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Impacts of Digital Financial Inclusion on Urban-rural Income Gap in China

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Impacts of Digital Financial Inclusion on Urban-rural Income Gap in China

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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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ABSTRACT

In order to solve the existing technical limitations, asymmetry in information issues between lenders and borrowers, imperfect supervision and management policies, network security and other matters on the evolution of digital financial inclusion in country areas of China are hindered. In the meantime, the matter of excessive earning disparity between urban-rural inhabitants in China should be further alleviated, so as to alleviate the occurrence of financial exclusion in China. This study explores the impact of digital financial inclusion on the urban-rural earning disparity in China from different dimensions of digital financial inclusion. This study empirically investigates the impact of digital financial inclusion on urban-rural income disparity in China by collecting a substantial amount of provincial-level data, including the digital financial inclusion index, urban and rural income levels, and other relevant indicators. The study focuses on the overall index of digital financial inclusion (primary dimension), which includes depth, coverage, and digitization (secondary dimensions), as well as digitalization-specific indices such as the payment index, insurance index, and credit index (tertiary dimensions), amounting to a total of seven indicators. Furthermore, the study conducts a comparative analysis of the influence of digital inclusive finance on urban-rural income disparity in China's eastern and western regions. Quantitative analysis methods are employed, and Stata software is used for empirical analysis. Pooled Ordinary Least Squares (POLS), Fixed Effects Models (FE), and Random Effects (RE) Models are applied to the compiled data. The empirical findings of the study indicate that, the digital financial inclusion can reduce the income disparity between urban and rural areas in China. The evolution of the total index of digital financial inclusion can effectively converge the income disparity between urban and rural areas in China. The breadth of coverage and the depth of use have an important influence on narrowing the income disparity. The influence of

digitalization degree on income disparity is also negative, but not significant. The insurance index has a significant effect on income inequality. The effect of payment index and credit index on income disparity is not significant. Simultaneously, the development of digital financial inclusion in the eastern economic zone and western economic zone can converge the income disparity, respectively. The convergence effect of digital financial inclusion on the income disparity in the western zone of China is better than that in the eastern region. The credit index converges the income disparity in western China less than that in eastern China. In the other six indicators of digital financial inclusion, the convergence effect in the western is better than that in the eastern. Digital financial inclusion not only converge the income disparity in the eastern and western zones, but also accelerate the economic growth of the western, so as to converge the disparity between the western and eastern zones. In light of these research findings, this thesis proposes effective recommendations to promote the development of digital financial inclusion in China, further narrowing the income disparity between urban and rural residents and addressing the development disparity between the eastern and western regions.

Keywords: Digital Financial Inclusion, Urban-rural Income Gap, Financial Exclusion

Kesan Kewangan Inklusif Digital Terhadap Jurang Pendapatan Bandar-Luar Bandar di China

ABSTRAK

Bagi menyelesaikan batasan teknikal sedia ada, asimetri dalam isu maklumat antara pemberi pinjaman dan peminjam, dasar penyeliaan dan pengurusan yang tidak sempurna, keselamatan rangkaian dan perkara lain mengenai evolusi rangkuman kewangan digital di negara China telah dihalang. Sementara itu, masalah perbezaan pendapatan yang berlebihan antara penduduk bandar dengan luar bandar harus dikurangkan lagi supaya dapat mengurangkan berlakunya pengecualian kewangan di China. Kajian ini meneroka kesan rangkuman kewangan digital terhadap jurang pendapatan bandar dengan luar bandar di China daripada dimensi rangkuman kewangan digital yang berbeza. Kajian ini secara empirikal menyiasat kesan rangkuman kewangan digital ke atas jurang pendapatan bandar dengan luar bandar di China dengan mengumpul sejumlah besar data peringkat wilayah, termasuk indeks rangkuman kewangan digital, tahap pendapatan bandar dan luar bandar serta penunjuk lain yang berkaitan. Kajian ini memberi tumpuan kepada indeks keseluruhan rangkuman kewangan digital (dimensi utama), yang merangkumi kedalaman, liputan dan pendigitalan (dimensi sekunder), serta indeks khusus pendigitalan seperti indeks pembayaran, indeks insurans dan indeks kredit (dimensi tertiari), kesemuanya berjumlah tujuh petunjuk. Tambahan pula, kajian ini menggunakan analisis perbandingan pengaruh rangkuman kewangan digital ke atas jurang pendapatan bandar dengan luar bandar di wilayah timur dan barat China. Kaedah analisis kuantitatif telah digunakan, dan perisian Stata digunakan untuk analisis empirikal. Model Pooled Ordinary Least Square (POLS), Model Kesan Tetap (FE) dan Model Kesan Rawak (RE) digunakan pada data yang telah disusun. Penemuan empirikal kajian ini menunjukkan bahawa rangkuman kewangan digital

dapat mengurangkan jurang pendapatan antara kawasan bandar dengan luar bandar di China. Evolusi jumlah indeks rangkuman kewangan digital dapat mengurangkan jurang pendapatan antara kawasan bandar dengan luar bandar di China secara berkesan. Keluasan liputan dan kedalaman penggunaan jumlah indeks rangkuman kewangan digital juga mempunyai pengaruh penting dalam mengecilkan jurang pendapatan. Pengaruh tahap pendigitalan terhadap jurang pendapatan adalah negatif, tetapi tidak ketara. Indeks insurans mempunyai kesan yang ketara ke atas jurang pendapatan. Kesan indeks pembayaran dan indeks kredit terhadap jurang pendapatan adalah tidak ketara. Pada masa yang sama, untuk kedua-dua wilayah timur dan barat China, pembangunan rangkuman kewangan digital di zon ekonomi timur dan zon ekonomi barat masing-masing dapat menyatukan jurang pendapatan. Kesan penumpuan rangkuman kewangan digital terhadap jurang pendapatan di zon barat China adalah lebih baik jika dibandingkan dengan wilayah timur. Indeks kredit yang menumpukan jurang pendapatan di wilayah barat China adalah kurang daripada di wilayah timur China. Enam petunjuk rangkuman kewangan digital yang lain menunjukkan bahawa kesan penumpuan di barat adalah lebih baik daripada di timur. Rangjuman kewangan digital bukan Sahaja menyatukan jurang pendapatan di zon timur dan barat, tetapi juga mempercepatkan pertumbuhan ekonomi barat, supaya dapat mengurangkan jurang perbezaan antara zon barat dan timur. Berdasarkan penemuan penyelidikan ini, tesis ini mencadangkan cadangan yang lebih berkesan untuk menggalakkan pembangunan rangkuman kewangan digital di China, seterusnya mengecilkan jurang pendapatan antara penduduk bandar dengan luar bandar dan menangani jurang pembangunan di antara wilayah timur dan barat.

Kata kunci: *Rangkuman Kewangan Digital, Jurang Pendapatan Bandar-luar bandar, Pengecualian Kewangan*

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LIST OF ABBREVIATIONS

CHFS	China Household Financial Survey Data
CNNIC	China Internet Network Information Center
FEM	Fixed Effects Models
G20	The Group of Twenty
GDP	Gross Domestic Product
GLS	Generalized Least Square
ICT	Information and Communications Technology
PBOC	The People's Bank of China
POLS	Pooled Ordinary Least Squares
PWC	Price Waterhouse Coopers
REM	Random Effects Model
RMB	Renminbi
SMEs	Small and Medium-Sized Enterprises
UNDP	The United Nations Development Program
VIF	Variance Inflation Factor
WLS	Weighted Least Squares

CHAPTER 1

INTRODUCTION

1.1 Introduction

Since the 21st century, the digital strategy in economy carried by the Internet has been developing rapidly. The internet has connected the world like never before and brought about a new era of globalization. The integration of modern technologies such as artificial intelligence, blockchain, and cloud computing has revolutionized the way we conduct business and interact with each other. The digital economy is indeed becoming a major driver of global economic gain. With the rapid evolution of the communication and internet industries, traditional industries are also being transformed through digitization and intelligence. This transformation has presented not only opportunities for businesses but also challenges that require innovative solutions. Overall, the digital strategy in the economy is constantly changing and evolving, which presents both opportunities and challenges for individuals, businesses, and governments. it is momentous to adapt and embrace these changes in order to stay competitive and thrive in this new digital age.

The G20 summit held in Hangzhou, China in 2016 discussed the meaningful of digital strategy in the economy, and the use of numerical knowledge and information as critical factors of production in economic activities. This process involves the use of modern networks, and effective utilization of information and communication technologies to improve efficiency and optimize economic structure. According to a report by Price Waterhouse Coopers (PWC) released in 2019 which ranked the world's top 100 largest companies, Microsoft, Apple, Amazon, Alphabet, Facebook, Alibaba, and Tencent are all examples of digital strategy in economy companies. The report suggests that digital economy

activity is increasing globally, leading to the rapid evolution of internet companies. The adoption of digital strategies in the economy is therefore essential for the growth and success of businesses in the current global market.

1.2 Background of the Study

1.2.1 Digital Economy Development in China and the World

China since it joined the World Trade Organization in 2001, the economy has realized rapid expansion, the evolution of the digital strategy in economy is becoming more and more mature.

It is evident that china has been implementing various policies and action plans to promote the evolution of digital economy since 2016. The major information infrastructure construction action plan, formulated for three years from 2017 to 2019, along with other related policy solutions, such as Beijing-Tianjin-Hebei District, Yangtze River Delta Region, Zhejiang Province, and Fujian Province are some examples. These policies and plans show that china recognizes the importance of the digital economy in its overall economic gain and has been taking steps to ensure its evolution. The focus on infrastructure evolution, innovation and evolution of digital economy, and investment in special funds management for digital economy highlights china's commitment to promoting a thriving digital economy. Furthermore, these policies and plans also demonstrate China's desire to integrate different regions and promote coordinated evolution across the country. By encouraging digital evolution across provinces and districts, China can create a more balanced and inclusive economy. Overall, China's focus on the digital economy through various policies and plans indicates that it recognizes its potential for growth and evolution. It will be interesting to see how these strategies will continue to shape China's economy in the coming years (China Academy of Information and Communications Technology, 2023).

Table 1.1: The Overall Scale of China's Digital Economy and Its Share in GDP, 2008-2022

Year	Scale of Digital Economy (Trillion RMB)	GDP (Trillion RMB)	Share of Current Year GDP (%)
2008	4.80	31.90	15.05
2011	9.40	48.80	19.26
2014	16.10	64.40	25.02
2015	18.60	68.90	27.00
2016	22.50	74.60	30.16
2017	27.20	83.20	32.69
2018	31.30	91.90	34.06
2019	35.90	99.10	36.23
2020	39.20	101.55	38.60
2021	45.50	114.32	39.80
2022	50.20	120.96	41.50

Sources: China Academy of Information and Communications Technology (2023), China Statistical Yearbook (2023).

Table 1.1 illustrates the rapid growth of the digital strategy in China's economy between 2008 and 2022. The scale has increased by 1045.83% from 4.80 trillion RMB to 50.20 trillion RMB. This growth is significant as the contribution of digital strategy in the economy accounted for 41.50% of GDP in 2022, highlighting its importance to the country's economic gain. Data from China Internet Network Information Center (CINIC) have shown that as of December 2022, the count of online payment users in China has reached 911 million. This reflects an increase of 7.81 million compared with December 2021 and accounts for 85.4% of the total netizens. Additionally, data from the People's Bank of China (PBOC) displays that in 2022, China observed 158.51 billion mobile payment transactions, indicating a 4.81% growth compared to the previous year. Finally, by the end of 2022, China had opened 2.3 million 5G base stations, and it had reached 561 million 5G users, making up over 60% of the world's total.

Developing countries are actively implementing it as part of their strategic planning. By embracing digital technologies, these countries can enhance their economic competitiveness, create new business opportunities, and improve access to services for their citizens. It's also crucial that they continue to invest in the necessary infrastructure and education needed to support digital transformation, so that they can fully reap the benefits of this approach. Overall, a strong commitment to digital strategy can help developing countries accelerate their pace of economic and social evolution and move towards greater prosperity.

Table 1.2 illustrates the worldwide digital strategy in economy, which reached 32.61 trillion US dollars in 2020, composing 38.31% of GDP. The United States had the highest digital strategy value of 13.60 trillion US dollars, while China followed closely with 5.36 trillion US dollars, accounting for 36.49% of its GDP. Other nations with more than $1 trillion worth of digital economies included Germany, Japan, the United Kingdom, and France at 2.54 trillion US dollars, 2.48 trillion US dollars, 1.79 trillion US dollars, and 1.19 trillion US dollars, respectively. South Korea and India both managed to exceed $500 billion in digital economies, while Canada, Brazil, Italy, Mexico, Russia, and Singapore surpassed $100 billion. Some other countries with digital economies beyond $10-100 billion are Southeast Asian regions such as Malaysia, Indonesia, and Thailand, and central European countries such as the Netherlands and Poland. Despite various economic obstacles, global digital strategies continue to develop steadily, and it is projected that the digital strategy in the economy will play a crucial role in promoting world economic gain during and after the COVID-19 pandemic.

Table 1.2: Digital Economy Size of the World's Major Countries, 2020

Countries	The Size of the Digital Economy (Trillion US Dollars)	Total 2020 GDP (Trillion US Dollars)	Share of GDP (%)
Global	32.61	85.12	38.31
US	13.60	21.06	64.58
China	5.36	14.69	36.49
Germany	2.54	3.89	65.30
Japan	2.48	5.04	49.21
British	1.79	2.7	66.30
France	1.19	2.64	45.08
South Korea	0.85	1.64	51.83
India	0.54	2.67	20.22
Canada	0.44	1.65	26.67
Italy	0.38	1.90	20.00
Mexico	0.35	1.09	32.11
Brazil	0.31	1.45	21.38
Australia	0.28	1.33	21.05
Russia	0.28	1.49	18.79
Spain	0.21	1.28	16.41
Ireland	0.20	0.43	46.51
Switzerland	0.14	0.74	18.92
Singapore	0.14	0.35	40.00
Sweden	0.13	0.55	23.64
Indonesia	0.13	1.06	12.26
Netherlands	0.13	0.91	14.29
Poland	0.11	0.60	18.33
Belgium	0.11	0.53	20.75
Finland	0.10	0.27	37.04
Denmark	0.10	0.36	27.78
Norway	0.08	0.36	22.22
Malaysia	0.08	0.34	23.53
Thailand	0.07	0.50	14.00
South Africa	0.06	0.34	17.65
Turkey	0.06	0.72	8.33

Sources: World Bank (2021) and China Academy of Information and Communications Technology (2021).

It is true that the evolution and advancement of digital strategy in economies around the world has brought significant advantages to global economic gain. One such advantage is the acceleration of global inclusive finance, which is reflected in the increasing rate of account ownership worldwide. As shown in Table 1.3, the count of adults with accounts at banks, other financial institutions or mobile money services has risen from 51% in 2011 to

76% in 2021. In developing countries, men account for 74% of financial accounts and women for 68%. However, despite this progress, there still remains a gender disparity of 4%, and the access to emergency funding within 30 days for an unexpected expense is only available to approximately half of adults in developing economies. Financial stress is also a major concern for two-thirds of them. Although the implementation of digital strategies in economies could significantly accelerate the growth of inclusive finance globally, it is worth noting that developing countries still have weaker digital infrastructure compared to developed countries. Hence, their evolution standards are lower as well, and progress might be slower in these areas as opposed to developed countries.

It is evident that the COVID-19 pandemic has accelerated the adoption of digital payment methods, especially in low- and middle-income economies. According to recent statistics, 40% of adults in these countries who used some kind of card, phone, or internet payment did so for the first time during the pandemic. Moreover, over a third of people in all low- and middle-income economies started using formal accounts to pay their utility bills directly following the outbreak. In India alone, more than 80 million adults used digital payment methods for merchant payments for the first time since the pandemic began, whereas in China, the number exceeded 100 million. This increase in digital payment adoption suggests that the pandemic has pushed individuals towards cashless transactions for safety and convenience. Such a shift also provides chances for the further evolution of financial inclusion initiatives, and may prove beneficial in promoting economic gain in these countries.

Table 1.3: Global Financial Inclusion Development Data, 2021

Development Projects	Global	Developing Countries	China
Account Ownership Rate	Male 78%	Male 74%	Male 23%
	Female 74%	Female 68%	Female 87%
Adults with Accounts Use Digital Payment Rate	64%	-	82%
Adults Who Have Had Savings	31%	-	50%

Source: World Bank: Global Findex Database 2021 (2022).

Secondly, the digital strategy in the economy has accelerated the generation and evolution of digital payment businesses. This can be observed through the main performance of current global digital payments, which include online shopping or third-party mobile payment. As of 2021, approximately 76% of adults worldwide tend to use the Internet, engage in online shopping or mobile payment businesses. In developed countries, this number is even higher, reaching 64% of adults. In China, this proportion has reached an impressive 82%. However, apart from China, in developing countries, the proportion of adults engaging in digital payments is only 20%, despite many of them engaging in online shopping. However, they oftentimes resort to paying cash upon receiving the goods.

Third, this passage highlights the importance of digital strategy in the economy and how it has transformed traditional industries in various countries. It emphasizes that digitalization of industries is a vital component of digital strategy in the economy, with Germany leading the way with a 90% proportion of industrial digitalization in their digital strategy. The passage also notes that most developed countries have achieved above 80% industrial digitalization, while developing countries have a range of 60-80%. The larger the digital strategy in the economy, the higher the proportion of industrial digitalization tends to be. Finally, the passage suggests that the evolution of global industry digitization has boosted economic gain in each countryside.

Fourth, the digital strategy in the economy has had a significant impact on the telecommunications, software, information technology services, and the internet industries. In 2018, the United States, China, and Japan were the top three countries in terms of ICT service scale with $1.3 trillion, $424.3 billion, and $242.5 billion, respectively. The global ICT service industry plays a vital role in digital industrialization, and in most countries, the proportion of the ICT service industry is above 90%. The advent of the 5G era has led to an increased focus on 5G technology innovation across the world. 2019 marked the first year of commercial 5G implementation, making it a historic year. The continuous evolution of internet technology, rapid growth of the software industry, and technological advancements in electronics manufacturing are all thanks to the promotion of the digital strategy in the economy.

Table 1.4 displays the digital strategy in economy industrialization scale of various countries in 2018. The United States had the largest scale at 1.52 trillion US dollars, followed by China, Japan, Germany, South Korea, Britain, France, India, and other countries with a scale of more than 100 billion US dollars. Italy, Canada, Mexico, Brazil, Spain, Indonesia, Ireland, the Netherlands, Sweden, Switzerland, Russia, Australia, Malaysia, Turkey, Poland, and other countries also had a large scale in digital strategy in economy industrialization. It is clear that the industrialization of digital strategy in economy has played a vital role in the growth of different countries and even the global economy. The adoption of digital technologies has enhanced productivity, efficiency, and competitiveness, allowing countries to reap the benefits of the digital economy. It has created new opportunities for businesses, enabled new business models, and transformed entire industries. As such, countries that have invested in digital strategy in economy industrialization have reaped vital economic benefits. They have witnessed increased employment, investment, and GDP growth. It is likely that

more countries will follow suit in the coming years as they seek to benefit from the advantages of digitalization.

Table 1.4: Digital Industrialization Scale of Major Countries in the World, 2018

Countries	Size (USD 100 Million)
United States	15,236
China	9,689
Japan	3,548
Germany	2,410
South Korea	2,253
British	2,038
French	1,728
India	1,511
Italy	875
Canada	819
Mexico	748
Brazil	711
Spain	631
Indonesia	516
Ireland	502
Netherlands	473
Singapore	437
Swedan	435
Switzerland	405
Russia	400
Australia	391
Malaysia	311
Turkey	260
Poland	256

Sources: China Academy of Information and Communications Technology, OECD. The Year of World Electronics Data (2018).

The digital economy is leading to significant changes across various industries and sectors, including agriculture, transportation, healthcare, education, and e-commerce. With the advancement of digital technologies and infrastructure, businesses and individuals can access new and innovative ways of conducting transactions and exchanging value. This has led to rapid growth in the digital payment industry, which has become one of the key components of the digital economy. As we move forward, the digital strategy in the economy

will continue to bring about more innovation and progress, transforming the way we live, work, and do business.

1.2.2 Income Gap between Urban and Rural Residents in China

Since China implemented its reform and opening policy in 1978, the country's economy has experienced unprecedented rise. Over the past 40 years, China's Gross Domestic Product (GDP) has increased from 367.87 billion RMB to 1,015.98 trillion RMB in 2020, a remarkable growth of 276 times. In the same period, GDP per capita has risen from 385 RMB to 72,000 RMB, an increase of 187 times.

However, despite the remarkable economic progress, China is still faced with a major challenge - the persistent urban-rural income disparity across all regions of the country. This income disparity exists between urban and countryside residents, with urban residents typically earning more than their countryside counterparts. The disparity between urban and countryside incomes in China remains a significant challenge for the country's evolution.

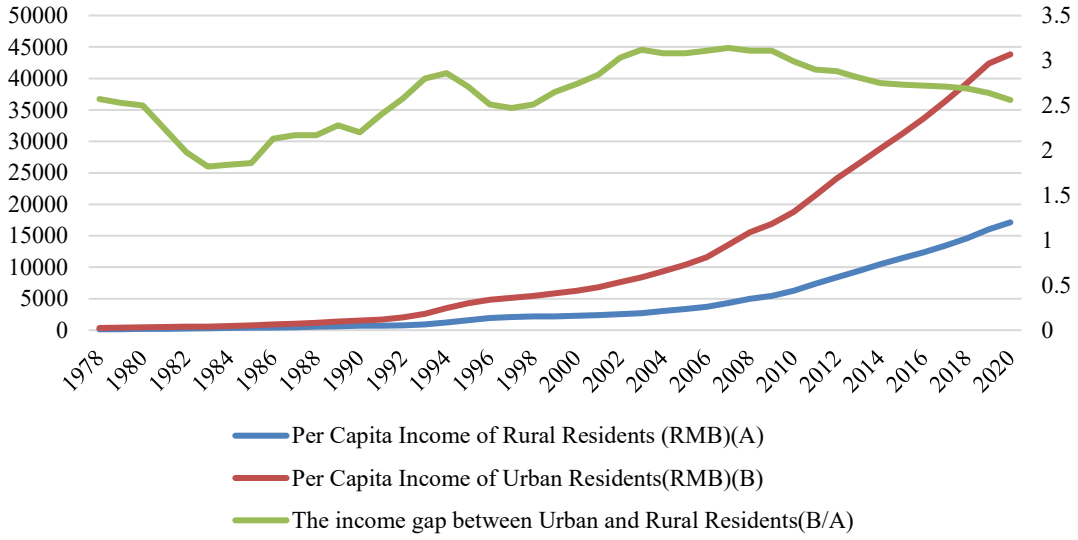

Figure 1.1: Income Gap Between Urban and Rural Residents in China, 1978 -2020

(Source: China Statistical Yearbook. National Bureau of Statistics of China.)

Figure 1.1 displays the annual average earnings per capita for countryside inhabitants and per capita disposable earnings for urban inhabitants over a period of 43 years, from 1978 to 2020. This period coincides with China's reform and opening-up policy. The graph also illustrates how the earnings disparity between urban-rural inhabitants changed during this time. The statistics reveal that the annual average per capita earnings of country inhabitants in China increased from 133.6 RMB in 1978 to 17,131.5 RMB in 2020, an astounding increase of 128 times. This demonstrates that the rural economy has advanced significantly over the period. In contrast, the per capita disposable earnings of urban inhabitants increased from 343.4 RMB in 1978 to 43,833.8 RMB in 2020, also an increase of 128 times. Between 1978 and 1983, the annual average per capita earnings ratio between urban-rural inhabitants was 2.57, which was the lowest in 43 years. However, in 2002, it breached the 3-mark for the first time and reached 3.14 in 2007. In 2020, the earnings disparity has slightly decreased to 2.56, but it remains significant.

In 2021, there was a significant income disparity between the top 20% of urban inhabitants, who earned an average of 102,595.8 RMB per year, and the bottom 20% of country inhabitants, who earned only 4,855.9 RMB per year on average. This disparity represents a staggering 21 times difference. China's economic evolution has been unbalanced, with the urban areas growing at a faster pace than country ones. The result is that there is a significant disparity in earning levels between urban-rural inhabitants, leading to unequal distribution of resources in areas such as consumer goods, education, healthcare, and employment opportunities. Rural residents often face inequality of opportunities and a lack of resources, which increases the hidden issue of earning disparity between urban-rural areas. It is crucial to address these issues and work towards a more balanced distribution of resources for both urban-rural residents.

The Gini coefficient is an internationally recognized measure of income inequality among residents in a country area or region. The coefficient ranges from 0-1, with higher values indicating greater income inequality and lower values indicating more equal income distribution. The United Nations Development Program and other relevant organizations have established standards for interpreting Gini coefficients: a coefficient between 0 and 0.2 represents absolute equality, between 0.2 and 0.3 represents relatively equal distribution, between 0.3 and 0.4 represents a somewhat unequal distribution, between 0.4 and 0.5 represents a high level of inequality, and above 0.5 means extremely high levels of inequality. When the Gini coefficient for a country area or region exceeds 0.4, this signals a serious income inequality issue that requires attention.

Figure 1.2 demonstrates the trend of China's Gini Coefficient in relation to average earning from 1978 to 2020. In the 1980s, the Gini Coefficient reflects relatively average earning, while in 1990, it exceeded 0.3 for the first time and remained in the stage of relatively reasonable earning. However, in 1995, China's Gini Coefficient sharply increased to 0.445, surpassing the warning line of 0.4 and indicating a concerning level of earning disparity. Despite the economic gain in the 21st century, earning disparity has remained high. In 2008, it even peaked at 0.491, approaching the extreme earning disparity range. The recent Gini coefficient of 0.465 in 2020 similarly shows a noticeable disparity in earning. These trends highlight the need to address income inequality in China's economic evolution.

Although China has experienced rapid economic gain since implementing policies of reform and opening up, particularly after joining the World Trade Organization in 2000, the issue of earning disparity between urban-rural inhabitants remains a concern that has impeded the country's continued economic progress. This has resulted in an imbalance in

regional economic gain, and has led to the evolution of an "urban-country dual structure" where significant disparities in economic evolution exist between towns and villages. This disparity has led to a serious issue of financial exclusion that needs to be addressed.

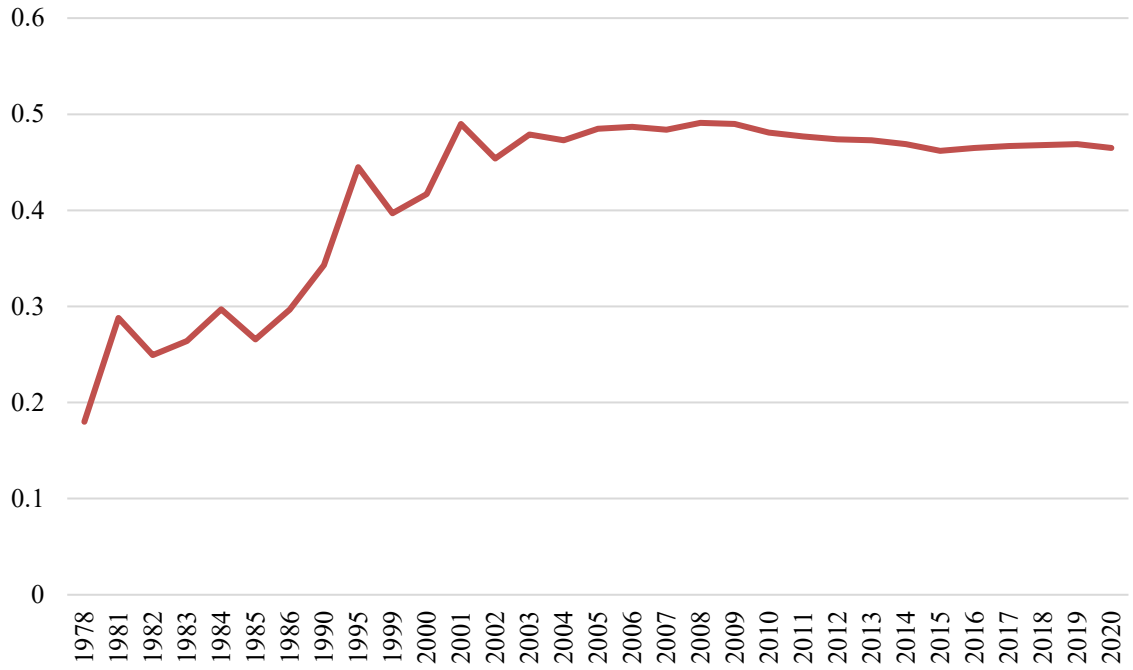

Figure 1.2: Overview of Gini Coefficient of China, 1978-2020

(Source: China Statistical Yearbook. National Bureau of Statistics of China.)

