



Faculty of Economics and Business

**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 (POLLS), 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 tertiar), 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 mengurangi jurang pendapatan antara kawasan bandar dengan luar bandar di China. Evolusi jumlah indeks rangkuman kewangan digital dapat mengurangi 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. Rangkuman 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