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**Financial Development and Poverty Alleviation in
Developing and Emerging Economies**

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Declaration: I, Ruomeng Wang, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Impact Statement

In examining the finance-poverty nexus in the context of developing and emerging economies, this thesis makes valuable contributions to the associated field of research. More importantly, the nature of the findings derived from this thesis enables it to have a profound impact both within and outside the academia realms.

Impacts Within Academia

Several contributions drawn from the thesis can be potentially influential within academia. Firstly, when investigating the direct impact of financial development on poverty, we consider the concepts and measures of financial development and poverty in a multidimensional context, which have been mostly overlooked in the previous literature. The comprehensive approach we take enables us to focus on more dimensions of both concepts and reach conclusive and robust results, addressing some deficiencies of previous studies, when assessing the direct effect of financial development on poverty alleviation.

Secondly, to broaden our horizons for better answering the question that concerns most of the developing and emerging economies – whether financial development is in favour to the poor – we decompose the total effect of financial development on poverty. We also differentiate the impact by its transmission channels, i.e., the direct channel and the indirect channels through economic growth and financial crises. By considering the quadrilateral relationship between financial development, economic growth, financial crises and poverty simultaneously, we draw a holistic picture on the finance-poverty nexus, where the previous literature failed to do.

Thirdly, in addition to our macroeconomic analyses regarding the finance-poverty nexus, we investigate such relationship from a microeconomic perspective, which helps us to look for answers from the root of this nexus. We use China as an example, and by using data from one of the most comprehensive household finance surveys (CHFS) in its 2017 wave, we investigate one of the primary dimensions of the financial system (i.e., financial inclusion) and its impact on poverty on a micro-level. Financial inclusion is a newly emerged topic that has become increasingly relevant in the context of sustainable and inclusive development.

Lastly, when considering all the above impacts together, this thesis makes an important contribution to the academic literature. We not only provide a comprehensive, integral and rigorous framework considering all channels available to investigate the impact of financial development on poverty, but also present a holistic picture comprising both macroeconomic and microeconomic perspectives. Moreover, to obtain robust results this thesis utilises a diverse range of econometric techniques allowing to tackle various statistical problems, including the issues of endogeneity due to bi-directional causality and unobserved heterogeneity. Among others such methods include the following: The System of Generalised Method of Moments (GMM); the Conditional Mixed Process (CMP) modelling for panel data analyses; the Quantile Regressions (QR), the Propensity Score Matching (PSM), and the Instrumental Variable Two-Stage Least Squares (IV-2SLS) for cross-sectional data. These methodologies have the potential to provide viable solutions for studies in other research fields when faced with similar issues.

Impacts Outside Academia

This thesis, which equipped with comprehensiveness and robustness in its empirical analyses regarding the finance-poverty nexus, has potentials to have a great practical relevance particularly to governments, central banks, think tanks and policymaking agencies of developing and emerging economies. Conclusions and policy implications that drawn from the thesis are beneficial for policymakers that are aiming to promote financial development effectively and responsibly at the same time, to maximise its benefits, and minimise the costs of financial instability. The findings of this study provide relevant recommendations for policymakers for developing optimal financial policies with maximising their growth-enhancing effect and minimising the risk of crises with further prospects to reduce the poverty.

On a macro level, for instance, the conclusions that drawn from *Chapter 2*, demonstrate how different dimensions of the financial system contribute to reducing poverty. Therefore, when designing the respective financial policies, it is important for policymakers to be aware of different dimensions of financial development and their respective effect on poverty reduction, rather than basing a decision on a typically utilised private credit measure. The conclusions drawn from *Chapter 3* in terms of the overall effect of financial development on poverty can help those policymakers to determine whether it is necessary to promote financial development on a broader scale. By considering the costs and benefits outlined and estimated in this thesis,

policymakers, who are ignorant about the financial sector development, should be reassured about the prosperity attached to financial development.

On a micro level, *Chapter 4* of this thesis demonstrates the financial inclusion and poverty reduction experiences in one of the most successful emerging economies in terms of poverty alleviation. Policymakers in other developing economies should take into considerations the analysis performed in this study when developing inclusive development strategies. As the lessons provided in our analyses in terms of promoting and shaping an inclusive environment to enable the underserved and unserved populations to access adequate and low-cost financial instruments is evidently vital for extracting the benefits from financial development to poverty.