There are several causes for the income disparity between urban-rural inhabitants in China. Firstly, country financial institutions often transfer savings deposits to urban areas instead of reinvesting them to enhance farmers' earnings. This creates capital outflows from country areas, allowing financial institutions to obtain higher lending margins. For instance, farmers find it difficult to secure loans from country credit cooperatives, resulting in limited support for country economies. Secondly, since the financial system reform in 1996, financial institutions have provided little support to country economies, resulting in slow evolution and limited earning growth for country inhabitants. Furthermore, urban areas

receive not only deposits from urban inhabitants and enterprises but also country savings deposits, exacerbating the income disparity.

Table 1.5: Data Related to China's Rural Financial Development, 1978-2020

Year	Rural Household Savings Deposits (100 Million RMB)	Rural Household Loans (100 Million RMB)
1978	55.70	115.60
1990	1,841.60	1,038.10
2000	12,355.30	4,888.99
2001	13,821.40	5,540.90
2002	15,405.80	6,884.58
2003	18,177.68	8,411.35
2004	20,766.17	9,843.11
2005	24,606.37	11,529.93
2006	28,805.12	13,208.19
2007	33,050.26	15,429.31
2008	41,878.69	17,628.82
2009	49,277.61	21,622.53
2010	59,080.35	26,043.20
2011	70,672.85	31,023.00
2012	54,615.64	36,195.00
2013	101,268.71	45,047.00
2014	116,104.17	53,587.00
2015	123,009.08	61,488.00
2016	152,617.34	70,845.85
2017	179,555.16	81,055.66
2018	213,111.33	92,322.00
2019	243905.10	103,000.00
2020	268535.94	118,100.00

Source: China Financial Yearbook (2001-2021).

Table 1.5 shows that from 1978 to 2020, savings deposits and loans to farmers increased rapidly. However, country economic evolution and earning growth have not been balanced, resulting in a widening income disparity. While country savings deposits increased by 3.83 times, country loans increased by 798.6 times from 1978 to 2020, highlighting the limited financial support for country economies. In addition, the average personal earning standard of country inhabitants increased by only 128 times from 1978 to 2020, accounting for approximately 1/35 of the deposit ratio. Rural areas tend to save more and lend less, with disposable income mostly used for deposits rather than loans. This aggravates the income disparity between rural and urban inhabitants. Thus, there is an urgent need to address this situation.

Secondly, while the income of country residents in China has been increasing, the growth rate has been gradually decreasing. According to Table 1.5, from 1978 to 1985, the average income of country residents increased from 133.6 RMB to 397.6 RMB, with an average annual rise rate of 24.7%. However, from 1986 to 1993, the average annual growth rate decreased to 14.68% as the income increased from 423.8 RMB to 921.6 RMB. From 1994 to 1999, the growth rate dropped further to 11.57% with the income increasing from 1,221 RMB to 2,210.3 RMB. Between 2000 and 2006, per capita disposable income of country residents increased from 2,282.1 RMB to 3,731 RMB, with the average annual growth rate decreasing to 9.07%. The per capita disposable income rised from 4,327 RMB in 2007 to 8,389.3 RMB in 2012, with an average annual rise rate of 15.65%. However, the growth rate dropped again to 13.67% as the income increased from 9,429.6 RMB in 2013 to 17,131.5 RMB in 2020.

The average earnings of country inhabitants have increased significantly in absolute terms, but the growth rate has been slowing down gradually. However, the earning disparity between urban-rural inhabitants remains a major issue, and it is quite severe. In the 43 years since the reform and opening up, the per capita disposable earning of country inhabitants has increased by 128 times, but the income disparity with urban inhabitants has remained high. This is reflected by an increase in the Gini coefficient from 0.18 in 1978 to 0.465 in 2020. The earning disparity between urban-rural inhabitants urgently needs to be addressed.

1.2.3 The Development of Digital Financial Inclusion in Rural Area in China

Since December 2003, the United Nations has emphasized the need for "Financial Inclusion" with the aim of providing financial services to all, particularly vulnerable groups, in an economical manner. China adopted the concept of inclusive finance in 2005 and officially proposed to vigorously develop it at the Third Plenary Session of the 18th Central Committee of the Communist Party of China in late 2013. Two years later, the promotion of inclusive finance was formally integrated into China's national evolution strategy, highlighting its importance in the country's economic evolution.

In March 2015, China introduced the concept of "Internet +", which greatly propelled the country's digital economic and financial inclusion efforts. The 2019 central document No.1 Several Opinions of the CPC Central Committee and the State Council on Adhering to the Priority Development of Agriculture and Rural Areas and Doing the Work of "Agriculture, Rural Areas and Farmers" emphasized the years 2019 and 2020 as crucial for China's poverty alleviation efforts. As such, the "Agriculture, Rural Areas and Farmers" service should be the top priority for funding, with a focus on prioritizing agriculture and country areas as the main financial security areas for the financial services sector. In order

to achieve this, the digital rural strategy will be implemented. “Internet Plus Agriculture” will also be expedited, with a view to expanding the demonstration of Agricultural Internet of Things applications. The intention is to bring information to every village and extend public services to country areas through the “Internet +”.

Meanwhile, the People’s Bank of China and the Ministry of Finance have implemented several monetary and fiscal policies aimed at supporting farmers, rural small enterprises, and individual industrial and commercial households. These policies include reducing lending rates, enhancing credit lines, and providing tax relief for value added tax and individual earning tax. These measures are designed to promote the evolution of agriculture, countryside, and farmers.

The banking industry strives to enhance the speed and quality of financial services to customers based on the present state of rural economic evolution in the region. Each financial institution innovates its own financial products and models to achieve this goal. The government’s policies to promote the sustained evolution of the environment and economy are being implemented through the active promotion of green finance. Financial institutions are investing in low-carbon, eco-friendly farming, modern communication, logistics and other green industries in order to support the evolution of new country areas. In addition to offline modes of product innovation, banking financial institutions also apply big data analytics to enhance online financial services and boost efficiency and financial inclusivity. China Construction Bank is a good example of this approach as it collects offline business data online to develop new financial products such as “Small Micro Enterprise Credit”. This product provides working capital loans to individuals and businesses using big data, such as the credit history of the enterprise and financial assets of the customers, to

speed up the loan approval process. The non-performing loan ratio for this product is a mere 0.32%.

Moreover, many online banks, including E-Bank, We-Bank, and XinWang-Bank, have strategically taken on the challenge of expanding their services into country areas, with a particular focus on inclusive finance. These virtual banks without any physical branches are now offering diverse types of loans to country areas, agricultural users, and poverty-stricken counties, thus providing necessary financial support. The emergence of third-party payment options like WeChat payment, Alipay, and Unionpay flash payment is another momentous evolution in China's internet finance landscape. These payment methods have gained substantial momentum in recent years and have notably altered the consumption practices of farmers. As a result, internet inclusive finance has swiftly evolved in rural regions, thanks to the substantial support of these innovative payment modes.

In addition to the banking industry, the Asset Management Association of China has been supporting rural revitalization through its establishment of funds in various districts across the country since 2015. For instance, in Shandong province, the association has set up several government-guided funds for rural revitalization, including the "West Coast of Qingdao in Shandong Rural Revitalization of Development Funds", "Lu Shang Rural Revitalization of Industry", "Shandong Rural Revitalization of the Mother Land Development Funds", and "Shandong Weifang Rural Revitalization of the Country" funds. These funds prioritize investment in modern and new agriculture, seeking to solve the challenges surrounding agricultural investment and financing, and accelerate the evolution of inclusive finance in country areas. Guided by modern information technology, these efforts aim to strengthen the sustainable evolution of country areas in all aspects, raising

farmers' earning and living standards and narrowing the income disparity between country and urban inhabitants.

Institute of Digital Finance Pecking University has been releasing Digital Financial Inclusion Index of China since 2011. Currently, the index has been updated to the year 2020. The institution categorizes digital financial inclusion into three major indicators: coverage breadth, usage depth, and degree of digitization. Figures 1.3 and 1.4 depict the current status of digital financial inclusion development in the 31 provinces, municipalities, and autonomous regions of China in the years 2011 and 2020, respectively.

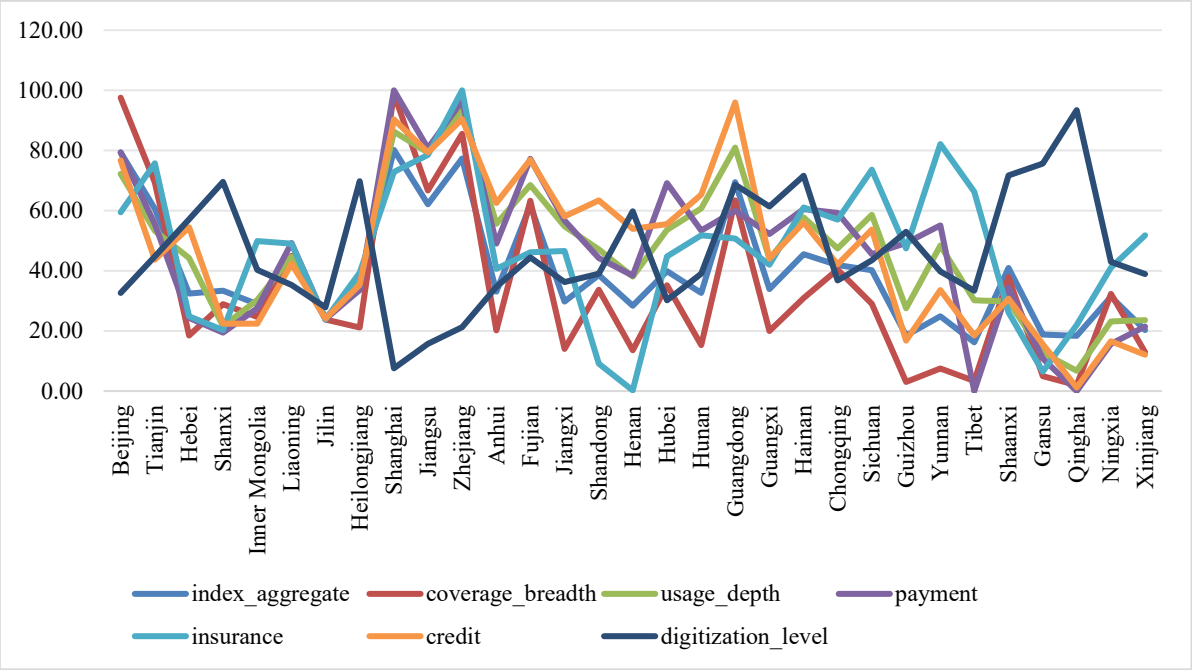

Figure 1.3: Provincial Digital Financial Inclusion Index, 2011

(Source: The Peking University Digital Financial Inclusion Index of China，PKU_DFIIC, 2021.)

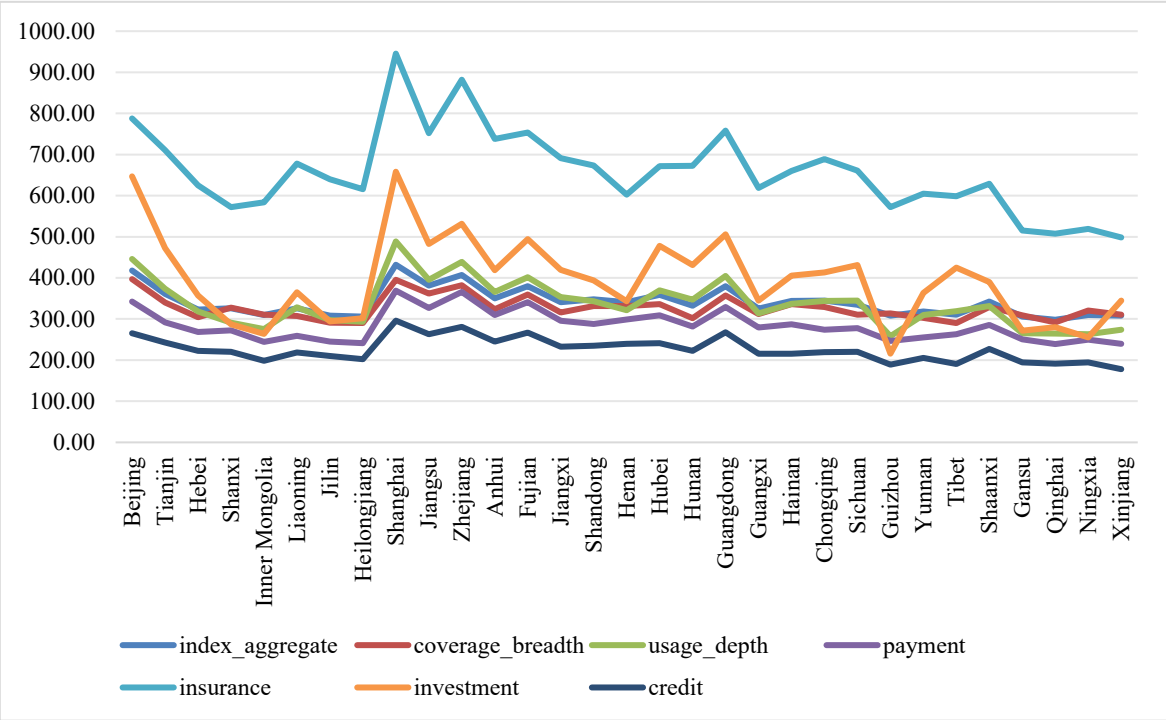

Figure 1.4: Provincial Digital Financial Inclusion Index, 2020

(Source: The Peking University Digital Financial Inclusion Index of China，PKU_DFIIC, 2021.)

The data from 2011 and 2020 indicates that the development of digital financial inclusion in China has been extremely rapid. At the same time, the 2020 data reveals regional disparities in the level of development of digital financial inclusion between the eastern and western parts of China. This disparity is illustrated in Figure 1.5. The development level in the eastern region is significantly better than in the western region.

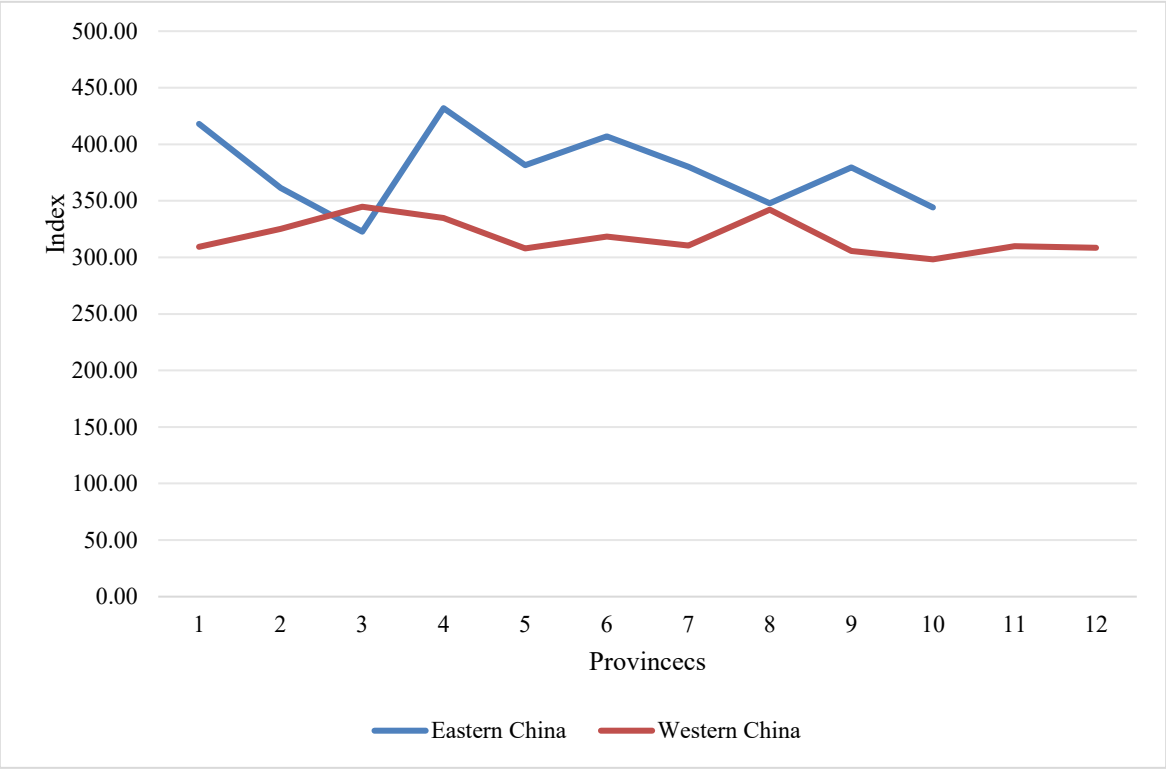

Figure 1.5: The Development of Digital Financial Inclusion in Eastern and Western China, 2020

(Source: The Peking University Digital Financial Inclusion Index of China，PKU_DFIIC, 2021.)

1.2.4 The Practice of Digital Financial Inclusion in Rural China

Since the G20 summit held in Hangzhou, China in December 2016, significant progress has been made in advancing inclusive finance through the use of cutting-edge digital and internet information technology. The G20 Inclusive Financial Senior Principles were agreed upon, which highlighted the importance of embracing innovation, managing risks, and regulation in the evolution of inclusive finance. This has led to an acceleration in the scientific and technological innovation of country financial services.

In 2018, rural China saw an impressive growth in digital financial services. A total of 670 million mobile phone banking accounts were opened, resulting in 9.39 billion transactions and a payment amount of 52.21 trillion RMB. Additionally, there were 612

million online banking accounts that facilitated 10.23 billion payment transactions with a total payment amount of 147.46 trillion RMB. Telephone banks also showed substantial growth with 208 million accounts opened, 81 million payment transactions, and a payment amount of 0.09 trillion RMB.

In 2019, the Chinese government issued "the Guidance on Financial Services for Rural Revitalization" which aims to promote the use of digital financial services to achieve financial inclusion in country areas by 2020. The guidance seeks to achieve full coverage of the network of township financial institutions and promote digital financial inclusion in country areas. These efforts will further support the evolution of rural economies and bridge the rural-urban divide in China.

Table 1.6: Statistics of Non-cash Payments in Rural Areas of China, 2018

Non-cash Payment Type	Opening Number (100 Million Households)	Number of Payment Transactions (100 Million)	Amount Paid (Trillion RMB)
Mobile Banking Service	6.7	93.87	52.21
Online Banking Service	6.12	102.28	147.46
Telephone Banking	2.08	0.81	0.09

Source: People's Bank of China, China Rural Financial Development Report 2018-2019.

Zhejiang Ant Small and Micro Financial Services Group was formally established in October 2014 as a technology enterprise dedicated to providing financial support to individuals and small businesses in underdeveloped areas. The group includes sub-business segments such as Alipay, Yu'ebao, Zhaocaibao, Ant Jubao, E-commerce Bank, Ant Huabei, Sesame Credit, Ant Financial Cloud, and Ant Dake. By the end of September 2019, Ant Financial had provided loans totaling over 510 billion RMB to more than 7 million farmers in rural China through digital financial inclusion services. On October 8, 2019, the World

Bank Group and the G20 presented Ant Financial's Internet bank, E-Banking, with the Global SME Banking Award, recognizing Ant Financial's significant contribution to promoting financial inclusion in economically disadvantaged areas.

The Hurun Global Unicorn List has been topped once again by Ant Financial in 2020, with an estimated value exceeding 150 billion US dollars. Ant Financial's impressive digital financial inclusion initiatives in rural China have resulted in a significant volume and scale of services. Table 1.7 provides a rundown of the top 10 Chinese companies in the Hurun Global Unicorns List for 2020.

Table 1.7: China's Top 10 Unicorns in Hurun Global Unicorn List, 2020

Global Rankings	Firm Name	Value (100 Million RMB)	Field
1	Ant Financial Services Group	10,000	Financial Technology
2	Byte Dance	5,600	Social Media
3	Didi Chuxing	3,700	Sharing Economy
4	Lufax	2,700	Financial Technology
8	AAuto	1,950	Social Media
9	Novice Network	1,900	Logistics
11	WeBank	1,500	Financial Technology
12	Jingdong Finance	1,300	Digital Technology
14	Buykee	1,000	Software Maintenance
14	DJI	1,000	The Robot

Source: The Hurun Global Unicorn 2020 List.

In China's country areas, many farmers face a challenge in obtaining credit information records and bank credit collateral. This lack of credit history and assets prevents them from accessing financial support from traditional institutions for their production and operation needs. However, Ant Financial has launched the "County Inclusive Finance" initiative in 2018, which has been successful in providing digital financial services to over

400 counties in 24 provinces and districts in China - representing more than one-fifth of China's counties. Ant Financial has developed innovative credit products such as the "Online Commercial Loan", "Wang Nong Loan", and "Trust Payment" which offer small loans at low interest rates, allowing customers to obtain the financial support needed to grow their businesses.

Table 1.8: Growth Rates of Digital Credit Indexes before and after the Signing of the Contract in 9 Cooperative Counties of Ant Financial

Signing Time	County	Province	Accumulated Loan Amount	Cumulative Number of Lenders	Loan Balance	Number of Existing Customers
May 2018	Neixiang County	Henan Province	225.0%	139.5%	65.2%	58.5%
May 2018	Lankao County	Henan Province	284.5%	529.4%	267.2%	454.7%
August 2018	Wulian County	Shandong Province	168.4%	276.4%	172.0%	252.0%
August 2018	Chengwu County	Shandong Province	141.9%	217.8%	139.3%	177.7%
September 2018	Quanjiao County	Anhui Province	166.4%	213.0%	140.4%	161.9%
September 2018	Quanzhou County	Guangxi Province	116.6%	193.3%	82.7%	151.3%
October 2018	Luochuan County	Shanxi Province	177.6%	166.8%	108.2%	107.6%
November 2018	Cao County	Shandong Province	115.3%	92.2%	96.0%	88.4%
January 2019	Jinzhai County	Anhui Province	54.7%	69.8%	47.4%	49.5%

Source: China Rural Financial Development Report 2018-2019.

In Table 1.8, the data for the nine counties that have partnered with Ant Financial has shown a significant increase before and after signing the contract. The amount of cumulative loans, number of cumulative lenders, loan equilibrium, and number of existing customers from these counties have all achieved a growth rate of more than 100%. Particularly, Lankao County in Henan province has exceeded a cumulative loan amount of 500%. Compared to

traditional rural financing, rural digital financial inclusion is more convenient and faster with lower risk and lower costs. It effectively addresses the challenges faced by rural households in accessing financing, which was previously difficult, slow, and expensive. According to the relevant data provided by Ant Financial, the operating cost of its rural digital inclusive financial loans is only about 2 RMB per loan, and the non-performing loan ratio of its small and micro businesses is only about 1 percent, demonstrating a gradual decrease.

Furthermore, Ant Financial Group has established partnerships with numerous financial institutions in country areas, including rural commercial banks and rural credit cooperatives, to provide comprehensive online financial inclusion services. This collaboration aims to enhance the efficiency and quality of digital financial inclusion services in remote regions, thereby advancing the evolution of inclusive financial systems in these areas.

1.2.5 Risks and Challenges Faced by the Development of Digital Financial Inclusion in China

Firstly, one momentous factor in achieving digital financial inclusion is the ability of internet financial institutions to leverage advanced information technologies. Unfortunately, many lending platforms currently lack the necessary technological infrastructure to provide effective financial services. Moreover, there are still many areas of online banking that remain unexplored due to technical challenges. For instance, remote account opening remains a major obstacle for many digital banks, limiting their ability to match the full range of services provided by traditional commercial banks. Addressing these technological shortcomings is crucial to achieving greater access to digital financial services, particularly for low-income populations who remain disproportionately underserved.

Secondly, the evolution of internet and big data technology has brought both benefits and challenges to the advancement of inclusive finance. On the one hand, it provides advanced technical support for the growth of inclusive finance, whereas on the other hand, it increases the level of digital security risks. There may be unintentional disclosure of personal information, leading to cyber scams, which carries a significant threat to customers who opt to borrow money online. In addition, it requires stricter security measures for the overall internet network.

Figure 1.6: GDP Comparison of China's 10 Eastern and 12 Western Provinces in 2020 (100 Million RMB)

(Source: China Statistical Yearbook, 2021.)

Thirdly, the economic development gap between the eastern and western regions of China is significant. It is worth noting that China's eastern region comprises ten provinces, while the western region encompasses 12 provinces, making them the two largest economic districts in China. However, due to geographical location, climate conditions, and other objective factors, the economic evolution of the western region lags behind that of the eastern region. Figure 1.6 provides a comparison of the GDP of the ten provinces in the eastern

region and twelve provinces in the western region in 2020. Therefore, the data we use for the analysis of China's eastern and western economic zones are representative and typical.

In the last decade, since the emergence of Chinese financial institutions offering inclusive financial services to their customers, several positive developments have taken place. These have streamlined fairness and efficiency in China's financial industry and enhanced economic gain in country areas. However, despite these advantages, there are still several technical constraints, information asymmetry issues, ineffective monitoring and supervisory protocols, and network security challenges that pose a significant threat to the continued improvement of inclusive financial services in China.

1.3 Problem Statement

Firstly, China's rapid evolution in Inclusive Finance could be attributed to the advanced internet technology and the growth of large data analysis. However, it has also resulted in the emergence of numerous lending network platforms on the internet platform. Some of these platforms are solely profit-driven, and therefore, they have increased the loan interest rates, consequently raising the cost of funds. Unfortunately, many borrowers on these platforms have to pay interest rates that are more than 20%, even higher. Such high-interest loans do not reflect the inclusive nature of financial inclusion, and as a result, they exclude many borrowers who cannot afford to borrow. This issue prompts the need for the relevant institutions and governments to pay attention and curb the issue through effective regulation and standardization.

Secondly, China's regulations and policies regarding digital financial inclusion are still not well-established. Although inclusive finance has been evolving in China for over a decade, there has not been any clear guidance or standards set by regulators. While the

People's Bank of China has made significant improvements in credit reporting services for both individuals and small to medium-sized enterprises, there are still many who have no credit record within the system. This poses a significant risk for both lenders and borrowers. Due to unclear entry requirements, many internet lending platforms and financial companies lack the relevant qualifications, making it difficult for borrowers to assess their credibility accurately. Furthermore, such lending platforms have weak anti-risk management capabilities, leading to borrowers misusing funds or defaulting on loans, thereby increasing the non-performing loan ratio.

Thirdly, inclusive financial support is primarily focused on providing assistance to country areas, micro, small, and medium-sized enterprises, as well as low-earning urban groups. However, in China, there are still a large number of farmers and low-income groups who lack the necessary internet and big data knowledge and skills. Inclusive financial services often rely on the internet to provide financial support to borrowers, which creates a serious information asymmetry between digital financial inclusion institutions and these low-income groups. This issue, in turn, hinders the effective evolution and evolution of digital financial inclusion.

In previous research, various studies have investigated digital financial inclusion in country areas of China, such as Shandong Province, analyzing its evolution and operational mechanisms (Yang, 2017). Zheng et al. (2023) investigated the nonlinear impact mechanism of digital inclusive finance on urban-rural income disparity. Zhao and Xue (2023) believe that digital inclusive finance helps narrow the income gap among mobile labor forces in urban and rural areas and can alleviate urban-rural income inequality. Additionally, others have explored the supply and demand of China's digital financial inclusion system,

examining its influence on urban-rural earning distribution (Li, 2017). Further research has also explored the sustainable evolution of China's economy through the lens of digital financial inclusion (Zhong, 2018) and its potential for inclusive growth (Li, 2019). These studies have contributed significantly to understanding the various dimensions of digital financial inclusion and its potential influence on promoting economic evolution in country areas.

