FINANCIAL LITERACY, FINANCIAL INCLUSION, INCOME INEQUALITY AND ECONOMIC UNCERTAINTY IN DEVELOPING COUNTRIES

By

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Thesis submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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June 2024

Chairman: Professor Law Siong Hook, PhD
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Financial inclusion is a strategic approach when confronting social issues such as rising income inequality, poverty and economic uncertainty. However, nearly one-third of the world's population is still denied access to financial services. Financial literacy remains disappointingly low and become a persistent obstacle to financial inclusion. Additionally, the ageing population has recently impacted society, which is less open to financial institutions and more susceptible to various types of risk. A digital gap also prevents these disadvantaged populations from fully participating with the higher socioeconomic groups. This situation may result in social exclusion and missed economic opportunities.

The first objective is to investigate the relationship between financial literacy and financial inclusion. The empirical results of the cross-sectional threshold model suggested a no threshold or no inverted U-shaped effect of financial literacy on financial inclusion. Following that, quantile regression techniques are used in this

work to examine the impact of financial knowledge on various quantiles of the conditional distribution. The outcomes suggest that the variable of financial literacy has no substantial influence on financial inclusion.

The second objective is to examine the role of the ageing population in moderating the impact of financial inclusion on income inequality. GMM method reveals that financial inclusion and the ageing population are not predictors of income distribution. However, the combined effect of financial inclusion and an ageing population on the income gap is significant. Meanwhile, the empirical findings of the panel quantile regression technique demonstrate that financial inclusion and an ageing population are crucial factors in reducing income inequality at a low quantile level. The ageing population moderates the relationship between financial inclusion and income inequality, particularly regarding the rise of income disparity at the low quantile (low income inequality). However, the parameter of the interaction effect between financial inclusion and the ageing population decreased at the upper quantile (higher income inequality).

The third objective is to analyse the effect of digitalisation on inclusion-economic uncertainty nexus. GMM estimators indicate that digitalisation contributes to a rise in economic uncertainty. Nevertheless, financial inclusion is an insignificant determinant of economic uncertainty. The interaction term between financial inclusion and digitalisation is an insignificant determinant of economic uncertainty. Meanwhile, the quantile regression results suggest that financial inclusion is crucial for reducing economic uncertainty at a low level of economic uncertainty. Additionally, digitalisation contributes to an increase in economic uncertainty at the low and high

levels of economic uncertainty (at low and high distribution quantiles). This study also discovered that the interaction effect between financial inclusion and digitalisation is more significant when uncertainty increases, particularly at the low economic uncertainty level.

As a policy recommendation, it is crucial to prioritise skill development and education to enhance financial literacy. Financial institutions should develop inclusive financial products tailored for older adults to ensure their participation in the formal financial system. Financial institutions also must establish a secure digital finance framework to minimise risks and build trust in financial transactions. This comprehensive approach will create an inclusive financial environment, reducing inequality and promoting economic stability.

Keywords: Financial Literacy, Financial Inclusion, Income Inequality, Economic Uncertainty, Developing Countries

SDG: GOAL 8: Decent Work And Economic Growth, GOAL 10: Reduced Inequalities

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

LITERASI KEWANGAN, KETERANGKUMAN KEWANGAN, KETIDAKSAMAAN PENDAPATAN DAN KETIDAKTENTUAN EKONOMI DI NEGARA SEDANG MEMBANGUN

Oleh

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Keterangkuman kewangan merupakan pendekatan strategik dalam menangani isu-isu sosial seperti ketidaksamaan pendapatan yang semakin meningkat, kemiskinan dan ketidakpastian ekonomi. Namun, hampir satu pertiga daripada populasi dunia masih dinafikan akses kepada perkhidmatan kewangan. Literasi kewangan berada di tahap rendah dan menjadi halangan berterusan kepada keterangkuman kewangan. Selain itu, populasi menua telah memberi kesan kepada masyarakat yang kurang terdedah kepada institusi kewangan serta lebih terdedah kepada pelbagai risiko. Jurang digital turut menghalang populasi terpinggir daripada menyertai kumpulan sosioekonomi yang lebih tinggi. Senario ini akan membawa kepada masalah pengasingan sosial dan kehilangan peluang ekonomi.

Objektif pertama kajian adalah menganalisis sama ada wujud hubungan antara literasi kewangan dan keterangkuman kewangan. Keputusan model regresi tahap ambang keratan rentas menunjukkan tiada tahap ambang dan tiada kesan berbentuk U atau

berbentuk U terbalik literasi kewangan ke atas keterangkuman kewangan. Seterusnya, kajian ini menggunakan teknik regresi sukuan untuk mengkaji kesan pekali literasi kewangan pada pelbagai sukuan pengagihan bersyarat keterangkuman kewangan. Dapatan kajian menunjukkan bahawa pembolehubah literasi kewangan tidak memberi kesan yang signifikan ke atas pelbagai sukuan dalam pengagihan bersyarat indeks keterangkuman kewangan.

Objektif kedua kajian adalah menganalisis peranan keterangkuman kewangan dan populasi menua terhadap ketidaksamaan pendapatan. Hasil dapatan melalui kaedah momen teritlak menunjukkan keterangkuman kewangan dan populasi menua bukan penentu terhadap ketidaksamaan pendapatan. Namun, kesan interaksi antara kedua-dua pembolehubah tersebut terhadap ketidaksamaan pendapatan adalah signifikan. Sementara itu, dapatan empirikal bagi teknik regresi sukuan menunjukkan keterangkuman kewangan dan populasi menua adalah penentu penting untuk mengurangkan ketidaksamaan pendapatan pada tahap sukuan yang rendah. Populasi menua juga memainkan peranan penting dalam memberi kesan hubungan antara keterangkuman kewangan dan ketidaksamaan pendapatan, terutamanya dalam meningkatkan ketidaksamaan pendapatan pada sukuan ketidaksamaan pendapatan yang lebih rendah. Walau bagaimanapun, nilai pekali interaksi antara keterangkuman kewangan dan populasi menua menunjukkan aliran condong ke bawah menuju ke arah sukuan ketidaksamaan pendapatan yang tinggi.

Objektif ketiga kajian adalah mengkaji kesan penyederhanaan pendigitalan terhadap hubungan antara keterangkuman kewangan-ketidakpastian ekonomi. Hasil kajian menggunakan kaedah momen teritlak mendapati pendigitalan memainkan peranan

dalam meningkatkan ketidaktentuan ekonomi. Namun, keterangkuman kewangan tidak menunjukkan bukti signifikan terhadap ketidaktentuan ekonomi. Interaksi antara keterangkuman kewangan dan pendigitalan terhadap ketidaktentuan ekonomi juga tidak signifikan. Kajian ini menggunakan teknik regresi sukuan untuk menerangkan lebih lanjut hubungan tersebut. Keputusan kajian teknik regresi sukuan menunjukkan keterangkuman kewangan adalah penting dalam mengurangkan ketidakpastian ekonomi pada sukuan ketidakpastian ekonomi yang rendah. Pendigitalan memainkan peranan dalam meningkatkan ketidakpastian ekonomi pada sukuan rendah dan tinggi. Kajian ini juga mendapati kesan peningkatan interaksi antara keterangkuman kewangan dan pendigitalan adalah lebih besar terutamanya pada sukuan ketidaktentuan ekonomi yang rendah.

Sebagai cadangan dasar, penting untuk mengutamakan pembangunan kemahiran dan pendidikan dalam meningkatkan literasi kewangan. Institusi kewangan perlu membangunkan produk kewangan yang inklusif untuk golongan warga emas bagi memastikan penyertaan dalam sistem kewangan formal. Institusi kewangan juga mesti mewujudkan rangka kerja kewangan digital yang selamat untuk meminimumkan risiko dan membina kepercayaan dalam transaksi kewangan. Pendekatan menyeluruh ini akan mewujudkan persekitaran kewangan yang inklusif, mengurangkan ketidaksamaan, dan meningkatkan kestabilan ekonomi.