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Abstract

Poverty has remained one of the most significant challenges faced by emerging and developing countries. After witnessing the success of financial development in facilitating economic growth and improving social welfare in developed countries, emerging and developing countries have been striving to develop their financial sectors with the aim of replicating the success. However, the multidimensional nature of both the financial system and poverty, the quadrilateral relationship between finance, growth, crises and poverty, and the difference between country-specific characteristics altogether impeded researchers and policymakers from reaching a consensus on whether financial development is pro-poor.

The literature on finance-poverty nexus received minimal attention over the last few decades, and existing literature has bifurcated into two main strands of views. One strand emphasises the positive effect of financial development through the direct and indirect growth channels, whereas the other focuses more on the negative indirect crisis channel and its associated costs for the poor during turbulent periods. The prior view tends to neglect the fact that crises are more likely to happen during economic booms being accompanied by financial development, and the effects of financial instability are exacerbated especially for countries with unsound financial system regulations and weak institutional performance. Once crises occur, the associated costs may pose a devastating effect on the poor. In contrast, the latter view overestimates the fact that crises are only occasional, and their adverse impacts on the poor are curable in the aftermaths if certain policies are appropriately tailored and implemented to minimise such effects. Thus, we are motivated to fill the gap by providing a comprehensive analysis that produces a unified approach for assessing the finance-poverty nexus. This approach is founded not only on a macroeconomic perspective that considers all channels, but also a microeconomic perspective to observe whether, on a household level, financial development is pro-poor.

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List of Abbreviation

ABC — Agricultural Bank of China
ATE — Average Treatment Effect
ATT — Average Treatment Effect on The Treated
CA — Capability Approach
CAPI — Computer-Assisted Personal Interviewing
CBRC — China Banking Regulation Commission
CFPS — China Family Panel Studies
CHFS — China Household Finance Survey
CIRC — China Insurance Regulatory Commission
CMP — Conditional Mixed Process
CSRC — China Securities Regulatory Commission
FAS — Financial Access Survey
FA — Financial Access
FD — Financial Depth
FE — Financial Efficiency
FS — Financial Stability
FSU — Former Soviet Union
GDP — Gross Domestic Product
GFDD — Global Financial Development Database
GMM — Generalised Method of Moments
HDI — Human Development Index
HDR — Human Development Report
HPI — Human Poverty Index
ILO — International Labour Organisation
IMF — International Monetary Fund
IV — Instrumental Variable
IV-2SLS — Instrumental Variable Two-Stage Least Squares
LDCs — Least Developed Countries
LGOP — Leading Group for Poverty Alleviation and Development
MA — Monetary Approach
MCCs — Microcredit Companies
MFIs — Microfinance Institutions

MOF — Ministry of Finance
MPI — Multidimensional Poverty Index
MSEs — Micro and Small Enterprises
MSMEs — Micro, Small and Medium Enterprises
NBFIs — Non-Bank Financial Institutions
OIR — Over-Identifying Restrictions
OLS — Ordinary Least Squares
PA — Participatory Approach
PBOC — People’s Bank of China
PPP — Purchasing Power Parity
PPS — Probability Proportion to Size
PSM — Propensity Score Matching
PSU — Primary Sampling Units
QR — Quantile Regressions
RCC — Rural Credit Cooperative
RCCs — Rural Credit Cooperatives
RCOMBs — Rural Commercial Banks
RCOPBs — Rural Cooperative Banks
RMCCs — Rural Mutual Credit Cooperatives
SE — Social Exclusion Approach
SURE — Seemingly Unrelated Regression Equations
SWUFE — South-Western University of Finance and Economics
UNDP — United Nations Development Programme
VTBs — Village and Township Banks
WB — World Bank
WDR — World Development Reports
WGI — Worldwide Governance Indicators

CHAPTER 1 – THE CONCEPTUAL FRAMEWORK FOR ANALYSING THE FINANCE-POVERTY RELATIONSHIP

1. Introduction

The financial sector, which constitutes a set of institutions, markets, instruments, and the legal and regulatory framework that permits transactions to be made by extending credit, has drawn much attention and interests from scholars and policymakers regarding the role it plays in the context of development economics. Over the past few decades, many emerging economies have made remarkable achievements in their economic development, partly with the contributions provided by the development of their financial sectors. As defined by the World Bank, financial sector development is the process of overcoming ‘cost’ incurred in the financial system associated with acquiring information, enforcing contract, and making transactions (World Bank, 2015a).