To effectively measure the influence of digital financial inclusion in China, it is crucial to consider various dimensions of financial inclusion. This requires identifying suitable indicators that can reflect the specific evolution of digital financial inclusion in the country. In order to accurately assess the extent of digital financial inclusion, we must measure multiple specific indicators that cover various dimensions of financial inclusion. Therefore, it is momentous to select indicators that can accurately reflect the state of digital financial inclusion.

According to the research from the Institute of Digital Finance Pecking University, the current digital inclusive financial index system is not comprehensive as it mainly focuses on indicators formulated by commercial banks. In China, aside from commercial banks, many other financial intermediaries such as Alipay and WeChat have made significant contributions to the evolution of finance through third-party payment platforms, online financial services, and other non-bank financial institutions. Therefore, to provide a comprehensive evaluation of the digital financial inclusion index in China, this study selects an index system from the Institute of Digital Finance Pecking University that considers three dimensions; digital financial inclusion coverage, depth of use, and degree of digitalization, with a total of 33 specific indicators. By analyzing the influence of digital financial inclusion from the perspectives of inclusive financial coverage, depth of use, and digitization standards,

we can identify the root cause of the financial evolution lagging behind economic gain in country areas. This study focuses on addressing the significant income disparity between urban and rural residents in China, as well as the substantial development disparity between the eastern and western regions. By examining the impact of the breadth of coverage, depth of usage, and degree of digitization of digital financial inclusion on the income disparity between urban and rural residents, the main factors influencing the impact of digital financial inclusion on income disparity are identified. Based on these findings, strategies and recommendations are proposed to promote the development of digital inclusive finance, thereby narrowing the income disparity between urban and rural areas.

Based on the results of this study, the thesis will propose strategies and recommendations to address these issues. These recommendations aim to foster the development of digital inclusive finance in China, contributing to the reduction of income disparities between urban and rural residents. In light of the research findings regarding the eastern and western regions of China, appropriate suggestions will also be put forth in this study. These recommendations are designed to narrow the income disparity between the eastern and western regions, further diminishing the economic development disparities between the two areas. In conclusion, the research presented in this study seeks to make a meaningful contribution to the ongoing development of the economy in China.

1.4 Objectives of the Study

1.4.1 Main Objective

The main objective of this study is to investigate the impact of digital financial inclusion on the urban-rural earning disparity.

1.4.2 Specific Objectives

i. To examine the impacts of digital financial inclusion on the urban-rural income disparity in China.

ii. To examine the impacts of the coverage of digital financial inclusion on the urban-rural income disparity in China.

iii. To assess the influence of the depth of use of digital financial inclusion on the urban-rural income disparity in China.

iv. To investigate the influence of digitalization degree of digital financial inclusion on urban-rural income disparity in China.

v. To investigate the influence of payment index of digitalization degree of digital financial inclusion on urban-rural income disparity in China.

vi. To investigate the influence of insurance index of digitalization degree of digital financial inclusion on urban-rural income disparity in China.

vii. To investigate the influence of credit index of digitalization degree of digital financial inclusion on urban-rural income disparity in China.

1.5 Research Questions

The research questions of this study are as follows:

i. What is the influence of digital financial inclusion on the urban-rural income disparity?

ii. What is the influence of the coverage of digital financial inclusion on the urban-rural income disparity?

iii. What is the influence of the depth of use of digital financial inclusion on the urban-rural income disparity?

iv. What is the influence of digitalization degree of digital financial inclusion on urban-rural income disparity?

v. What is the influence of payment index of digitalization degree of digital financial inclusion on urban-rural income disparity?

vi. What is the influence of insurance index of digitalization degree of digital financial inclusion on urban-rural income disparity?

vii. What is the influence of credit index of digitalization degree of digital financial inclusion on urban-rural income disparity?

1.6 Significance of the Study

This study elaborates on its significance from theoretical, national, societal, and individual-family perspectives. The concept of digital financial inclusion and the evolution of related theories have enriched inclusive finance and rural financial evolution theories, providing a solid foundation for financial research. Quantitative research on digital financial inclusion and its operational mechanisms have contributed to the theoretical evolution of rural finance. To maintain the sound evolution of digital finance to accelerate the evolution of China's economy and support the government's economic agenda. To achieve inclusive economic gain, ensuring that financial progress does not leave behind micro and small and medium-sized enterprises (SMEs). With the Chinese government and central bank providing macro guidance and regulation, digital financial inclusion has the potential to improve the financing efficiency of SMEs, accelerating their growth. This, in turn, contributes significantly to improving the income levels of both urban and rural residents.

1.6.1 Theoretical Significance

The urban-rural divide and financial exclusion have been long-standing issues in many countries, including China. However, the concept of digital financial inclusion and the evolution of related theories have enriched inclusive finance and rural financial evolution theories, providing a solid foundation for financial research. By addressing the issue of financial exclusion, the evolution of digital financial inclusion can contribute to narrowing the earning disparity between urban-rural dwellers in theory, providing a potential solution to the issue of the dual economy.

To take things further, quantitative research on digital financial inclusion and its operational mechanisms have contributed to the theoretical evolution of rural finance. The comprehensiveness, depth, and digitization of digital financial inclusion have provided corresponding financial assistance to meet the needs of farmers. From a supply and demand perspective, digital financial inclusion has the potential to expedite the evolution of country finance. However, further research is necessary to fully understand the extent of this evolution and any associated obstacles.

1.6.2 Practical Significance

Since the implementation of China's reform and opening up policy in 1978, the issue of earning inequality between urban-rural residents has been a persistent challenge for policymakers. Over the past four decades, China's Gini coefficient has widened from 0.18 in 1978 to 0.465 in 2020, approaching the threshold for extreme income disparity. However, the implementation of inclusive finance and the advancements in digital financial inclusion in recent years hold promise in alleviating this issue to some extent. By providing access to financial services and resources, inclusive finance has the potential to narrow the earning

disparity between urban-rural residents. Furthermore, the integration of modern technologies and financial services facilitates this goal, as more individuals can easily access banking services and participate in digital financial transactions.

The "Law of the People's Republic of China on the National Economic and Social Development for the 14th Five-Year Plan" states that from 2021 to 2025, China will prioritize a "high-standard industrial foundation" to improve modernization standards, promote the evolution of the agricultural sector, balance urban and rural developments, and make significant progress in constructing a modern economic system. Additionally, the plan aims to reform the property rights system, strengthen market-oriented reforms, enhance fair competition, and develop a more open economy. To achieve these objectives, digital financial inclusion in China's country areas will play a crucial role in promoting economic gain and realizing the goals of the 14th Five-Year Plan. Hence, it is essential to maintain the sound evolution of digital finance to accelerate the evolution of China's economy and support the government's economic agenda.

Secondly, another major challenge that hinders the growth of China's market economy is the limited access to funding for small and medium-sized enterprises (SMEs). In rural and township areas, there is a significant number of SMEs, which includes small, micro and medium-sized enterprises, operating across various industries. Typically, these enterprises have a few hundred employees and generate earnings within tens of millions of RMB. However, due to the lack of financing options, these businesses often struggle to secure the necessary funds to expand and grow their operations.

Inclusive finance is a crucial component for achieving inclusive economic gain, ensuring that financial progress does not leave behind micro and small and medium-sized enterprises (SMEs). Through inclusive finance, micro and SMEs can access financial support through electronic channels that are low-cost and highly efficient. This will particularly benefit rural micro and SMEs, contributing to the growth of China's rural economy. For instance, MYBANK, China's online merchant bank launched on June 25, 2015, has provided service to over 2.71 million small micro-enterprises across 23 provinces, municipalities, and autonomous regions in just a little over a year, with a total lending amount of 115.1 billion RMB, and a non-performing loan ratio of less than 1%, lower than most ordinary commercial banks. As of the end of 2020, outstanding small and micro loans in China surged to 15.1 trillion RMB, with an increase of 30%. During 2020, 32.28 million business entities benefited from inclusive finance, representing a 5.24 million increase compared to 2019.

Thirdly, with the Chinese government and central bank providing macro guidance and regulation, digital financial inclusion has the potential to improve the financing efficiency of small, medium, and micro enterprises, accelerating their growth. This, in turn, contributes significantly to improving the income levels of both urban-rural residents. While the earning standards of the two groups have seen significant improvements in recent years, with rural laborers earning an average of 14,617 RMB and urban inhabitants earning 39,250.8 RMB in 2018, there still exists a significant disparity. Therefore, this study examines how digital financial inclusion, through its breadth, depth, and degree of digitization, can help narrow this disparity.

1.7 Organization of the Study

This thesis is divided into five chapters. The first chapter serves as the research introduction, providing an overview of the research background, problem statement, research objectives, research questions, significance and scope of the study. The second chapter conducts a comprehensive review of the current status of digital financial inclusion and urban-rural income disparity both domestically and internationally.

The third chapter primarily focuses on variable selection, research methods, and model establishment. Specifically, this study utilizes a digital financial inclusion index to construct the model, measuring the impact of digital financial inclusion on urban-rural income disparity through seven indicators: total index of digital financial inclusion, coverage, depth of use, degree of digitalization, payment level, insurance level, and credit level.

The fourth chapter presents empirical results. Utilizing the data and model established in the third chapter, empirical research is conducted, and the results are analyzed for China as a whole, as well as the eastern and western regions of China.

The fifth chapter comprises conclusions and recommendations. Based on the empirical research results and analysis from the fourth chapter, specific strategies are proposed to address the income disparity between urban and rural residents in China and alleviate the regional disparity between the eastern and western parts of the country.

1.8 Scope of the Study

This study aims to supplement the relevant theoretical framework of digital financial inclusion. The concept of digital financial inclusion and the evolution of its related theories can enrich the theories of financial inclusion and the evolution of rural finance, providing a solid foundation for financial research. Quantitative research on the concept and operational mechanisms of digital financial inclusion can promote the theoretical evolution of rural finance.

The concept of financial inclusion was introduced in China in 2005. In 2015, the proposal of the "Internet+Finance" concept during National Assembly of China further promoted the development of digital financial inclusion in the country (People's Bank of China). Despite the relatively late appearance of digital financial inclusion, it has experienced rapid development in China, thanks to advanced internet technology and the growth of big data analytics. However, the current regulatory policies for the development of digital financial inclusion in China are not sufficiently standardized, posing significant risks for both lenders and borrowers. The development of internet and big data technologies has both advantages and disadvantages for the smooth progress of financial inclusion, providing advanced technological support while also introducing potential risks to digital security.

Digital financial inclusion primarily supports the development of rural areas, small and medium-sized enterprises (SMEs), and low-income urban populations. However, in China, many farmers and low-income individuals lack the necessary knowledge and skills related to the internet and big data, essential for leveraging digital financial inclusion. There is a significant information asymmetry issue between digital financial inclusion institutions

and these low-income groups, hindering the inclusive development of digital finance in China.

Over the past decade or so, digital financial inclusion in China has seen many successful practices and achieved positive results. However, existing issues pose numerous risks and challenges for its further development in the country. Therefore, the outcomes of this study will contribute to the theoretical and practical advancement of digital financial inclusion in China. The development of digital financial inclusion is expected to narrow the income gap between urban and rural residents and between the eastern and western regions, further promoting economic development in China.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of research conducted by domestic and international scholars on the impact of financial market inclusivity on the earning disparity between urban-rural communities. The issue of urban-rural earnings disparity has been a persistent challenge for China's economic gain. In 2020, China announced a significant victory in the "Battle of Poverty Alleviation", with all 99.99 million rural poor lifted out of poverty. However, relative poverty remains a concern, and digital financial inclusion can assist in supporting the evolution of rural economies to some extent. Nevertheless, the degree of digitalization, coverage, and use of digital financial inclusion varies across China, and it produces different outcomes in narrowing the earning disparity between urban-rural residents. Tang's (2020) research emphasizes these crucial differences.

This research aims to examine the early effects of domestic and foreign studies on the earning disparity between urban-rural residents, as well as the use of advanced digital information technology by financial institutions to provide inclusive financial services. Through analyzing these factors, a theoretical framework has been developed to explore the influence of digital financial inclusion on closing the earning standard disparity. The constructs of this framework are then presented and elaborated upon to establish hypotheses for further study.

It is true that both developed and developing countries have implemented various policies related to digital strategy in the economy to achieve significant results. Developed countries have been at the forefront of recognizing the importance of digital strategy in driving economic and social rise for a long time, and have therefore implemented such strategies much earlier. The United States was the first country to implement a digital strategy in the economy with the implementation of the "Information Superhighway" in the 1990s. Since then, the US has published numerous reports on the emerging digital economy, such as "The Emergence of Digital Economy", "The Emerging Digital Economy 1999", "Digital Economy 2000", "Digital Economy 2002" and "Digital Economy 2003", which have laid a solid foundation for the evolution of digital strategy in the economy worldwide. In 2021, the U.S. Gross Domestic Product (GDP) reached 23.32 trillion US dollars, a growth rate of 10.73% than 2020, this is inseparable from the growing digital strategy in economy (World Bank, 2022).

In 2001, Japan issued the E-Japan Strategy, followed by u-Japan, I-Japan, ICT Growth Strategy and Smart Japan ICT Strategy to realize the evolution of the digital strategy in economy at information and networking of every period. In 2019, Japan's GDP reached 5.12 trillion US dollars, with a growth rate of 1.59% than 2018. Although Japan's GDP fell to 4.94 trillion US dollars in 2021 due to the COVID-19 pandemic, it is still supported by the digital economy (World Bank, 2022) .

In 2009, the UK released its strategic plan for Digital Britain. It's impressive to see how the UK's digital strategy has contributed to the growth of its economy and society. The UK's efforts in formulating various policies such as "The UK Information Economy Strategy 2013" and "The UK Digital Economy Strategy 2015-2018" have played a crucial

role in elevating the importance of the digital sector in national evolution. Britain's GDP in 2021 increase to 3.13 trillion of US dollars, the growth rate of 15.93% than 2020 (World Bank, 2022). This figure indicates that the digital strategy has been successful in driving economic gain and creating more job opportunities for citizens. It's momentous to note that the success of the UK's digital strategy is not just limited to economic gain. The implementation of digital policies has also resulted in significant social evolution, such as increased access to digital services, improved digital literacy, and better communication. Overall, the UK's digital strategy serves as an excellent example of how investing in digital infrastructure can lead to significant benefits for both the economy and society.

Developing countries have lagged behind developed countries in formulating and implementing digital strategies in their economy evolution plans. This can be attributed to several reasons, including lack of technological infrastructure, limited resources, and a shortage of skilled workforce. While developed countries have been investing heavily in technology for years, developing countries have only recently begun to recognize the importance of technology in driving economic gain. as a result, many developing countries are now playing catch-up in terms of developing comprehensive digital strategies. However, it is momentous to note that developing countries also have some advantages in this area. For example, developing countries can learn from the mistakes made by developed countries and avoid making the same errors. Additionally, developing countries can take advantage of new technologies and innovative approaches to leapfrog outdated systems and processes. Overall, while developing countries may be behind in terms of digital strategy evolution, they have the potential to catch up quickly if they invest in the right infrastructure, resources, and skilled workforce.

It is impressive to see the impact of "The Digital India" initiative which was launched in 2015, and how it has contributed significantly to the Indian economy. The fact that the digital strategy in the economy accounts for more than 23% of the GDP shows the significance of this initiative.

According to the statistics mentioned, the digital industrialization scale stands at 151.1 billion US dollars, with Information and Communications Technology (ICT) service industry accounting for 120.1 billion us dollars, and the ICT manufacturing scale being 30.9 billion US dollars. These numbers indicate the growth potential of these sectors and their contribution to the nation's economy. It is momentous to note that the rapid evolution of the digital strategy in the economy has made a significant contribution to the economic evolution of India. It has opened up new avenues for businesses, created job opportunities, and enhanced connectivity among people. Overall, the success of "The Digital India" initiative is commendable and inspiring as it showcases the power of technology in driving economic gain and evolution. India's GDP was 3.18 trillion US dollars in 2021, a growth rate of 19.10%. The scale of digital industrialization is 160 billion US dollars in 2019 (World Bank, 2022).

In 2016, Brazil promulgated "the National Strategy for Scientific and Technological Innovation (2016-2019)", establishing a unified national e-government authentication system and implementing resource sharing. These measures have effectively improved the work efficiency and service standard of government agencies. In 2021, Brazil's GDP was 1.61 trillion US dollars, with GDP growth of 11.03% (World Bank, 2022).

The Russian Federation has recognized the importance of a digital strategy in their economy and has shown significant growth in this area over the past few years. In 2017, the digital strategy in the economy was valued at 220.5 billion US dollars which increased to 294.2 billion US dollars in 2018. This resulted in a contribution of over 20% to the GDP in that year. The growth rate of the digital strategy in the economy was also impressive, with a 33.42% increase in 2018 compared to 2017, which was significantly higher than the GDP growth rate for that year. However, it should be noted that while the digital strategy in the economy is an momentous factor to consider, it is not the only factor contributing to GDP growth. The GDP of Russia in 2021 was 1.78 trillion US dollars, with a GDP growth rate of 19.46% (World Bank, 2022).

2.2 Theoretical Review

The following sub-headings will cover the discussion of mainstream theories.

2.2.1 Deepening of Finance

In 1973, Shaw and Mckinnon put forth the financial deepening theory in their books titled "Financial Deepening and Economic Development and Money" and "Capital in Economic Development". Their research delved into the connection between financial systems and economic progress in underdeveloped countries. Their findings suggested that economically less developed countries experience "financial repression". This is due to an unfair distribution of capital, which amplifies income inequality and impedes economic gain. Consequently, the authors proposed that relaxing financial market regulations and reducing government administrative intervention in country areas would accelerate financial deepening and national economic progress (Shaw & Mckinnon, 1973).

By the end of the 20th century, China had undergone nationwide financial reforms that exposed several shortcomings in financial markets. Firstly, there are significant information asymmetry issues in the rural financial market, resulting in groups in country areas being inadequately informed about loan policies and other relevant information. Secondly, according to Tan's 2021 study, country areas struggle with a lack of collateral due to their underdeveloped economic status. Thirdly, financial institutions aiming for profit tend to invest more in urban areas, which often results in financial exclusion in country areas (Chen, 2004), and exacerbates the disparity in earning levels between urban-rural residents.

One significant reason for the widening disparity in earning standards between urban-rural dwellers in China is the unfair and inefficient distribution of financial resources. Rural finance, by promoting the "poverty reduction effect", can help to narrow this disparity (Zheng & Zhang, 2021). However, recent research by Zhang (2021) highlights the challenge of the "threshold effect" in financial deepening, which restricts access to financial resources by low earners and further amplifies the urban-rural disparity in earnings.

2.2.2 Financial Constraint Theory

In the 1990s, Stiglitz and Honohan developed a theory of "financial repression". According to this theory, policies such as government supervision and administrative intervention can promote financial deepening to a certain extent. When the rural economy is stable and the inflation rate is low, these policies can create rent-seeking opportunities for both the financial and production sectors. This can reduce information asymmetry and promote economic gain. For developing countries, a moderate level of financial repression may be more effective than financial liberalization. However, as the financial sector expands,

the government should gradually reduce its intervention and allow for a more market-based economic system.

Financial constraint theory highlights the role of governments in shaping the evolution of financial markets. Its core idea is that rural financial policies have a significant influence on economic gain. However, it is momentous to carefully balance government intervention in the financial system, to ensure that financial deepening and economic progress can be promoted effectively (Liu, 2008).

2.2.3 Kuznets Effect of Financial Development on Income Distribution

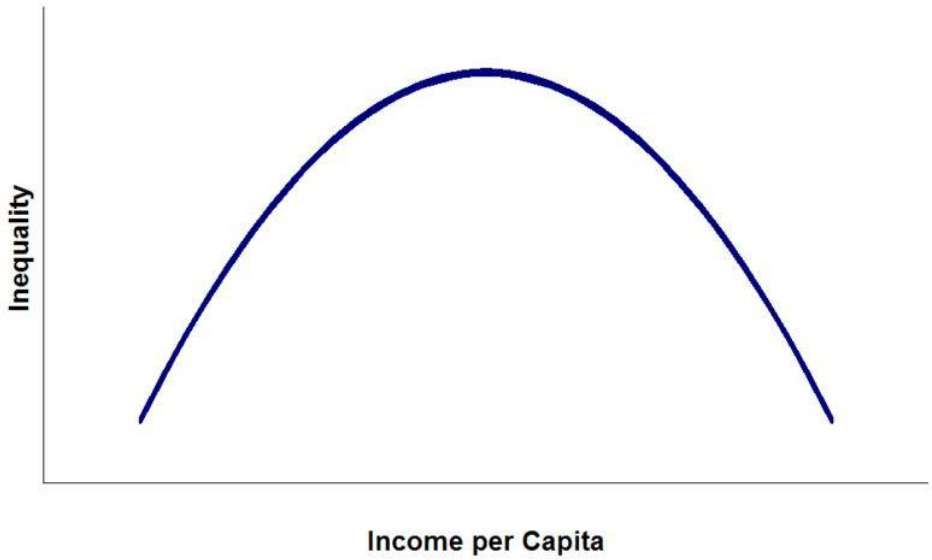

Figure 2.1: Kuznets Curve

In 1955, Simon Smith Kuznets proposed the hypothesis of an inverted U-shaped curve, which suggests that as a country's per capita income rises from the lowest to the middle levels, its income distribution tends to deteriorate initially. However, with the gradual evolution of the economy, income distribution improves to some extent and eventually achieves a relatively fair distribution. This inverted U-shape has been observed in multiple studies (Shao & Jin, 2016).

In 1989, Greenwood and Jovanovic proposed the G-J model, which supported the findings of the Kuznets curve. According to them, in the short term, financial evolution can accelerate economic gain, but the cost of financial services makes it difficult for low-earning groups to access financial support. Consequently, finance contributes to increase the income disparity by providing support to high-earning urban groups. However, Galor and Zeraia (1993) questioned the inverted U-shape argument, asserting that financial evolution and income distribution were negatively correlated with an initial wealth threshold. Furthermore, financial evolution would widen the urban-rural earning disparity. Empirical results showed that financial evolution indeed accelerated economic gain, but it failed to benefit low-earning groups.

Over time, the increasing incomes in country areas will lead to more people receiving financial assistance. Ultimately, financial evolution has the potential to narrow the earning disparity between urban-rural areas (Ping & Li, 2017). Ruixin and Sami (2019) argue that financial evolution stimulates economic gain, creates employment opportunities for farmers, increases their earning and ultimately decreases the earning disparity between urban-rural areas. They support their argument by utilizing global data to demonstrate the convergence effect.

2.2.4 Financial Exclusion Theory

The theory of financial exclusion was first proposed by Leyshon and Thrift (1995) in the United States. This theory mainly refers to the situation in which socially vulnerable groups are excluded from financial institutions and cannot obtain financial services, due to a much lower standard of living than the average standard of society, and experiencing poverty in their economy, daily life, physical condition, or family (Leyshon & Thrift, 1995).

In 1999, Kempson and Whyley proposed a six-dimensional framework for financial exclusion. These dimensions include physical access exclusion, assessing exclusion, condition exclusion, price exclusion, marketing exclusion, and self-exclusion. Sarma (2011) later divided financial exclusion into five categories, which include opportunity exclusion, conditional exclusion, price exclusion, market exclusion, and self-exclusion. The analysis of financial exclusion can be viewed from both the supply and demand perspectives. From the supply perspective, financial exclusion occurs when people "want but cannot get" financial services due to factors such as geography, conditions, prices, and market positioning. Digital technology has been instrumental in reducing financial exclusion by increasing the supply of financial services. Digital financial inclusion has eased geographical restrictions by providing services in cyberspace. This has enabled residents in remote areas to access financial services, thereby alleviating the exclusion of opportunities. Furthermore, digital inclusive finance has reduced the threshold for financial services, thus alleviating conditional exclusion. It has also reduced the cost of financial services, making them more affordable and alleviating price exclusion. Additionally, digital inclusive finance targets the financially excluded population directly, alleviating the issue of market exclusion. In China, assessed exclusion and conditional exclusion have high overlap, while self-exclusion has a minimal impact. According to Tan (2021), China's rural financial exclusion can be condensed into four dimensions: physical access exclusion, conditional exclusion, price exclusion, and marketing exclusion.

The issue of financial exclusion is particularly prevalent in rural China, with more severe levels of exclusion seen in the central and western regions compared to the eastern regions (Zhang et al., 2014; Wang et al., 2013). Moreover, Wang et al. (2013) observed that Chinese farmers face more credit exclusion than savings exclusion. In a micro-data study,

Su and Fang (2016) discovered that banking and insurance exclusion is more pronounced in central China, whilst internet finance exclusion is more commonplace in the west. Empirical research by Zhang and Yin (2016), using data from the 2013 Chinese Household Finance Survey (CHFS), revealed that improving financial knowledge can effectively mitigate financial exclusion when applying for financial services. Li (2020) advocates for inclusive finance evolution across all regions to alleviate financial exclusion in China. Ding and Zhou (2022) found that financial concentration can to some extent reduce the negative effect of financial exclusion on economic evolution.

2.3 Research Status of China's Financial Development and Urban-rural Income Gap

Scholars have differing opinions regarding the influence of China's financial evolution on the earning disparity between urban-rural residents. One viewpoint posits that financial evolution may widen the income disparity. This is because the financial market has a high credit threshold and high service costs (Wen et al., 2005), which makes it difficult for country residents to obtain financial support due to their small scale or substandard credit. Financial institutions often prioritize providing resources to urban areas and offering support to urban economic evolution (Zhang & Wang, 2016). This creates a vicious cycle that perpetuates the earning disparity between urban-rural areas, leading to an increasing disparity over time (Liu, 2015).

The second perspective asserts that financial evolution can reduce the earning disparity between urban-rural residents. The enhancement of financial markets can provide more investment avenues for society, ultimately promoting economic evolution at the national level (Zhu & Wang, 2017). Economic evolution can, in turn, create more employment opportunities and provide financial support for small and micro-enterprises,

individual industrial and commercial households, and individual farmers in country areas (Tan & Peng, 2018). Akhter and Daly (2009) utilizing transnational data from developing countries, observed that financial evolution enterprises through promoting economic gain and improving income distribution can alleviate poverty. Jeanneney and Kpodar (2011) argued that financial evolution could spur poverty alleviation through direct channels, such as capital allocation, risk management, deposits, and loans. Rajan et al. (1998) found that financial evolution could fuel economic gain, optimize resource allocation, and help urban-rural residents accumulate wealth, narrow the earning disparity and foster economic gain under the stimulus effect of fiscal and monetary policies. Furthermore, the rise of the total financial resource and the expansion of the financial industry's coverage can address financing constraints faced by small and micro-enterprises and urban-rural residents, ultimately reducing income inequality (Levine, 2005). This view maintains that financial evolution can facilitate economic progress in country areas, therefore, bridging the earning standard disparity between urban-rural inhabitants.

The third perspective posits that financial evolution has varying effects on the industrial structures and financial market structures of different regions (Li et al., 2020). Given China's large land size and abundant resources, it is divided into four major economic regions: east, central, west, and northeast districts. Furthermore, the financial market structures in each region vary (Yang & Ma, 2014). Additionally, the primary, secondary, and tertiary industries have different characteristics and structures, with varying levels of evolution (Lu et al., 2014). Thus, this viewpoint maintains that financial evolution affects economically developed regions and secondary and tertiary industries more significantly than economically underdeveloped regions and primary industries (Jiang et al., 2016).