Kata Kunci: Literasi Kewangan, Keterangkuman Kewangan, Ketidaksamaan Pendapatan, Ketidaktentuan Ekonomi, Negara Sedang Membangun

SDG: MATLAMAT 8: Kerja yang Decent dan Pertumbuhan Ekonomi, MATLAMAT 10: Pengurangan Ketidaksamaan

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ADBI	Asian Development Bank Institute
ATM	Automated teller machine
CPI	Consumer price inflation
CRE	Outstanding loan accounts over the gross domestic product
DEP	Number of deposit accounts per 1,000 adults
FAS	Financial Access Survey
FIN	Financial Inclusion Index
GDP	Gross domestic product
GHS	General Household Survey
GINI	Gini Coefficient index
GMM	Generalised method of moments
IMF	International Monetary Fund
INE	Income inequality
INF	Inflation
LCH	Life cycle hypothesis
MENA	Middle East and North African
OECD	Organization for Economic Cooperation and Development
OIC	Organisation of Islamic Cooperation
OLS	Ordinary least squares
SDG	Sustainable Development Goals
SWIID	Standardized World Income Inequality Database
TPB	Theory of planned behaviour
WDI	World Development Indicators

CHAPTER 1

INTRODUCTION

1.1 Introduction

The global financial crisis also known as the Great Recession, was widely regarded as one of the worst economic crises in history. Many financial institutions worldwide faced significant challenges and required government assistance. As a result of this calamity, governments worldwide implemented several strategies to alleviate the impacts and protect depositors. These actions involved bailouts of failing banks, guarantees on deposits, and capital injections into the financial sector. Despite these efforts, the financial crisis has a spillover effect on economies and impacts people in developing countries.

The developing countries had long struggled with various social problems such as high poverty, inequality, hunger, financial market volatility, and increasing insecurity, translating into tepid economic growt. The crisis further widens income inequality, increases economic insecurity, and threatens sustainable development in many parts of the world (Altunbaş & Thornton, 2019; Doumbia & Kinda, 2019). Rising income disparity in most countries is one of the most critical issues that has drawn the attention of policymakers, international organisations, academics, economists, and other social scientists. In fact, the United Nations Development Program (UNDP) 2020 report highlights that income inequality has increased in developed and developing countries, leading to a call for more equitable distribution of wealth and resources.

Undoubtedly, the global crisis also has evolved into a profound challenge of uncertainty, causing concerns about the future economic conditions in developing nations. The term uncertainty signifies the level of insight into the future economic performance that arises from various factors, including economic, political, and social conditions, as well as unforeseen events or changes in market trends (Gao et al. 2019; Moore, 2017; Pan et al. 2021). Developing countries often face various challenges and events that can significantly impact their economies and market stability (Ahir et al. 2022; Matsebula & Sheefeni, 2022; Zhou et al. 2022). Besides, financial sector instability in developing countries can significantly affect the economies and societies (Phan et al. 2021; J. Wu et al. 2022). Financial sector instability can increase economic uncertainty by making it more difficult for households and businesses to access credit, make long-term plans, and predict the future value of assets and investments. If this problem persists, it can undermine social stability, impede economic growth, and trigger uncertainty and further recession.

Financial sector development plays a pivotal role in economic stability and prosperity. The financial sector comprises two primary elements: financial institutions and financial markets (World Bank, 2018). The essential function of financial institutions and financial markets lies in providing various financial services. Additionally, a well-established financial sector is necessary to improve access to business capital to increase output and other economic activities promoting growth and development (Bencivenga & Smith, 1991; Asli Demirgüç-Kunt & Levine, 2009; King & Levine, 1993; Levine, 1997). The financial development is also vital in capital accumulation and technological progress, which can be described in four concepts: financial depth, accessibility, stability and efficiency (World Bank, 2018). A stable and effective

financial system is an essential element of economic growth (Estrada et al. 2015). Hence, it is crucial to ensure the advantages of the financial development reach a wider spectrum of the population.

The initial concept within the financial sector development is financial depth. Financial depth refers to the size and liquidity of the market. Financial sector efficiency contributes to the institution's affordable financial products and services. Meanwhile, financial access mainly measures individuals' and firms' ability to receive formal services promptly without any barriers. Improving accessibility has been recognised as an essential measure in financial services, and priority should be given to the low-income household to be involved (Claessens, 2006). Thus, if vulnerable groups do not have access to financial facilities, this can lead to a persistent widening of the wealth gap and slower economic growth in the long run. Financial stability revolves around the ability of financial systems to endure potential shocks (Čihák et al. 2020; World Bank, 2018) and financial efficiency refers to the ability of the institution to effectively manage its financial resources to reduce risk (Ozili, 2021; World Bank, 2018).

This research will give prominence to financial accessibility due to its critical importance in the financial sector. Access to and use of formal financial services, such as bank accounts, loans and insurance, is vital for individuals and businesses to manage their finances effectively. The ability of people to engage in formal financial services could significantly impact the financial inclusion level. Financial inclusion increases bank liquidity and provides more creditworthy funds for profitable investments, leading to a more substantial multiplier effect on economic growth. One

of the crucial performance indicators of the financial sector could be determined by the number of individuals and companies that have access to and use the formal financial services offered by conventional financial institutions. Therefore, addressing any significant barriers to financial services is critical to attaining social and economic goals.

1.2 Background of the Study

1.2.1 The Importance of Financial Literacy in the Financial Sector

Various types of financial services are available, and financial knowledge is critical to assist individuals in understanding the risks and rewards before making any choices. The complexity of the financial markets makes financial literacy more important than ever (Philippas & Avdoulas, 2020; Van Rooij et al. 2011). Several organisations, including government agencies and financial institutions, undertake various initiatives to educate the public about finance. In the mid-1990s, the Jump$tart Coalition, founded in the United States (US), began promoting financial education as a crucial policy objective for development (Mandell, 2008). This effort became necessary after the global financial crisis when the community was negatively impacted and unable to cope with the economic downturn owing to limited financial knowledge. One of the efforts to understand and evaluate the literacy level among young Americans through a survey started in 1997-1998 as part of the early contribution of this program (Mandell, 2008). This initiative focuses on cooperation and teamwork to harness financial understanding among youth community in the US. Since then, policymakers in many countries have found the crucial role of monetary knowledge and shifted their approach to the policy issue related to financial literacy.

Financial literacy could be a key determinant for financial inclusion, which is positively linked to higher savings, improving access to employment, investment behaviour, and borrowing practices that reduce inequality (Fouejieu et al. 2020; Annamaria Lusardi, 2019; Zins & Weill, 2016). Although there have been numerous discussions about financial literacy, a controversy exists between scholars and experts due to the absence of a standard interpretation of financial literacy in the literature. The conceptualisation of financial literacy is imprecise and could be defined in several ways. In the literature, the terms financial education, financial capacity and financial knowledge are used interchangeably (Álvarez-Franco et al. 2017; Aren & Dinç Aydemir, 2014; Hussain et al. 2018; Huston, 2010; Kennedy, 2013). Organization for Economic Cooperation and Development (2013) defines financial literacy as "a combination of awareness, knowledge, skill, attitude, and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being". Lusardi and Mitchell (2014, p.6) described financial literacy as "people's ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pension". Hence, financial literacy describes an individual who understands financial concepts and risks and employs the knowledge to make sound financial decisions. Consequently, it helps to improve the financial well-being of individuals and society and participate in economic activities (Atkinson & Messy, 2012).

Besides, financial literacy refers to an individual's ability to comprehend and utilise personal financial information for better financial decisions (Grohmann, 2018). Lusardi and Mitchell (2014) also emphasise that financial literacy is associated with the level of knowledge among individuals to understand the fundamentals of finance

and the ability to process information to make simple calculations before any decision-making in financial activities. Further, Askar et al. (2020) explained that financial literacy is generally the ability of a person to understand financial principles and handle financial resources, which are now becoming an essential component of efforts to reform the financial sector. Financial knowledge develops into financial skills, enabling individuals to make appropriate economic decisions and financial behaviour (Safitri, 2021). It also could be explained in two dimensions; familiarity and knowing finances and how to apply their understanding in personal life and business operations (Huston, 2010).

Generally, the community's financial knowledge level could determine their participation in the financial sector. Financial literacy is crucial in developing countries since most people require skills and knowledge to meet their financial objectives. Figure 1.1 illustrates a scatter diagram between the financial literacy and financial inclusion index of seventy-six selected developing countries. The graph depicts a linear relationship between the two variables and a possible non-linear U-shaped relationship. A high level of financial literacy and the number of people participating in the financial sector is observed in emerging economies but limited in low-income countries. The financial knowledge of underdeveloped regions might has different elasticities of impact on financial decision-making. As the expansion of financial facilities becomes available, the influence elasticity gradually increases (Y. Li et al. 2020). In addition to financial literacy, factors such as social networks and infrastructures play a crucial role in financial decisions (Lyons et al. 2019). For instance, if an individual has a network of financially literate friends and family members who make sound financial decisions, they may be more likely to do the same.