According to the 2017 World Bank Development Indicators database, major emerging economies such as Brazil, China, India, Mexico and Russia have increased their per capita GDP (constant 2010 US\$) by an average of 30% from 1985 to 2015, about four times the growth in developed economies. Simultaneously, the poverty headcount ratio at \$1.90 (2011PPP) a day has decreased by an average of 66% among these countries, and China has experienced the most drastic decline (82%) in the poverty rate. Even with significant economic achievements and considerable improvements in several aspects including human condition, global wealth, global connections, and technological capabilities etc., poverty nonetheless, remains a critical issue in many parts of the world. Moreover, regardless of the declining poverty rate in many developing countries, the poor population in the context of relative poverty is steadily increasing in certain countries such as Brazil, India, and Mexico; as relative poverty, which is measured based on national poverty lines, is usually understated by international poverty lines (World Bank, 2017c). In addition, the proportion of people living in absolute poverty¹ in Sub-Saharan Africa dropped from 55.7 per cent in 1990 to 40.2 per cent in 2018; however, the absolute number² covering the same period increased from 283.8 million to 433.4 million (World Bank, 2020b). Therefore, the large discrepancy between different

¹ It is measured by the poverty headcount ratio at \$1.90 a day (2011PPP).

² It refers to the number of poor at \$1.90 a day (2011PPP).

poverty measures when assessing poverty situations has become a source of fundamental concern about the significance of the measures being used and cited (United Nations, 2016).

From a historical perspective, financial development is not a new topic for developed economies. For emerging economies, however, this topic gained its popularity only in the 1980s. At their early stage of financial sector development, they were highly motivated to adopt measures of financial liberalisations and reforms, such as interest rate deregulation to boost economic growth (Levine et al., 2000). The corresponding empirical studies that investigate the financial development and economic growth nexus are plentiful. Nevertheless, there is still a dearth of empirical research looking into how a more developed financial sector could contribute to poverty alleviation, especially for emerging economies.

From a theoretical perspective, the impact of financial development on poverty manifests via various channels. The direct channel, discussed in detail in *section 5.1*, considers the impact of financial development on poverty via reducing credit and transaction-related costs, removing credit constraints, facilitating investment (incl. human capital investment), and broadening access to finance of the poor and the vulnerable groups (incl. via provision of microfinance). The indirect growth channel, discussed in *section 5.2*, considers the impact of financial development on poverty via economic growth by improving the core financial system functions. The indirect macroeconomic and financial instability channel, discussed in *section 5.3*, considers the impact of financial development on poverty via increasing the probability of financial crises. In *section 5.4*, we further discussed another indirect channel through which financial development alleviates poverty – the employment and entrepreneurship channels.

Among existing literature, there seems to be an implicit assumption that the positive impact of financial development on economic growth, if there is any, could automatically generate positive implications for poverty alleviation. Nevertheless, this is not necessarily true. Among other things, faster economic growth does not always lead to poverty alleviation due to the fact that income distribution could be worsened thereby resulting in a disproportionate percentage of the gains from growth being transferred to the non-poor (Schmukler, 2004). In addition, financial liberalisation has been identified and well documented as a significant source of the financial crisis and macroeconomic instability (Kaminsky & Reinhart, 1999). For instance, the Latin American debt crisis in the 1980s, the Mexican crisis during 1994-95, the Asian financial crisis in 1997 and the global financial crisis of 2008-09 – all of these have had broad and

devastating impacts, not only on economies of the affected countries but also other developing countries. More importantly, these crises led by macroeconomic and financial instabilities are detrimental to the poor and have placed them in a much worse situation than the rest of the population group among those countries (Easterly & Fischer, 2001).

It is acknowledged that economic growth is a powerful tool to alleviate poverty, and the way financial development affects economic growth and helps to reduce poverty are clearly related issues (Ravallion et al., 1998). Nevertheless, given the potential negative impacts of increasing inequality, possible crises and other factors that may arise along with economic and financial sector development, the benefits of the two may be undermined or even offset to the poor. Therefore, this raises our interest in assessing the specific impact of financial development on poverty in developing and emerging economies by identifying and quantifying its positive and negative channels.

