini (2012), which claims

that as good governance system in a country brings prosperity to the banking industry that brings economic growth (Sethi & Acharya, 2018).

Moreover, social prosperity to the population will increase the financial sectors' stability. For instance, when literacy is increased, the awareness for savings and investments among the people is also increased (Bayar et al., 2017; Chikalipah, 2017). Hence, the financial sector will be developed through increased savings and investments by the population (Bayar et al., 2017). Furthermore, studies like Cooper, Henderson and Kish (2019) and Xie, Nozawa, Yagi, Fujii and Managi (2019) also witnessed the increase in stability of the institutions when they follow sustainable social practices.

Economic growth in the Asian region has been shown to be enhanced by sustainable ecological practices (Apergis & Payne, 2010; Bowden & Payne, 2010; Khoshnevis Yazdi & Shakouri, 2017). Financial institutions in the region are stabilized by economic growth (Belkhir, Naceur, Candelon, & Wijnadts, 2022). In the event of flooding, droughts, or natural disasters, environmental sustainability mitigates the economic damage caused by climate change. By improving environmental quality, the economy grows at a steady rate, ensuring stability.

Table 4.17: Results for Relationship Between ESG and FST by Mediation of FI

	FST (DV) Equation 3.2	FI (DV) Equation 3.3	FST (DV) Equation 3.4	FST (DV) Equation 3.5	FST (DV) Equation 3.6
DV lag	0.933*** [0.0097]	0.972*** [0.003]	0.948*** [0.006]	0.941*** [0.008]	0.974*** [0.023]
ESG	0.167*** [0.06]	0.038*** [0.014]		0.119** [0.047]	0.23** [0.111]
FI			0.022*** [0.001]	0.043*** [0.013]	0.014*** [0.0067]

Table 4.18 continued

GDPR					0.017** [0.007]
BMG					-0.050*** [0.008]
PGP					0.009 [0.007]
IGD					-0.034*** [0.03]
COVID DUMMY					-0.172*** [0.029]
Constant	0.0014 [0.0017]	0.010*** [0.0005]	0.002** [0.0008]	0.0024** [0.0013]	0.011** [0.005]
Observations	504	504	504	504	480
Instrument	40	40	41	41	39
Groups	42	42	42	42	40
Instrument ratio	1.05	1.05	1.02	1.02	1.03
AB-1 z Prob > z	-2.75 (0.006)	-1.74 (0.082)	-2.76 (0.006)	-2.76 [0.006]	-2.31 (0.021)
AB-2 z Prob > z	-0.87 (0.343)	0.95 (0.344)	-0.79 (0.352)	-0.93 [0.355]	-1.10 (0.272)
Sargan Test χ^2 Prob > χ^2	1093.35 (0.485)	300.70 (0.821)	193.76 (0.410)	192.17 (0.566)	49.33 (0.49)
Hansen J-test χ^2 Prob > χ^2	37.13 (0.782)	39.57 (0.334)	40.68 (0.694)	23.63 (0.857)	30.66 (0.619)
Difference in Hansen test Prob > χ^2	(0.569)	(0.993)	(0.992)	(0.864)	(0.291)

Note: Standard errors are in []. *, **, *** denote statistical significance at 10%, 5%, 1% levels, respectively. A.B Test: Arellano-Bond Test. DV: Dependent Variable.

In the third column of Table 4.17, the ESG performance shows a positive and significant association with FI. Hence, when country leads in overall ESG, it would enhance the confidence of the population that will participate in the formal financial system, which will increase FI in a country (Dev, 2006; Cull et al., 2014; Ajide, 2017; Kabakova & Plaksenkov, 2018; Le et al., 2019a; Majeed & Tauqir, 2020). The good quality of governance

in a country enhances financial inclusion in the region. Recent studies also endorse that good governance in a country, and financial development (Law & Azman-Saini, 2012) increase the consumption of financial services and products (Eldomiaty et al., 2020). This positive relationship can be further supported by the notion that, when different sectors in a country opt for environment-friendly practices, they would need funds for switching from carbon-intensive to green practices. Attaining capital from financial institutions would increase FI in a country (IPA, 2017; Baulch et al., 2018). It implies that social development in the region also encourages the population to be part of the formal financial system, increasing the FI (Peleah & Ivanov, 2013; Fijalkowska et al., 2018; Amin, 2019; Amin, 2020).

The fourth column of Table 4.17 illustrates that FI has a significantly positive impact on FST in region (Morgan & Pontines, 2018; Morgan & Zhang, 2018; Tomilova & Valenzuela, 2018; Yangdol & Sarma, 2019; Malik et al., 2021). These results imply that financial inclusion sustains the financial stability of financial institutions. This trend is justified by the support of some recent literature such as Chen, Feng, and Wang (2018) and Shihadeh, Hannon, Guan, Ul Haq and Wang (2018) argue that an increase in FI raises the number of customers of a financial institution which enable financial institutions to diversify their portfolio. Hence, diversification of portfolio risk to financial institutions is also diversified (Chen et al., 2018; Shihadeh et al., 2018).