In the initial stages of financial evolution, basic savings services may widen the earning disparity between urban-rural areas by primarily serving low-earning individuals. However, in the middle and later stages of financial evolution, credit funds can be used by low-income individuals to invest in new technologies, education, and other areas, leading to increased productivity and overall wealth creation, ultimately narrowing the earning disparity between urban-rural areas. Furthermore, Kim's (2016) study examined the relationship between financial evolution and earning disparity in 40 different countries, categorizing them based on per capita GDP into high-earning and low-earning countries. Results indicate that the effect of financial evolution on earning disparity varies depending on the level of economic evolution. Specifically, in low-income countries, financial evolution has no significant influence on narrowing the earning disparity between urban-rural areas compared to high-income countries.

Inclusive finance is a vital component in enhancing a country's financial infrastructure and can also facilitate economic gain and social evolution. Dev (2006) highlights that financial inclusion can enhance the welfare of poor farmers and ensure the stability of the society and economy at large. Arya and Mishra (2015) posit that developing nations require inclusive finance to stimulate sustainable economic gain since the inclusive finance system caters to the financial needs of a larger populace. Additionally, Lal (2018) argues that inclusive finance can effectively perform its role as a cooperative financial mechanism to alleviate poverty in the economic system.

2.4 Research Status of China's Financial Inclusion and Urban-rural Income Gap

Foreign scholars generally agree that equity is a critical aspect of inclusive economic gain. Social and economic evolution should benefit all members of society and narrow the disparity between people, reducing or even eliminating inequality in social opportunities. According to the economic gain theory of Hungarian economist Janos Kornai, economic gain cannot continue indefinitely. When growth reaches a certain point, resources, technology, and systems become limiting factors, necessitating a transformation in the mode of economic gain. In light of the increasing income disparity and wealth inequality in countries around the world, the World Bank has researched inclusive growth and proposed sustainable growth strategies that take into account both sustained and coordinated growth. Other organizations and scholars have further interpreted inclusive growth. The United Nations Development Program (UNDP) believes that inclusive growth is both a result and a process. Jean-Pierre Lehmann proposed that inclusive growth should focus on participation and sharing, combining "equity", "sharing", "coordination", and "growth".

On the influence of traditional financial evolution on poverty alleviation in developing countries. Dollar and Kraay (2002) selected indicators such as GDP per capita and inflation rate to study the effects of financial evolution on poverty. They concluded that financial evolution can greatly promote economic gain and pro-poor policies, enabling poor people to increase their income share and improve their living standards. Geda and Alemayehu (2006) used panel data from Ethiopia to show that access to finance, by providing credit and other financial services, is an momentous factor in promoting stable consumption and reducing poverty. The use of financial products such as loans and savings accounts can improve income levels, increase output, and reduce poverty. Maurer and Haber (2007) point out that poor groups and small and medium-sized enterprises often lack access

to financial services, thus exacerbating the income disparity between the rich and poor in society. Large companies and wealthy individuals continue to occupy more financial services, leading to increasing income inequality.

Since 2005, the United Nations has advocated for the concept of "Inclusive Finance" in the promotion of microfinance. They define an "Inclusive Financial System" as one that can effectively and comprehensively provide services to all classes and groups in society. This has led to numerous studies on the impact of inclusive finance on the urban-rural earning disparity. However, academic outcomes from this research have been varied.

The expansion of financial services through inclusive finance in China is seen as a positive evolution that can potentially reduce the earning disparity between urban-rural residents. Liu and Bi (2019) suggest that inclusive finance can accelerate economic evolution in country areas, narrowing the distance between earning standards of urban-rural inhabitants. Inclusive finance aims to provide financial services to all classes and groups in society, with a particular emphasis on promoting financial inclusion (Zhang & Ren, 2017). By lowering the threshold of financial services, inclusive finance offers everyone the opportunity to access financial support (Jiao et al., 2015). Research by Corrado et al. (2017) and Dai-Won et al. (2018) supports the idea that inclusive finance can reduce poverty and narrow the urban-rural earning disparity by making financial loans more accessible for farmers and enabling them to invest in the agricultural economy, thus increasing their earning levels. As the income levels of rural households rise, they are gradually lifted out of poverty and the earning disparity between rural and urban residents is likely to diminish.

Sarma and Pais (2011) argue that inclusive finance, which refers to financial services that are available, effective, and convenient for all groups, can improve the availability of funds for low-income groups and alleviate poverty. Similarly, Sehrawat et al. (2016) found that inclusive finance contributes to poverty alleviation. In a study of developing countries in Asia, Park et al. (2018) discovered that inclusive finance has a significant promoting effect on poverty reduction. Furthermore, Park and Mercado (2015) analyzed the degree of financial inclusion in various countries and tested the influence of financial inclusion and other economic factors on poverty and earning inequality. They found that the evolution of inclusive finance has a positive effect on reducing poverty and narrowing the earning disparity. Finally, Chakravarty (2013) studied India's data and concluded that the evolution of inclusive finance can significantly reduce the urban-rural earning disparity.

The advent of the internet has the potential to enhance the evolution of inclusive finance, thereby bolstering its capacity to reduce the urban-rural earning disparity. Assuming other variables remain the same, higher digital finance penetration is associated with greater inclusivity in finance. By leveraging formal financial systems, cost-effective financial services can be extended to a larger customer base, resulting in a more expansive and effective platform for inclusive finance (Malady, 2016). Digital inclusive financial services can be optimized to bridge the disparity between urban-rural financial evolution, ultimately increasing the accessibility of financial resources in country areas.

After conducting empirical research on the influence of inclusive finance in different economic regions in China, scholars found that the evolution of financial institutions offering inclusive financial services to customers can effectively narrow the earning disparity between urban-rural populations (Sun & Lin, 2018). This perspective suggests that the

expansion of inclusive financial services can alleviate poverty and reduce the earning disparity between urban-rural residents (Zheng & Zhu, 2019). While some scholars have reached different conclusions, it is worth noting that many individuals in China are still excluded from traditional financial services despite the aim of inclusive finance to provide effective financial services to all members of society (He et al., 2020).

By the end of December 2020, over 1.1 billion individuals and 60.92 million enterprises and organizations had been registered in the credit information system of the People's Bank of China. However, despite these achievements, still around 300 million people remain outside of the personal credit system and many small and micro enterprises and individual businesses also remain unregistered. This unregistered population is primarily concentrated in country areas. This lack of access to the credit reporting system has resulted in significant economic gain for regions receiving inclusive financial services, while simultaneously exacerbating poverty in remote areas without access to these services (Li & Han, 2019).

The aforementioned situation can be attributed to the inadequate support system and a lack of appropriate technological resources during the implementation process of inclusive finance, as stated by He and Miao (2015). As a result, there exists a disparity in providing inclusive financial services to all customers, failing to achieve the goal of comprehensive inclusivity, as noted by Xue and He (2016).

2.5 Research Status of China's Digital Financial Inclusion and Urban-rural Income Gap

The emergence of digital technology in the financial sector presents tremendous opportunities for financial institutions to provide inclusive financial services to customers (Zhang et al., 2019). However, China's financial market has faced ongoing challenges due to a malfunctioning supervision and management control system (Liu, 2017). Fortunately, the evolution of digital technology has provided a promising solution to this dilemma (Fu, 2020). Wang (2015) has identified that digital finance has spurred the evolution of various businesses in the Chinese market, including online banking, third-party payment, online lending, digital insurance, online investment, and more.

The combination of finance and the Internet in China's financial system is being driven by financial repression. One major challenge to promoting inclusive finance in country areas is the lack of available information. However, digital technology has helped to alleviate problems caused by information asymmetry, high transaction costs, and mortgage constraints, making it easier to implement inclusive finance in these areas. Research by Barbesino et al. (2005) has shown that the Internet is a recognized business channel for European banks. In addition, big data-powered technologies are now promoting the thickening, downward extension, and "long tail" distribution of financial services. This has expanded the coverage of financial services and improved information exchange among different regions. The evolution of digital finance has made considerable achievements in fields such as payment, insurance, and credit. Furthermore, the Internet has broken down spatial barriers, reducing regional differences in the evolution of digital finance. This has helped to narrow the disparity between urban-rural areas, making it easier to achieve the goal of developing rural finance more accurately.

Although the integration of digital technology in the financial industry may entail advances in service delivery and technical support, it should primarily focus on the evolution and enhancement of internet-based financial ecosystems and the evolution of digital financial inclusion (Cheng & Zhang, 2019; Wei, 2019).

Digital inclusive finance plays a crucial role in promoting inclusive economic gain. According to Kapoor's (2013) research, digital finance can be a significant driver of economic gain. In a financial system that is not universally accessible, vulnerable groups may find it difficult to improve their abilities through education investments, and enterprises may struggle to grow through financing, leading to a widening income disparity that ultimately slows down economic gain. Manyika et al.'s (2016) study findings show that the evolution of digital inclusive finance can address the financing challenges of small enterprises and promote the economic gain of middle-earning countries. Case analysis by Siddik and Kabiraj (2020) further confirms the positive impact of digital finance on inclusive finance and inclusive growth. These findings highlight the importance of digital finance in promoting inclusive economic gain, especially in bridging gaps in access to financial services.

2.5.1 The Concept of Digital Financial Inclusion

The evolution of digital technology in China's financial institutions has been driven by the need to address financial exclusion (Li & Feng, 2020). Financial exclusion refers to the inability of certain groups within a region or community to access financial services or participate in the financial system (Tan et al., 2014). This phenomenon is not unique to China and is a global issue. Finance serves as a means to transfer value across time and space and to mitigate risks, thus improving the efficiency of resource allocation in society (Zhang et

al., 2006). However, the lack of financial support for certain groups can hinder the effective and equitable allocation of resources in society (Sui & Ma, 2011).

Financial exclusion is a phenomenon wherein certain individuals are unable to access financial services in a convenient and accessible manner. As per the research conducted by Demirg et al. (2009), this issue is prevalent globally. Inclusive finance is the solution to bridging the disparity created by unbalanced and insufficient financial evolution. One of the most successful pilots in this journey towards financial inclusion is the Grameen Bank, founded by the Nobel Peace Prize laureate Yunus. Some scholars define inclusive finance from the perspectives of usability, effectiveness, and penetration (Sarma, 2010). The reasons for financial exclusion include a lack of financial knowledge among low-income groups, voluntarily giving up financial services due to high costs, and financial institutions practicing exclusion due to risk prevention arising from a lack of credit information for low-income groups (Allen, 2016).

In China, addressing rural financial exclusion is imperative for the evolution of the rural economy. Financial exclusion in country areas impedes technological advancements, labor standards, and capital accumulation, ultimately widening the earning disparity between urban-rural communities (Liu et al., 2013). Traditional financial services remain expensive, feature high credit thresholds, and suffer from information asymmetries between customers and banks, leading to issues with moral hazard and adverse selection (Shi et al., 2017). Consequently, to mitigate these risks, lending institutions require collateral from loan customers, which limits access to financial support for many (Yao, 2005).

Moreover, conventional commercial banks require various forms of support such as physical branches, equipment, and personnel to facilitate their operations, all of which incur added costs (Yang & Zhang, 2021). This results in higher borrowing costs for these banks. Additionally, traditional commercial banks prioritize profit generation, and often direct their funding towards wealthy individuals and large corporations (Tan & Wang, 2010).

As urbanization rapidly accelerates in China, it becomes increasingly challenging for low-income individuals and small and medium-sized enterprises (SMEs) to access financial services, as acknowledged by Xu and Tian (2008). Tian (2011) further emphasized that the majority of such groups are situated in country areas, resulting in a phenomenon called "Rural Financial Exclusion" in China.

Therefore, the key element in achieving "Digital Financial Inclusion" is still finance, with inclusiveness being its inherent nature. "Digital" is merely a tool used to carry out the inclusive nature of finance (Huang & Huang, 2018). Furthermore, Ding (2015) emphasizes that the process of delivering digital financial services must be a sustainable evolution for financial intermediaries.

The concept of digital financial inclusion suggests that financial institutions are using advanced digital technology to provide inclusive financial services to their customers, which is essentially a combination of digital finance and financial inclusion. Alternatively, digital financial inclusion can be viewed as the inclusivization of digital finance or the digitization of inclusive finance (Li & Feng, 2020).

To begin, the implementation of traditional inclusive finance lacks a sound and perfect supporting mechanism, and it also lacks necessary technical support (Xu & Zhang, 2014). Inclusive finance has not been completely inclusive, and it has not achieved the

intended “all-round” effect. Therefore, applying digital technology to the evolution of financial institutions can improve the situation by offering inclusive financial services to customers (Su & Wei, 2017). By providing lending services through the internet, the implementation cost of inclusive finance can be reduced (Ma, 2018).

Digital technology can continuously improve China’s personal and corporate credit information system, which can further reduce the risk of information asymmetry (Zhang et al., 2017). Studies have shown that digital technology supports financial inclusion better than traditional finance (Zhang, 2019); this is mainly because digital finance is formed by applying advanced internet technology to the financial field. It is a supplement to traditional finance rather than a substitute (Zhang & Bai, 2018). The main task of digital finance is to provide more social groups with the opportunity to access financial services through the internet or high-tech means (Chen & Chen, 2018). In order to meet market requirements, digital finance needs to be inclusive. It can improve the efficiency of financial resource allocation through technical means, reduce the risk of information asymmetry, and accelerate the further evolution of the financial market (Cao et al., 2015).

2.5.2 The Relationship between Digital Financial Inclusion and Urban-rural Income Gap

At present, scholars have conducted extensive research and analysis on the relationship between digital financial inclusion and the urban-rural earning disparity in China. The relationship between the two can be empirically tested through various research tools. For instance, spatial measurement models such as those used by Wang and Chen (2020), Zhang and Tan (2018), and Li (2017), spatial panel models like those used by Wu et al. (2018), and Sun and Lin (2018) and spatial Dubin models like those applied by Qian and Sun (2019) can all test this relationship. Other methods include assessing the inclusive

economic gain effects (Tang et al., 2020; Ren & Li, 2019), the poverty reduction effect (Zheng & Zhang, 2021; Wang & Chen, 2020; Yao & Li, 2020; Lu & Zhang, 2017), the disequilibrium effect (Xiong & Chen, 2020), the earning distribution effect, and the threshold effect (Ma, 2020; Liu & Bi, 2019; Shao & Jin, 2016).

Furthermore, researchers can also use different macro and micro data to test the relationship between digital financial inclusion and the earning disparity. For example, the China Household Financial Survey Data (CHFS) used by Yang et al. (2020), and the China Family Tracking Survey (CFPS) used by Zhang et al. (2020), Gini coefficient, Chinese urban-rural inhabitants' earning standard, and the Peking University Digital Financial Inclusive Index developed by Guo et al. (2020) can all provide insight into this relationship. Overall, various research tools or statistical data research consequences display that digital financial inclusion can reduce the difference between the earning standards of urban-rural inhabitants in China.

The Digital Financial Inclusion Index, which is published by the Digital Finance Research Center at Peking University, currently stands as the only digital financial index of its kind available on the market. This study has identified three key dimensions that make up the index: coverage breadth, depth of use, and level of digitalization (Guo et al., 2020).

Research suggests that digital financial inclusion can play an momentous role in reducing the earning disparity between urban-rural areas. Specifically, studies have found that the coverage of digital financial services has the most significant impact (Zhang & Ren, 2017). Digital payment services, in particular, have been found to be effective in reducing the income disparity (Li & Han, 2019). Other financial services like insurance and investment have less impact on narrowing the disparity (Ren & Li, 2019). Furthermore, the

extent to which digital financial services are utilized can have different effects in different regions (Wang, 2020).

The impact of digital financial inclusion on the urban-rural earning disparity is a spatially-dependent phenomenon, as noted by Kong (2020). Compared to traditional financial inclusion methods, digital financial inclusion is more effective in narrowing the earning disparity between urban-rural populations, according to Yin and Hou (2017). The use of digital financial services has demonstrated a significant positive effect on reducing earning inequality. However, He (2020) suggests that the influence of digital financial inclusion varies across different regions in China. Jiao (2020) further points out that digital financial inclusion has a higher impact on country areas in eastern China, as opposed to central and western regions. While the implementation of digital financial inclusion has proven effective in reducing the earning disparity in the east, its effects in central and western regions are relatively less pronounced.

Several studies have demonstrated that digital finance combined with financial inclusion can bring benefits to users, providers, governments and economies, as discussed by Sutherland et al. (2018) and Ozili (2018). The advancement of digital financial inclusion not only fosters financial inclusivity but also drives inclusive economic gain, accelerates the dissemination of innovative technologies, and contributes to the evolution of the digital economy. Regarding its significance for "agriculture, country areas and farmers", the intrinsic inclusivity of digital finance encourages the growth of country financial markets, addresses the deficiencies of the rural financial system, reduces the costs of financial services, and solidifies the implementation of inclusive finance.

Overall, the advancement of digital information technology in financial institutions has enabled the provision of inclusive financial services, thus narrowing the earning disparity between urban-rural inhabitants in China. However, there are still some concerns that need to be addressed, as pointed out by Sun and Lin (2018). Firstly, there are significant regional disparities in the effects of digital financial inclusion implementation, with the eastern regions performing better than the central and western regions, and urban areas performing better than rural ones, as noted by Shen et al. (2019). Secondly, the level of education of inhabitants significantly affects the implementation of digital financial inclusion, with areas with high education standards achieving better results, according to Yang et al. (2021). Lastly, the implementation of digital financial inclusion is also influenced by the earning standard of inhabitants, with higher income levels resulting in better implementation results, as observed by Zheng et al. (2019).

2.5.3 The Specific Process of the Impact of Digital Financial Inclusion on the Urban-rural Income Gap

To begin with, it's worth noting that numerous studies have demonstrated that digital financial inclusion can effectively narrow the earning disparity between urban-rural residents. But how is this achieved, and what is the influence of digital financial inclusion on the earning disparity? Existing research examines this issue from multiple angles. Firstly, some studies have looked at the role of digital finance in promoting financial inclusion in country areas. Through the use of digital technologies such as mobile payments and online banking services, people living in country areas have greater access to financial services, which can help to reduce the earning disparity. Secondly, other studies have explored the role of digital finance in promoting small and micro-enterprises in country areas. By providing financial services such as credit and financing to these enterprises, digital finance

can stimulate economic gain in underdeveloped regions and reduce the earning disparity. Thirdly, there is research that highlights the impact of digital finance on the evolution of rural infrastructure. By providing online access to financial services and digital payment solutions, digital finance can stimulate the evolution of rural internet infrastructure and enhance the level of digital literacy among local residents.

Finally, some studies have also examined the impact of digital finance on the overall level of economic evolution in country areas. By promoting access to financial services, digital finance can provide country residents with the means to invest in their businesses and improve their standard of living, thus narrowing the earning disparity between urban-rural residents. Overall, it's momentous to note that the impact of digital financial inclusion on the income disparity is highly contextual and time-sensitive. While digital finance has the potential to promote financial inclusion and reduce the income disparity, there are also challenges to implementing these initiatives effectively. Addressing challenges such as limited digital literacy, inadequate infrastructure, and regulatory barriers is crucial to ensuring the success of digital financial inclusion initiatives in reducing the earning disparity between urban-rural residents.

To start with, it is momentous to note that digital financial inclusion is a valuable tool for alleviating some of the financial difficulties faced by small and medium enterprises, micro enterprises, and farmers. According to Liu et al. (2017), it offers them access to credit support that they would otherwise have difficulty obtaining. However, Zheng and Huang (2021) suggest that such financing difficulties have long hindered the successful evolution of China's market economy. Moreover, Zhang (2020) highlights an momentous issue with traditional financial institutions, which impose strict restrictions on loan customers due to high credit thresholds and service costs. As a result, many small, medium, and micro

enterprises and individual farmers are left without viable options for obtaining financial support from formal channels (Song, 2021). Additionally, it is worth noting that many farmers may lack their own personal credit records within the Credit Information Center of the People's Bank of China. In summary, digital financial inclusion can serve as a solution for financial hardship faced by these smaller businesses and farmers, by providing them with access to credit support. However, traditional financial institutions continue to impose challenges on the adoption of digital finance, leading to a lack of reliable financial support for those who need it. Such challenges must be addressed to ensure that digital finance can effectively contribute to the broader goal of reducing income inequality between urban-rural areas.

Digital financial inclusion refers to the use of advanced internet and blockchain technology to provide financial services to small, medium, and micro enterprises through online banking, approval, and other modes (Yang & Zhang, 2021). This technology has significantly improved the efficiency of online business processing while reducing the cost of financial services for institutions (Le et al., 2021). As of 2020, inclusive loans for small and micro enterprises in China have reached an equilibrium of 15.1 trillion Yuan, which represents an increase of 30% year-on-year. Additionally, credit support was provided to a total of 32.28 million business entities in 2020, which represents an increase of 5.24 million from 2019.

Secondly, digital financial inclusion can contribute to job creation in country areas (Zhang & Huang, 2021). According to the aforementioned studies, financial institutions utilizing advanced digital information technology to offer inclusive financial services to customers can provide credit funds support to small, medium and micro enterprises as well as farmers (Liu et al., 2017). This financial support can provide more opportunities for

enterprise production and operation, allowing for more projects to be carried out smoothly. Additionally, individual farmers or families can also initiate their own business plans with this support (He & Li, 2019). As a result, these efforts have provided more employment opportunities and positions within surrounding areas. Especially since the COVID-19 pandemic, many traditional physical industries have suffered significant impacts (Wu & Zhu, 2021). However, the usage of advanced digital information technology to offer inclusive financial services has helped to alleviate this situation. Furthermore, it has also accelerated the transformation and upgrading of these enterprises, facilitating their evolution of online businesses (Zhang & Chi, 2018).

Thirdly, the utilization of advanced digital information technology by financial institutions for providing inclusive financial services to customers can enhance the consumption standards of the population (Han & Zhao, 2021). Consumption is a crucial impetus for the growth of the rural economy (Bi, 2021). Apart from the channeling of credit funds towards small and micro enterprises as well as farmers, the provision of digital financial inclusion can also foster the consumption patterns of the inhabitants (Zhang et al., 2020).

The evolution of the financial market has the potential to enhance the efficiency of capital allocation, stimulate economic gain, and boost consumers' purchasing power. Consequently, this can lead to further improvements in the efficiency of capital allocation. As the consumption level of residents is positively correlated with credit availability and inversely associated with income disparity, it is crucial to address credit constraints and foster the growth of consumer finance in order to narrow the earning disparity and elevate residents' standard of living. According to Germana and Luisa (2017), inclusive finance has

the ability to facilitate long-term investment and consumption decisions for individuals by providing them with access to individual credit.

In China, there are various traditional financial institutions and internet lending platforms that offer consumer loans (Tang, 2020). These loans are used for daily consumption, travel, decoration, study abroad, car purchases, and even in the real estate market. Most of these loans are short-term, while some are long-term, aimed at improving the competitiveness of rural finance and increasing farmers' earnings. The use of advanced digital information technology by financial institutions to provide inclusive financial services to customers can increase the likelihood of inhabitants obtaining consumer loans (He, 2020). This could lead to increased spending power amongst individuals, thus boosting the economic gain of country areas (Gao, 2021).

Fourthly, the adoption of advanced digital information technology by financial institutions has enabled them to provide inclusive financial services to customers residing in country areas, thereby enhancing the financial literacy of country inhabitants (Yang et al., 2021). In comparison to economically developed regions, the education levels of individuals in country areas in China tend to be relatively lower. Moreover, owing to the influence of traditional Chinese feudal culture, the financial awareness of country inhabitants in China is largely underdeveloped (Guo et al., 2020).

Digital financial inclusion has revolutionized the way in which low-earning groups access financial services through the internet. As stated by Fu and Huang (2018), this has enabled them to embrace new financial ideas and participate in China's evolving financial market. Chen and Ren (2020) further elaborate on the significance of this evolution, emphasizing that the provision of financial services facilitated through digital platforms has moved beyond traditional banking structures and has opened up opportunities for

underserved communities to access financial resources. Moreover, the accessibility of financial services through digital platforms has not only provided access to financial resources but has also fostered financial literacy among low-earning groups, as highlighted by Cai et al. (2021), who suggest that the process of obtaining financial services has allowed them to acquire the latest financial culture knowledge. This has resulted in the formation of personal and family financial management plans, where individuals are no longer just saving but are actively strategizing to optimize the potential of their resources (Zhou & Chen, 2021).

Many scholars have conducted research on the relationship between digital financial inclusion and urban-rural income disparity, yielding fruitful results. In the realm of research on the impact of digital financial inclusion on urban-rural income disparity, foreign studies predominantly draw on the experiences of developing countries. These empirical studies consistently indicate that inclusive finance helps narrow the urban-rural income disparity, improves the living standards of rural residents, and has significant poverty reduction effects (Burgess, 2005).

In the area of measuring the development level of digital financial inclusion, some scholars propose using indicators such as the network of regional bank branches (Beck, 2007). Others construct inclusive finance indices based on dimensions like service coverage, transaction convenience, and transaction costs (Arora, 2010). Additionally, there are indices based on the penetration of financial institutions, the accessibility of financial services, and the adaptability of financial institutions (Sarma, 2011).

Regarding mitigating the effects of financial exclusion, based on traditional considerations of the trade-off between financial returns and costs, financial institutions may proactively withdraw from remote areas such as rural regions. Simultaneously, due to the asymmetric information between urban and rural areas, financial resource allocation tends

to favor diversified and higher-yielding development in urban areas, gradually leading to financial exclusion in remote areas such as rural regions (Jack, 2014). Credit constraints and uneven development are crucial factors influencing the urban-rural income disparity (Ehrlich & Seidel, 2015). Inclusive finance mainly focuses on promoting economic growth through the development breadth of financial intermediaries, which, in turn, contributes to the convergence of urban-rural income disparities (Augustin, 2017).

Beck et al. (2007) suggest that inclusive finance development can narrow urban-rural income disparities. Chakravarty (2013), and Challa and Bala (2013) conduct tests using inclusive finance data from India and find that the development of inclusive finance in India significantly converges urban-rural income disparities. In-depth studies reveal that the accessibility and service thresholds of inclusive finance are key factors determining whether it can reduce urban-rural income disparities. Arun and Kamath (2015) argue that the fundamental reason for the lack of clear effects in developing countries is the low per capita income level not reaching a threshold.

The use of digital technology reduces the costs of inclusive finance, enhances information flow (Peterson, 2018), and brings more development opportunities for inclusive finance (Sutherland & Jarrahi, 2018).

2.5.4 What Factors Hinder the Reduction of the Urban-rural Income Gap Caused by Digital Financial Inclusion?

In the aforementioned study, we found that digital financial inclusion can contribute to increasing financial literacy and supporting small, medium, and micro enterprises as well as individual farmers. Additionally, it can create employment opportunities and improve consumption to a certain extent. Nevertheless, the evolution of the financial market is intricate and dynamic, and the implementation of cutting-edge digital technology also entails

opportunities and challenges. Therefore, we must ask ourselves: has digital finance truly achieved inclusivity? If not, what barriers are obstructing the effectiveness of digital financial inclusion in narrowing the earning disparity between urban-rural dwellers?

To start with, it is worth noting that financial exclusion has been a longstanding issue in China (Wang & Xiong, 2020). The insufficient access to financial services in country areas cannot be solely attributed to traditional financial institutions or inclusive finance initiatives. Rather, it is often the case that low-income groups in these regions lack the necessary education, financial literacy, and access to internet technology to support their economic gain (He et al., 2017). Unfortunately, the lack of adequate education and internet infrastructure creates a vicious cycle that limits their earning potential and perpetuates their exclusion from mainstream financial systems.

Based on China's unique national context, it is crucial for the country to balance rapid economic gain with a reasonable economic structure (Li et al., 2018). To achieve this, it is essential for China's market economy to have adequate financial support (Gong & Song, 2021). However, this support must be properly calibrated to avoid excessive stimulus. Additionally, it is essential for China's economy to maintain a focus on the real economy over the long term.

In light of these factors, the evolution of digital financial inclusion in China is being impeded (Li & Liu, 2011). The allocation of funds to groups with higher incomes and education levels may widen the earning disparity income disparity between urban-rural residents (Liang & Liu, 2018).