2. Identifying the Gaps in the Existing Literature

First of all, concerning the influence that development in financial sectors may impose on poverty, most of the emphasis has been placed on investigating the indirect channel - through which financial development affects poverty during the early stages of the debates, i.e., economic growth. Ever since McKinnon (1973) and Shaw (1973) established the theoretical foundation regarding the finance-growth nexus, a substantial amount of studies have focused on the causality analysis between financial development and economic growth, and treated poverty alleviation as a collateral benefit of financial and economic development. For high-income countries that first took the lead to develop their financial sectors, poverty issues were not that critical. In contrary, this was not the case for middle-income countries that only started to adopt measures of financial liberalisation and reforms since the 1980s. Poverty related issues were underexplored in the context of financial sector development.

Regarding the relationship between financial development and economic growth, Cairncross and Lewis (1956) argue that financial sector development acts as an outcome of economic development, and it promotes real economic growth in turn. Levine (2004) further enhances the point by arguing that, a thriving financial market during its progression not only attracts more investment but also optimises its capital allocation, which further acts as a stimulant to

economic growth. The development in the finance sector has been considered as a vitally important component for economic development by many studies (see, for example, Abu-Bader & Abu-Qarn, 2008; Dewi et al., 2018; Gould et al., 2016; Jalilian & Kirkpatrick, 2002; King & Levine, 1993; Spears, 1992; World Bank, 2015). It has become a consensus that a well-functioning financial system not only promotes efficient credit allocation, mobilising savings, and risk management; but also has a positive impact over economic growth in turn.

Overall, most academic scholars find a positive relationship between financial development and economic growth. The positive experiences of financial development in developed economies have motivated many developing and emerging economies in pursuing the course of financial liberalisation and reforms with expectations to achieve a further financial deepening of their economies with consequent benefits for growth (Levine et al., 2000). Indeed, many of the emerging economies have undoubtedly achieved remarkable economic performances. At the same time, however, some of them are still struggling to fight against poverty. A prosperous country's development process involves not only economic growth, but also poverty alleviation and many other issues. Moreover, implications that draw from such relationships, mainly focus on the developed countries do not necessarily imply that the developing countries across every income group can benefit from growth. Not to mention these countries have significant differences in the stage of development, country-specific characteristics, and many other factors underlying their financial and institutional systems. There are some conflicting predictions about the relationship between financial development and poverty in the finance-poverty literature. Up until now, no universal consensus has been reached.

The direct benefit of a sound financial system should not be limited to act as merely a tool for risk reduction in a way that diversifies investments in financial intermediaries (Jalilian & Kirkpatrick, 2002; Jeanneney & Kpodar, 2011; Odhiambo, 2009, 2010a, 2010b; Stiglitz, 2000). Instead, it should also be leveraged to lower transaction costs of these intermediaries through amelioration in information generation and capital accumulation. More importantly, a sound financial system has the potential to eliminate credit constraints faced by the poor. Lifted restrictions encourage the poor to participate in activities in increasing productive assets that can lead to poverty reduction. Many political economy theories are also in favour of the argument that a better functioning financial system could make its services available to a larger

proportion of the population rather than restricting capital to entrenched occupants (Haber et al., 2003; Rajan & Zingales, 2003).

However, there are a significant number of imperfections in the financial market induced by asymmetric information that could weaken its contributions to economic growth, and consequently to poverty alleviation (Aghion & Bolton, 1997; Stiglitz, 2000). Levine et al. (2000) argue that the underlying imperfections of the credit market allow the rich to exclusively obtain benefits from the growth of financial markets, which will further lead to inequality in income and wealth distribution. Moreover, Banerjee and Newman (1993) argue that credit constraints produced by information asymmetries are exceptionally binding on the poor to access bank credit, as they barely have resources, collaterals, or political connections to fund their projects. Apart from confining the poor to explore investment opportunities, these credit constraints may also slow aggregate growth by hindering capital from flowing to its highest value use (Galor & Zeira, 1993).

More importantly, the mechanism through which finance helps to stimulate economic growth may also render the economy more vulnerable to shocks and fragility. This is especially true for emerging economies, since their financial sectors typically experience with inadequate regulation and supervision, weak corporate governance, and excessive deposit insurance (Easterly et al., 2001). Compared to developed economies, the development of financial systems in emerging economies are not only slower in progress, smaller in scale, but also lower in standard. The financial systems in emerging economies even lag substantially behind their dynamic real sectors such as the manufacturing sectors, which are world-class in many ways. For countries failed to recognise their financial market imperfections and underdevelopment that led to premature deregulations, they have experienced severe backfires to their financial systems' stability and economic development, which already, in turn, worsen the situation of the poor (Brownbridge & Kirkpatrick, 2002; Kraay, 1998). The inherited structural weaknesses induced by the above factors may further exacerbate the situation of the poor during and after crises (Arner, 2007). The underlying vulnerabilities were proved to be incontestable during the global financial crisis (J. Williamson & Mahar, 1998). Then followed by a sudden deceleration in economic growth, the poorest people in crisis-hit countries were deemed to suffer the most (Kanbur & Squire, 1999).