Besides, suppose an individual can access financial services, such as a bank account or a credit card, they might be motivated to use other financial facilities and continue making wise judgements.

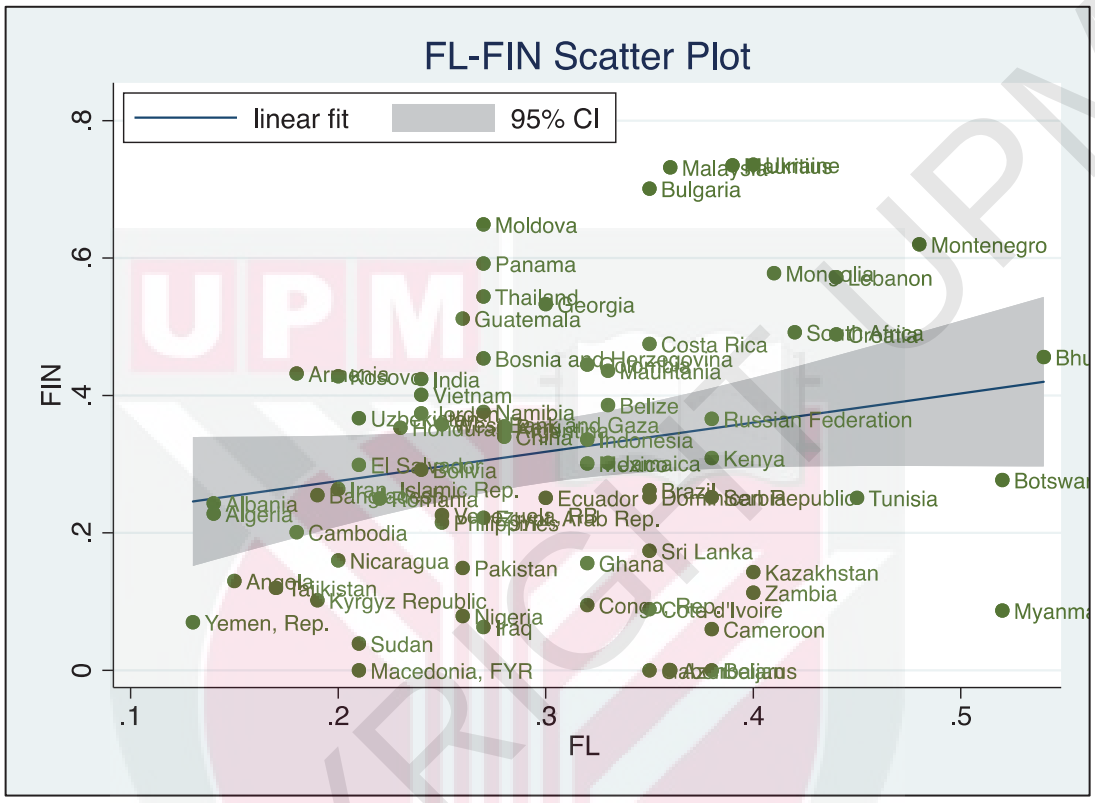

Figure 1.1: Scatter Plot of Financial Literacy (FL) and Financial Inclusion Index (FIN) in 2014
(Source: Authors' calculation, S&P Global FinLit Survey and International Monetary Fund)

Financial knowledge in a society also strongly correlates with the development of the corresponding country's financial sector (Hasan et al. 2021). People with greater financial literacy can make better saving decisions and manage their investments to maximise their returns (Kadoya et al. 2018). Studies also demonstrated the essential role of financial knowledge in raising financial inclusion as a fundamental prerequisite for encouraging the usage of financial services among poor and vulnerable communities (Kumari et al. 2020; Morgan & Long, 2020; Philippas & Avdoulas,

2020). Financial literacy is seen as enhancing people's ability to make the right choices, and they may be involved in advanced financial activities. Hence, this suggests that it is often seen as an essential mechanism to increase financial inclusion and reduce income inequality (Grohmann et al. 2018).

Despite many discussions on the different properties of financial literacy and its effect on the financial sector, studies on the relationship between financial literacy and financial inclusion have been contentious in recent studies (Morgan & Long, 2020), begging the need for continued research related to financial literacy to understand better the relationship between financial inclusion. Therefore, further research on the relationship between financial literacy and financial inclusion is critical to determine if financial literacy is linearly or non-linearly related to financial inclusion. If a non-linear relationship existed, this analysis could identify the financial literacy threshold level that impacts financial inclusion in developing economies.

1.2.2 Financial Inclusion: Prospects and Dilemmas

Financial inclusion is a crucial policy instrument for achieving economic development, particularly in eliminating social issues such as income inequality and poverty. Nevertheless, financial inclusion revolution poses socioeconomic challenges during global crises, requiring policymakers and financial institutions to cooperate. Even when financial services are available, reaching customers' demands might be challenging (Ozili, 2021). Therefore, it is vital to understand issues related to financial accessibility and ensure that disadvantaged groups can utilise formal financial services to achieve economic advantages.

The World Bank's Global Financial Development highlights the importance of financial accessibility for economic growth (World Bank, 2018). A common concept of financial inclusion in the literature defined as a process that ensures the usage and accessibility of formal financial services by low-income people (Adil & Jalil, 2020; Allen et al. 2016; Beck, Demirgüç-Kunt, et al. 2007; Fouejieu et al. 2020; Kling et al. 2020; Omar & Inaba, 2020; Ozili, 2018). Meanwhile, financial inclusion has been described by Ofosu-Mensah Ababio et al. (2020) and Sarma and Pais (2010) as the mechanism by which individuals and businesses gain access to and use the formal financial institution for economic activities. One of the essential indicators of financial inclusiveness is that individuals have access to a bank account, a gateway to the formal financial institution. A formal bank account helps people manage their salaries, remittances and government grants. Moreover, it can also promote savings and greater access to credit. Thus, having a formal account is a measure of financial inclusion (Klapper & Hess, 2019). Further, the priority of financial inclusion is to ensure the entry of the weaker and vulnerable groups into the formal financial institutions, allowing them to use the services such as credit facilities and other financial programs at an affordable price and on time (Abel et al. 2018). These vulnerable communities will benefit from bank deposits, credits, saving, investment opportunities, productive expenditure, saving and smooth consumption and emergency insurance (Grohmann et al. 2018; Kim et al. 2017). Financial sector inclusiveness also could incorporate the capital owners and borrowers, positively impacting the vulnerable group (Mader, 2018).

Although the importance of having access to financial activities is known, the data signifies that there is still room for improvement. Recent statistics from the World

Bank Global Findex database indicate that the proportion of adults with an account has now reached 69% worldwide, a rise of 7% percentage point from 2014, which could also be translated into approximately 515 million adults who has access to financial facilities (Demirguc-Kunt et al. 2018). However, developed countries are the major contributors to global account ownership. Figure 1.2 shows the account ownership among different classified income groups of economies based on the World Bank. In high-income economies, the figure shows that 92% of adults use the formal financial sector compared to the lower-middle and lower-income economies, which had the lowest account penetration among adults using a formal financial account in 2017, with only 44% and 33%, respectively. It explains that the percentage gap in account ownership remains high between developed regions and developing countries represented by lower- or middle-income economies.