Secondly, the disparity in the evolution of China's financial institutions among different regions is striking. Despite the use of advanced digital information technology to provide inclusive financial services, research (Ge & Zhu, 2018) has shown that more funds still flow towards high-earning groups. While evolving financial institutions are expected to continue the traditional financial evolution, this spatial clustering effect could leave low-earning groups without financial support (Guo et al., 2017), leading to a widening disparity between urban-rural earners.

In the aforementioned study on the correlation between digital financial inclusion and the urban-rural earning disparity, it was found that the adoption of advanced digital financial services by financial institutions in China is constrained by regional economic differences (Xiang & Liu, 2020). Dayal-Gulati and Husain (2002) have previously demonstrated that regional disparities in financial evolution have a significant influence on economic evolution gaps. In terms of the influence of financial evolution on the earning disparity between urban-rural areas, there are distinct regional variations. For instance, rural financial evolution in the eastern and middle regions has been shown to increase farmers' income, while in the western regions it actually decreases. In this respect, the adoption of advanced digital financial services by financial institutions in the eastern region could more effectively elevate the earning standard of country inhabitants, while the opposite is true for the central and western regions, where it has not contributed to a meaningful improvement in rural incomes and in fact, may even have a negative correlation (Li, 2017).

Thirdly, China's developing countryside faces a significant challenge in the complex and ever-changing financial market, which is characterized by numerous risks (Xie & Xue, 2021). The evolution of financial institutions that employ advanced digital information

technology to provide inclusive financial services to customers in China is also fraught with risks. Market risk, credit risk, operational risk, and reputation risk, as well as policy risks, are some of the risks faced by financial markets (Huang & Zhang, 2020). It is worth mentioning that digital financial inclusion is not immune to these risks and must deal with them like traditional finance (Li & Zhang, 2020).

In regards to market risk, it is momentous to note that any fluctuations in the prices of submarkets or financial products can have a significant influence on the progress of digital financial inclusion. This can include variations in interest rates (Pei & Zhao, 2021), exchange rates (Chen, 2021), stocks (Wu et al., 2020) and commodity prices (Zhong et al., 2020). Such changes, especially in country areas, have the potential to cause losses for enterprises and financial institutions. Therefore, it is momentous to stay vigilant and implement strategies to manage and mitigate these risks.

When it comes to credit risk, digital inclusive financial services can be more susceptible to online risks. China's credit investigation system is currently facing significant disparities and information security concerns (Sun & Li, 2017). Financial institutions are not adequately tracking customers post-loan disbursement, leading to some customers investing funds in high-risk stock markets. Furthermore, online lending platforms have relatively high loan interest rates and a loose review process, which significantly increases the risk of customer default (Tian et al., 2021). Thus, there is a pressing need for financial institutions and regulators to collaborate and develop effective risk management strategies to mitigate potential risks and promote a sustainable and stable evolution of digital finance.

Regarding operational risk, it mainly relates to internet operational risk. The reliance of financial institutions on cutting-edge digital information technology to deliver comprehensive financial services to consumers is tightly bound to digital technology (He, 2020). Ensuring the safety of digital technology has always been a major concern. In the event of technical issues or malfunctions, financial institutions may bear losses (Wang, 2019).

In relation to reputation risk, financial institutions may receive negative feedback due to inadequate management practices, which can lead to financial panics such as "runs on the bank" (Wang, 2021). This risk becomes even more pronounced in the context of digital financial services, where financial institutions use advanced information technology to offer inclusive financial services to customers. Recognizing this challenge, the China Banking and Insurance Regulatory Commission recently issued "Measures for the Management of the Reputational Risk of Banking and Insurance Institutions (for Trial Implementation)" in February 2021. These measures aim to address the reputational risks associated with digital financial services and provide a framework for financial institutions to manage and mitigate these risks. By implementing effective risk management strategies, financial institutions can promote the healthy evolution of digital finance and offer more reliable and secure services to their customers.

When it comes to policy risks, new policies introduced by market supervision and management departments can cause market volatility and pose risks to financial institutions and customers (Chen & Mao, 2020). For instance, in November 2020, Ant Financial Services Group was set to go public on the Chinese A-share market and the Hong Kong stock market but was ordered by regulatory authorities to make rectifications as it did not meet the listing

regulatory requirements, leading to the suspension of its listing. Meanwhile, the China Banking and Insurance Regulatory Commission, together with the People's Bank of China and other relevant departments, drafted and issued the Interim Measures for the Management of Online Small Loans (Draft for Comment) in the same period (Chen & Wu, 2021).

In the process of financial institution's evolution towards offering inclusive financial services using advanced digital information technology, it is vital to mitigate potential risks. Proper risk assessment and prediction at each stage of the plan's implementation is necessary to ensure the smooth functioning of such services in China's financial market (Hu & Zhao, 2020).

Fourth, in order for digital financial inclusion to be effective, clients must have a certain level of digital technology and capabilities (Fu, 2020). Unlike traditional financial inclusion, digital financial inclusion relies heavily on digital technology. This means that low-earning groups, such as small and micro enterprises, as well as farmers, who want to benefit from digital financial inclusion services, must first have access to digital technology (Cao et al., 2015). As an example, a farmer looking to obtain financial support through digital financial inclusion must have a smartphone or computer, and must also be able to operate digital devices proficiently (Cai et al., 2021). Unfortunately, many low-income groups lack the necessary digital equipment and knowledge, which hinders their ability to access financial services (Yao, 2013). In fact, the evolution of financial institutions using advanced digital technology to offer inclusive financial services may widen the existing earning disparity between urban and rural populations due to unequal access to digital technology.

In summary, scholars have examined four key factors that may hinder digital financial inclusion's potential to reduce the earning disparity between urban-rural populations. However, it is essential to investigate the precise impact of digital financial inclusion on the earning disparity and determine how to accurately measure and analyze it. Furthermore, it is vital to identify which dimensions of digital financial inclusion have a positive or negative influence on the earning disparity between urban-rural residents. This thesis acknowledges the importance of addressing these issues and aims to provide solutions to bridge the urban-rural earning disparity through digital financial inclusion.

2.6 Chapter Summary

This chapter explores the interplay between China's financial market, inclusive financial market, digital inclusive financial market, and the disparity in earnings between urban-rural residents. Various scholarly perspectives are presented regarding the concept, evolution, and evolution of financial institutions utilizing advanced digital technology to provide inclusive financial services to customers. Additionally, this chapter delves into the mechanisms through which digital financial inclusion can impact the disparity in earnings between urban-rural residents. Moreover, it analyzes the factors that impede the convergence of this disparity despite financial institutions leveraging advanced digital technology to offer inclusive financial services to customers.

Researchers have been examining the influence of digital financial inclusion on the earning disparity between urban-rural residents from various perspectives. Some researchers have conducted empirical studies using a variety of methods such as spatial econometric models, poverty reduction effects, and panel models. Results indicate that digital financial inclusion can accelerate economic evolution in China, but the benefits are mainly concentrated in urban areas. Rural financial evolution has been hindered by outdated

thinking and technological conditions in China's country areas. Consequently, digital financial inclusion may further widen the earning disparity between urban-rural residents instead of narrowing it.

Secondly, several scholars have delved into the evolution of digital financial inclusion across various regions. They have analyzed the progress of digital inclusion in specific provinces and compared the evolution of digital inclusion in the eastern, central, and western districts. However, the slow evolution of technology in underdeveloped districts has hindered the progress of financial institutions in providing advanced digital financial services to consumers. It is momentous to note that economic and financial evolution are intertwined, and the evolution of one sector is essential to drive the progress of the other.

Thirdly, there is a wealth of data available for scholars to use in their studies. This includes cross-sectional data, panel data, macro data, and micro data. Micro-data can be obtained either through second-hand data from authoritative institutions or by conducting original research. Scholars can choose different data types and periods to enhance their research.

How does digital financial inclusion affect the urban-rural earning disparity in China? Does each aspect of digital financial inclusion contribute to reducing the disparity between urban-rural inhabitants' earning standards? Is the overall impact positive or negative, and to what extent? While many researchers have addressed these questions, are the latest findings consistent with earlier studies? Furthermore, what is the situation in each province of China? These unanswered questions show a significant disparity in the existing literature, and this study aims to fill it.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter focuses on the methodology used in the research. First, the research methods and types are identified. This study employs a quantitative research approach. Second, the relevant data is determined, and methods for data collection are chosen. Variable definitions are established, including dependent variables, independent variables, and control variables. A model for empirical research is designed, and an appropriate analysis tool for this research is selected. Finally, the three hypotheses of this study are tested through empirical research.

3.2 Research Design

The research design encompasses the comprehensive structure of the thesis' content, including its research purpose, methodology, and type. The primary aim of this study is to examine how digital financial inclusion can impact the earning disparity between urban-rural residents in China. The study intends to explore the potential of digital finance in narrowing the income divide, which has been a persistent issue affecting the livelihoods of millions of rural dwellers.

This research adopts digital financial research center at the university of Beijing, China digital inclusive financial index, to study the count of different dimensions of inclusive financial index to the influence degree of the earning disparity in China. In the meantime, according to the consequences of the study comes up to reduce the urban areas

and country areas of China's earning disparity of inhabitants related countermeasure and the suggestion.

There are seven specific objectives.

i. To determine the influence of digital financial inclusion on the urban-rural income disparity.

ii. To determine the influence of the coverage of digital financial inclusion on the urban-rural income disparity.

Financial inclusion is commonly measured by the count of individuals who have access to financial institutions and bank accounts or those who have linked their bank accounts to third-party payment platforms such as Alipay. This can be evaluated through account coverage indicators such as the proportion of Alipay users who have linked their accounts to bank cards and the average number of bank cards linked to Alipay accounts per 10,000 people. To determine the influence of inclusive financial coverage on reducing the earning disparity between urban-rural areas, indicators such as the Gini coefficient or Theil index can be used to calculate the difference between the earnings of residents in different regions.

iii. To analyse the influence of the depth of use of digital financial inclusion on the urban-rural income disparity.

The level of digital financial inclusion refers to the range of financial services accessed by account holders, including payment, credit, insurance, money market funds, and other related investment services. This is determined by the count of transactions conducted through the account and the specific amount or frequency of transactions per account or

individual. By measuring the depth of digital financial inclusion in this way, it becomes possible to gauge its impact in reducing the earning disparity between urban-rural populations.

iv. To scrutinize the influence of digitalization degree of digital financial inclusion on urban-rural income disparity.

The degree of digitalization in digital financial inclusion refers to the extent to which various account-related transactions can be conveniently, inexpensively, and efficiently executed. The level of digitalization can be measured based on several indicators such as the frequency of mobile payments, loan usage, QR code payments, and advance investment and consumption. These indicators can help us assess how digital financial inclusion impacts the earning disparity between urban-rural residents. By analyzing these indicators, we can set specific targets to enhance the level of digital financial inclusion and reduce the earning disparity between urban-rural areas.

v. To scrutinize the influence of payment index of digitalization degree of digital financial inclusion on urban-rural income disparity.

vi. To scrutinize the influence of insurance index of digitalization degree of digital financial inclusion on urban-rural income disparity.

vii. To scrutinize the influence of credit index of digitalization degree of digital financial inclusion on urban-rural income disparity.

Figure 3.1 represents the conceptual framework of this research. First of all, as a first-standard target, the digital financial inclusion index has an influence on the earning disparity between urban-ruralside areas. Second, the three secondary targets which are the coverage of digital financial inclusion, the depth of use and the degree of digitalization contained in

the digital financial inclusion index, are expected to have a negative influence on the earning disparity between urban-ruralside areas. Thirdly, the digitalization degree index of digital financial inclusion is divided into three three-horizontal indexes, namely digital payment standard, digital insurance horizontal, and digital credit standard. They also have a adverse influence on the earning disparity between urban-rural areas. It is worth noting that the inflation rate affects the authenticity of earning standard in both city and countryside areas. Therefore, in this research, the earning data of town and countryside areas firstly eliminate the inflation rate to ensure the authenticity of earning standard.

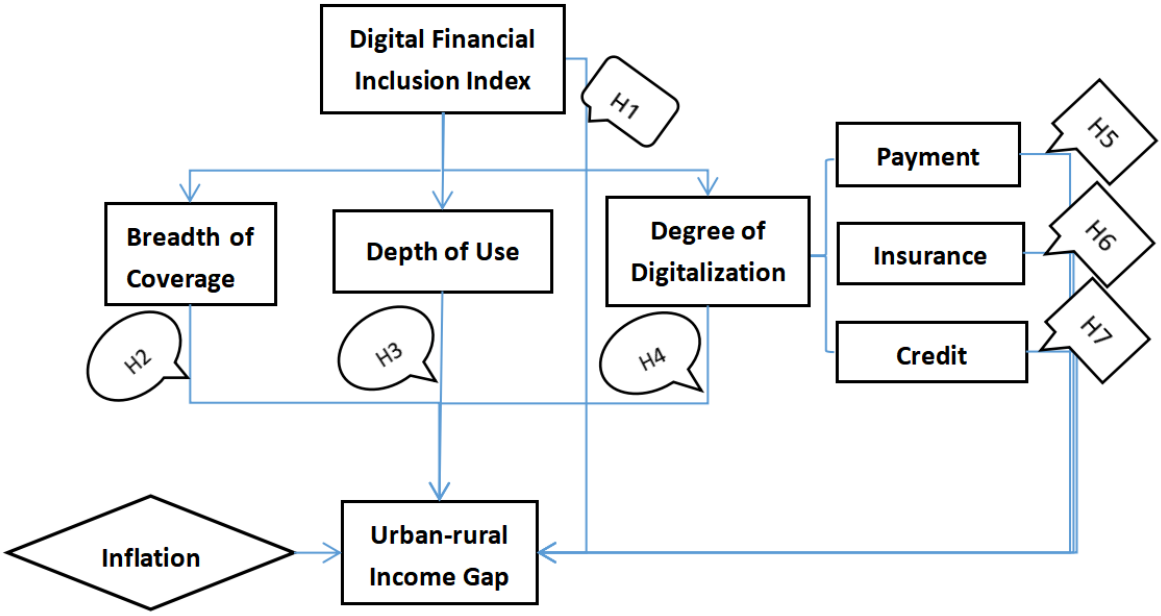

Figure 3.1: Conceptual Framework

3.3 Research Hypotheses

According to the Digital Financial Inclusive Index published by the Peking University Digital Finance Center, this research will study the impact of digital financial inclusion on the distance between the earning standard of urban inhabitants and country inhabitants from the seven dimensions of digital financial inclusion, depth of use, and digitization.

H1: The total index of digital financial inclusion has a negative influence on the urban-rural income disparity in China.

H2: The coverage of digital financial inclusion has a negative effect on the income disparity between urban-rural areas in China.

H3: The depth of use of digital financial inclusion has a negative influence on the income disparity between urban-rural areas in China.

H4: The digitalization degree of digital financial inclusion has a negative effect on the income disparity between urban-rural areas in China.

H5: The payment index of digitalization degree of digital financial inclusion has a negative effect on narrowing the urban-rural income disparity in China.

H6: The digitalization degree of digital financial inclusion insurance index has a negative influence on narrowing the urban-rural income disparity in China.

H7: The digitalization degree credit index of digital financial inclusion has a negative effect on narrowing the urban-rural income disparity in China.

3.3.1 Research Approach

This study utilizes a quantitative research approach, which involves mathematical and empirical investigation. Within this chapter, the variables are defined and data collection and analysis tools are identified. Additionally, the chapter outlines the model building, data processing, and empirical analysis that will be conducted in Chapter 4. The aim of this analysis is to determine the direction and strength of the influence of the coverage breadth,

usage depth, and digitization degree of digital financial inclusion on the income disparity between urban-rural inhabitants.

3.3.2 Type of Study

Compared to the causal study, this thesis places more emphasis on the analysis of correlation. Specifically, it examines the correlation between independent and dependent variables, such as the strength and direction of the correlation. This study empirically investigates the impact of digital financial inclusion on the earning disparity between urban-rural areas in China, focusing on the breadth and depth of coverage, as well as the level of digitization. The research assumes that there is a negative correlation between the seven indicators of digital financial inclusion and the earning disparity. The upcoming empirical chapter will provide further evidence of this correlation and its degree of impact.

3.4 Variable Definition and Data Selection

The aim of this study is to examine the disparity in earnings between urban-rural areas. In order to measure this disparity, there are two main types of indicators used in existing literature. The first category comprises static indicators such as urban per capita disposable income, rural per capita disposable earning, Gini coefficient, and Lorenz curve, which do not take into account the mobility of people between urban-rural areas. The second category includes indicators that consider the proportion of urban and rural populations, such as the Theil index and the structure relative coefficient.

Per capita disposable income ratio for urban and rural residents does not account for the population distribution between urban and rural areas. It is a static indicator that cannot reflect the population's mobility between urban and rural areas. The Gini coefficient measures overall income inequality and is more sensitive to income changes in the middle

class. However, as the main focus of urban-rural income disparity lies at the two extremes, the Gini coefficient may not effectively reflect this disparity. The Theil index, on the other hand, is sensitive to income changes at both ends of the spectrum, making it suitable for measuring urban-rural income disparity in China. Therefore, this study chooses the Theil index to assess the urban-rural income disparity. A smaller Theil index suggests smaller differences, while a larger index indicates greater disparities. Many scholars studying the income disparity between urban and rural residents use the Theil index to measure income inequality (Li et al., 2020; Wang & Ou, 2007). However, due to the difference of price fluctuation between urban-rural areas, this thesis will first eliminate the influence of inflation on urban inhabitants' earning, country inhabitants' earning and total earning. The Thiel index is the difference between the real earning levels of urban and countryside inhabitants. Inflation is measured by changes in the consumer price index (CPI). The earning disparity between urban-rural inhabitants is calculated as follows.

$$P_{i,t} = p\left(1 - CPI_{i,t}\right) \qquad \text{Equation 3.1}$$

$$\mathrm{GAP}_{i,t} = \left(\frac{\mathrm{P_{1t}}}{\mathrm{P_t}}\right)\ln\left(\frac{\frac{\mathrm{P_{1t}}}{\mathrm{P_t}}}{\frac{\mathrm{Z_{1t}}}{\mathrm{Z_t}}}\right) + \left(\frac{\mathrm{P_{2t}}}{\mathrm{P_t}}\right)\ln\left(\frac{\frac{\mathrm{P_{2t}}}{\mathrm{P_t}}}{\frac{\mathrm{Z_{2t}}}{\mathrm{Z_t}}}\right) \qquad \text{Equation 3.2}$$

Among them, GAP stands for urban-rural earning disparity. i=1 is urban, i=2 is rural, P is real earning, p is nominal earning, Z is population, t is time, CPI is inflation rate. Therefore, P_{1t} is the earning standard of urban inhabitants in period t, and Z_{1t} is the population of the town in period t. P_{2t} is the earning standard of country inhabitants in period t, and Z_{2t} is the population of country inhabitants in period t. P_t is the total earning standard of national inhabitants in period t, and Z_t is the total population of the countryside in period t.

Table 3.1 presents China's inflation rates from 2010 to 2020, which are categorized as national, urban, and rural rates. The data highlights a high inflation rate for China in 2010 and 2011, where the inflation rate exceeded 5%, with country areas reaching an alarming 5.8%. Throughout the 11-year period, the inflation rate in urban-rural areas saw fluctuations, with country areas sometimes experiencing higher rates than urban areas and vice versa. In 2018, inflation rates were equal across both areas. Consequently, to better analyze and compare actual earning levels between urban-rural inhabitants, this study excludes inflation rates for urban, rural, and national inhabitants, which is advantageous for a more accurate analysis.

Table 3.1: China's National, Urban and Rural Inflation Rates, 2010-2020

Year	The National Inflation Rate (%)	Urban Inflation Rate (%)	Rural Inflation Rate (%)
2010	3.3	3.2	3.6
2011	5.4	5.3	5.8
2012	2.6	2.7	2.5
2013	2.6	2.6	2.8
2014	2.0	2.1	1.8
2015	1.4	1.5	1.3
2016	2.0	2.1	1.9
2017	1.6	1.7	1.3
2018	2.1	2.1	2.1
2019	2.9	2.8	3.2
2020	2.5	2.3	3.0

Source: China Statistical Yearbook (2021).

In this study, the independent variables include the total index of digital financial inclusion, as well as the coverage breadth, use depth, and digitization degree of digital financial inclusion. Additionally, we consider the digital payment index standard, digital insurance index standard, and digital credit index standard. To measure these variables, we adopt Peking University's Digital Financial Inclusion Index, as outlined in Table 3.2 (Guo et al., 2021; Li et al., 2020; Zhang et al., 2019).

Table 3.2: Index System of Digital Financial Inclusion

Level 1 Dimension	The Secondary Dimension		Specific Indicators
Coverage Breadth	Account Coverage Ratio		Number of Alipay Accounts Per 10,000 People
			Proportion of Alipay Users Bound to Bank Account
			Average Number of Bank Cards Bound to Each Alipay Account
Usage Depth	Payment Transactions		Number of Payments Per Person
			Amount Paid Per Person
			High Frequency (Active 50 Times or More Per Year) Ratio of Active Users to Active 1 Time or More Per Year
	Money Fund Services		The Number of Yu 'ebao Pens Per Capita
			Per Capita Purchase of Yu 'ebao
			The Number of People who Buy Yu 'ebao Per 10,000 Alipay Users
	Credit Services	Personal Consumption Loan	The Number of Internet Consumer Loan Users in Every Ten Thousand Alipay Adult Users
			Loans Per Capita
			Per Capita Loan Amount
		Small and Micro Business Operator	Every Ten Thousand Alipay Adult Users have the Number of Users of the Internet Small and Micro Business Loans
			Average Number of Loans for Small and Micro Business Owners
			Average Loan Amount of Small and Micro Business Operators
	Insurance Services		The Number of Insured Users Per 10,000 Alipay Users
			Number of Insurances Per Capita
			Insurance Amount Per Person
	Investment Services		The Number of Alipay Users Participating in Internet Investment and Financial Management Per 10,000 People
			Number of Investments Per Capita
			Per Capita Investment
	Credit Services		Number of Calls Per Person of Natural Person Credit

Table 3.2 continued

		Number of Users Using Credit-based Services (Including Finance, Accommodation, Travel, Social Networking, etc.) Per 10,000 Alipay Users
Degree of Digitalization	Mobile Informatization	Proportion of Mobile Payments
		Proportion of Mobile Payment Amount
	Affordable	Average Loan Interest Rate for Small and Micro Operators
		Average Personal Loan Interest Rate
	Creditization	Proportion of Huabei Payments
		Proportion of Huabei's Payment Amount
		Proportion of the Number of Sesame Credit Free Deposits (Compared to All Cases Where a Deposit is Required)
		Percentage of Sesame Credit Free Deposit (Compared to All Cases Where Deposit is Required)
	Facilitation	Percentage of User QR Code Payment
		The Proportion of the Amount Paid by the User's QR Code

Source: Guo et al. (2020).

The Digital Financial Inclusion Index from Peking University is currently the most detailed indicator system in China for measuring the level of development in digital inclusive finance. It is divided into three dimensions, comprising a total of seven indicators. They are:the totel index, coverage, depth of use, digitalization degree, digital payment index standard, digital insurance index standard, and digital credit index standard. These seven index dimensions are the independent variables of the empirical research in this study.

Based on our analysis and calculations, we were able to obtain the independent variable data for this study - specifically, the Digital Financial Inclusion Index from Peking University. Table 3.3 displays the relevant data for the year 2020.

Table 3.3: Peking University Digital Financial Inclusion Index (2020) (Excerpt)

Province	Index Aggregate	Coverage Breadth	Usage Depth	Digitization Level
Beijing	417.88	397.00	445.83	436.02
Tianjin	361.46	340.29	373.91	408.74
Hebei	322.70	304.10	318.42	391.92
Shanxi	325.73	327.29	291.37	383.04
Inner Mongolia	309.39	310.40	275.66	367.40
Liaoning	326.29	307.11	328.12	386.33
Jilin	308.26	290.78	297.63	385.29
Heilongjiang	306.08	290.48	293.69	380.09
Shanghai	431.93	395.20	488.68	450.08
Jiangsu	381.61	362.11	395.01	421.70
Zhejiang	406.88	382.07	439.25	429.98
Anhui	350.16	323.75	366.15	408.38
Fujian	380.13	359.21	401.80	409.82
Jiangxi	340.61	316.14	353.23	398.52
Shandong	347.81	331.66	343.49	409.00
Henan	340.81	331.16	321.21	408.32
Hubei	358.64	336.54	369.58	411.73
Hunan	332.03	302.28	347.44	402.30
Guangdong	379.53	356.94	404.35	409.06
Guangxi	325.17	311.98	313.24	390.41
Hainan	344.05	335.87	337.24	383.46
Chongqing	344.76	329.39	343.91	397.12

Table 3.3 continued

Sichuan	334.82	310.76	344.86	396.05
Guizhou	307.94	313.24	258.20	380.81
Yunnan	318.48	302.46	309.45	387.78
Tibet	310.53	290.18	319.38	361.67
Shanxi	342.04	329.53	331.73	402.11
Gansu	305.50	308.87	265.35	367.36
Qinghai	298.23	292.06	264.67	379.58
Ningxia	310.02	320.45	262.72	361.52
Xinjiang	308.35	310.22	273.85	364.88

Source: Peking University Digital Financial Inclusion Index (PKU-DFIIC), 2011-2020.

According to the objectives of this study and considering the focus of previous scholars' research, five appropriate control variables have been selected for this research (Zhang et al., 2019; Li et al., 2020; Tang et al., 2020; Sun et al., 2020). One such variable is education, which has a significant influence on earning potential. Research has shown that higher levels of education are associated with higher incomes, indicating a positive correlation between education and earning standards. However, country areas in China often lack educational resources, leading to a discrepancy in educational attainment between urban and rural populations. Urban areas have more access to educational hardware and software, which has widened the education disparity and perpetuated the earning disparity between urban-rural populations. As a result, measuring the standard of education of local inhabitants is crucial to understanding the income disparity. In this study, the average number of higher education students per 100,000 population is used as a proxy for the education standard in a given region.

Secondly, the level of financial support provided to the agricultural sector has a significant impact on the earning disparity between urban-rural populations. By allocating a higher percentage of the national fiscal expenditure towards rural economic evolution, the pace of progress in the agricultural sector can increase, leading to a narrowing of the income disparity. Therefore, strengthening financial support for agriculture can serve as a viable strategy to bridge the income divide. In this study, the ratio of regional spending on agriculture, forestry, and water resources to GDP serves as the measure for assessing the level of financial support for agriculture. This encompasses expenses associated with advancing agriculture, forestry, fishery, and other related industries funded by public expenditure.

Thirdly, economic transformation, as measured by the percentage of the value added by the tertiary sector in GDP, has a significant influence on the urban-rural earning disparity. The higher the proportion of value added by the tertiary sector, the more advanced the economic transformation. Generally, more advanced economic transformation leads to a narrower disparity between urban-rural incomes.

Fourthly, in addition to the aforementioned factors, technological progress also plays a crucial role in narrowing the urban-country earning disparity. The level of technological progress can be gauged by the percentage of GDP devoted to research and evolution. The higher this proportion, the greater the advancement in technology. As a general trend, greater technological advancement leads to a smaller disparity in earning levels between urban-rural areas.

Fifthly, this study also discovered that the degree of opening-up has a significant influence on the earning disparity between urban-rural areas. This can be measured by the ratio of import and export volume to regional GDP. When this ratio is high, it indicates a higher degree of opening-up. This research found that regions with a higher degree of opening-up generally experience a narrower disparity between urban-rural earning levels. Therefore, it is momentous to consider the degree of opening-up when examining urban-rural earning disparities.

The data used in this research primarily stems from two sources: The China Statistical Yearbook spanning from 2012 to 2021, and the Digital Financial Inclusion Index of Peking University covering the years 2011 to 2020. The China Statistical Yearbook provides data pertaining to the dependent variable of urban-rural earning disparity, while the explanatory variables including coverage, usage depth, and digitization degree of digital

financial inclusion are derived from the Digital Financial Inclusion Index of Peking University (Guo et al., 2021; Li et al., 2020; Zhang et al., 2019).