The most recent global financial crisis, for instance, is the result of many underlying factors triggered by the failures in housing and financial markets in the US. The development of sophisticated financial derivatives purportedly allowed an efficient transfer of risk to those best able to bear it. However, those instruments had potentially overcurtained the true magnitude of the substantial intrinsic systemic risk within the financial system, which originated from massive lending to house buyers with subprime credit ratings. This kind of financial innovation progressed rapidly and extensively, which far outpaced the capacity of the regulatory authorities and led them failed to keep up. Consequently, after repeated failures in containing such excessive risk-taking behaviours under the existing prudential regulations and supervision, financial innovation, and finance, in general, have predictably and understandably received a world-wide criticism in the aftermath of the global crisis. The adverse impacts of the crisis have highlighted the importance of the financial authorities in monitoring and controlling the risks associated with financial innovation. Failure to fulfil their regulatory duty would induce severe instabilities to the financial systems and the real economies. Therefore, other than being treated as a lubricant of economic development, finance has come to be associated with crises, credit crunches and recessions (Estrada et al., 2010). Given the above background, investigating the crises channel through which financial development negatively affects the poor in developing and emerging economies deserves much more attention than it had been given in the past and is very much beneficial to do so.

Regardless of many previous attempts to investigate the relationship between financial development and economic growth empirically, very few studies have attempted to investigate the link between financial development and poverty reduction, except for some significant contributions made by Beck et al. (2004), Dollar and Kraay (2004), Honohan (2004), and Odhiambo (2009, 2010a, b). The topics of financial development, economic growth, financial crises, and poverty are inter-related to each other. Based on theories and evidence provided by Jalilian and Kirkpatrick (2002), Jeanneney and Kpodar (2011), and Levine (1997), financial development can affect poverty both indirectly – through its impact on growth and crises, and directly – through expanding the access to financial services for the poor, as argued by Aghion and Bolton (1997) and Banerjee and Newman (1993). Nevertheless, studies which specifically investigate the relationship between financial development and poverty alleviation in the case of developing and emerging economies are scarce. This is especially true in the context of a comprehensive approach that examines the relationship considering all major channels (i.e.,

direct channel, indirect channels through economic growth, and crises), and leverage a range of financial development indicators reflecting the financial system's multidimensionality.

With the hope to shed light on the relationship between financial development and poverty alleviation in developing and emerging economies, we are interested in undertaking a comprehensive analysis that formed by three empirical chapters as follows:

I. From a macroeconomic perspective, re-examining the direct impacts of financial development on poverty alleviation, using a battery of different measures for both financial development and poverty, to see if the results are consistent and robust.

The rationale for using measures of financial development from different dimensions is to explore what are the impacts of various dimensions of financial development (such as financial depth, access, efficiency, and stability) on poverty alleviation. A deep financial system may not necessarily induce a high degree of financial access, and an efficient financial system may not necessarily provide more stability than the one less efficient (Čihák et al., 2012). Therefore, when investigating the impact of financial development by only considering the financial system depth dimension, which was prevalent among most of the literature, may not be sufficient. Thus, we intend to incorporate the 4x2 matrix of financial system characteristics in the first chapter. Likewise, to reflect the multidimensional nature of poverty, we also intend to use different measures. For instance, we use the poverty headcount ratio and poverty gap ratio at different threshold levels to measure absolute poverty and the income share held by the lowest 20% to measure relative poverty.

II. From a macroeconomic perspective, decomposing the total effect of financial development on poverty alleviation by examining its direct impacts and indirect impacts via the growth and crisis channels simultaneously.

Based on lessons learnt from the developed economies, the direct poverty-reducing and growth-enhancing effect of financial development are promising and appealing to the developing and emerging economies. However, the financial development induced crises cost has been argued to be detrimental for the poor during and post-crisis (Arner, 2007), especially in a case where most of the emerging economies still have incomplete and ineffective regulatory and supervisory frameworks. This argument concerned many scholars and

policymakers when trying to understand whether financial development is pro-poor. Therefore, it is necessary to decompose the total effect of financial development on poverty by differentiating its direct, indirect growth, and indirect crises effect, in order to understand whether financial development is pro-poor.