The fifth column of Table 4.17 demonstrates the results for the full model (ESG+FI→FST). In the presence of FI, ESG is still significant, which implies that FI partially mediates between ESG and FST. The last column of Table 4.17 illustrates the results with the addition of control variables. GDPR was found to be positively impacting on FST. BMG and IGD has negative impact on FST. The results of this study are in line with

those of Malik et al. (2022), that BMG affects FST negatively. Consequently, Asian economies must be vigilant in managing the increase in money supply in parallel with the financial sector to avoid adverse effects. Price volatility is largely predicted by monetary transmission mechanisms, as established in the literature (Razmi, Mohamed, Chin, & Habibullah, 2015). The impact of PGP was found to be insignificant.

The impact of Covid pandemic was found to be negative on FST. Risk assets have fallen sharply since the outbreak of the pandemic. In 2008 and 2009, risk assets experienced declines equal to or greater than half of what they experienced recently. In many economies, equity markets have been affected by declines of 30 percent or more at their lowest points. Particularly for lower-rated borrowers, credit spreads have in firms, credit spreads have risen. Additionally, the global dollar market shows signs of stress as well (Adrian & Natalucci, 2022). These effects have been caused by the pandemic and the economic uncertainty it has created, as well as by the response of governments and central banks. The uncertainty has led investors to become risk-averse, choosing to invest in safe haven assets such as gold and US Treasuries. As a result, risk assets have sold off, and the resulting lack of liquidity has resulted in a widening of credit spreads and a tightening of the global dollar market.

Using stakeholder theory, it can be explained how environmental, social, and governance (ESG) practices contribute to financial inclusion and stability in a country. The theory argues that a country's success and sustainability are not solely dependent on its financial performance, but also on its stakeholders' well-being. By encouraging equality and access to financial services for all citizens, regardless of their social or economic background, countries with strong ESG practices can foster financial inclusion. By doing so, poverty and financial exclusion can be reduced, and the financial well-being of citizens can

be improved. Ultimately, a country's focus on ESG practices can contribute to financial inclusion and financial stability, since it supports the well-being of all stakeholders and creates a financially sustainable and resilient system.

4.6.2 Result for Relationship Between ESG and FEF by Mediation of FI

FEF represents the composite index comprised of NIM, ROA and ROE. As a part of mediation analysis (Baron & Kenny, 1986), Table 4.18 illustrates the results of each step. The second column shows the first step (ESG→FEF), the impact of ESG on FEF is negatively significant, which suggest that improving ESG can hit profits of the financial institutions (Nieto, 2017; Younis & Chaudhary, 2017).

This negative impact may be because most of the industries in Asia have relied on outdated technologies. Moreover, most of the sectors, in general, are related to the carbon-intensive sector. Imposing restrictions on financial institutions to comply fully with green practices can affect the financial institutions as they may lose substantial money-making customers (Nieto, 2017). Although there are also possibilities that more companies would incline towards financial institutions to obtain capital to opt for green practices, that would compensate the existing loss to financial institutions of losing money-making carbon-intensive sectors that are established for centuries.

Table 4.19: Results for Relationship Between ESG and FEF by Mediation of FI

	FEF (DV) Equation 3.7	FI (DV) Equation 3.8	FEF (DV) Equation 3.9	FEF (DV) Equation 3.10	FEF (DV) Equation 3.11
DV lag	0.073*** [0.0002]	0.972*** [0.003]	0.051*** [0.0004]	0.045*** [0.0004]	0.057*** [0.001]
ESG	-1.861*** [0.027]	0.038*** [0.014}		-1.22*** [0.022]	-0.37*** [0.058]

Table 4.18 continued

FI			-1.05*** [0.021]	-0.89*** [0.016]	-0.616*** [0.076]
GDPR					0.221*** [0.007]
BMG					-0.176*** [0.006]
PGP					0.218*** [0.019]
IGD					0.081*** [0.008]
COVID DUMMY					0.221*** [0.007]
Constant	-0.006 [0.0061]	0.010*** [0.0005]	0.026** [0.011]	0.012 [0.009]	0.002 [0.026]
Observations	504	504	504	504	480
Instrument	40	40	40	41	39
Groups	42	42	42	42	40
Instrument ratio	1.05	1.05	1.05	1.02	1.03
AB-1 z Prob > z	-1.71 (0.088)	-1.89 (0.082)	-2.11 (0.088)	-1.65 (0.088)	-1.73 (0.084)
AB-2 z Prob > z	-0.98 (0.325)	0.95 (0.344)	-0.97 (0.332)	-0.89 (0.330)	-1.15 (0.307)
Sargan Test χ^2 Prob > χ^2	457.47 (0.53)	300.70 (0.821)	455.20 (0.67)	451.72 (0.31)	386.41 (0.391)
Hansen J-test χ^2 Prob > χ^2	40.15 (0.931)	39.57 (0.334)	40.04 (0.992)	38.90 (0.591)	28.85 (0.61)
Difference in Hansen test Prob > χ^2	(0.997)	(0.993)	(0.743)	(0.811)	(0.55)

Note: Standard errors are in []. *, **, *** denote statistical significance at 10%, 5%, 1% levels, respectively. A.B Test: Arellano-Bond Test. DV: Dependent Variable.