Table 3.4: Classification, Names and Calculation Methods of Variables

Variable Classification	Variable Name	Calculation Method
Dependent Variable	Urban-rural Income Gap	Equation 3.2
Independent Variables	Total Index of Digital Financial Inclusion	Table 3.2
	Coverage Breadth of Digital Financial Inclusion	Table 3.2
	Usage Depth of Digital Financial Inclusion	Table 3.2
	Digital Financial Inclusion Degree of Digitalization	Table 3.2
	Digital Level of Payment Index	Table 3.2
	Digital Level of Insurance Index	Table 3.2
	Digital Level of Credit Index	Table 3.2
Control Variables	Educational Level of Residents	Average Number of Higher Education Students Per 100,000 Population in a Region (logarithm)
	The Level of Financial Support for Agriculture	Regional Expenditure on Agriculture, Forestry and Water Resources/Gross Regional Product
	Economic Transformation Advances in Technology	Value-added of Tertiary Industry /GDP R&D Spending/GDP
	Degree of Openness	Import and Export Volume/Regional GDP

Moreover, control variables necessary for the empirical analysis are mainly derived from The China Statistical Yearbook. The key control variables encompass the level of economic transformation, the percentage of non-agricultural employment, the urbanization rate, the structure of industry, the level of education of residents, and the level of financial

support for agriculture. Please refer to Table 3.4 for the specific method of calculation for each variable.

3.5 Model Setting

According to the research assumptions and objectives mentioned above, this research needs to study the impact of the seven indicators of digital financial inclusion on the urban-rural earning disparity in China, the total index, the coverage breadth, the depth of use, the degree of digitization, payment index, insurance index and credit index. In this study, data from 31 provinces and cities in China (excluding Hong Kong, Macao and Taiwan) from 2011 to 2020 were used for empirical analysis. The mathematical model is built according to the seven assumptions above.

$$GAP_{i,t} = \alpha_0 + \alpha_1 Index_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.3}$$

$$GAP_{i,t} = \alpha_0 + \alpha_1 \text{Breadth}_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.4}$$

$$GAP_{i,t} = \alpha_0 + \alpha_2 \text{Depth}_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.5}$$

$$GAP_{i,t} = \alpha_0 + \alpha_3 \text{Digitalization}_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.6}$$

$$GAP_{i,t} = \alpha_0 + \alpha_1 \text{Payment}_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.7}$$

$$GAP_{i,t} = \alpha_0 + \alpha_2 \text{Insurance}_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.8}$$

$$GAP_{i,t} = \alpha_0 + \alpha_3 \text{Credit}_{i,t} + \alpha_x X_{i,t} + \mu_{i,t} \quad \text{Equation 3.9}$$

Where, GAP represents the dependent variable urban-rural earning disparity. i, t represent the district and the time. $Index$ represents total index of digital financial inclusion (IA). $Breadth$ represents one of the independent variables, the coverage breadth of digital

financial inclusion (CB). $Depth$ represents the depth of use of digital financial inclusion (UD). $Digitalization$ represents the degree of digitalization of digital financial inclusion (DL). $Payment$ represents the digital payment standard (PAY). Insurance represents the digital insurance standard (INS). $Credit$ represents the digital credit standard (CRE). $X_{i,t}$ is the control variable. $\mu_{i,t}$is the random interference term. The others are constants.

Previous literature has extensively researched the impact of financial institutions utilizing advanced digital information technology to offer inclusive financial services on the income of single provinces or each province in China (Sun et al., 2020; Chen et al., 2021; Tang, 2020). Building upon existing scholarship, this study has collected comprehensive data to comprehensively examine the impact of the evolution of financial institutions' use of advanced digital technology to provide inclusive financial services on the earnings of each region in China, including the eastern and western economic zones. This research is a significant contribution to existing literature, providing unique insights into the earnings impact of digital financial inclusion.

In this specific empirical research, the impact of digital financial inclusion on the overall income disparity in China is analyzed using national data. The study involves an empirical analysis of different economic zones in China to obtain the impact of digital financial inclusion on income disparity in the eastern and western economic zones. The results of the analysis are compared to determine the variation in consequences. The current economic districts in China, excluding Hong Kong, Macao, and Taiwan, are classified into four major economic districts, namely, eastern, central, western, and northeastern, as shown in Table 3.5.

Table 3.5: China's Four Major Economic Districts

Four Major Economic Districts	Including Provinces, Municipalities Directly Under the Central Government and Autonomous districts
The Eastern Economic Zone	Beijing, Tianjin, Hebei Province, Shanghai, Jiangsu Province, Zhejiang Province, Fujian Province, Shandong Province, Guangdong Province and Hainan Province
The Central Economic Zone	Shanxi Province, Anhui Province, Jiangxi Province, Henan Province, Hubei Province, and Hunan Province
The Western Economic Zone	Inner Mongolia Autonomous Region, Guangxi Zhuang Autonomous Region, Chongqing Municipality, Sichuan Province, Guizhou Province, Yunnan Province, Xizang Autonomous Region, Shanxi Province, Gansu Province, Qinghai Province, Ningxia Hui Autonomous Region and Xinjiang Uygur Autonomous Region
The Northeast Economic Zone	Liaoning Province, Jilin Province, and Heilongjiang Province

3.6 Data Analysis Tools and Techniques

In this study, Stata software is employed for the empirical analysis of data. The specific methods and procedures adopted involve the use of static linear panel models, and the testing procedures will be outlined and analyzed in Chapter 4. The data processing and analysis steps, as well as the results of the empirical research, will be presented comprehensively.

3.6.1 Pooled Ordinary Least Squares (POLS), Fixed Effects Models (FEM) and Random Effects Model (REM)

In the empirical analysis, the first step is to establish panel data. We also use different Stata commands to display the statistical features of the panel data. To empirically analyze the impact of digital finance on reducing urban-rural earning disparity and promoting rural economic evolution, we use data from 31 Chinese provinces and cities (excluding Hong Kong, Macao, and Taiwan) from 2011 to 2020. Since the individuals in the sample are

identical in each time period (i.e., every year), with 31 provinces and prefecture-level cities, we have short panel data that is in equilibrium. This allows us to examine the impact of digital finance on various regions of China, which will provide momentous insights for promoting rural economic evolution through digital finance.

Establish the individual-specific effects model, as shown in Equation 3.10.

$$y_{it} = x'_{it}\beta + z'_{it}\delta + u_i + \varepsilon_{it} \qquad \text{Equation 3.10}$$

In this study, we consider a panel dataset with n individuals and T time periods. We use the following notation: i = 1, ..., n represents the individual index, and t = 1, ..., T represents the time period index. The variables in the model can vary depending on the individual and the time period. x_{it} represents the individual-specific characteristics that do not change over time, and ε_{it} represents the composite error term that includes all unobserved factors that affect the dependent variable y_{it}. The individual-specific effects, which are denoted by a_i, capture the unobserved time-invariant heterogeneity among individuals, and they represent the part of the error term that varies both across individuals and across time.

Next, we need to use Pooled Ordinary Least Squares (POLS) to model our data. If all individuals in our sample have the same regression equation, these individual effects can be accounted for in Equation 3.11 of the POLS model (Chen, 2021).

$$y_{it} = \alpha + x'_{it}\beta + z'_i\delta + \varepsilon_{it} \qquad \text{Equation 3.11}$$

To control for the omitted variables. In other words, the decision to use FEM (Fixed Effects Model) or REM (Random Effects Model) depends on whether these omitted variables are correlated with the independent variables, which would make FEM more

appropriate. Specifically, FEM uses time-invariant variables to create dummy variables, which are then included in the regression equation to control for the omitted variables. The equation for FEM is illustrated in equation 3.12, where Y is the dependent variable, a_i is the intercept for each individual i, β is the coefficient for the independent variable X, and γ_i is the coefficient for the dummy variable D_i that takes the value of 1 for individual i and 0 for others. On the other hand, REM assumes that the individual-specific effects are uncorrelated with the independent variables, making it more suitable when the omitted variables are uncorrelated with the independent variables. The equation for REM is provided in equation 3.13, where u_i represents the individual-specific effect, and u_i is the error term. Therefore, in order to determine which model to use for our analysis, we need to carefully consider the specific characteristics of the data, such as the presence of time-invariant variables and the correlation between the omitted variables and the independent variables. By doing so, we can choose the appropriate model and obtain accurate and reliable results.

$$y_{it} = \alpha + x'_{it}\beta + z'_i\delta + \sum_{i=2}^{n} \gamma_i D_i + \varepsilon_{it} \qquad \text{Equation 3.12}$$

Where, individual dummy variable D_i=1, if is individual i.

$$y_{it} = x'_{it}\beta + z'_i\delta + u_i + \varepsilon_{it} \qquad \text{Equation 3.13}$$

To determine whether to use a fixed effects model (FEM) or a random effects model (REM), a Hausman Test (Hausman, 1978) must be conducted. This test can be performed using Stata software. This test will help in determining which model is more appropriate for the given dataset.

3.6.2 Diagnostic Tests

Next, it is necessary to conduct diagnostic tests. Firstly, the Multicollinearity test must be carried out to verify the Variance Inflation Factor (VIF) of explanatory variables. If there exists multicollinearity and it has a noticeable effect on the significance of certain variables, then it must be addressed. Some ways to address this issue include increasing the sample size, eliminating variables which lead to severe collinearity, standardizing the variables, or modifying the model again.

Secondly, if Heteroskedasticity is present, it must be addressed. Several methods can be used for this purpose: The first method is to perform OLS regression, but with robust standard errors that are valid even in the presence of Heteroscedasticity. This approach is straightforward and does not require any additional data preparation. Alternatively, we can use weighted least squares (WLS) estimation, which assigns larger weights to observations with smaller variances, since they contain more information. This approach can effectively handle Heteroscedasticity and improve the precision of parameter estimates. Lastly, the feasible weighted least squares (Feasible WLS) method can also be used to deal with Heteroscedasticity. This approach involves iteratively re-weighting observations and can be more computationally intensive than the other methods mentioned, but can provide more accurate estimates of the underlying data structure. In summary, addressing Heteroscedasticity is a crucial step in conducting an accurate and reliable empirical analysis of the effects of digital finance on rural economic evolution and earning inequality, and researchers need to carefully consider which method best suits their research question and available data.

To ensure the integrity of the analysis, it is momentous to perform serial correlation tests. Methods such as the Breusch-Godfrey Test, Q Test or Durbin and Watson Test can be used for this purpose. In case an autocorrelation is detected, additional steps will be necessary. Several approaches can be considered: First, it is possible to use the "OLS and Heteroscedasticity autocorrelation robust standard error". Second, the quasi-difference method can be applied based on the weighted least square approach. This technique transforms the original model to achieve a spherical perturbation term, therefore eliminating autocorrelation and resulting in more accurate estimations. Third, the generalized least square (GLS) method can handle both Heteroscedasticity and autocorrelation simultaneously. Finally, a thorough examination of the model and its assumptions is recommended. If necessary, adjustments to the model setting should be made to ensure accurate results.

3.7 Chapter Summary

This chapter is dedicated to discussing the research methodology employed for the study at hand. Its main objective is to investigate the influence of digital financial inclusion on the earning disparity between urban-rural populations in China. To achieve this objective, seven key indicators have been selected to evaluate the progress of digital financial inclusion, namely: the total index, coverage breadth, depth of use, degree of digitization, payment index, insurance index and credit index. These indicators will serve as the independent variables in this empirical study, while the dependent variable will be measured by the Theil index, used to quantify the earning disparity between urban-rural areas. Specifically, the earnings of urban-rural inhabitants, as well as the national total earnings adjusted for inflation, will establish the real earning standards. Additionally, the study includes five control variables, such as the education level of the inhabitants, financial

support for agriculture, economic transformation, technological advancements, and the level of openness in the market.

The data for this study were obtained from two main sources: the China Statistical Yearbook and the Peking University Digital Financial Inclusion Index. These datasets were selected because they provided a comprehensive and reliable picture of the digital finance landscape in China from 2011 to 2020. The variables used in the empirical analysis were defined based on relevant literature and theory, and the regression model was constructed using robust statistical methods. The Stata software was used to estimate the model coefficients and test the hypotheses proposed in this research.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter focuses on the empirical results of our study. Firstly, we analyze the national data using Stata software to examine the impact of each independent variable and five control variables on the dependent variable. Secondly, we investigate the data outcomes of the eastern region, using software and models to assess the influence of each independent variable and five control variables on the dependent variable. Thirdly, we employ the same analysis approach used for the eastern region to analyze the data outcomes of the western region. Fourthly, we compare the empirical results of the eastern and western regions to identify the reasons for the different relationships between digital financial inclusion and urban-rural earning disparities.

4.2 Empirical Results of China

Table 4.1 shows the outcomes of the seven empirical models in identifying the impact of digital financial inclusion on the rural-urban earning disparitys in China. The *F*-statistics signify that all seven models are significant at the 1% standard. This indicating that all data can be pooled together. Then, we proceeded to the next step by identifying whether the POLS model or RE model is preferable through the Breusch-Pagan LM test in this study. The empirical findings signify that all models are statistically significant, and thus the null hypothesis of POLS is preferable is rejected at the 1% significant standard. Then, this study will further conduct the Hausman test to determine whether the RE or FE model is the desired model in this research. The outcomes signify that the FE model is the model best suited for this study, because the Hausman test is significant at the 1% standard in all models. See

Appendix 1A-1G for the specific testing process of the 7 models. After the final model has been identified in this study, then we will proceed to the diagnostic checking. The results of empirical analysis show that the digital financial inclusion can reduce the income disparity between urban and rural areas in China. The evolution of the total index of digital financial inclusion can effectively converge the income disparity between urban and rural areas in China. The breadth of coverage and the depth of use have an important influence on narrowing the income disparity. The influence of digitalization degree on income disparity is also negative, but not significant. The insurance index has a significant effect on income inequality. The effect of payment index and credit index on income disparity is not significant.

The empirical outcomes show that the models do not suffer from the multicollinearity matter. However, they do suffer from the Heteroskedasticity and serial correlation matters. These matters can be rectified by using panel-corrected standard errors. After rectifying these issues, the final outcomes of the FE models are presented in the Table 4.1. The empirical findings in Table 4.1 signify that, at the 99% confidence standard, the total index of digital financial inclusion (Model 1) has an adverse influence on the earning disparity between rural and urban areas. The empirical finding signifies that an increment of 1% in the total digital financial inclusion index reduces earning disparity by 0.05% in the urban-rural areas in China. A possible cause is that the evolution of digital financial inclusion enables country areas to obtain financial assistance more conveniently with the help of advanced information technology such as the Internet. This indicates that the evolution of digital financial inclusion can effectively narrow the earning disparity, and thus hypothesis 1 is verified.

Table 4.1: Empirical Analysis Results of China

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	3.719*** (0.756)	3.519*** (0.711)	3.648*** (0.758)	3.613*** (0.762)	3.826*** (0.884)	3.684*** (0.778)	3.564*** (0.739)
LIA	-0.045*** (0.012)						
LCB		-0.056*** (0.015)					
LUD			-0.023* (0.012)				
LDL				-0.010 (0.007)			
LPAY					-0.015 (0.013)		
LINS						-0.019** (0.009)	
LCRE							-0.017 (0.021)
LEL	-1.681*** (0.280)	-1.528*** (0.264)	-1.754*** (0.297)	-1.780*** (0.302)	-1.850*** (0.341)	-1.757*** (0.292)	-1.751*** (0.315)
LFS	0.146*** (0.031)	0.149*** (0.030)	0.138*** (0.030)	0.140*** (0.030)	0.137*** (0.030)	0.144*** (0.031)	0.134*** (0.029)
LET	-0.368*** (0.069)	-0.330*** (0.076)	-0.419*** (0.057)	-0.449*** (0.055)	-0.431*** (0.066)	-0.420*** (0.067)	-0.435*** (0.054)
LRD	-0.110*** (0.022)	-0.103*** (0.021)	-0.120*** (0.022)	-0.123*** (0.021)	-0.111*** (0.024)	-0.118*** (0.021)	-0.123*** (0.022)
LOW	-0.034*** (0.013)	-0.038*** (0.013)	-0.029** (0.013)	-0.027* (0.014)	-0.032** (0.014)	-0.027** (0.014)	-0.028** (0.013)

Table 4.1 continued

F-Test (*p*-value)	120.72*** (0.000)	124.28*** (0.000)	118.9*** (0.000)	118.45*** (0.000)	115.26*** (0.000)	119.31*** (0.000)	118.62*** (0.000)
Breusch-Pagan LM Test (*p*-value)	1133.66*** (0.000)	1136.85*** (0.000)	1132.53*** (0.000)	1112.22*** (0.000)	1078.16*** (0.000)	1117.71*** (0.000)	1134.08*** (0.000)
Hausman Test (*p*-value)	36.58*** (0.000)	52.02*** (0.000)	30.66*** (0.000)	32.16*** (0.000)	24.75*** (0.000)	34.23*** (0.000)	18.97*** (0.004)
Multicollinearity	3.81	3.77	3.74	3.68	3.76	3.66	3.74
Heteroskedasticity	2835.58 (0.000)***	2634.46 (0.000)***	2071.46 (0.000)***	2414.12 (0.000)***	5585.19 (0.000)***	2382.73 (0.000)***	2060.92 (0.000)***
Serial Correlation	39.374 (0.000)***	40.369 (0.000)***	43.740 (0.000)***	48.092 (0.000)***	39.905 (0.000)***	47.139 (0.000)***	47.629 (0.000)***
Observations	310	310	310	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Model 2 signifies that the coverage of digital financial inclusion is adversely influence the earning disparity between urban and countryside areas at the 99% confidence standard. A 1% rise in the coverage of digital financial inclusion cuts the earning disparity by 0.06% between urban and countryside areas in this study. A possible cause is that the wider the coverage of digital financial inclusion is, the more country areas will be covered, and country areas will have more opportunities to get financial assistance. As a consequence, the wider the coverage of digital financial inclusion is, the more it can narrow the earning disparity between town and countryside areas. Hypothesis 2 is verified. At the 90% confidence standard, the depth of digital financial inclusion (Model 3) has an adverse effect on the earning disparity between urban and countryside areas. Every 1% increment in the use of digital financial inclusion will reduce the earning disparity between urban and countryside areas by 0.02%. The possible cause is that the more digital payment and credit services are used by the average person or each small and micro enterprise in country areas, the more the earning standard of areas in country areas can be improved and the earning disparity can be narrowed. Thus, the in-depth evolution of digital financial inclusion can efficaciously converge the earning disparity between town and countryside areas. Hypothesis 3 is valid in this study.

However, the effect for depth of digital financial inclusion (0.02%) on the earning disparity is lesser than the influence of the breadth of digital financial inclusion (0.06%). A possible cause is that the evolution of the coverage breadth of digital financial inclusion places greater importance on the evolution of new customers who use digital financial inclusion, while the in-depth evolution of digital financial inclusion places greater importance on the increase of the count of old customers who use digital financial inclusion. Therefore, it is better to develop new customers group of digital financial inclusion than to

accelerate the use frequency of old customers to minimize the earning disparity among the town and countryside areas.

The digitalization degree of digital financial inclusion has an adverse influence on the earning disparity between town and countryside areas, but the consequence is not significant. The empirical finding shows that for every 1% increment in the digitization of digital financial inclusion, the earning disparity falls by 0.01%. Simultaneously, among the three dimensions of coverage, depth of use, and degree of digitalization of digital financial inclusion, the degree of digitalization has the lowest convergence standard on the earning disparity between town and countryside areas. The possible cause is that the evolution of digital business is currently limited in China's country areas. Many country areas in remote areas are inaccessible to the Internet and lack the relevant information technology and equipment. There are even areas where inhabitants still cannot own or use smartphones. Simultaneously, many inhabitants in country areas distrust digital finance, do not believe that financial assistance can be obtained through the Internet and smart devices, and are unwilling to connect their bank accounts to smartphone apps. Thus, the digitalization standard of digital financial inclusion has no significant influence in reducing the earning disparity between town and countryside areas. Hypothesis 4 is not valid.

The digital payment index with digitalization degree has a negative impact on urban-rural earning disparity, but it is not a significant variable in affecting the rural-urban earning disparity in China. For every 1% increment in the standard of digital payments, the earning disparity fell by 0.02%. That may be because cash transactions are still more common in country areas. Rural areas have less digital payment equipment, distrust digital payment, and face weak evolution of the Internet, which could explain this phenomenon. As a

consequence, the digital payment index has no significant influence on the earning disparity between town and countryside areas. Hypothesis 5 is not detected in this study.

At the 95% confidence standard, the digitalized insurance index has an adverse influence on the urban-rural earning disparity. For every 1% increment in the standard of digital insurance, the earning disparity fell by 0.02%. This could be because there are many types of small insurance business, which can guarantee the stability of agricultural production. areas in country areas are more confident that they can accept Internet insurance and believe it can be guaranteed through insurance. Small insurance can give the same service to town and countryside areas, and country areas have better service effect. Hence, the evolution of digital insurance can narrow the earning disparity between town and countryside areas. Hypothesis 6 is verified.

The digitalization credit index has an adverse impact on the urban-rural earning disparity, but the consequence is not significant. Every 1% increment in digital credit reduces the earning disparity by 0.02%. A feasible cause is that the count of areas in country areas using digital devices is low, and the frequency is low. Rural areas do not know how to use digital equipment for business management. Simultaneously, digital credit business is not widely accepted ideologically, and it still relies on traditional financial business for financial assistance. In a nutshell, the impact of digital credit index on rural-urban earning disparity is not significant. Hypothesis 7 is not valid in this study.

In summary, this study evidenced that the digital financial inclusion can reduce the earning disparity between town and countryside areas in China. Nevertheless, the standard of earning disparity is affected by the various dimensions of digital financial inclusion. Among the three dimensions, the evolution of the total index of digital financial inclusion

can effectively converge the earning disparity between town and countryside areas in China. Besides that, the breadth of coverage and the depth of use have an significant influence on narrowing the earning disparity, with effect degrees of 0.05%, 0.06%, and 0.02%, respectively. The influence of digitalization degree on earning disparity is also negative, but not significant. This is closely related to China's long-standing matter of "financial exclusion". The influence of digital finance related businesses on China's country areas is much lower than the influence on China's urban areas.

The three dimensions of digital financial inclusion - payment index, insurance index, and credit index - all have a negative effect on earning disparity. However, only insurance index has a significant effect on earning inequality. The effect of payment index and credit index on earning disparity is not significant. Simultaneously, although insurance index has a significant influence on the earning disparity, the effect degree is 0.02%, which is far lower than the influence of the breadth of coverage and depth of use on the earning disparity. In practice, micro-insurance provides more targeted financial services for countryside areas, alleviates the shortage of digital financial services in country areas, and thus helps country areas improve their standard of earning.

4.3 Empirical Results of Eastern Economic Region

Table 4.2 shows the empirical outcomes of the impact of digital financial inclusion in China's eastern economic zone. The empirical consequences show an adverse impact between the total index of digital financial inclusion and rural-urban earning disparity. A 1% increase in the total digital financial inclusion index will converge the earning disparity by 0.09%. Among the second-dimension indicators under the total digital financial inclusion index, first, the breadth of coverage is negatively correlated with earning disparity. If the

breadth of coverage increases by 1%, then earning disparity is reduced by 0.09%, and vice versa. Second, the depth of use can effectively reduce earning disparity. An increase in depth of use by 1% will decrease earning disparity by 0.08%. Third, the degree of digitalization has an adverse impact on urban and countryside earning disparity. Every 1% increase in the digitalization degree will reduce the disparity by 0.03%. Therefore, the digitalization degree has a weaker impact on earning disparity in eastern China than the extent of breadth of coverage and depth of use. See Appendix 2A-2G for the specific testing process of the 7 models.

Among the three-dimensional indicators subordinate to the digitalization degree of digital financial inclusion, first, the payment index can effectively minimize the earning disparity. A change in the payment index of 1% will shift the disparity by 0.09% in the opposite direction. Second, the insurance index has a negative influence on urban and rural earning disparity. If the insurance index increases by 1%, earning disparity will be reduced by 0.04%. Third, the credit index is negatively correlated with earning disparity. If the credit index increases or decreases by 1%, the disparity will be adjusted in the opposite direction by 0.11%. It is worth noting that among the control variables, education standard, economic transformation and degree of opening to the outside world can alleviate earning disparity in the eastern district of China. The education standard has made the biggest contribution. However, the evolution of financial support for agriculture and technological progress is widening earning disparity, possibly because financial support for agriculture is insufficient to meet the needs of country inhabitants. The construction of public infrastructure in the country areas also lags behind that in cities. More scientific research funds are still invested in the urban areas, while the standard of scientific and technological evolution in the country

areas lags behind that in the cities. Meanwhile, the impact of technological progress on earning disparity is not always significant.

For the eastern Economic Zone of China, the coverage breadth of digital financial inclusion has a relatively higher degree of evolution, and the convergence effect on the earning disparity is better, followed by the depth of use, and the degree of digitalization has the lowest convergence effect on the earning disparity. This shows that it is more significant for the eastern district to develop Internet technology, so as to accelerate financial institutions to develop more digital financial products.

Table 4.2: Empirical Analysis of the Eastern Economic Zone of China

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	3.727*** (0.531)	3.821*** (0.489)	3.619*** (0.611)	2.629*** (0.418)	4.179*** (0.460)	2.806*** (0.498)	4.194*** (0.651)
LIA	-0.085*** (0.016)						
LCB		-0.091*** (0.015)					
LUD			-0.078*** (0.019)				
LDL				-0.034*** (0.009)			
LPAY					-0.086*** (0.010)		
LINS						-0.038*** (0.011)	
LCRE							-0.106*** (0.023)
LEL	-1.423*** (0.235)	-1.436*** (0.228)	-1.425*** (0.246)	-1.106*** (0.198)	-1.609*** (0.202)	-1.128*** (0.220)	-1.656*** (0.248)
LFS	0.079** (0.034)	0.079** (0.034)	0.074** (0.035)	0.083** (0.033)	0.084** (0.035)	0.089** (0.036)	0.061* (0.035)
LET	-0.120* (0.073)	-0.087 (0.069)	-0.154** (0.076)	-0.282*** (0.064)	-0.086* (0.052)	-0.252*** (0.070)	-0.120* (0.071)
LRD	0.028** (0.015)	0.033** (0.015)	0.019 (0.017)	0.005 (0.015)	0.034** (0.014)	0.014 (0.016)	0.021 (0.018)
LOW	-0.199*** (0.015)	-0.201*** (0.014)	-0.190*** (0.015)	-0.179*** (0.017)	-0.196*** (0.010)	-0.177*** (0.016)	-0.190*** (0.014)
F-Test (*p*-value)	182.68*** (0.000)	193.88*** (0.000)	173.10*** (0.000)	160.30*** (0.000)	187.26*** (0.000)	169.09*** (0.000)	175.95*** (0.000)

Table 4.2 continued

Breusch-Pagan LM Test (*p*-value)	15.79*** (0.000)	15.80*** (0.000)	18.81*** (0.000)	22.98*** (0.000)	21.83*** (0.000)	23.59*** (0.000)	12.30*** (0.000)
Hausman Test (*p*-value)	34.01***	28.01*** (0.000)	35.14*** (0.000)	41.46*** (0.000)	29.54*** (0.000)	33.15*** (0.000)	37.47*** (0.000)
Multicollinearity	5.25	5.23	5.20	4.57	5.40	4.51	5.43
Heteroskedasticity	1126.14 (0.000)***	671.19 (0.000)***	1036.76 (0.000)***	1274.03 (0.000)***	1150.04 (0.000)***	907.21 (0.000)***	852.98 (0.000)***
Serial Correlation	8.979 (0.015)**	8.319 (0.018)**	9.501 (0.013)**	10.733 (0.009)***	9.575 (0.013)**	9.347 (0.014)**	9.497 (0.013)**
Observations	100	100	100	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

4.4 Empirical Results of Western Economic Region

Table 4.3 shows the impact of digital inclusive finance in China's western economic zone on earning disparity in China. An adverse relationship is detected between the total index of digital financial inclusion and earning disparity. A 1% increase in the total index reduces earning disparity by 0.15%. Among the second-dimension indicators under the total index, first, the breadth of coverage has an adverse impact on earning disparity. The breadth of coverage increases or decreases by 1%, and the disparity is adjusted in the opposite direction by 0.12%. Second, the depth of use can effectively converge earning disparity. A 1% change in depth of use will shift the disparity by 0.14% in the opposite direction. Third, the degree of digitalization is negatively correlated with earning disparity. A 1% increase in the degree of digitalization will reduce the disparity by 0.11%.