III. From a microeconomic perspective, with a specific focus on China, examining the relationship between financial development and poverty alleviation using household finance survey data. Specifically, we intend to discuss China's financial inclusion experience and poverty dynamics in detail and to investigate if its financial inclusion experience enhances the welfare of the population and contributes respectively to poverty alleviation. Financial inclusion, when using household survey data, is more relevant and appropriate to reflect a country's macro-level of the financial sector development. Also, it may perfectly complement the role financial development plays in explaining whether or how individuals and households can benefit from financial services when available.

3. Financial Development Concept and Its Measuring Framework

Regarding the role of financial development in the process of economic growth and poverty alleviation, there have been considerable debates among economists for decades. However, in its majority, the theoretical reasoning and empirical evidence suggest that the central role finance plays during the social-economic development process cannot be neglected (for an overview see, for example, Levine, 1997, 2004). Economies with higher levels of financial sector development are likely to have faster economic growth and poverty alleviation (Čihák et al., 2012). Therefore, to help the audience to understand the rationale and mechanism of how financial development works, it is essential to define the concept of financial development and its relative measures in this section.

3.1. A Functional Perspective on Financial Development

Markets are imperfect, and people may undertake substantial costs when they acquire and process information about potential investments, as well as enforcing contracts. For promising ideas and projects that worth to be invested in, are often unavoidably restricted from absorbing the flow of the society's savings. Moreover, transacting goods, services and financial

instruments also induce costs. Consequently, the costs induced by imperfect markets will curtail economic development and retard improvements in living standard (Čihák et al., 2012).

The existence of costs associated with market imperfections incentivise the emergence of particular types of financial contracts, markets, and intermediaries that help to mitigate such costs. Financial products and institutions are also created given the motivation of profits, to improve the impacts of these market imperfections. Moreover, a range of services from legal and accounting systems to state-owned banks are also established by the government, to reduce these imperfections and enhance resource allocation. Various types and combinations of information, enforcement, and costs that in conjunction with miscellaneous legal, regulatory, and tax systems have motivated specific financial contracts, markets, and intermediaries across countries and throughout history to emerge and progress. The inherent nature of financial systems is to ameliorate market frictions, which enables them to influence the allocation of resources across space and time spontaneously, and through various ways. For instance, the emergence of banks or institutions such as credit registers that improve the information acquisition about firms and managers will unquestionably alter and improve credit allocation. Similarly, financial contracts that help investors to build up confidence in firms' abilities to payback will likely to influence the way people allocate savings. Additionally, the development of liquid stock and bond markets means that people who are reluctant to relinquish control over their savings for extended periods can trade claims to multiple projects on an hourly basis, which may have profound impacts over the amount and the place where people save. Sharing no unique path of financial system development, some of the economies are comparatively more successful in reducing these imperfection-related costs, while the others emphasise considerably more on its impacts over economic development.

From the most basic conceptual level, financial development takes place when financial instruments, markets, and intermediaries mitigate the effects of imperfect information, limited enforcement, and transactions costs, even though these effects may not be wholly and essentially eliminated. The creation of credit registries, for instance, tends to facilitate information acquisition and circulation about potential borrowers and to improve resource allocations that have positive impacts over economic growth. Besides, the development of equity and bond markets which is facilitated by effective legal and regulatory systems could also allow investors to hold more diversified portfolios than they could without efficient

securities markets. The greater diversification of risk will further enable the capital to flow to projects with higher yields, boosting economic growth, and improving living standards.

Nevertheless, it would be too narrow to define financial development as the degree to which the financial system eases market imperfections, as it does not disclose much information on the actual functions provided by the financial system to the overall economy (Čihák et al., 2012). Therefore, when defining financial development and demonstrating its broad coverage, it is necessary to describe models where market frictions stimulate the diversified financial arrangements to emerge and how those arrangements alter incentives and break constraints in ways that may affect economic growth. As summarised by Levine (2004), Merton (1992), Merton and Bodie (1995, 2002), there are many broad functions provided by the financial systems to ease costs related to information acquisition, enforcement, and transaction. Those functions tend to focus on what the financial system actually does, which may efficiently provide specific assistance in organising a theoretical literature review and tying this literature to the history of economic thought on finance and growth. Therefore, financial development can be defined as improvements in the quality of the following five critical financial functions at a broader level:

- i. Producing and processing information ex-ante in terms of creditable investments and providing capital allocation based on these assessments;
- ii. Monitoring those individuals/firms and exerting corporate governance after capital allocation/finance provision;
- iii. Facilitating the trading, diversification, and management of risk;
- iv. Facilitating the exchange of goods, services, and financial instruments; and
- v. Mobilising and pooling savings.