Besides, in column three of Table 4.18, it is demonstrated that ESG is good for FI in Asia. It is inferred that better governance, environmental and social conditions in Asia will accommodate the population to participate in the formal financial system, which will increase the FI in the region (Law & Azman-Saini, 2012; Peleah & Ivanov, 2013;

Fijalkowska et al., 2018; Amin, 2019; Amin, 2020). It can be shown that this positive impact is the result of different sectors in a country switching from carbon-intensive to green practices when they opt for environment-friendly practices. The acquisition of capital by different entities in a country from financial institutions would increase FI in that country (IPA, 2017; Baulch et al., 2018). As a consequence of social development in the region, the population is also encouraged to engage in formal financial systems, thereby increasing FI (Peleah & Ivanov, 2013; Fijalkowski et al., 2018; Amin, 2019; Amin, 2020). In addition to being associated with sound governance, financial development (Law & Azman-Saini, 2012) is associated with an increase in the consumption of financial services and products (Eldomiaty et al., 2020). Furthermore, the results of Post Estimation Tests from Sargan and Arellano Bond (Tables 4.24 and 4.25) show that instrumental variables used by GMM are valid and provide robust results (Vo et al., 2020).

According to the results of this study, financial inclusion is associated with a decrease in the efficiency of financial institutions. There may be a reason for the negative impact of FI, such as the addition of bank branches and automated teller machines (ATMs), because it increases banks' operational costs, which in turn reduces the profitability of Asian banks. However, in the long-term, cost efficiency is achieved once these operational costs are compensated by the increase in customers at a certain point (Harimaya & Kondo, 2016).

Moreover, Bose et al. (2017) also explain that when financial institutions offer affordable products and services for the population, that increases FI, such as low-interest loans to farmers. In turn, this will result in a reduction in bank profits. Furthermore, these results are also in line with findings of Garcia and Jose (2016); Le, Chuc and Taghizadeh-Hesary (2019a). Their analysis noted that a widespread financial inclusion is likely to result

in high costs of transaction and information due to the intensive participation of low-income clients in the financial system. Consequently, there is a significant increase in the information asymmetries that depict financial systems, which is a fundamental source of inefficiencies that are extremely challenging to tenacity for example, when there is no collateral or credit history (Garcia & Jose 2016; Le, Chuc & Taghizadeh-Hesary 2019a).

Last but not least, the fifth and last column of Table 4.18 confirms that FI partially mediates between ESG and FEF in Asia. This is due to the fact that including the variable FI reduces the magnitude of ESG's impact on FEF. Additionally, the post estimation test results and the statistically significant lagged dependent variable confirm that the estimates derived from GMM are accurate and reliable.

In line with stakeholder theory, it can be explained that despite ESG having negative impacts on financial inclusion and financial efficiency, each stakeholder's interests should be considered. This is especially important in the case of ESG initiatives, which require a long-term view in order to be successful. By considering each stakeholder's interests, it can be ensured that the financial, social, and environmental impacts of their decisions are taken into account.

4.6.3 Additional Analysis

Additional analysis has been conducted in this section to analyze the relationship between variables in countries with different levels of income. In this section, no hypothesis will be considered; however, additional analysis may allow readers to gain a deeper understanding of the phenomenon of best ESG practices on financial inclusion, financial stability, and financial efficiencies. It is also intended to set the direction for future

researchers to study the factors that respond differently in countries with different income levels.

4.6.3.1 Relationship Between ESG, FI and FST with different income level of countries

Considering the different income levels of the Asian countries, the results of the relationship between ESG, FI and FST are presented in this section. As illustrated in Table 3.1, these countries have been classified by the World Bank. The second column of Table 4.19 illustrates the relationship between ESG, FI, and FST in low- and lower-middle-income countries, upper middle-income countries, and high-income countries. The impact of ESG and FI on FST was found to be positive in all countries regardless of income level.

Table 4.20: Relationship of Variables with FST in Different Income Level of Countries

	Low and lower-middle income countries	Upper middle-income countries	High-income countries
FST Lag	0.958*** [0.082]	0.476*** [0.059]	0.776*** [0.0519]
ESG	0.098** [0.046]	2.098** [1.077]	1.97* [1.093]
FI	0.064** [0.029]	2.72** [1.19]	0.59*** [0.069]
GDPR	0.054** [0.051]	0.091*** [0.013]	0.023** [0.011]
BMG	-0.052* [0.029]	0.091 [0.160]	-0.015 [0.094]
PGP	0.007 [0.054]	0.41*** [0.158]	0.003 [0.085]
IGD	-0.059** [0.03]	-0.710*** [0.093]	0.007 [0.054]
COVID DUMMY	-0.077* [0.0463]	-0.79*** [0.065]	-0.13*** [0.012]
Constant	0.0174 [0.09]	-0.143 [0.253]	-0.571*** [0.206]
Observations	228	132	120

Table 4.19 continued

Instrument	17	11	8
Groups	19	11	10
Instrument ratio	1.12	1.00	1.25
AB-1			
z	-2.58	-0.72	-1.07
Prob > z	(0.010)	(0.469)	(0.028)
AB-2			
z	-0.37	0.52	0.67
Prob > z	(0.708)	(0.604)	(0.504)
Sargan Test			
χ^2	114.93	88.34	68.47
Prob > χ^2	(0.896)	(0.68)	(0.461)
Hansen J-test			
χ^2	9.88	1.6	6.29
Prob > χ^2	(0.479)	(0.29)	(0.383)
Difference in Hansen test Prob > χ^2	0.318	0.212	0.189

Note: Standard errors are in []. *, **, *** denote statistical significance at 10%, 5%, 1% levels, respectively. A.B Test: Arellano-Bond Test.