Among the three-dimensional indicators subordinate to the degree of digitalization of digital financial inclusion, first, the payment index can effectively mitigate the earning disparity. A change of 1% in the payment index will shift the disparity by 0.14% in the opposite direction. Second, the insurance index has a negative impact on earning disparity. A 1% increase in the insurance index reduces the disparity by 0.10%. Third, the credit index is negatively correlated with earning disparity. An increase or decrease of 1% in the credit index will adjust the disparity in the opposite direction by 0.10%.

It is worth noting that among the control variables, education standard and economic transition have no significant impact on earning disparity. Only technological progress has a negative impact on the earning disparity. The standard of financial support for agriculture and the degree of opening-up will widen the earning disparity. This is likely because rural construction in western China lags behind other areas in China, and the amount of funding and support for agriculture is insufficient. Older or less-educated people in some remote

parts of the west cannot use electronic devices to access financial services. In the meantime, the western district is located in the interior of China and lags behind other districts in terms of opening-up and evolution.

4.5 Comparative Study of the Eastern and Western Economic Districts of China

A comprehensive comparative analysis shows that the evolution of digital inclusive finance in the eastern economic zone and western economic zone can reduce earning disparity in both areas. The findings show that digital inclusive finance has a greater impact in narrowing earning disparity in the west than in the east. A possible reason is that western China's economic evolution lags behind that of eastern China. Besides that, the earning standard of western China is lower than that in eastern China. Accordingly, there is more room for reducing the earning disparity in the west than the east, and the evolution of digital inclusive finance in western China is more conducive to narrowing earning disparity. According to the consequences of the seven models, the degree of influence of all the variables in the western district is higher than that in the eastern districts in Model 1 to Model 6. Therefore, Hypotheses 1 to 6 are overturned. Only in the credit index is the influence of the western district (0.10%) lower than in the eastern district (0.11%). A possible reason is that digital credit has developed less in the west than in the east. In the meantime, compared with the other variables of digital financial inclusion, the degree of evolution of digital credit in western China is the lowest. Hypothesis 7 is verified. See Appendix 3A-3G for the specific testing process of the 7 models.

Table 4.3: Empirical Analysis of the Western Economic Zone of China

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	0.459 (1.230)	-0.344 (1.219)	0.747 (1.267)	1.403 (1.326)	1.169 (1.381)	1.367 (1.296)	0.306 (1.402)
LIA	-0.152*** (0.034)						
LCB		-0.115*** (0.029)					
LUD			-0.136*** (0.030)				
LDL				-0.106*** (0.031)			
LPAY					-0.135*** (0.026)		
LINS						-0.098*** (0.030)	
LCRE							-0.103*** (0.024)
LEL	0.217 (0.786)	0.495 (0.566)	-0.079 (0.586)	-0.365 (0.611)	-0.345 (0.638)	-0.388 (0.578)	-0.049 (0.667)
LFS	0.106 (0.078)	0.115*** (0.034)	0.068* (0.039)	0.124*** (0.033)	0.034*** (0.035)	0.098*** (0.037)	0.047 (0.038)
LET	0.259 (0.195)	0.187 (0.197)	0.263 (0.189)	0.067 (0.179)	0.354** (0.179)	0.162 (0.216)	0.204 (0.160)
LRD	-0.220*** (0.043)	-0.218*** (0.018)	-0.244*** (0.021)	-0.219*** (0.020)	-0.252*** (0.021)	-0.233*** (0.020)	-0.251*** (0.022)
LOW	0.059* (0.032)	0.056*** (0.020)	0.065*** (0.017)	0.078*** (0.019)	0.055*** (0.016)	0.079*** (0.017)	0.059*** (0.018)

Table 4.3 continued

F-Test (p-value)	35.12*** (0.000)	36.55*** (0.000)	33.02*** (0.000)	30.46*** (0.000)	28.57*** (0.000)	32.45*** (0.000)	32.45*** (0.000)
Breusch-Pagan LM Test (*p*-value)	379.51*** (0.000)	364.35*** (0.000)	391.80*** (0.000)	389.69*** (0.000)	404.63*** (0.000)	380.13*** (0.000)	403.18*** (0.000)
Hausman Test (*p*-value)	8.79 (0.1860)	24.58*** (0.0004)	24.58*** (0.0004)	6.79 (0.3408)	8.04 (0.2354)	8.35 (0.2139)	43.09*** (0.0000)
Multicollinearity	3.17	3.12	3.20	3.06	3.28	3.05	3.37
Heteroskedasticity	366.64 (0.000)***	532.81 (0.000)***	177.55 (0.000)***	322.74 (0.000)***	251.13 (0.000)***	212.49 (0.000)***	510.78 (0.000)***
Serial Correlation	112.849 (0.000)***	96.501 (0.000)***	83.526 (0.000)***	84.565 (0.000)***	87.584 (0.000)***	59.452 (0.000)***	148.440 (0.000)***
Observations	120	120	120	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Among the three second-standard indicators of breadth of coverage, depth of use and degree of digitalization, both the eastern economic zone and the western economic zone have a better convergence effect on earning disparity between urban-rural inhabitants in terms of breadth of coverage and depth of use. A possible reason is that the evolution of digital inclusive finance in China is still in its infancy. The breadth of coverage needs to be developed first, and the matter of financial exclusion should be overcome on the basis of comprehensive Internet coverage. Later, the focus of evolution should turn to the depth of use. On the basis of Internet coverage, in-depth evolution of inclusive financial products is more suitable for the country areas. China's current breadth of coverage and depth of business is developing rapidly. On this basis, digital business needs to rely on the evolution of advanced Internet technology and the breadth of coverage and depth of use. Therefore, the convergence effect of digital business of digital inclusive finance on urban-rural earning disparity is lower than the breadth of coverage and depth of use.

Among the control variables, inhabitants' education standard can greatly reduce earning disparity in eastern China. However, it does not have a significant effect on earning disparity in western China. The reason may be that there is a greater allocation of educational resources in the urban areas in the east than in the west. That said, improving inhabitants' education standard will further increase the earning levels of rural and urban inhabitants. However, thus far, increments in the earning levels in the country areas has been lower than those in the urban areas. For the eastern and western districts, the standard of financial support for agriculture will widen the earning disparity. Economic transformation will narrow earning disparity in the eastern zone, but it has no significant influence on earning disparity in the western zone. Technological progress can obviously narrow the western district's earning disparity. But in eastern China, technological progress has had a significant

impact in reducing rural-urban earning disparity. However, this impact is not significant with the inclusion of depth of digital financial inclusion, digitalization, insurance or credit because the growth of these digital financial services requires a high standard of technology. The degree of opening to the outside world can obviously narrow earning disparity in the eastern zone, but will widen earning disparity in the western zone.

The consequences show that digital inclusive finance is playing a crucial role in minimizing earning disparity in eastern and western China. In sum, the convergence effect of digital inclusive finance on earning disparity in the western zone of China is better than that in the eastern district. The credit index reduces earning disparity in western China less than in eastern China. In the other six indicators of digital financial inclusion, the convergence effect in the western district is better than that in the eastern district. The consequences can further narrow urban and rural earning disparity and the regional evolution disparity in China.

For China's western economic zone, although digital financial inclusion can better converge the earning disparity, the total economic evolution of the western district is still far lower than that of the eastern district. Therefore, while developing digital financial inclusion business, the western district should also vigorously develop its economy through various other ways, with the primary, secondary and tertiary industries developing together. By narrowing the disparity between the western district and the eastern district in terms of economic evolution standard, the earning disparity between the inhabitants of the western district and the eastern district can be further narrowed.

The development of digital financial inclusion in the eastern economic zone and western economic zone can converge the income disparity, respectively. The convergence effect of digital financial inclusion on the income disparity in the western zone of China is better than that in the eastern region. The credit index converges the income disparity in western China less than that in eastern China. In the other six indicators of digital financial inclusion, the convergence effect in the western is better than that in the eastern. Digital financial inclusion not only converge the income disparity in the eastern and western zones, but also accelerate the economic growth of the western, so as to converge the disparity between the western and eastern zones.

Previous research results have shown divergent opinions on the overall impact of digital financial inclusion on narrowing the income disparity between urban and rural residents. Some scholars argue that digital financial inclusion can effectively reduce this gap nationwide (Yang et al., 2020; Zhang et al., 2020). However, scholars using Peking University's Digital Inclusive Finance Index found that the three dimensions of digital financial inclusion have varying effects on the urban-rural income disparity (Yao & Li, 2020). The breadth of coverage in digital financial inclusion has the most significant effect on narrowing the income disparity between urban and rural residents (Zhang & Ren, 2017), consistent with the findings of this study based on national data.

Secondly, within digital financial inclusion, only digital payment services have been identified as effective in reducing the urban-rural income disparity, whereas the effects of insurance and investment services are less pronounced (Li & Han, 2019; Ren & Li, 2019). However, this study suggests that insurance services can contribute to narrowing the income disparity between urban and rural residents.

Thirdly, the level of digitalization in digital financial inclusion primarily impacts the urban-rural income disparity concerning regional differences (Wang, 2020). China's eastern, central, and western regions exhibit significant disparities in economic development (He, 2020), with the eastern region having a notably higher level of economic development than the central and western regions. Consequently, the impact of digital financial inclusion on rural areas in the eastern region is higher than in the central and western regions (Jiao, 2020). However, this study finds that, among the various digital financial inclusion indicators, only the credit index shows a convergence effect in the eastern region compared to the western region. For other digital financial inclusion indicators, the impact on the income disparity is higher in the western region than in the eastern region.

Theoretically, we believe that digital financial inclusion is restricted by the Internet and advanced information technology, and the evolution speed and scale of digital financial inclusion depend on the evolution standard of the Internet. However, through the analysis, this study finds that the effect of digital financial inclusion on alleviating the earning standard disparity in China's western economic zone is significantly better than that in the eastern economic zone. It is well known that China's eastern economic zone is better developed in Internet and information technology than its western economic zone. Therefore, this study believes that the possible reason is that the economic evolution standard of the western economic zone of China lags behind the eastern one, and the earning disparity is also higher than the eastern one. Although the evolution degree of digital financial inclusion in the western Economic zone is lower than that in the eastern district, the western district lags far behind the eastern district in terms of economy and earning, so the effect of digital financial inclusion in the western district is better than that in the eastern district. It is found that the degree of digital evolution of digital financial inclusion is weaker than the evolution of

coverage breadth and use depth. Therefore, to further narrow the earning disparity between urban-rural inhabitants, we should continue to develop digital financial inclusion, and in the meantime, we still need to vigorously develop Internet and information technology.

In the long run, the evolution of financial institutions in digital financial inclusion business is slowly maturing, and individuals and families, as well as SMEs themselves need to strengthen the awareness of using digital financial inclusion business to get financial services. Only by increasing public awareness of online access to financial services can we further accelerate the evolution of coverage and depth of use. To achieve this, the most significant thing is to spread knowledge and policies related to digital financial inclusion to inhabitants through financial institutions and communities. In addition, relevant departments also need to strengthen network security management. Because in China, there are a lot of online fraud phenomenon, the public lack of security for money transactions through the Internet. In the meantime, this also requires regulators to strengthen the supervision of online financial business.

In the future, China must adopt a comprehensive and multi-dimensional approach to develop inclusive digital financial services and effectively fuse digital technology with financial inclusion. This requires financial institutions to develop more financial products tailored to country areas, thus narrowing the income disparity. Furthermore, it is crucial to prioritize key areas for evolution during this evolution. For instance, the eastern economic zone should focus on enhancing its digital inclusive finance services, particularly in the small insurance sector. Although the western economic zone has shown better convergence results overall, it too must expand its digital business offerings in terms of breadth of coverage and depth of use.

4.6 Chapter Summary

This chapter examines the empirical findings of research conducted on the impact of digital financial inclusion on the urban-country earning disparity in both eastern and western regions of China. The results indicate that the total index and coverage breadth of digital financial inclusion have the most significant positive impact on narrowing the earning disparity. Additionally, the depth of use and standard of digital insurance also have a significant negative impact on the earning disparity. However, the degree of digitization and digital payment and credit levels do not have a significant impact on the earning disparity. Five control variables were also considered, and the results show that education, economic transformation, technological progress, and openness can all contribute to narrowing the earning disparity, while financial support to agriculture can lead to an expansion of the earning disparity. Based on these findings, it is recommended that China should develop comprehensive and multidimensional digital financial inclusion services. Furthermore, financial institutions should provide more suitable financial products for country areas to further narrow the earning disparity. The integration of digital technology with financial inclusion should be a priority for the future evolution of China's financial system.

In terms of addressing the earning disparity in eastern China, it has been found that there are seven independent variables which have significant impact at a level of 1%. These variables can help to effectively converge the earning disparity in the east. Additionally, control variables such as inhabitants' education standards, economic transformation, and opening to the outside world can also play a role in narrowing the earning disparity. However, it is worth noting that the level of financial support for agriculture and technological progress may actually widen the earning disparity in the east. Therefore,

careful consideration and management of these variables and control factors is necessary to fully address and reduce the earning disparity in the region.

In western China, we have identified seven independent variables that significantly impact the earning disparity, and all of them show a potential to narrow it down at the 1% standard. Additionally, digital financial inclusion seems to play a more prominent role in reducing the earning disparity in the western region compared to the eastern region. It is noteworthy that technological progress, among the control variables, has the potential to reduce the earning disparity. However, the other four control variables do not seem to have a significant impact on the dependent variable.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section serves as a recap of the previous chapter and aims to provide a concluding statement based on the data analysis presented in Chapter 4. Through the examination of digital financial inclusion and its potential application in reducing the earning disparity between urban-rural areas, several key issues were identified. This chapter offers momentous suggestions and conclusions that address these issues. Furthermore, in light of the future evolution direction of digital financial inclusion, recommendations are provided to further close the income disparity.

5.2 Discussion on Findings

This study mainly measured the impact of various indicators of digital financial inclusion on the urban-countryside earning disparity in China from 2011 to 2020. First of all, In the theoretical research basic, this research examines the influence of digital financial inclusion on the earning disparity in urban and countryside areas of China by establishing relevant models. There are seven targets in the three dimensions of digital financial inclusion that have a certain influence on the earning disparity between town and countryside areas. Secondly, the convergence effect of digital inclusive finance on earning disparity in the western zone of China is better than that in the eastern district. The credit index reduces earning disparity in western China less than in eastern China. In the other six indicators of digital financial inclusion, the convergence effect in the western district is better than that in the eastern district. The consequences can further narrow urban and rural earning disparity and the regional evolution disparity in China. Simultaneously, the data of the earning

standard used in this research are the real earning standard of town and countryside areas; that is, the real earning after the inflation rate is eliminated. This is representative and innovative. The research consequences offer certain guidance for the future evolution direction of digital financial inclusion. The research outcomes can be used for reference to further narrow the urban and countryside earning disparity in China.

This study makes significant contributions to both the theoretical development and practical aspects of digital financial inclusion in China. Firstly, from a theoretical perspective, The urban-rural divide and financial exclusion have been long-standing issues in many countries, including China. However, the concept of digital financial inclusion and the evolution of related theories have enriched inclusive finance and rural financial evolution theories, providing a solid foundation for financial research. By addressing the issue of financial exclusion, the evolution of digital financial inclusion can contribute to narrowing the earning disparity between urban-rural dwellers in theory, providing a potential solution to the issue of the dual economy.

To take things further, quantitative research on digital financial inclusion and its operational mechanisms have contributed to the theoretical evolution of rural finance. The comprehensiveness, depth, and digitization of digital financial inclusion have provided corresponding financial assistance to meet the needs of farmers. From a supply and demand perspective, digital financial inclusion has the potential to expedite the evolution of country finance. However, further research is necessary to fully understand the extent of this evolution and any associated obstacles.

Secondly, from a practical standpoint, Development status of China's inclusive finance with digital technology is relatively robust. As digital technology continues to advance, China not only has a huge financial market, but also has a wide range of digitized services in fields such as mobile payments, lending, and investment. Currently, many Internet finance companies and traditional financial institutions are accelerating their digital transformation. For China's vast number of small and medium-sized enterprises and individual customers, inclusive finance with digital technology provides them with more convenience, credit and access to financing. At the same time, digital finance makes risk management more rigorous, which also helps protect consumer interests. Overall, the evolution of China's inclusive finance with digital technology faces two challenges: one is to maintain steady market growth and maximize consumer benefits; the other is to control risks and prevent the possibility of economic system collapse. But overall, the future of China's inclusive finance with digital technology is full of hope.

As of the end of 2020, the count of internet users in China reached 938 million, accounting for roughly one-third of the world's population. Unlike traditional banking and financial services, digital inclusive finance institutions focus more on mobile payments and other digitized forms of transactions. According to the 2020 report by the People's Bank of China, the total transaction volume of China's third-party payment market at the end of 2020 was nearly RMB 261 trillion (approximately USD 40.3 trillion). Currently, China's digital inclusive finance enterprises are mainly concentrated in urban areas. However, rural users are significantly lagging behind compared to urban users. The 2019 Domestic Residents Network Life Survey Report released by the China Academy of Information and Communications Technology pointed out that the Internet penetration rate in country areas was 39.1%, while it was 68.4% in urban areas. In the Chinese digital inclusive finance

market, mobile payment applications are very popular. According to the 2020 China Internet Network Development Report, in the first half of 2020, the count of Chinese mobile payment users reached 854 million, making it one of the most representative examples of the country's digital economy. One momentous area of digital inclusive finance is peer-to-peer (P2P) lending platforms. However, according to data released in May 2020, there were a total of 2,087 online P2P platforms in China, which is a decrease of 25.4% from 2019, due to regulatory efforts and crackdowns on illegal internet financial activities.

China's inclusive finance with digital technology has made a significant contribution in narrowing the earning disparity between urban-rural areas. Firstly, digital inclusive finance makes it easier for migrant workers to obtain loans. Many of them struggle to get traditional bank loans due to the lack of regular employment and secure housing. Digital inclusive finance institutions provide more borrowing channels for these people through electronic payments, prepaid cards, and credit assessments, helping them start businesses or invest. Secondly, digital inclusive finance promotes the evolution of rural e-commerce industry. In the past, few people were willing to open shops in country areas because the market was unstable and transportation costs were high. However, digital inclusive finance institutions offer a new way for rural products to enter cities and be paid and settled, thereby promoting the rapid evolution of rural e-commerce. Furthermore, digital inclusive finance improves the efficiency of financial services. Digital banks and other inclusive finance institutions use modern technologies such as artificial intelligence, big data, and mobile technology to reduce the cost of financial services and better meet the needs of different customers. As a result, even people far away from the city center can access efficient, fast and secure financial services. In summary, China's digital inclusive finance plays a crucial

role in narrowing the earning disparity between urban-rural areas, helping migrant workers, poor families, and country residents gain more financial support.

There are differences in the evolution of China's digital inclusive finance between the eastern and western regions. The eastern region is a developed area in China's economy, with a more complete infrastructure and service system for digital inclusive finance. In contrast, the western region is relatively underdeveloped economically, and digital inclusive finance facilities and services are relatively lacking. Therefore, in the western region, there is greater space and potential for the evolution of digital inclusive finance. In addition, due to the existence of a certain degree of digital divide in the western region, namely the imbalance of digital resource allocation between urban-rural areas, and between wealthy and poor populations, the role of digital inclusive finance in poverty alleviation and promoting economic evolution is more evident. Finally, policy orientation is also an momentous factor influencing the evolution of digital inclusive finance in the eastern and western regions. The country will implement different support policies according to local conditions to adapt to the different needs and characteristics of the evolution in the east and west regions.

5.3 Implications

5.3.1 Implications for China

China has now eliminated absolute poverty and entered a new stage of socialist modernization. But rural earnings across China still lag far behind those of urban inhabitants. Rural inhabitants use the Internet and information technology less frequently than their urban counterparts. Rural inhabitants also use financial services less often than their urban counterparts. Digital inclusive financial services can offer more convenient financial services for country inhabitants, accelerate rural economic evolution and raise farmers' earning levels. This requires country areas to vigorously develop Internet and information

technology facilities, strengthen network security, and raise awareness of accepting digital financial services. There are three major limitations of this study. Firstly, under the current level of technology, the application of digital technology may face network security problems. Secondly, it is difficult to evaluate the long-term stability of digital inclusive finance. In China, digital inclusive finance is still in a rapid evolution stage, and its long-term stability cannot be determined. Therefore, its research has been affected to some extent. Thirdly, there is a lack of effective regulatory mechanisms for digital inclusive finance in China at present. Digital inclusive finance has not yet formed a sound regulatory system and normative institutional framework, which may lead to loan risks.

The future prospects for the evolution of China's digital inclusive finance are very promising for mainly three reasons. Firstly, it is due to policy support. In recent years, China has strongly supported the evolution of digital inclusive finance. The country has issued relevant policies and regulations, including promoting internet financial innovation, digital wealth management, and more. Relevant departments have also vigorously promoted the concept of "financial technology" and encouraged digital inclusive finance enterprises to cooperate with traditional financial institutions to improve social financial services. Secondly, there is a diversified range of application scenarios. With the popularity of mobile internet and 5G networks, the application scenarios of digital inclusive finance are increasing. Based on domestic and foreign experiences, the fields covered by digital inclusive finance include consumer finance, micro-enterprise financing, cross-border payments, etc., and all fields have great potential for evolution. Thirdly, technological innovation is driving the industry forward. The digital inclusive finance industry has been exploring technological innovation, such as the application of technologies including artificial intelligence, big data, and blockchain. These technologies can not only improve

operational efficiency but also enhance risk control capabilities, better serving the general consumers. In summary, digital inclusive finance is of great significance for China's future evolution. Under the support of the country, relevant departments, technological innovation, and market demand, digital inclusive finance enterprises will have greater opportunities for evolution in the future.

Scholars both domestically and internationally are generally optimistic about the evolution prospects of China's digital inclusive finance. Firstly, as one of the world's largest consumer markets, China has great potential for the evolution of its digital economy. Digital inclusive finance, as an momentous field within the digital economy, will continue to steadily grow in the future. Secondly, China places great emphasis on the evolution of digital inclusive finance and has provided strong policy support at the governmental level. For example, the "Guiding Opinions on Promoting the 'Internet +' Action" issued in 2015 clearly stated that digital financial innovation should be promoted. In addition, Chinese fintech companies have achieved many successes in the field of digital inclusive finance, such as the widespread use of mobile payment applications like Alipay and WeChat, and the rapid rise of hundreds of online lending platforms and investment platforms. Although there are some challenges facing the evolution of digital inclusive finance in China, such as the lack of regulation and inadequate risk control, overall the prospects for China's digital inclusive finance are very promising.

Currently, there are still many limitations in China's research on digital inclusive finance. Firstly, the data sources for research on digital inclusive finance are not comprehensive enough. Digital inclusive finance is a evolution model based on information technology, which integrates information resources from various industries to provide

comprehensive financial services. Due to the issue of data sources, the conclusions drawn from research on digital inclusive finance in China may not be comprehensive and objective enough. Secondly, it is difficult to evaluate the long-term stability of digital inclusive finance. In China, digital inclusive finance is still in a rapid evolution stage, and its long-term stability cannot be determined. Therefore, its research has been affected to some extent. Thirdly, there is a lack of effective regulatory mechanisms for digital inclusive finance in China at present. Digital inclusive finance has not yet formed a sound regulatory system and normative institutional framework, which may lead to loan risks. Fourthly, China's current research on digital inclusive finance is relatively single-minded. Current research on digital inclusive finance mostly focuses on the enterprise and market levels, while perspectives such as consumers and national participation have not received enough attention. Fifthly, the continuous advancement of technological innovation will affect the future evolution trend of digital inclusive finance. Digital inclusive finance is always closely related to information technology. The continuous improvement and innovation of technology may have a significant impact on the future direction of digital inclusive finance.

5.3.2 Implications for Asian Business

In this study, we focus on analyzing how digital financial inclusion can contribute to reducing the earning disparity between urban-rural populations in China. We explore the various dimensions of digital financial inclusion that can play a role in narrowing the earning disparity between these two regions. Our findings can serve as a reference for other Asian countries, specifically those that are still developing, to improve the standard of living for their populations and stimulate their economic gain by narrowing the wealth disparity between urban-rural areas.

In studies related to income levels in Asian countries, it is momentous to account for the impact of inflation rates on residents' earnings. By measuring earnings in real terms, we can ensure that the data accurately reflects the standard of living for residents, without being skewed by varying inflation rates across different countries.

This research has significant implications for Asian countries looking to improve the overall standard of living for their residents, while also reducing income inequality. Firstly, governments can promote digital financial services through financial institutions or online platforms, expand access to these services, and increase coverage of inclusive digital finance. Secondly, by expanding coverage, Asian countries can better understand their existing customer base and identify new opportunities for growth. Thirdly, financial institutions must improve the quality of digital financial products, using advanced technologies to expand their online offerings to include more complex financial products. Building upon these steps, governments and financial institutions can help residents improve their digital literacy skills, enabling them to efficiently manage their finances online. By implementing these strategies, Asian countries can leverage digital finance as a powerful tool for reducing income disparities and improving living standards across the region.

China's experience and practices in the field of digital inclusive finance have momentous reference significance for Asian countries. Digital inclusive finance refers to the use of digital technology and innovative financial models to increase the coverage and popularity of financial services, while reducing the cost of financial services and promoting financial inclusion. Firstly, China's experience can help Asian countries develop digital payment and settlement systems, improve payment methods, and enhance payment security and convenience. China has established a digital payment and settlement network covering

the entire country, greatly facilitating people's lives and corporate operations. Asian countries can learn from China's successful cases of digital payments, making their own digital payment systems stronger and more perfect. Secondly, China's experience in digital inclusive finance also provides reference for Asian countries' financing for small and micro enterprises and credit risk control. China's evolution in fintech and big data analysis allows small and micro-enterprises to obtain better financing support, solving the financing issue caused by information asymmetry and weak risk control in traditional financial systems. Asian countries can draw on China's successful cases of digital inclusive finance and formulate suitable policies and measures according to their actual situations. Finally, China's digital inclusive finance can provide inspiration for country areas with dense populations and backward banking infrastructures. China actively promotes digital inclusive finance in country areas, addressing the issue where traditional financial institutions struggle to provide funding support to all residents.

This study highlights that digital financial inclusion is only part of the solution towards reducing income inequality. While it is momentous to promote online financial services and enhance financial literacy among all inhabitants, there are other factors that need to be addressed. Firstly, a significant effort should be made by Asian countries to improve the education standard for all residents. This can be achieved through increased investment in schools, raising awareness about the importance of education, and providing education subsidies for underprivileged students. Improving the overall education standard will help narrow the earning disparity between urban-rural areas. Secondly, developing nations need to focus on the evolution of their tertiary industries and accelerate economic transformation. A higher level of economic transformation is associated with a smaller earning disparity. Thirdly, increasing investment in technology research and evolution will

help to create new opportunities for emerging industries and the internet economy. Technological advancements will also aid in narrowing the income disparity and promoting economic gain. Lastly, the COVID-19 pandemic has disrupted the import and export business of many countries which has affected the national economy. Asian countries can mitigate the impact by exploring new ways to enhance their openness to the outside world. This can be achieved through improving the standards of inspection and quarantine of import/export products or developing foreign tourism and study abroad programs. In summary, while digital financial inclusion is a critical factor in reducing income inequality, it should be viewed as a part of a comprehensive strategy that includes improvements in education, acceleration of economic transformation, investment in technology research, and enhancement of openness to the outside world.