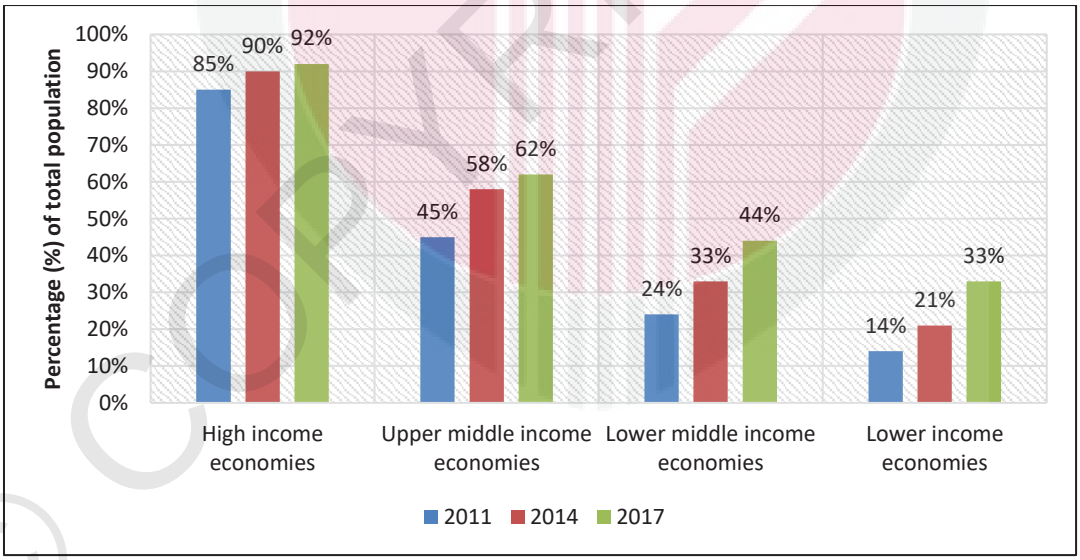

Figure 1.2: Account holder with an established financial institution
(Source: World Bank's Global Findex database)

United Nations also recognises that financial inclusion is a critical strategy for achieving Sustainable Development Goals (SDGs) and eliminating inequalities

globally (Klapper et al. 2016). However, efforts to ensure that vulnerable groups have access to financial activities and develop an integrated financial sector are challenging. Demirguc-Kunt et al. (2018) explained that some people avoid financial facilities due to high cost, location and documentation issues. Based on the previous discussion of the concept of financial inclusion, it is apparent that financial inclusion is a multidimensional phenomenon. Therefore, increasing public access to formal financial services is crucial, particularly for unbanked individuals who could be excluded from the financial sector due to a lack of access or other barriers.

1.2.3 Confronting Financial Exclusion Hurdles

Previous discussions of financial inclusion have linked the clarifications to tackle financial exclusion. Financial exclusion can be described as restricting access to financial services such as bank accounts, loans, and insurance for specific individuals or groups (Leyshon & Thrift, 1995).

Kempson and Whyley (1999) further explained five different categories of exclusion. The first category is access exclusion, which refers to parts of the community with limited access to formal financial activities because they are geographically isolated or a risky population to access the financial institutions. The next type is condition exclusion, when an individual is deliberately excluded from participating in financial activities and demonstrates their unsuitability for specific activities. Meanwhile, price exclusion arises when an individual is excluded from the system due to financial services becoming unaffordable among the underserved population. Marketing exclusion happens when financial institutions develop targeted marketing and specialised sales strategies to attract exclusive clientele. Finally, self-exclusion

exclusion occurs when a group refuses to be involved in the formal financial institutions due to fear of rejection or frustration with the process. On the other hand, Demir et al. (2020) and Kabakova and Plaksenkov (2018) tied the issue of financial exclusion to the market imperfections and asymmetrical information that prevent some businesses and households from accessing financial services due to a lack of knowledge or experience in the financial institutions.

Meanwhile, Demirgüç-Kunt et al. (2008) classified financial exclusion into two distinct viewpoints: voluntary and involuntary financial exclusion (Figure 1.3). Voluntary exclusion refers to a group of individuals or firms that choose not to participate in financial services for various reasons, as they believe financial services are unnecessary. It also happens when people believe their involvement would contradict their values, religious beliefs, customs and culture (Khandare, 2019). Nevertheless, addressing the pressing issue of involuntary financial exclusion is imperative. This condition happens when an individual has insufficient wealth and is exposed to further uncertainty and risk. Factors such as inaccurate information, non-competitive marketplaces, deficiencies in the contractual framework, and a lack of physical infrastructure can create this barrier, leading to the market's failure (Ahmad et al. 2020). As a result, individuals may be forced to withdraw from or refuse to involve in financial services.

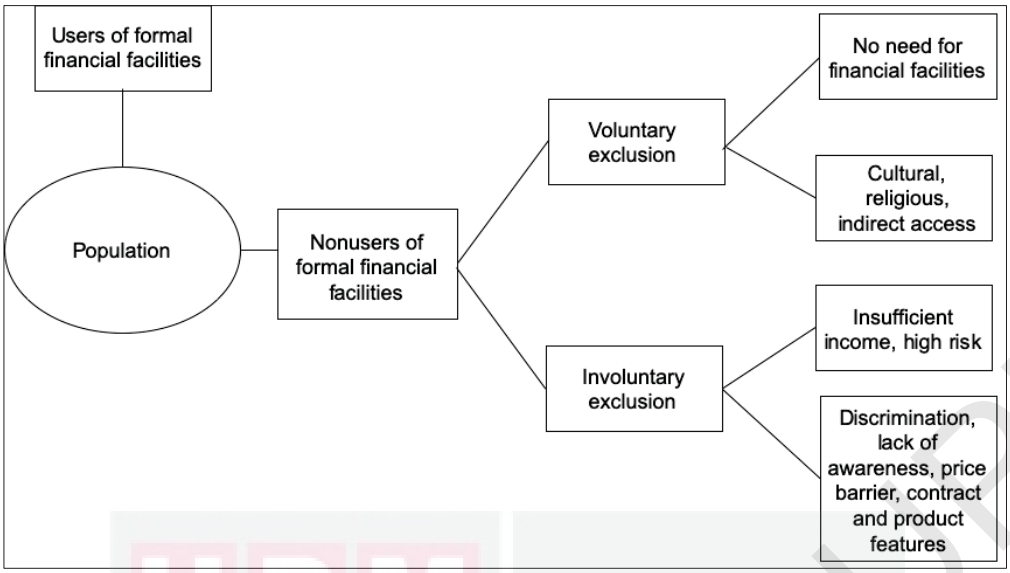

Figure 1.3: Use of and access to financial facilities
(Source: Adapted from Demirgüç-Kunt et al. 2008)

Financial exclusion has the potential to harm the financial sector as well as economic progress. Individuals who cannot save and invest for the future may limit their potential to generate wealth and financial stability. Further, this might exacerbate regional differences in income and economic advancement, contributing to persistent inequality (Kling et al. 2020; Leyshon & Thrift, 1995).

1.2.4 Addressing Income Inequality and the Challenges of an Ageing Population through Financial Inclusion

Rising global inequality can be addressed from various viewpoints, most commonly through income inequality. It is essential to tackle this issue as equality is fundamental in most societies. Income inequality refers to unequal income distribution among different social groups and is generally captured by the Gini coefficient value (OECD, 2011). Growing income inequality has long been a significant concern for policymakers in developed and developing countries, driven by the potential impact

of the swift rise in disparity that might impact economic development and the recovery from the ongoing crisis. A shift in income inequality trends was observed in emerging and developing economies during the early 2000s (Anderson, 2022). Between 88 and 115 million people are predicted to fall back into poverty by 2020, suggesting the crisis will exacerbate inequality worldwide. According to the World Bank (2020), many developing countries are slipping deeper into poverty due to global problems such as recessions and pandemics. Indeed, global imbalances and widening income inequality remain the challenges for future development.