Additionally, the Covid variable negatively impacts the FST of countries regardless of their level of income. Consequently, the effects of this global health pandemic are far-reaching and have a broad effect on economic stability. The results are almost identical to those discussed in Section 4.6.1, which have already been discussed in detail.

4.6.3.2 Relationship between ESG, FI and FEF with different income level of countries

In this section the relationship between ESG, FI and FEF was analyzed with different income levels of the Asian countries. The second column of Table 4.20 demonstrates the relationship between variables in low and lower-middle income countries. It can be seen that ESG negatively impact the FEF in low and lower-middle income Asian countries. Moreover, FI also negatively impacts FEF. The available literature supports these negative relationships between ESF and FEF in low and lower-middle income countries.

The literature suggests that developing countries lack the resources for economic growth which can be available at the lowest possible cost (Majeed and Tauqir, 2020). A number of additional costs are associated with the adoption of ESG practices as a result of increased regulations and expenditure on various projects. Countries with low incomes must invest in updated technologies, processes and personnel to comply with ESG regulations, which can be costly. They must also allocate resources to monitor and report their ESG performance, which can be a time-consuming process. Additionally, countries must stay up to date on the latest ESG trends in order to remain competitive on the market (Rehman, 2021). Therefore, the costs associated with the implementation of ESG may negatively affect the profits of financial institutions. Despite the heavy investments needed to comply with ESG regulations, countries must also be mindful of the associated costs. If not managed properly, ESG implementation could lead to an increase in costs, resulting in a decrease in profits for financial institutions (Rehman, 2021).

Table 4.21: Relationship of Variables with FEF in Different Income Level of Countries

	Low and lower-middle income countries	Upper middle-income countries	High-income countries
FEF Lag	0.245*** [0.026]	0.393*** [0.009]	0.383*** [0.042]
ESG	-0.043*** [0.005]	-0.64 [1.37]	0.344** [0.126]
FI	-0.78** [0.39]	-0.469* [0.273]	0.14** [0.064]
GDPR	0.15*** [0.058]	0.37** [0.18]	0.069* [0.037]
BMG	-0.082* [0.048]	0.277 [0.069]	0.022** [0.005]
PGP	0.14*** [0.0128]	-0.793 [0.599]	0.018*** [0.003]
IGD	-0.007*** [0.0128]	-0.082* [0.042]	0.009*** [0.0015]

Table 4.20 continued

COVID DUMMY	0.009* [0.005]	0.91* [0.47]	0.032* [0.0185]
Constant	-0.099 [0.18]	0.019 [0.252]	0.008 [0.170]
Observations	228	132	120
Instrument	17	8	10
Groups	19	11	12
Instrument ratio	1.12	1.38	1.20
AB-1 z Prob > z	-1.47 (0.014)	-1.39 (0.016)	-0.56 (0.057)
AB-2 z Prob > z	-0.91 (0.363)	-0.54 (0.591)	0.10 (0.917)
Sargan Test χ^2 Prob > χ^2	186.23 (0.421)	298.78 (0.587)	69.16 (0.438)
Hansen J-test χ^2 Prob > χ^2	3.88 (0.91)	2.23 (0.43)	3.85 (0.95)
Difference in Hansen test Prob > χ^2	0.591	0.333	0.292

In the third column it can be noted that the impact of ESG on FEF is insignificant. The reason for this phenomenon may be that upper-middle income countries have reached the level where the effect of EGS on FEF has shifted from being negative to being positive. Additionally, the fourth column of Table 4.20 illustrates that ESG positively influences FEF in Asian countries. As a result, high income countries have invested sufficient time and resources into ESG, which has resulted in an increase in FI and FEF (Rehman, Malik, Md Isa, & Jais, 2022).. This suggests that countries with higher incomes are better equipped to implement ESG strategies, as they have access to the resources and expertise needed to do so. As a result, these countries have been able to realize the full potential of ESG, which has

led to an increase in financial inclusion and financial efficiency (Rehman, Malik, Md Isa, & Jais, 2022).

In low- and lower-middle-income countries, Environmental, Social, and Governance (ESG) practices are often believed to negatively influence financial efficiency according to the Kuznets curve. According to the Kuznets curve theory, income inequality increases initially and then decreases as a country develops economically. In the early stages of economic development, as companies prioritize financial growth over environmental and social concerns, ESG and financial efficiency are thought to be negatively correlated. According to theory, as a country becomes wealthier and more developed, it is likely to place an increased emphasis on ESG. The relationship between ESG and financial efficiency will become stronger.

Research has suggested that companies in developed countries with strong environmental, social, and governance practices tend to perform better financially than their peers. The same may not hold true for companies in low- and lower-middle income countries where economic growth may still take precedence over ESG concerns. In terms of this relationship, it is critical to note that it is complex and not always straightforward. In any given country, ESG and financial efficiency are determined by a variety of factors, such as economic development, cultural values, and regulatory environments. In addition, research suggests that putting an emphasis on environmental, social, and governance (ESG) can impact financial performance in countries with low and lower middle incomes. However, this can vary depending on a number of factors, such as stakeholder engagement and ESG practices.