5.4 Future Research Directions

In the future evolution of digital financial inclusion, China should ensure the steady evolution of digital financial inclusion coverage and depth of use and further leverage the positive effect of the evolution of breadth of coverage and depth of use on narrowing the earning disparity. Simultaneously, the digitalization degree of digital financial inclusion should be popularized in countryside areas and improve country areas' ideological understanding and trust of digital business. Furthermore, leaders can set up learning outlets in country areas to train and heighten the ability of country areas to use digital services so as to heighten the horizontal of country areas using digital payment business and the ability to get financial assistance through digital credit business. They can then increase the influence of digitalization on the earning disparity. Only in this way can the earning disparity between town and countryside areas in China be further narrowed through the evolution of digital financial inclusion.

China's latest census signifies that there are now more than 1.4 billion citizens, including more than 900 million urban people and more than 500 million rural people. The inclusive evolution of digital financial inclusion should be carried out for the 1.4 billion population, especially the 500 million rural population. Thus, some difficulties and challenges still arise for the future evolution.

It has long been a matter that the economic standard of China's eastern and western economic zones is not equilibrium. In the process of continuous evolution, China has been committed to promoting the economic gain of the western zone. Narrowing the economic disparity between the western and eastern districts has always been an significant matter to be solved urgently. The emergence and evolution of digital inclusive finance has provided a lot of opportunities for the western district. Digital inclusive finance not only converges the earning disparity in the eastern and western zones, but also accelerates the economic gain of the western district, so as to reduce the disparity between the western and eastern zones.

Generally, the evolution of digital financial inclusion should include the online digital business evolution of traditional financial institutions in addition to the inclusive business of Internet finance involved in the digital financial inclusion index of Peking University as adopted in this research. However, the evolution of digital financial inclusion in China cannot cover all digital businesses at present due to limited research capacity. The research in this research may underestimate the evolution of digital financial inclusion. Future research can try to develop a more comprehensive digital financial inclusion index and apply more representative index data.

5.5 Chapter Summary

This chapter highlights the significant findings of our study on the importance of digital finance in reducing income disparity and promoting rural economic evolution in Asia. We present our research results from the perspective of China, including its eastern and western economic zones, and provide actionable recommendations for the future evolution of digital inclusive finance in country areas. Our study also emphasizes the need for coordinated evolution between China's eastern and western districts to promote balanced economic gain. Additionally, we discuss the potential impact of our research on China and other developing countries in Asia and provide insights on how education, economic transformation, science and technology research and evolution, and increased openness to the world can also contribute to narrowing income disparity and promoting economic evolution. Finally, our study looks towards the future of digital financial inclusion as a promising tool for addressing urban-rural earning disparity.

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APPENDICES

Appendix 1A: LIA of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.719***	6.426***	6.318***	3.719***
	(0.942)	(0.589)	(0.577)	(0.756)
LIA	-0.045**	-0.040***	-0.040***	-0.045***
	(0.022)	(0.007)	(0.007)	(0.012)
LEL	-1.681***	-2.860***	-2.827***	-1.681***
	(0.445)	(0.283)	(0.278)	(0.280)
LFS	0.146***	0.044**	0.011	0.146***
	(0.043)	(0.021)	(0.021)	(0.031)
LET	-0.368***	-0.139***	-0.119***	-0.368***
	(0.091)	(0.037)	(0.036)	(0.069)
LRD	-0.110***	-0.031**	-0.019	-0.110***
	(0.029)	(0.015)	(0.015)	(0.022)
LOW	-0.034*	0.029***	-0.034***	-0.034***
	(0.020)	(0.008)	(0.008)	(0.013)
F Test	120.72***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1133.66***		-	-
(*p*-value)	(0.000)			
Hausman Test	36.58***			-
(*p*-value)	(0.000)			
Multicollinearity	-	-	3.81	-
Heteroskedasticity	-	-	2835.58 (0.000)***	-
Serial Correlation	-	-	39.374 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 1B: LCB of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.519***	5.910***	5.794***	3.519***
	(0.929)	(0.600)	(0.579)	(0.711)
LCB	-0.056***	-0.037***	-0.036***	-0.056***
	(0.017)	(0.005)	(0.005)	(0.015)
LEL	-1.528***	-2.622***	-2.591***	-1.528***
	(0.444)	(0.289)	(0.279)	(0.264)
LFS	0.149***	0.054***	0.014	0.149***
	(0.042)	(0.021)	(0.021)	(0.030)
LET	-0.330***	-0.152***	-0.129***	-0.330***
	(0.087)	(0.035)	(0.033)	(0.076)
LRD	-0.103***	-0.036**	-0.022	-0.103***
	(0.028)	(0.015)	(0.015)	(0.021)
LOW	-0.038**	0.026***	-0.032***	-0.038***
	(0.020)	(0.008)	(0.008)	(0.013)
F Test	124.28***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1136.85***		-	-
(*p*-value)	(0.000)			
Hausman Test	52.02***			-
(*p*-value)	-	(0.000)		
Multicollinearity	-	-	3.77	-
Heteroskedasticity	-	-	2634.46 (0.000)***	-
Serial Correlation	-	-	40.369 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 1C: LUD of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.648***	6.562***	6.484***	3.648***
	(0.948)	(0.584)	(0.574)	(0.758)
LUD	-0.023	-0.042***	-0.040***	-0.023*
	(0.022)	(0.007)	(0.007)	(0.012)
LEL	-1.754***	-2.940***	-2.926***	-1.754***
	(0.446)	(0.279)	(0.274)	(0.297)
LFS	0.138***	0.042**	0.010	0.138***
	(0.043)	(0.021)	(0.021)	(0.030)
LET	-0.419***	-0.137***	-0.120***	-0.419***
	(0.091)	(0.037)	(0.036)	(0.057)
LRD	-0.120***	-0.037	-0.026*	-0.120***
	(0.029)	(0.015)	(0.015)	(0.022)
LOW	-0.029	0.028***	-0.033***	-0.029**
	(0.020)	(0.009)	(0.008)	(0.013)
F Test	118.9***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1132.53***		-	-
(*p*-value)	(0.000)			
Hausman Test	30.66***			
(*p*-value)	-	(0.000)		-
Multicollinearity	-	-	3.74	-
Heteroskedasticity	-	-	2071.46 (0.000)***	-
Serial Correlation	-	-	43.740 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 1D: LDL of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.613***	7.168***	7.076***	3.613***
	(0.951)	(0.601)	(0.590)	(0.762)
LDL	-0.010	-0.010*	-0.010*	-0.010
	(0.019)	(0.006)	(0.005)	(0.007)
LEL	-1.780***	-3.363***	-3.332***	-1.780***
	(0.445)	(0.281)	(0.276)	(0.302)
LFS	0.140***	0.028	0.006	0.140***
	(0.043)	(0.022)	(0.022)	(0.030)
LET	-0.449***	-0.218***	-0.194***	-0.449***
	(0.085)	(0.036)	(0.036)	(0.055)
LRD	-0.123***	-0.038**	-0.025	-0.123***
	(0.029)	(0.016)	(0.016)	(0.021)
LOW	-0.027	0.038***	-0.042***	-0.027*
	(0.020)	(0.009)	(0.009)	(0.014)
F Test	118.45***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1112.22***		-	-
(*p*-value)	(0.000)			
Hausman Test	32.16***			
(*p*-value)	-	(0.000)		-
Multicollinearity	-	-	3.68	-
Heteroskedasticity	-	-	2414.12 (0.000)***	-
Serial Correlation	-	-	48.092 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 1E: Lpayment of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.826***	6.794***	6.730***	3.826***
	(0.958)	(0.565)	(0.556)	(0.884)
Lpayment	-0.015	-0.052***	-0.050***	-0.015
	(0.022)	(0.008)	(0.008)	(0.013)
LEL	-1.850***	-3.000***	-2.995***	-1.850***
	(0.444)	(0.267)	(0.263)	(0.341)
LFS	0.137***	0.045**	0.015	0.137***
	(0.043)	(0.021)	(0.021)	(0.030)
LET	-0.431***	-0.067	-0.056	-0.431***
	(0.096)	(0.042)	(0.041)	(0.066)
LRD	-0.111***	-0.033**	-0.023	-0.111***
	(0.029)	(0.015)	(0.015)	(0.024)
LOW	-0.032	0.018**	0.023***	-0.032**
	(0.020)	(0.009)	(0.009)	(0.014)
F Test	115.26***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1078.16***		-	-
(*p*-value)	(0.000)			
Hausman Test	24.75***			
(*p*-value)	-		(0.000)	-
Multicollinearity	-	-	3.76	-
Heteroskedasticity	-	-	5585.19 (0.000)***	-
Serial Correlation	-	-	39.905 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 1F: Linsurance of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.684***	6.972***	6.868***	3.684***
	(0.947)	(0.594)	(0.583)	(0.778)
Linsurance	-0.019	-0.014***	-0.015***	-0.019**
	(0.014)	(0.004)	(0.004)	(0.009)
LEL	-1.757***	-3.234***	-3.199***	-1.757***
	(0.444)	(0.279)	(0.274)	(0.292)
LFS	0.144***	0.032	-0.002	0.144***
	(0.043)	(0.021)	(0.022)	(0.031)
LET	-0.420***	-0.197***	-0.174***	-0.420***
	(0.085)	(0.036)	(0.035)	(0.067)
LRD	-0.118***	-0.036**	-0.023	-0.118***
	(0.029)	(0.016)	(0.015)	(0.021)
LOW	-0.027	0.038***	0.043***	-0.027**
	(0.020)	(0.009)	(0.008)	(0.014)
F Test	119.31***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1117.71***		-	-
(*p*-value)	(0.000)			
Hausman Test	34.23***			-
(*p*-value)	-		(0.000)	
Multicollinearity	-	-	3.66	-
Heteroskedasticity	-	-	2382.73 (0.000)***	-
Serial Correlation	-	-	47.139 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 1G: Lcredit of China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.564***	6.207***	6.204***	3.564***
	(0.944)	(0.582)	(0.574)	(0.739)
Lcredit	-0.017	-0.054***	-0.050***	-0.017
	(0.022)	(0.008)	(0.008)	(0.021)
LEL	-1.751***	-2.761***	-2.790***	-1.751***
	(0.448)	(0.278)	(0.275)	(0.315)
LFS	0.134***	0.052**	0.021	0.134***
	(0.043)	(0.021)	(0.021)	(0.029)
LET	-0.435***	-0.120***	-0.111***	-0.435***
	(0.089)	(0.036)	(0.036)	(0.054)
LRD	-0.123***	-0.049***	-0.039***	-0.123***
	(0.028)	(0.015)	(0.015)	(0.022)
LOW	-0.028	0.018**	0.024***	-0.028**
	(0.020)	(0.009)	(0.009)	(0.013)
F Test	118.62***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	1134.08***		-	-
(*p*-value)	(0.000)			
Hausman Test	18.97***			-
(*p*-value)	-		(0.004)	
Multicollinearity	-	-	3.74	-
Heteroskedasticity	-	-	2060.92 (0.000)***	-
Serial Correlation	-	-	47.629 (0.000)***	-
Observations	310	310	310	310

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2A: LIA of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.727***	3.306**	3.245**	3.727***
	(0.823)	(1.363)	(1.586)	(0.531)
LIA	-0.085***	-0.032	0.007	-0.085***
	(0.018)	(0.022)	(0.021)	(0.016)
LEL	-1.423***	-1.568***	-1.751**	-1.423***
	(0.360)	(0.609)	(0.721)	(0.235)
LFS	0.079**	0.043	-0.026	0.079**
	(0.035)	(0.036)	(0.038)	(0.034)
LET	-0.120	-0.251**	-0.097	-0.120*
	(0.091)	(0.113)	(0.111)	(0.073)
LRD	0.028	-0.035	-0.790*	0.028**
	(0.023)	(0.034)	(0.044)	(0.015)
LOW	-1.989***	-0.104***	0.086*	-0.199***
	(0.019)	(0.031)	(0.043)	(0.015)
F Test	182.68***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	15.79***		-	-
(*p*-value)	(0.000)			
Hausman Test	34.01***			
(*p*-value)	-	(0.000)		-
Multicollinearity	-	-	5.25	-
Heteroskedasticity	-	-	1126.14 (0.000)***	-
Serial Correlation	-	-	8.979 (0.015)**	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2B: LCB of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.821***	3.486***	3.346**	3.821***
	(0.787)	(1.331)	(1.574)	(0.489)
LCB	-0.091***	-0.049**	-0.019	-0.091***
	(0.017)	(0.022)	(0.022)	(0.015)
LEL	-1.436***	-1.554***	-1.659**	-1.436***
	(0.347)	(0.598)	(0.723)	(0.228)
LFS	0.079**	0.046	-0.017	0.079**
	(0.034)	(0.036)	(0.038)	(0.034)
LET	-0.087	-0.177	-0.014	-0.087
	(0.089)	(0.115)	(0.115)	(0.069)
LRD	0.033	-0.019	-0.059	0.033**
	(0.022)	(0.034)	(0.044)	(0.015)
LOW	-0.201***	-0.120***	0.055	-0.201***
	(0.019)	(0.031)	(0.043)	(0.014)
F Test	193.88***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	15.80***		-	-
(*p*-value)	(0.000)			
Hausman Test	28.01***			
(*p*-value)	-	(0.000)		-
Multicollinearity	-	-	5.23	-
Heteroskedasticity	-	-	671.19 (0.000)***	-
Serial Correlation	-	-	8.319 (0.018)**	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2C: LUD of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	3.619***	3.186**	3.252**	3.619***
	(0.862)	(1.377)	(1.581)	(0.611)
LUD	-0.078***	-0.022	0.010	-0.078***
	(0.019)	(0.021)	(0.020)	(0.019)
LEL	-1.425***	-1.579**	-1.757**	-1.425***
	(0.376)	(0.619)	(0.720)	(0.246)
LFS	0.074**	0.035	-0.026	0.074**
	(0.036)	(0.036)	(0.038)	(0.035)
LET	-0.154	-0.282***	-0.013	-0.154**
	(0.093)	(0.110)	(0.108)	(0.076)
LRD	0.019	-0.047	-0.077*	0.019
	(0.023)	(0.032)	(0.042)	(0.017)
LOW	-0.190***	-0.091***	0.087**	-0.190***
	(0.019)	(0.030)	(0.041)	(0.015)
F Test	173.10***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	18.81***		-	-
(*p*-value)	(0.000)			
Hausman Test	35.14***			-
(*p*-value)	-	(0.000)		
Multicollinearity	-	-	5.20	-
Heteroskedasticity	-	-	1036.76 (0.000)***	-
Serial Correlation	-	-	9.501 (0.013)**	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2D: LDL of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	2.629***	2.880**	2.665	2.629***
	(0.805)	(1.382)	(1.609)	(0.418)
LDL	-0.034***	-0.003	0.016	-0.034***
	(0.012)	(0.011)	(0.010)	(0.009)
LEL	-1.106***	-1.517**	-1.561**	-1.106***
	(0.369)	(0.623)	(0.719)	(0.198)
LFS	0.083**	0.037	-0.038	0.083**
	(0.036)	(0.037)	(0.038)	(0.033)
LET	-0.282***	-0.353***	-0.126	-0.282***
	(0.083)	(0.093)	(0.095)	(0.064)
LRD	0.005	-0.056*	-0.099**	0.005
	(0.023)	(0.032)	(0.044)	(0.015)
LOW	-0.179***	-0.076***	0.108***	-0.179***
	(0.020)	(0.028)	(0.040)	(0.017)
F Test	160.30***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	22.98***		-	-
(*p*-value)	(0.000)			
Hausman Test	41.46***			
(*p*-value)	-		(0.000)	-
Multicollinearity	-	-	4.57	-
Heteroskedasticity	-	-	1274.03 (0.000)***	-
Serial Correlation	-	-	10.733 (0.009)***	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2E: Lpayment of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	4.179***	4.033***	3.059*	4.179***
	(0.854)	(1.478)	(1.648)	(0.460)
Lpayment	-0.086***	-0.050**	0.015	-0.086***
	(0.017)	(0.028)	(0.030)	(0.010)
LEL	-1.609***	-1.807***	-1.707**	-1.609***
	(0.369)	(0.631)	(0.722)	(0.202)
LFS	0.084**	0.045	-0.029	0.084**
	(0.035)	(0.036)	(0.039)	(0.035)
LET	-0.086	-0.142	-0.132	-0.086*
	(0.093)	(0.144)	(0.145)	(0.052)
LRD	0.034	-0.019	-0.085*	0.034**
	(0.023)	(0.037)	(0.047)	(0.014)
LOW	-0.196***	-0.118***	0.096*	-0.196***
	(0.019)	(0.035)	(0.051)	(0.010)
F Test	187.26***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	21.83***		-	-
(*p*-value)	(0.000)			
Hausman Test	29.54***			-
(*p*-value)	-	(0.000)		
Multicollinearity	-	-	5.40	-
Heteroskedasticity	-	-	1150.04 (0.000)***	-
Serial Correlation	-	-	9.575 (0.013)**	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2F: Linsurance of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	2.806***	3.093**	3.321**	2.806***
	(0.781)	(1.343)	(1.584)	(0.498)
Linsurance	-0.038***	-0.014	-0.001	-0.038***
	(0.010)	(0.010)	(0.009)	(0.011)
LEL	-1.128***	-1.534**	-1.736**	-1.128***
	(0.358)	(0.614)	(0.720)	(0.220)
LFS	0.089**	0.042	-0.022	0.089**
	(0.037)	(0.036)	(0.038)	(0.036)
LET	-0.252***	-0.301***	-0.070	-0.252***
	(0.080)	(0.090)	(0.095)	(0.070)
LRD	0.014	-0.042	-0.071	0.014
	(0.023)	(0.032)	(0.044)	(0.016)
LOW	-0.177***	-0.088***	0.074*	-0.177***
	(0.018)	(0.027)	(0.039)	(0.016)
F Test	169.09***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	23.59***		-	-
(*p*-value)	(0.000)			
Hausman Test	33.15***			-
(*p*-value)	-		(0.000)	
Multicollinearity	-	-	4.51	-
Heteroskedasticity	-	-	907.21 (0.000)***	-
Serial Correlation	-	-	9.347 (0.014)**	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 2G: Lcredit of Eastern China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	4.194***	3.093**	3.234**	4.194***
	(0.927)	(1.343)	(1.575)	(0.651)
Lcredit	-0.106***	-0.014	0.025	-0.106***
	(0.025)	(0.010)	(0.031)	(0.023)
LEL	-1.656***	-1.534**	-1.788**	-1.656***
	(0.395)	(0.614)	(0.720)	(0.248)
LFS	0.061*	0.042	-0.028	0.061*
	(0.036)	(0.036)	(0.038)	(0.035)
LET	-0.120	-0.301***	-0.142	-0.120*
	(0.096)	(0.090)	(0.122)	(0.071)
LRD	0.021	-0.042	-0.072*	0.021
	(0.023)	(0.032)	(0.041)	(0.018)
LOW	-0.190***	-0.088***	0.093**	-0.190***
	(0.019)	(0.027)	(0.040)	(0.014)
F Test	175.95***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	12.30***		-	-
(*p*-value)	(0.000)			
Hausman Test	37.47***			-
(*p*-value)	(0.000)			
Multicollinearity	-	-	5.43	-
Heteroskedasticity	-	-	852.98 (0.000)***	-
Serial Correlation	-	-	9.497 (0.013)**	-
Observations	100	100	100	100

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3A: LIA of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Random Effects (Robust Standard Errors)
Constant	0.459	6.224***	6.225***	0.459
	(1.601)	(0.685)	(0.669)	(1.230)
LIA	-0.152***	-0.053***	-0.053***	-0.152***
	(0.035)	(0.009)	(0.008)	(0.034)
LEL	0.217	-2.717***	-2.713***	0.217
	(0.786)	(0.344)	(0.337)	(0.565)
LFS	0.106	0.021	0.005	0.106***
	(0.078)	(0.033)	(0.033)	(0.035)
LET	0.259	-0.156***	-0.153***	0.259
	(0.195)	(0.049)	(0.048)	(0.195)
LRD	-0.220***	-0.052***	-0.041**	-0.220***
	(0.043)	(0.020)	(0.020)	(0.019)
LOW	0.059*	0.055***	0.054***	0.059***
	(0.032)	(0.009)	(0.009)	(0.018)
F Test	35.12***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	379.51***		-	-
(*p*-value)	(0.000)			
Hausman Test	8.79			
(*p*-value)	-	(0.1860)		-
Multicollinearity	-	-	3.17	-
Heteroskedasticity	-	-	366.64 (0.000)***	-
Serial Correlation	-	-	112.849 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3B: LCB of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	-0.344	6.068***	6.144***	-0.344
	(1.610)	(0.748)	(0.702)	(1.219)
LCB	-0.115***	-0.035***	-0.034***	-0.115***
	(0.024)	(0.006)	(0.006)	(0.029)
LEL	0.495	-2.737***	-2.770***	0.495
	(0.790)	(0.371)	(0.348)	(0.566)
LFS	0.115	0.033	0.007	0.115***
	(0.077)	(0.036)	(0.034)	(0.034)
LET	0.187	-0.199***	-0.194***	0.187
	(0.183)	(0.051)	(0.047)	(0.197)
LRD	-0.218***	-0.070***	-0.053***	-0.218***
	(0.042)	(0.021)	(0.020)	(0.018)
LOW	0.056*	0.057***	0.054***	0.056***
	(0.032)	(0.010)	(0.009)	(0.020)
F Test	36.55***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	364.35***		-	-
(*p*-value)	(0.000)			
Hausman Test	24.58***			-
(*p*-value)	(0.0004)			
Multicollinearity	-	-	3.12	-
Heteroskedasticity	-	-	532.81 (0.000)***	-
Serial Correlation	-	-	96.501 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3C: LUD of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Random Effects (Robust Standard Errors)
Constant	0.747	6.719***	6.736***	0.747
	(1.627)	(0.658)	(0.656)	(1.267)
LUD	-0.136***	-0.052***	-0.051***	-0.136***
	(0.037)	(0.009)	(0.009)	(0.030)
LEL	-0.079	-2.990***	-2.996***	-0.079
	(0.789)	(0.324)	(0.325)	(0.586)
LFS	0.068	0.014	0.004	0.068*
	(0.080)	(0.033)	(0.034)	(0.039)
LET	0.263	-0.140***	-0.139***	0.263
	(0.207)	(0.050)	(0.049)	(0.189)
LRD	-0.244***	-0.058***	-0.051**	-0.244***
	(0.044)	(0.020)	(0.020)	(0.021)
LOW	0.065*	0.052***	0.052***	0.065***
	(0.033)	(0.009)	(0.009)	(0.017)
F Test	33.02***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	391.80***		-	-
(*p*-value)	(0.000)			
Hausman Test	1.48			-
(*p*-value)	-	(0.9610)		
Multicollinearity	-	-	3.20	-
Heteroskedasticity	-	-	177.55 (0.000)***	-
Serial Correlation	-	-	83.526 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3D: LDL of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Random Effects (Robust Standard Errors)
Constant	1.403	7.043***	7.017***	1.403
	(1.656)	(0.717)	(0.702)	(1.326)
LDL	-0.106***	-0.038***	-0.039***	-0.106***
	(0.039)	(0.009)	(0.009)	(0.031)
LEL	-0.365	-3.189***	-3.166***	-0.365
	(0.801)	(0.356)	(0.350)	(0.611)
LFS	0.124	0.001	-0.016	0.124***
	(0.082)	(0.036)	(0.036)	(0.033)
LET	0.067	-0.195***	-0.190***	0.067
	(0.196)	(0.052)	(0.051)	(0.179)
LRD	-0.219***	-0.054**	-0.041*	-0.219***
	(0.045)	(0.022)	(0.022)	(0.020)
LOW	0.078**	0.065***	0.064***	0.078***
	(0.033)	(0.010)	(0.010)	(0.019)
F Test	30.46***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	389.69***		-	-
(*p*-value)	(0.000)			
Hausman Test	6.79			
(*p*-value)	-	(0.3408)		-
Multicollinearity	-	-	3.06	-
Heteroskedasticity	-	-	322.74 (0.000)***	-
Serial Correlation	-	-	84.565 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3E: Lpayment of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Random Effects (Robust Standard Errors)
Constant	1.169	7.022***	7.053***	1.169
	(1.664)	(0.624)	(0.618)	(1.381)
Lpayment	-0.135***	-0.059***	-0.058***	-0.135***
	(0.039)	(0.009)	(0.009)	(0.026)
LEL	-0.345	-3.121***	-3.135***	-0.345
	(0.797)	(0.303)	(0.301)	(0.638)
LFS	0.034	0.012	0.001	0.034***
	(0.084)	(0.032)	(0.033)	(0.035)
LET	0.354	-0.081	-0.082	0.354**
	(0.233)	(0.053)	(0.052)	(0.179)
LRD	-0.252***	-0.059***	-0.051**	-0.252***
	(0.046)	(0.020)	(0.020)	(0.021)
LOW	0.055	0.042***	0.041***	0.055***
	(0.034)	(0.010)	(0.009)	(0.016)
F Test	28.57***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	404.63***		-	-
(*p*-value)	(0.000)			
Hausman Test	8.04			-
(*p*-value)	-	(0.2354)		
Multicollinearity	-	-	3.28	-
Heteroskedasticity	-	-	251.13 (0.000)***	-
Serial Correlation	-	-	87.584 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3F: Linsurance of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Random Effects (Robust Standard Errors)
Constant	1.367	7.000***	7.003***	1.367
	(1.624)	(0.676)	(0.670)	(1.296)
Linsurance	-0.098***	-0.033***	-0.033***	-0.098***
	(0.028)	(0.006)	(0.006)	(0.030)
LEL	-0.388	-3.180***	-3.178***	-0.388
	(0.777)	(0.329)	(0.328)	(0.578)
LFS	0.098	0.004	-0.009	0.098***
	(0.080)	(0.034)	(0.035)	(0.037)
LET	0.162	-0.179***	-0.176***	0.162
	(0.197)	(0.050)	(0.049)	(0.216)
LRD	-0.233***	-0.059***	-0.050**	-0.233***
	(0.044)	(0.020)	(0.021)	(0.020)
LOW	0.079**	0.064***	0.063***	0.079***
	(0.033)	(0.010)	(0.009)	(0.017)
F Test	32.45***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	380.13***		-	-
(*p*-value)	(0.000)			
Hausman Test	8.35			-
(*p*-value)	-	(0.2139)		
Multicollinearity	-	-	3.05	-
Heteroskedasticity	-	-	212.49 (0.000)***	-
Serial Correlation	-	-	59.452 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.

Appendix 3G: Lcredit of Western China

Variable	Pooled OLS	Random Effects	Fixed Effects	Fixed Effects (Robust Standard Errors)
Constant	0.306	6.910***	6.976***	0.306
	(1.700)	(0.703)	(0.698)	(1.402)
Lcredit	-0.103***	-0.042***	-0.041***	-0.103***
	(0.036)	(0.009)	(0.009)	(0.024)
LEL	-0.049	-3.163***	-3.195***	-0.049
	(0.825)	(0.344)	(0.343)	(0.667)
LFS	0.047	0.021	0.010	0.047
	(0.084)	(0.036)	(0.037)	(0.038)
LET	0.204	-0.153***	-0.153***	0.204
	(0.216)	(0.053)	(0.053)	(0.160)
LRD	-0.251***	-0.074***	-0.066***	-0.251***
	(0.045)	(0.021)	(0.021)	(0.022)
LOW	0.059*	0.045***	0.045***	0.059***
	(0.035)	(0.011)	(0.011)	(0.018)
F Test	32.45***			
(*p*-value)	(0.000)			
Breusch-Pagan LM Test	403.18***		-	-
(*p*-value)	(0.000)			
Hausman Test	43.09***			
(*p*-value)	-	(0.0000)		-
Multicollinearity	-	-	3.37	-
Heteroskedasticity	-	-	510.78 (0.000)***	-
Serial Correlation	-	-	148.440 (0.000)***	-
Observations	120	120	120	120

Notes: Asterisk ***, ** and * represent significance at the 1, 5 and 10 percent level, respectively. The figures in brackets are the values of standard error.