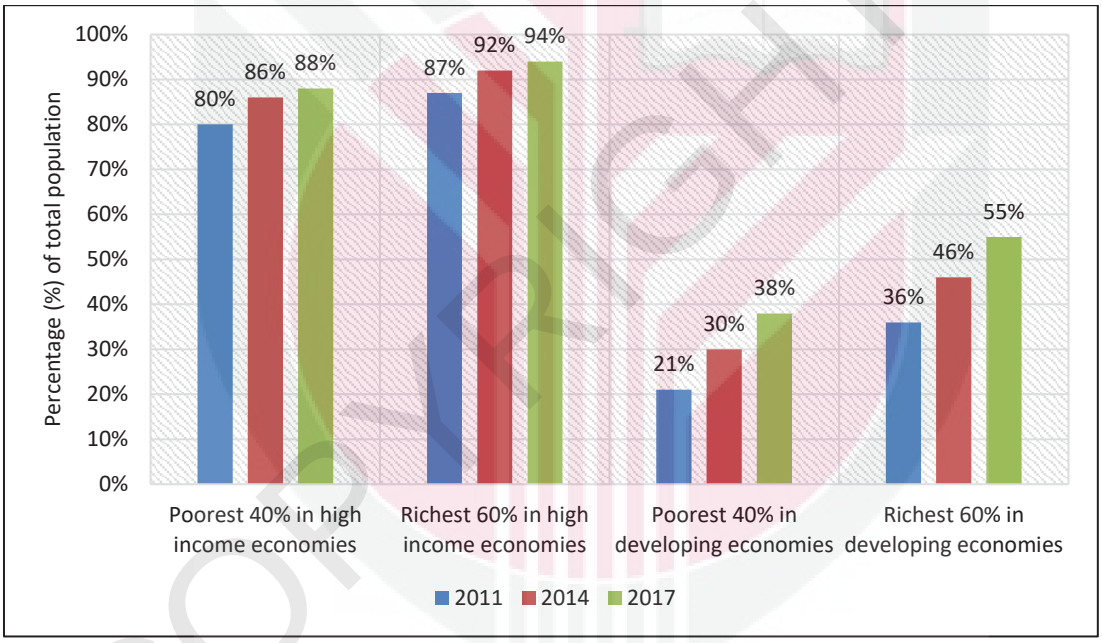

Figure 1.4: Account Ownership Discrepancies Across Income Levels
(Source: World Bank's Global Findex database)

There is data to suggest that income inequality is a persistent problem. In the context of financial accessibility, an apparent disparity is observed between advanced and emerging countries. For example, Figure 1.4 illustrates the income gap in account ownership between the richest top 60 and poorest below 40 individuals or entities in high-income and developing economies. Since 2011, income disparities between high-

income and developing economies have been widening. In 2017, statistics explained that 88% of adults in high-income economies, which are among the poorest 40 per cent of households, have an account, while the proportion is 94% among the wealthiest 60 per cent of households, compared to 38% among the poorest 40 per cent of families and 55% among the wealthiest 60 per cent of households in developing nations. In terms of wealth accumulation, households in developed countries have a higher disposable income, leading to greater opportunities for saving and investment. Thus, it can be seen that income disparity in account ownership between developed and developing economies remains significant, even though the percentage has decreased since 2011.

Recognising that problems can also present opportunities, several countries are using economic recovery to spur regulatory reforms and strengthen the role of the financial sector. Financial sector expansion can promote wealth and economic growth. For example, the financial institutions can reduce income inequality by allocating credit to underserved communities and small businesses by providing financial facilities that can be used for various purposes, such as investing in companies or expanding operations to improve the living standards of low-income individuals and households. Therefore, access to financial services is a high priority on the global reform agenda to alleviate poverty and reduce income inequality (Omar & Inaba, 2020). Despite numerous efforts to reduce poverty and economic sustainability worldwide, several developing regions in Asia, Africa, Latin America, and the Caribbean are still struggling to achieve a minimum standard of living. Regional inequality in developing countries remains a problem that is worth examining.

The financial sector also potentially impacts capital, labour management and economic development, leading to significant consequences for poverty and widening income inequality (Demirgüç-Kunt & Levine, 2009). The crucial role of finance in fostering wealth creation is undeniable, given the persistent challenges of financial exclusion and increasing income inequality in developing economies. Furthermore, the United Nations (UN) members also recognise the vital role of financial services access as a veritable platform for realising the Sustainable Development Goals (SDGs) and reducing inequality (SDG10) (Klapper et al. 2016; Mader, 2018). From the perspective of the SDGs, access to basic financial services is essential to enable people to earn higher returns on capital. As a result, it is easier for households to increase their income to escape poverty if they are included in the financial institutions, as they can do so through economic opportunities or better education. Therefore, understanding the mechanisms that influence the distribution of wealth through access to the financial sector and the formulation of financial system policies is a critical area of study.

Population ageing is a universal demographic issue as the global population trend has grown over the last decade. This phenomenon is anticipated to have significant social, economic, and political consequences. The United Nations defines the ageing population as a population of individuals over the age of 65 (United Nations, 2017). The growth of the ageing population happens as life expectancy increases and the birth rate decreases. According to Bloom et al. (2010), the global average life expectancy is 65 years, and the cut-off point could reach 75 years by 2050. A growing trend of an ageing population is also anticipated to affect global social and economic development. A rapidly ageing society is expected to affect the economic growth of

many countries, and if not managed appropriately, it could result in further economic stagnation (Acemoglu & Restrepo, 2017).

United Nations (2017) also highlights that the proportion of the ageing society significantly affects the size of the family, the need for goods and services, involvement in the labour force, and financial markets. Figure 1.5 demonstrates that a significant proportion of the world population aged 65 and over has risen steadily. The graph shows constant growth during the first part of the period (1950-1990), but the figures have increased constantly since 1990. Looking at the perspective of the developing economies, the statistics indicate that the overall percentage of the population aged 65 over the total population is beginning to diverge significantly from 1990, and the rate is projected to rise continuously until 2050. This situation clearly shows that most countries are heading towards an ageing population.

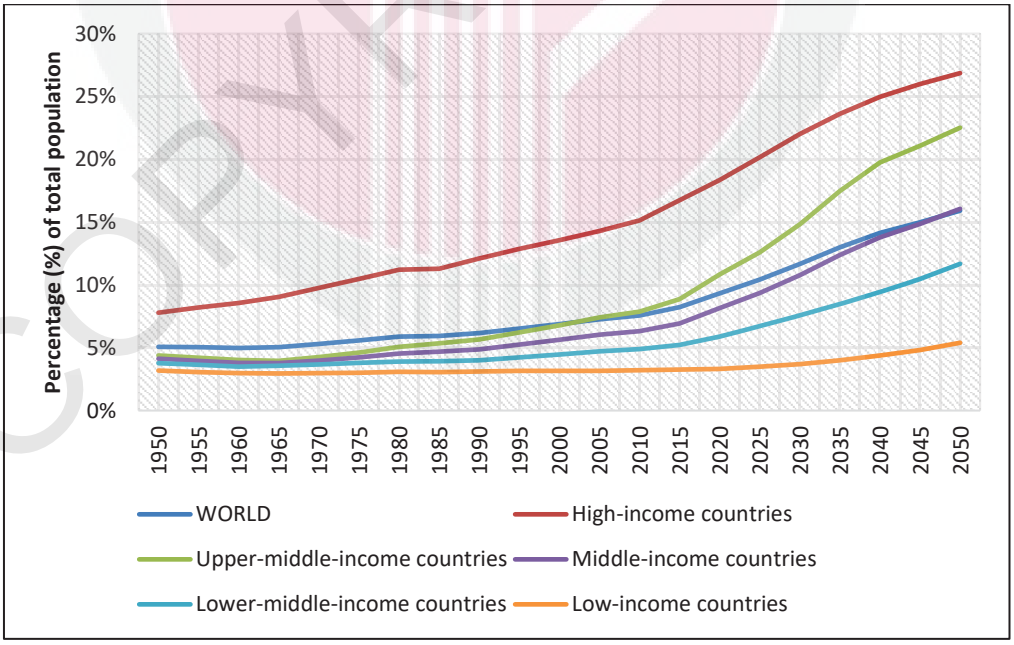

Figure 1.5: Percentage of Population Aged 65 years (Estimates and Projection) (Source: United Nations Department of Economics and Social Affairs, Population Division, 2019)

Accordingly, a study analysing how the ageing population is connected with the financial sector is needed to control its adverse effects. The common understanding is that financial sector development has a great potential to lessen inequality. For example, the critical role of financial inclusion is to ensure everyone has equal ability to access and benefit from financial services, and no one should be excluded. Therefore, income inequality can be reduced through increasing access to financing, providing an opportunity for a growing economy for the poor and vulnerable groups. However, older adults usually face difficulties managing their finances due to lower savings, earnings, and pension earned (Demirguc-Kunt et al. 2018; OECD, 2018). Thus, a financially excluded threat exists when financial institutions impose additional requirements on the older adults for financial transactions. In addition, existing pension schemes tend to be vulnerable because only a tiny percentage of older adults are covered under the system in many developing countries (Lyons et al. 2018). On the other hand, the ageing society also leads the working-age groups to limit their consumption and set aside their wages for their parents' allocation (Abd Rahman et al. 2020). These potential worst-case scenarios would diminish potential growth as consumption and investment by private households primarily power the economy.