In conclusion, ESG and financial efficiency are complex issues influenced by a variety of factors in low and lower-middle income countries. According to Kuznets curve theory, ESG and financial efficiency are negatively correlated in the early stages of economic development. However, this relationship is not necessarily straightforward and may depend on several factors.

4.7 Robustness Checks

In order to ensure that the results of the present study are accurate, an additional test was performed to further verify the mediating role of financial inclusion. In this context, the Sobel (1982) test was applied to Equations 3.2 and Equation 3.6 to determine the relationship between ESG, FI, and FST. While Sobel (1982) was applied to Equations 3.7 and Equation 3.11 to analyze the relationship between ESG, FI and FEF.

4.7.1 Post Estimation Tests

In this study, a higher number of cross-sections were used than instruments that have been shown to verify the validity of GMM estimates (Blundell & Bond, 1998; Roodman, 2009). Thus, the instrument ratio (i.e., the number of cross sections divided by the number of instruments) is greater than 1, which implies that the underlying assumptions of system GMM are not violated (Asiedu & Lien, 2011; Baharumshah, Slesman, & Wohar, 2016).

An optimal number of lags was determined by Sargan and Hansen's post-estimation tests. The Arellano Bond Test was used to verify the accuracy of the results in error-term (Shehata & Mickaiel, 2012; Tran & Vo, 2020). Difference-in-Hansen tests were applied to ensure the validity of the subset instruments used in regression level calculations. The null hypothesis has not been rejected by this test, which suggests that the model is well-defined

(Baharumshah, Slesman, & Wohar, 2016). Considering the significant results at the first lag, no further lag was applied.

4.7.2 Sobel Test

To verify that FI is mediated between ESG and FST as well as between ESG and FE, this study applied the Sobel (1982) test. The indirect impact of ESG on FST and FE is also examined (Malik et al., 2021; Wang & Jiang, 2019). Equation 4.3 provides an empirical illustration of the Sobel test.

$$Sobel = \frac{ab}{(a^2 S_b^2 + b^2 S_a^2 + a^2 + b^2)^{1/2}} \quad \text{Equation 4.1}$$

Where, a is the coefficient for the association between ESG and FI, b is the coefficient for association between FI and dependent variable, S_a is the standard error of a , S_b is standard error of b .

The results for Sobel (1982) test illustrate the relationship between ESG and FST was significantly mediated by FI (Sobel test = 2.78, standard error = 0.013 and $p = 0.005$). Moreover, ESG and FEF were also significantly mediated by (Sobel test = -40.47, standard error = 0.048 and $p < 0.001$).

4.8 Chapter Summary

This study investigated the role of governance quality, environmental and social sustainability (ESG) of countries for financial inclusion (FI), financial stability (FST) and financial efficiency (FEF). Based on theoretical and statistical basis all hypotheses were tested. Table 4.21 demonstrates the status of hypotheses (accepted or rejected).

Table 4.22: Status of Hypotheses

Hypothesis		Decision
H1	ESG has a significant and positive relationship with FST in Asia	Accepted
H2	ESG has a significant and positive relationship with FI in Asia.	Accepted
H3	ESG has a significant and positive relationship with FEF in Asia.	Rejected
H4	FI significantly and positively impacts FST in Asia.	Accepted
H5	FI significantly and positively impacts FEF in Asia.	Rejected
H6	FI mediates between the ESG and FST in Asia.	Accepted
H7	FI mediates between the ESG and FEF in Asia.	Accepted

The main purpose of testing hypotheses is to achieve the objectives of the study to answer the research questions presented in Section 1.4. The present study achieved its all objectives that were defined in Section 1.5. Table 4.22 shows how many objectives of the study were achieved.

Table 4.23: Status of Objectives of the Study

Research Objectives		Status
RO1	To investigate the relationship between ESG and FST in Asia.	Achieved
RO2	To examine the relationship between ESG and FI in Asia.	Achieved
RO3	To analyze the association between FI and FST in Asia.	Achieved
RO4	To investigate whether FI mediates between the ESG and FST in Asia.	Achieved
RO5	To investigate the relationship between ESG and FEF in Asia.	Achieved
RO6	To analyze the relationship between FI and FEF in Asia.	Achieved
RO7	To examine whether FI mediates between the ESG and FEF in Asia.	Achieved

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter is dedicated to concluding the findings of the study and discussing their relevance. This chapter also discusses the contribution and limitations of the study. In the end, the study discusses possible future directions in which the research can be conducted.

5.1.1 Relationship Between ESG, FI, and FST

The results revealed that governance quality, environmental and social sustainability (ESG) is crucial for the country's financial stability (FST). When governance quality is improved in a country, institutional quality in a region is increased. Thus, improved institutional quality maintains FST in a country by mitigating risks through critical supervision. Moreover, better governance supports the development of the financial sector which increases the productivity of the financial intermediation process and hence strengthens FST (Sayilir et al., 2018). Better governance substantially augments the growth of the banking industry (Law & Azman-Saini, 2012), which intensifies the use of financial services (Eldomiaty et al., 2020) which contributes to economic growth (Sethi & Acharya, 2018).