It is believed that an ageing population could have a beneficial or harmful impact on the financial sector and a country's economy. Therefore, it is critical to understand the relationship between the ageing population and the financial industry, as well as the implications of this issue, given its potential to exacerbate income inequality.

1.2.5 Leveraging Financial Inclusion and Digitalisation to Address Economic Uncertainty

There is a substantial relationship between the state of the financial sector and the overall economy. The accessibility of financial services is crucial in promoting economic growth and stability. Despite this, it is undeniable that external shocks such as the commodities price shock and the global financial crisis exacerbated uncertainty (Ahir et al. 2022; N. Bloom, 2009; Dai et al. 2020). As economic uncertainty grows, access to financial services for individuals and businesses may become more complex. Hence, individuals and businesses with access to basic financial services can better manage their money and bounce back from economic shocks.

Economic uncertainty can be discussed from various perspectives. Generally, uncertainty is defined as the conditional volatility of an unforeseen interruption from the standpoint of economic agents (Jurado et al. 2015). Bloom (2009) associated uncertainty with the fluctuation of the realised stock market and employed the Chicago Board Options Exchange implied volatility index (VIX) as an indicator of uncertainty. The argument is that the high market volatility reflects macroeconomic uncertainty (Bicchal & Durai, 2020). Meanwhile, Bloom (2009) and Baker et al. (2016) generated an Economic and Policy Uncertainty index based on newspaper articles to determine the volatility of the upcoming economic situation. All these indicators are substantial, but the data are limited to developed countries and only documented after the 1990s (Ahir et al. 2022).

Figure 1.6 illustrates global uncertainty as measured by the World Uncertainty Index (WUI). This index is derived from the frequency counts of occurrences of

"uncertainty" and its related terms within the reports compiled by the Economist Intelligence Unit (EIU) for various countries (Ahir et al. (2018). The financial credit crunch in 2008 and the debt crisis in 2012 were vital sources of uncertainty worldwide. The problem has created further uncertainty, particularly in the financial market, as relative stock prices can no longer be forecast accurately, causing risk in inefficient fund management. The managers' unwillingness to take more risks and exercise greater caution when deciding affects the financial sector's credit availability, efficiency, and stability (Baum et al. 2020). Therefore, the global crisis will likely exacerbate the economy's resilience due to a malfunctioning financial sector that contributes to increase resource wastage, discourage the accumulation of funds, increases conjecture, lacks capital allocation and misallocates scarce capital (Law & Singh, 2014). Consequently, the economic climate becomes volatile and stagnant, which may result in other social problems.

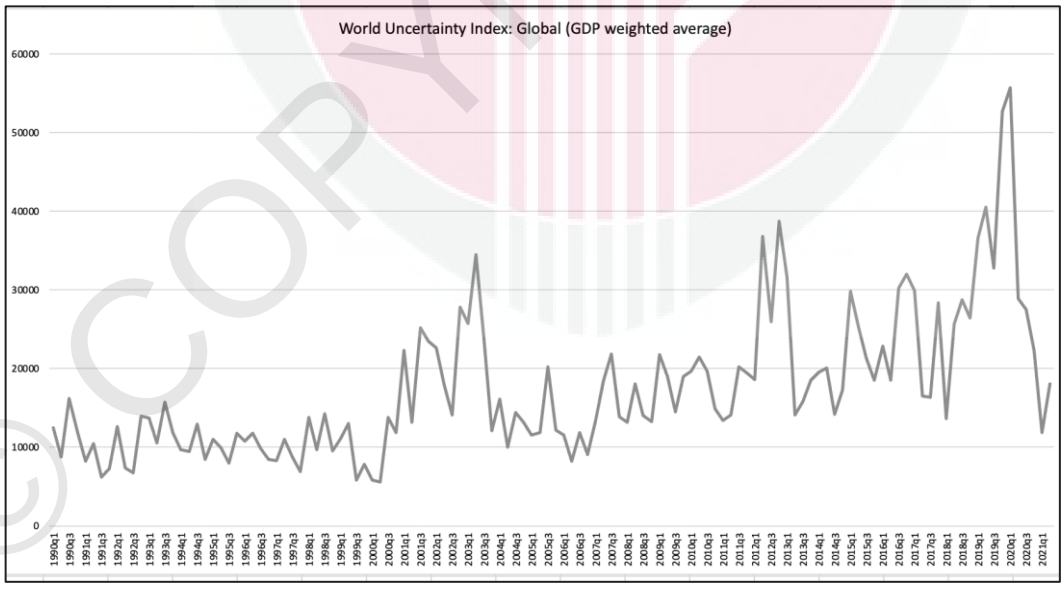

Figure 1.6: World Uncertainty Index
(Source: Ahir et al. 2022)

Governments and financial institutions must implement policies to expand financial access, particularly for underserved communities. Figure 1.7 provides some groundwork perspectives on the link between financial inclusion and economic uncertainty in selected developing nations. As indicated by the scatter plot, there might be a correlation between financial inclusion and economic uncertainty. Financial inclusion provides more people with access to financial services, thereby reducing their vulnerability during periods of economic uncertainty. Nevertheless, low-income families and small companies may be isolated from the mainstream financial institutions in remote areas. Measures must be taken to address the issue of macroeconomic uncertainty in developing economies where welfare costs are high (Loayza et al. 2007). A more inclusive and resilient financial sector can assist in reducing the detrimental consequences of economic volatility. Individuals and businesses coping with risks and enduring economic downturns could benefit from financial inclusion.

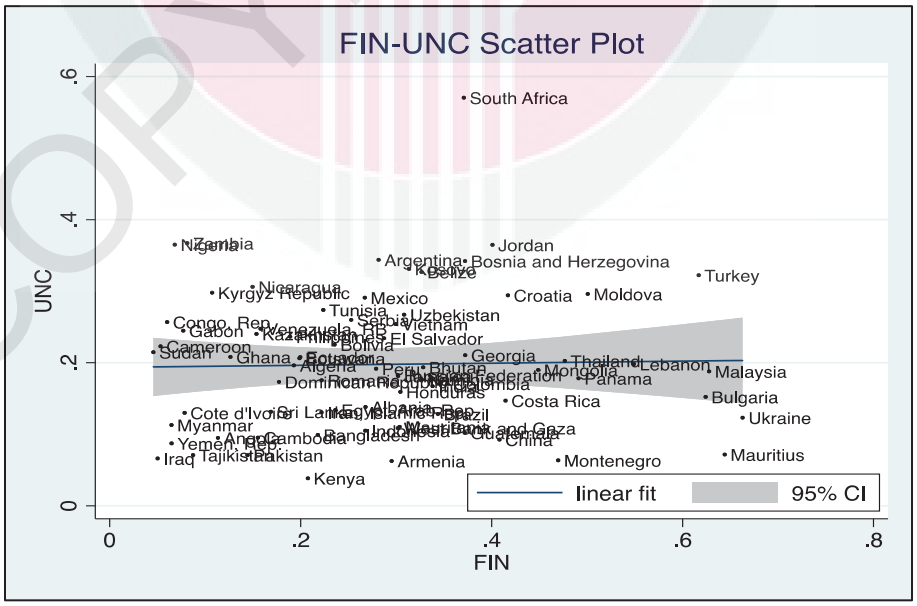

Figure 1.7: Scatter Plot of Financial Inclusion Index (FIN) and Economic Uncertainty (UNC)
(Source: Authors' calculation, World Development Indicators and Ahir et al. 2022)

However, financial institutions are becoming more prudent in financing requirements during economic uncertainty. This situation might make it more challenging for them to secure credit for funding operations or investing in businesses. Therefore, organisations such as The Alliance for Financial Inclusion (AFI) try to disseminate best practices, particularly in developing countries (AFI, 2018). The Maya Declaration is another example of a global project that represents a commitment from institutions and the government to alleviate poverty and uncertainty for the benefit of everyone by promoting financial inclusion in developing economies (AFI, 2018).

Digitalisation has advanced rapidly, impacting various industries, including the financial sector. The advent of digital technology has transformed the financial industry, especially in how services are delivered and accessed. For example, mobile applications revitalise access to goods and services by changing how people transfer money, save, borrow and manage risk (Son et al. 2020). Digital finance bridges the gap for underserved communities and significantly contributes to economic progress. The United Nations 2030 Agenda for Sustainable Development also emphasises the importance of digitalisation and interconnectedness in various sectors such as education, finance, medicine and energy as critical success factors in achieving sustainable growth (United Nations, 2015).

Digitalisation can help to promote financial inclusion and mitigate the adverse effects of economic uncertainty. Adopting digital technology in financial activities can enhance the efficiency of online transactions, access to business credit, and international money transfers, hence eliminating financial exclusion and disparities (GPFI, 2016). For example, rural communities could rely on mobile phones

application to access financial services such as payment processing and international and domestic money transfers. Additionally, mobile money transfer services, such as m-Pesa, are essential for people in developing countries like Kenya to send and receive money despite their lack of access to bank accounts (Son et al. 2020). Besides, digital applications have reshaped the financial services industry and human judgement toward automated analysis of consumer data dramatically (Frame et al. 2019). Incorporating digital technologies within financial institutions can optimise operational efficiencies by automating manual processes, enabling the expansion of the scope of products and services offered to clients.

Nevertheless, promoting digitalisation for financial inclusion during economic uncertainty poses challenges. In general, people who do not have access to digital technologies may have fewer opportunities for education, employment, and knowledge exchange. The percentage in Figure 1.8 shows that less than two-thirds of the population in lower-middle-income and lower-income economies are involved in digital financial transactions. Compared with the high-income and upper-middle-income economies, more than 90%, on average, use the facilities actively. These numbers indicate that almost 50% of adults particularly in lower-middle-income and lower-income countries are still denied access to digital financial services and have possible financial exclusion issues globally.

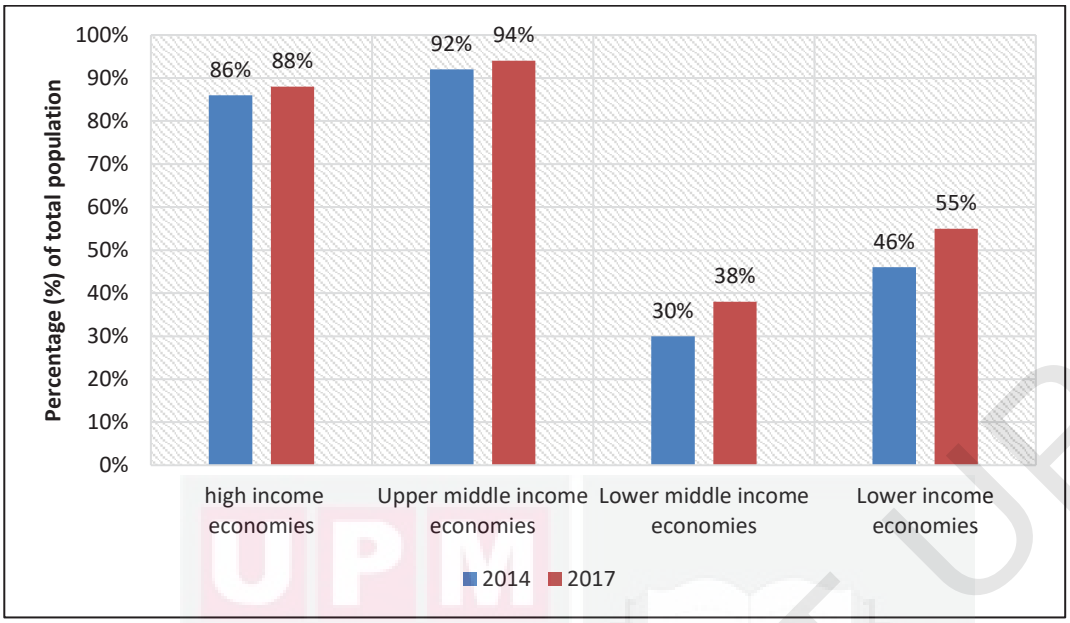

Figure 1.8: The Adult Involvement in Digital Payment
(Source: World Bank's Global Findex database)

There is also concern that the advancement of digital financial products could undermine stability, especially if they are not adequately regulated (Sahay et al. 2020). The interconnectivity and reliance on technology in digital finance products and platforms expose them to network and systemic risks (Ozili, 2020a). The reliance of financial institutions on vast amounts of data and technology also exposes them to the vulnerability of cyberattacks, which can impact stability (World Bank, 2019). The scatter plot in Figure 1.9 depicts the correlation between the proportion of internet users over the total population as a measure of digitalisation and the level of uncertainty. It is expected that higher digitalisation would increase uncertainty. As new technologies continue to evolve, they have the potential to disrupt existing markets and create new ones that cause uncertainty about the economy's future direction. Digital financial transactions may negatively affect and increase customer risks (Arner et al. 2020; Mader, 2018; Ozili, 2020; Ray et al. 2019). Uncertainty levels have become more unpredictable and crucial than ever as digitalisation has

transformed our lives. Thus, bold steps are essential to bridge the gap between developed and less-developed countries to achieve sustainable growth globally (United Nations, 2015).

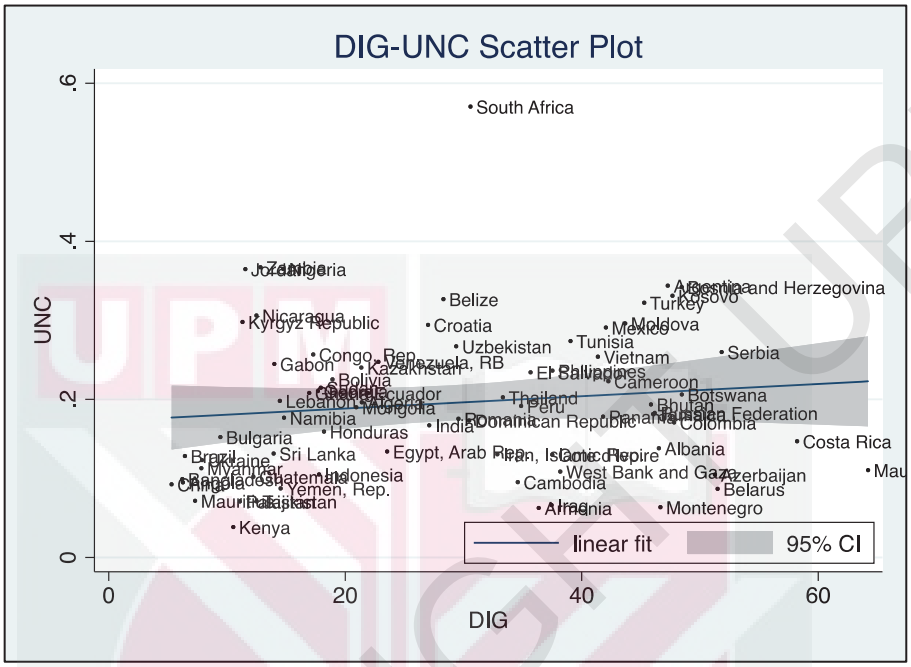

Figure 1.9: Scatter Plot of the Percentage of Internet Users over Total Population (DIG) and Economic Uncertainty (EUN)
(Source: International Telecommunication Union (ITU) and Ahir et al. 2022)

Digital services may exacerbate the level of uncertainty for some people, especially those who are not familiar with the risks while adopting digital technology. Garcia (2016) highlighted that the rapid expansion in credit and an uncontrolled financial sector might inherently pose greater threats to financial markets. For instance, digital financial transactions also may negatively affect and increase the operational or security threat to the customers (Arner et al. 2020; Mader, 2018; Ozili, 2020a; Ray et al. 2019). One explanation is that digitalisation affects the demand for particular professions and skills, causing some jobs to become automated or outdated. Digitalisation may lead to disruptive effects when the number of bank branches and conventional financial services is rapidly decreasing, leading to financial exclusion

and economic uncertainty (Heng & Tok, 2022). Therefore, digitalisation may expose individuals and organisations to several challenges and increase the risk that could be detrimental to the economy.

To sum up, there has been a rise in digital financial products and services in recent years, suggesting a widespread acceptance of digitalisation in the financial sector. Digital innovation in financial activities has the potential to raise market efficiency, thereby mitigating the adverse impacts of economic uncertainty. While digitalisation presents many opportunities, it poses several risks that could impact the economy. Therefore, additional research is necessary to understand the link between digitalisation, financial inclusion and economic uncertainty in developing countries.