Furthermore, effective governance is crucial for financial inclusion and stability in an economy. Financial inclusion refers to the access of many individuals and businesses to affordable and secure financial services, while financial stability refers to the absence of systemic risk in the financial sector (Malik et al., 2021). Good governance implies that regulatory and supervisory agencies are independent, transparent, and accountable. This

helps prevent fraud, reduces the risk of moral hazard, and promotes financial stability. It also ensures that consumers' interests are protected and that financial services providers comply with ethical and legal standards. Better governance promotes transparency in the financial sector, which increases information flow and reduces information asymmetry. This, in turn, can improve the proficiency of financial markets and increase public trust in the financial sector (Malik et al., 2021).

Alternatively, a country's ESG could improve climate quality, thereby reducing environmental risks. A clean and healthy environment can promote financial inclusion by creating new economic opportunities and jobs in industries such as renewable energy, eco-tourism, and sustainable agriculture. This can increase individuals' income and spending power, leading to increased demand for financial services and greater financial stability in communities (Rehman, Malik, Kanwal, & Lashari, 2022).

Moreover, global warming is a critical issue for which legislators have raised their concerns because it is a serious risk to humans and other species. Deteriorated environmental quality affects developing countries more significantly by causing floods and droughts (Sitorus, 2018). Dry spells from cyclones and floods in the past decade have contributed to production losses, increasing the price of various products, including wheat (ADB, 2017). Most countries in Asia had experienced losses in agricultural, fishing, and tourism sectors that have ripped up their GDP by 11 percent (IMF, 2018). Consequently, better ESG performance improves financial sustainability by mitigating environmental risks.

A clean and healthy environment can contribute to financial stability by reducing the risks associated with environmental degradation and natural disasters. For example, investment in renewable energy and sustainable infrastructure can reduce dependence on

fossil fuels and decrease the likelihood of financial losses due to price volatility. In addition, investment in green technologies and sustainable practices can lead to increased efficiency and cost savings, contributing to the overall stability of the financial system. In conclusion, improving environmental quality can have a positive impact on both financial inclusion and financial stability. This can be done by creating new economic opportunities, reducing financial risks, and promoting efficiency and stability in the financial system.

On the other hand, social sustainability can help to promote financial inclusion by addressing social and economic barriers that prevent people from accessing financial services. For example, initiatives that aim to improve education and financial literacy can help people understand the importance of savings and investment and increase their confidence in using financial services (Malik et al., 2022). Moreover, providing access to financial services in under-served communities can increase financial stability by giving people the tools they need to manage their finances and reduce their dependence on informal and often costly financial services. Furthermore, better ESG achievements improve human quality of life (Malik et al., 2022). Human wellbeing in the region facilitates better health and wealth that encourage them to participate and contribute to the national economy. Socially developed societies have a skilled workforce that boosts economic activities. On the other hand, it also encourages the population to invest and save their additional income, which will increase the use of financial services and hence raise FI (Malik et al., 2022).

Social sustainability can contribute to financial stability by promoting responsible lending practices, preventing financial sector fraud and corruption, and promoting financial literacy and consumer protection. For example, by providing financial education to consumers, social sustainability initiatives can help people make informed financial

decisions, reducing the likelihood of over-indebtedness and financial distress. By promoting transparent and responsible lending practices, social sustainability initiatives can reduce the risk of systemic financial instability and help to protect the stability of the overall financial system (Malik et al., 2022).

It is very clear that ESG plays a significant role in intensifying FST and FI in Asia. Better ESG performance creates better institutional and environmental quality and social prosperity that brings financial sustainability to the region. Enhancing ESG performance strengthens institutions that bring political stability, terrorism absence, voice and accountability, regulatory quality, effective government, and control over corruption. These all factors together create a better business atmosphere that attracts national and international investors to invest in productive ventures. This will upsurge the financial and economic activity in the region. Hence, increased economic and financial activities will increase FI and FST in the country.

The study was based on stakeholder theory (SHT), which considers each entity in the region, including the government, as a stakeholder in FI, FST, and FEF. Therefore, the study supports the notion that each entity has a stake in FI and FST. SHT suggests that stakeholders in an area have a vested interest in the success of the region and that they should work together to achieve their goals. By recognizing the value of each stakeholder, the study provides evidence that when all stakeholders cooperate and share their perspectives, the region can be more successful.

5.1.2 Relationship Between ESG, FI and FEF

The results revealed that ESG affects the financial efficiency (FEF) or profitability of the financial sector. The reason for the negative impact may be due to the cost involved

in adopting better ESG. For instance, authorities to improve the governance system would require extra supervision in the financial sector to mitigate any possible risk. Compliance with regulatory requirements may involve high costs, such as excessive reporting, audits, maintaining a certain board size, data protection regulations, environmental regulations, and other costs.

Moreover, a better ESG also requires the financial sector to enhance FI in the region. Increasing FI would entail the financial sector increasing access to products and services to the population, which also compels them to increase the number of branches, ATMs and offer attractive loans with lower interest rates. Financial inclusion can also be negatively impacted by ESG initiatives, due to the focus on environmentally friendly products and services that are more expensive and not accessible to low-income customers. This can result in limited access to financial products and services for these individuals, reducing their ability to participate in the financial sector. Hence, this may slash profits and increase the operating costs of the financial sector. However, an increasing number of customers can compensate for the loss in the long term.

Besides, financial inclusion can help mitigate ESG's negative impact on financial efficiency. Financial inclusion initiatives can help to increase access to financial products and services for low-income customers, thereby improving their financial stability and enabling them to participate in the financial sector. In addition, financial inclusion initiatives can help to create more sustainable and inclusive economic growth, thereby improving the overall financial efficiency of the sector.

It is important to note that this relationship between ESG and financial efficiency and financial inclusion is not necessarily a long-term one. In the long run, countries that prioritize

ESG and implement sustainable practices will likely see positive impacts on financial efficiency and financial inclusion. This is because sustainable ESG practices can improve the quality of life for local communities, which in turn can lead to a more stable and prosperous local economy. Additionally, by prioritizing ESG, countries can build trust in their financial institutions, making it easier for people to access financial services and products.

By balancing the interests of both ESG initiatives and FEF and financial inclusion, companies can create a more sustainable and inclusive financial sector that benefits all stakeholders, including low-income customers, the environment, and the overall economy. Therefore, it is concluded that instead of some distress over profitability, better ESG sustainability practices should be adopted that have a positive long-term impact on the financial prosperity of the region.

5.1.3 Relationship Between ESG, FI and FST with Different Income Level of Countries

In the case of low and lower-middle income countries, a country that has a better ESG score is likely to attract more foreign investment, which can then be channeled into the financial sector. As a result, underserved communities and small businesses can gain access to finance, thereby improving their financial inclusion. The improvement of ESG performance can also reduce the likelihood of financial crises, which can cause the entire economy to be destabilized. In turn, this improves investor confidence and strengthens the financial system as a whole, leading to increased financial inclusion.

Enhanced ESG performance in upper middle-income countries can help attract socially responsible investors, who are more inclined to invest in countries with a strong

ESG history. Small businesses and underserved communities can benefit from this, increasing their access to finance. As a result of better ESG performance, a country can also improve its creditworthiness, thereby increasing its appeal to investors and reducing the cost of borrowing for both the government and the private sector.

The enhanced performance of companies in the area of ESG, in the case of high-income countries, can encourage socially responsible investing, where investors seek to support companies and countries that place a strong emphasis on the factors of environmental, social, and governance. It is expected that this will increase access to finance for small businesses as well as underserved communities, resulting in a greater level of financial inclusion. Moreover, improved ESG performance can enhance a country's reputation, which may make it more attractive to investors and businesses. By improving financial stability and increasing access to finance, underserved communities and small businesses will be able to benefit from improved financial inclusion.

5.1.4 Relationship Between ESG, FI and FEF with Different Income Level of Countries

Several factors can influence the ESG, FI and FEF relationship, such as the specific policies and institutions in place, the stage of economic development, and the level of engagement by businesses and other stakeholders. Financial efficiency can be negatively affected in low- and lower-middle-income countries due to weak governance structures and a lack of laws and regulations. Companies may prioritize short-term profits rather than long-term sustainability. As well as lack of resources and infrastructure, these countries often face additional costs and reduced efficiency when it comes to addressing environmental and social sustainability issues.

There is generally a more balanced impact of governance quality, environmental sustainability, and social sustainability on financial efficiency in upper-middle income countries. A stronger governance structure and regulations are in place in these countries, and the business sector is more engaged in sustainability issues. Nevertheless, the impact may vary from country to country depending on the context and policies.

Often in high income countries, robust regulations, a well-developed infrastructure, and a high level of engagement by businesses on these issues are responsible for the positive impacts of good governance, environmental and social sustainability on financial efficiency. By implementing sustainability practices and considering the long-term environmental and societal impacts of their activities, different sectors in these countries are often able to realize cost savings and improved operational efficiency.

Overall, it is evident that the relationship between governance quality, environmental sustainability, and financial efficiency is complex and can vary significantly across countries and contexts. However, it is generally understood that ESG plays an important role in achieving long-term financial success and stability.

5.2 Contribution of the Study

This study examined the impact of ESG on FI, FST and FEF in Asia. It has been demonstrated in numerous studies that FST and FEF are impacted by a variety of factors. Despite this, very few studies have focused on macro factors such as governance quality, environmental conditions, and social conditions in a country. Therefore, this study utilized data pertaining to governance quality, environmental sustainability, and social sustainability at the country level. Study results revealed that improving governance quality (also known as institutional quality) contributes to maintaining financial stability and improving financial

efficiency. Moreover, it was found that FI could also be increased by improving a country's ESG.

Additionally, a number of studies have examined the impact of environmental sustainability practices on the performance of businesses. Through the application of environmental sustainability indicators at a country level, this study went beyond the firm level, and demonstrated how better environmental practices mitigate the country's environmental risks, which can have a significant impact on every sector, including finance. Risks associated with the environment do not only affect a company's performance, but they also threaten the country's financial stability and profitability. It was found that maintaining environmentally friendly practices at the country level increases FI and ensures that the country's FST and FEF are maintained.

In addition, previous literature has stressed the importance of social sustainability for building a better society, such as enhancing the quality of life for people by creating goods, services, and jobs that enable them to satisfy their basic needs. Study findings indicate that bringing social prosperity to a country can create a win-win situation for the entire society. A study of social sustainability indicators at the country level was conducted. Based on the results of this study, financial inclusion and financial stability can be achieved by bringing social sustainability to a region on a regional level.