1.3 Statement of the Problem

Developing countries are exposed to heightened threats and challenges to the repercussions of the global financial crisis. The crisis might exacerbate income inequality and evolve into a profound challenge of economic uncertainty. Unfortunately, about 1.7 billion people or nearly one-third of the world's population, continue to be denied access to financial services and face economic instability (GPFI, 2020). Although the financial sector provides significant benefits to the economy, the problem of limited access to formal financial activities is widening in developing countries compared to developed countries.

With the necessary financial knowledge and skills, individuals will likely be more willing to engage in formal financial services. However, financial illiteracy has become a persistent obstacle to financial inclusion which needs further investigation.

The OECD (2017) report that restricting financial services to low-income populations causes financial literacy to remain disappointingly low, especially in developing countries. Furthermore, the complexity of financial goods and risks in financial markets has detrimental effects on customers, even though financial institutions offer various product improvements. Therefore, further testing on the financial literacy and financial inclusion relationship was reasonable in determining whether the nexus remained positive or otherwise.

According to the World Bank (2020), many countries are slipping deeper into massive inequality due to global crisis such as recessions and pandemics. High levels of disparity can jeopardise the sustainability of economic growth and macroeconomic stability. Widening income inequality has long been a significant concern for policymakers in developing countries. Though, the ageing population has recently impacted society, especially in less developed countries that are less open to financial institutions and more susceptible to various types of risk, including wealth disparity and unsustainable economic development (GPFI, 2019). Since 1980, the number of individuals aged 60 and over has more than doubled globally, and the percentage of older adults is projected to double again by 2050 (United Nations, 2017). If this problem is not adequately addressed, the effects of demographic trends changes could affect people's savings and pension coverage which are likely to reduce. Therefore, it is critical to investigate further how the ageing problem could affect financial inclusiveness levels and income distribution, especially among vulnerable populations, which brings us to the next topic of this research.

It is undeniable that external shocks such as the commodities price shock and the global financial crisis also exacerbated uncertainty. With the escalation of economic uncertainty, financial services for individuals and businesses may become more complex. The accessibility of financial services is crucial in promoting economic growth and stability. While digitalisation has numerous significant benefits, its impact on inclusive productivity, widening opportunities for the lower and middle classes and the diffusion of accountable governance have been less than expected (World Bank, 2016). Eventually, a digital gap prevents these disadvantaged populations from fully participating with the higher socioeconomic groups. In that case, this may lead to the problem of social exclusion, possible loss of savings and lost opportunities for the industry, which retard the economic stability.

Therefore, studying how financial inclusion, global megatrends and macroeconomic issues such as inequality and economic uncertainty is highly pertinent. The dynamics of financial literacy, the ageing population and digitalisation and their interaction with financial inclusion remain questionable. If these issues are not appropriately addressed, the underserved group may face financial difficulties, exacerbating inequality and economic uncertainty.

1.4 Research Questions

Based on the topics discussed in the previous section, the research questions addressed in this study are as below:

a) What is the relationship between financial literacy and financial inclusion?

b) How do financial inclusion and the ageing population influence income inequality?

c) How does digitalisation affect the financial inclusion-economic uncertainty relationship?

1.5 The Objective of the Study

The general objective of this study is to assess the role of financial literacy and consequences of financial access on income distribution and economic uncertainty. This research also incorporates growing global megatrends such as the ageing population and the impact of digitalisation on the existing framework of financial inclusion in developing countries. In particular, the specific objectives of this research are:

a) To investigate the relationship between financial literacy and financial inclusion.

b) To examine the role of the ageing population in moderating the impact of financial inclusion on income inequality.

c) To analyse the effect of digitalisation on inclusion-economic uncertainty nexus.

1.6 Significance of the Study

This study is expected to add new perspectives to the literature in several ways. Financial inclusion is undeniably recognised as an essential strategy for country development, and the government should continue to push for greater access to and use of financial services to achieve Sustainable Development Goals (SDGs) (Klapper

et al. 2016). This research contributes to the literature by considering developing countries' perspectives. This study underlines the importance of financial inclusion in fostering inclusive and sustainable growth within these nations. The primary motivation for this research stems from the increasing number of financial inclusion activities focused on low- and middle-income countries to improve the quality of life of poor and low-income people (Duvendack & Mader, 2020).

The first objective of this study is to investigate the relationship between financial literacy and financial inclusion. Individuals in developing countries often demonstrate a significantly lower degree of financial literacy than their established economies counterparts, such as those in the OECD countries (Hasler & Lusardi, 2017). This research also answers recent calls by Askar et al. (2020) and F. Khan et al. (2022) for future research on financial literacy beyond developed countries because a study from the perspective of developing economies is currently understudied. Notably, there is no clear consensus and deficient empirical analysis that examines the role of financial literacy on access to finance based on aggregate countries' macro data. Thus, this research contributes to the empirical literature by exploring the role of financial knowledge in the context of developing economies as described by the World Bank using available cross-country databases. Next, this study also contributes to methodological literature by tests a threshold regression model and quantile regression analysis to explain the current financial literacy and inclusion nexus dispute. It is essential to examine whether an optimal level of financial literacy promotes financial inclusion and fills an essential gap in the scientific literature.

The second objective of the study is to investigate the effect of financial inclusion and the role of an ageing population on income inequality. The global population is ageing along with greater social and economic trends (United Nations, 2020). The results would assist various stakeholders in developing necessary new strategies to translate into practical development policy. In terms of theoretical evolution, there has been a paucity of studies that thoroughly examine the role of the ageing population in moderating the impact of financial inclusion on income disparity. Based on this unaddressed theoretical gap, the theoretical contribution of the second research objective is to incorporate the ageing population as an interacting variable in the model. This study is the first to provide evidence of a link between financial inclusion, the ageing population and income inequality at the cross-country level. Secondly, this research also contributes to literature by estimating the financial inclusion index that considers three critical aspects of an inclusive financial system: penetration, availability and usage of financial services to construct the multidimensional index. In terms of methodological contribution, this study employed the dynamic panel system generalised method of moments (GMM) and the panel quantile regression technique with nonadditive fixed effects as proposed by Powell (2016) as an extension of linear regression to compare the results and robustness of the estimations. Furthermore, this analysis also applied demeaned interaction terms to handle the multicollinearity problem, as Balli and Sørensen (2013) suggested.

Subsequently, the third objective of this study aims to evaluate the consequences of digitalisation in moderating the relationship between financial inclusion and economic uncertainty. Digitalisation will likely produce market domination, concentration and resistance to competition, unheard of before the digital era (Knudsen et al. 2021). In

the financial sector, digitalisation may also result in greater financial inclusion in developing countries by expanding financial services and increasing bank account ownership and use through increasingly prevalent mobile technology (Della Peruta, 2018). Therefore, this research adds to the strand of theoretical literature that examines whether financial inclusion and digitalisation could increase or alleviate economic uncertainty. This study contributes to the body of knowledge by evaluating the potential causes of economic uncertainty and contributing to practical applications for financial sector. Therefore, the study's findings will aid policymakers and financial institutions to develop appropriate policies that consider the role of digitalisation in the economy's stability.

1.7 Scope of the Study

The scope of this research based on the World Bank's classification of developing countries. The organisation divided countries into four income categories: low-income countries, low to middle-income countries, high to middle-income countries, and high-income countries. This study used a database from 2004 to 2019, consist of six economic regions: Europe and Central Asia, Middle East and North Africa, East Asia and Pacific, Latin America and the Caribbean, Sub-Saharan Africa, and South Asia. These classifications are revised annually based on the previous year's gross national income (GNI) per capita. The country classifications are shown in Table 1.1.

Table 1.1: Countries Classification by Income for the Year 2020

Classification	Range of GNI per capita	No. of countries
Low-income economies	$1,035 or less	29
Lower-middle-income economies	$1,036 to $4,045	50
Upper-middle-income economies	$4,046 to $12,535	56
High-income economies	$12,536 or more	83

(Source: The World Bank, 2020)

1.8 The Organisation of the Study

This research is divided into five chapters. The first section of this study explains the general background of the study, the problem statement, the research question, the research objectives, the significance of the study, and the scope of the study. Following this chapter, a brief review of the theoretical and empirical literature that serves as the foundation for this thesis is presented in chapter two. The research gaps are then addressed in the same chapter, highlighting the importance of the study. Chapter three explains the theoretical framework for each research objective, model specification, description, and variables used in the analyses. Chapter four reports the empirical results. The final section of this research discusses the summary, major findings, policy recommendations and concludes the study.

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