An investigation was conducted to determine whether environmental, social, and governance (ESG) performance of a country could negatively impact financial efficiency and financial inclusion. Stakeholder theory suggests that a country should take into account the interests of all stakeholders in order to achieve long-term success. However, the study found that in the short-term, countries with poor ESG performance may experience lower

financial efficiency and reduced financial inclusion. Several factors may contribute to this trend, including a lack of investment in sustainable practices, reduced productivity, or a decrease in consumer confidence.

Despite these short-term challenges, the study also found that in the long-term, the relationship between ESG performance and financial efficiency and financial inclusion is likely to be positive. Countries that prioritize ESG considerations are likely to benefit from improved human capital morale, and more stable and sustainable financial performance. Therefore, the study concludes that while there may be short-term costs to improving ESG performance, the long-term benefits to financial efficiency and financial inclusion make it a worthwhile investment. Countries should strive to balance their focus on financial performance with a commitment to sustainable and socially responsible practices.

Moreover, many studies have assessed FI because of its importance in bringing economic and financial sustainability to the region. However, this study explored that FI could mediate several factors that might improve FST and FEF in the region. Considering FI as a mediator can help policymakers to effectively use FI as a tool for sustainable economic and financial growth in society.

Additionally, this study applied the stakeholder theory to a country. A large number of past studies have applied this theory on the firm level. A very small number of studies considered the stakeholder theory on a broad level (Flak & Rose, 2005; Nie, Ibrahim, Mustapha & Mokhtar, 2019). This study applied the stakeholder theory on a regional level and demonstrated how every entity in the region has a role as a stakeholder to bring economic and financial prosperity to the region by improving ESG.

5.3 Implication

This study has given indispensable implications to policymakers and other entities of Asia. Specifically, how improving ESG may aid in maintaining FST and growing FI in Asia. The Asian region also has the world's most poor population and is highly exposed to climate change (ADB, 2017). In this context, improving the ESG in Asian regions would help to mitigate several risks.

Improving governance would create a better business atmosphere in Asia. Law and order situation along with political stability in Asia will boost economic activities further. The local population's confidence in the financial system would be increased, which will enable them to participate in the formal financial system. Participation in the formal financial system will boost financial inclusion, creating opportunities for the population to increase their well-being by having access to insurance, credit, etc. On the other hand, with an improved governance system, more investors will also be attracted to invest in Asian markets which may contribute to improving the stability of the financial sector in Asia.

Furthermore, bringing environmental sustainability in Asia would help to mitigate environmental risks. Asia is at higher risk of the disastrous impact of climate change, which requires immediate actions for mitigating adverse impacts (Le et al., 2020). Continuous disasters such as floods and dry spells may create threats to food security, losses to agricultural, fishing, and tourism industries. Hence, bringing environmental sustainability in Asia could help mitigate environmental risk, bringing economic and financial prosperity to Asia. Despite some reductions to profits of the financial sector, environmental sustainability practices would ensure their long-term stability. Meanwhile, it is also revealed that industries switching to green or environment-friendly practices and technologies would also increase

FI and profits of the financial institutions in Asia. Therefore, it can be said that the environmental sustainability practices will provide double-edged benefits to Asia.

Additionally, social sustainability in Asia would assist in the population's well-being by increasing opportunities for education and skills, income, good health, fundamental human needs, and housing. Hence, improving social well-being in Asia would help to boost economic activities due to the available skilled workforce and required infrastructure, which will further assist in maintaining FST. Moreover, due to certainty, low crimes, and good health of the population, business activities would be increased in Asia that will further aid the economy and FST. Besides, the social well-being of Asian society would enhance FI in Asia. Because when society is developed, the trend of investments and savings also increases, increasing the use of financial services and products. Thus, increased FI will also contribute to the national economy.

Lastly, ESG as a policy can be opted by Asian policymakers. It is not a matter of concern if there is a temporary reduction in profits of the Asian financial sector because, on the other hand, ESG also ensure their stability. Hence, better ESG would improve the social well-being of the people, better climate quality with less environmental risks and good institutions that would ensure the identify and mitigate overall risks in Asia.

5.4 Limitations and Recommendations for Future Studies

Despite achieving its objective, this research has some limitations. First of all, the study is limited to the selected Asian countries. In this context, the suggestions and recommendations based on the results cannot be applied to other regions. Furthermore, there were limitations in the compilation of data. This study relies solely on secondary data. There

is a lack of data for many countries. In fact, some countries were excluded from the sample because of this reason. Though, this limitation is unavoidable.

In addition, the study was limited to the examination of the relationship between ESG, FI, FST, and FEF considering the income levels of the countries. It is possible, however, to conduct a more comprehensive analysis using the Kuznet hypothesis. This can provide further insight into how income levels influence the relationship between these variables. Depending on the resources of the countries, this method could provide insight into how a negative relationship between variables can become a positive relationship, and vice versa. The Kuznet hypothesis predicts that as countries become wealthier, the relationship between two variables will first become more negative and then become more positive. This is because, as countries become wealthier, they are able to invest more in social services and infrastructure which can help to improve the relationship between those variables.

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