These five essential financial functions may work individually and collaboratively to affect saving and investment decisions and hence the economic growth (in *section 5.2.1*, these five broad functions are discussed in detail in the context of how a financial system facilitates economic growth). While the above functions may be performed in a similar way across economies and over time, yet, marked differences across countries in their legislations, regulations and policies may create distinct discrepancies in how well they could perform those functions and provide relevant services. As a result, improvements in any dimension will lead

to distinct implications for resource allocation and hence social welfare, depending on other frictions at play in the economy.

3.2. Financial Development Measuring Framework

As mentioned earlier in *section 3.1*, the study investigates the incentives of the emergence of financial sector development and its broader functions within economies. However, to investigate the impacts of the development on economic growth and poverty alleviation, it is necessary to quantify the functioning of financial systems. A comprehensive framework needs to be employed to measure the four broad characteristics of financial institutions and markets, which are widely used and emphasised among existing literature. The four characteristics are: financial access, financial depth, financial efficiency, and financial stability. For financial access, it measures the degree to which an individual/firm could access and use products and services provided by financial institutions and markets. For financial depth, it measures the size of financial institutions and markets. For financial efficiency, it measures how efficient financial institutions and markets are in providing financial services. Finally, financial stability measures the stability of financial institutions and markets.

The above-mentioned four characteristics are widely used to reflect financial institutions and financial markets. Financial institutions in most economies contain mostly banks, and financial markets include both equity and bond markets. The four broad characteristics to measure the two primary components of the financial sector underlie the 4x2 matrix of financial system characteristics used widely nowadays. Although it may still have limitations in capturing all features of the financial system, the features that they have reflected, on which much of the empirical literature has been focused, provide sufficient support for this study to use these measures for our further investigation.

3.2.1. The 4x2 Framework of Financial Systems

In theory, an ideal method to capture the critical features of a financial system is to have straightforward measures of how well financial institutions and financial markets perform in

their embedded functions³. A direct measure that could transfer those monitored performances into simple numerical numbers will be useful for researchers and policymakers to compare different financial systems, to identify and overcome their shortcomings and enhance their advantages. Unfortunately, researchers have failed to obtain a simple numerical way to get direct measures of these financial functions in reality so far.

The objective of this section is to outline measures of the four essential characteristics of financial systems: access, depth, efficiency, and stability. These characteristics of financial systems are only proxies of the services provided by financial systems, instead of being functions themselves. For instance, ‘financial access’ only represents a proxy of the overall extent of the service supplied by the financial system, measured by several financial development indicators. Meanwhile, this section presents measures for both financial institutions and financial markets of each financial system characteristics. The subsequent 4x2 framework of the financial system that builds on relevant literature seeking to offer empirical insights into the comparison between financial systems demonstrates the multidimensional nature of financial systems. In the following subsections, we further include comparisons of graphical trends in the financial system depth, access, and efficiency dimensions for advanced economies (AE) and emerging economies (EM) from 1980 to 2018. The dataset used for computing the trend is extracted from IMF (2020)⁴. Noticeably, the dataset does not include measures of the stability dimension as it is treated by IMF (2020) as an outcome of financial development.

3.2.1.1. Financial Depth

The variable private credit to GDP has received much attention in the previous empirical literature concerning financial development. It is defined as domestic private credit to the real sector by deposit money banks as a percentage of Gross Domestic Product (in local currency). The private credit thus does not include credit issued to governments, government agencies, public enterprises, or credit issued by central banks. The most common feature of private credit to GDP is its strong correlation with income level, and this financial depth proxy variable

³ For full descriptions regarding the five broad functions provided by financial systems, please refer to *section 3.1*.

⁴ The dataset provides nine indexes that summarise the level of development in financial institutions and financial markets across countries. Six sub-indexes are constructed based on a range of indicators in terms of financial access, depth, and efficiency, for both financial institutions and financial markets. It covers more than 180 countries during 1980-2018. For more details, see Svirydzienka (2016).

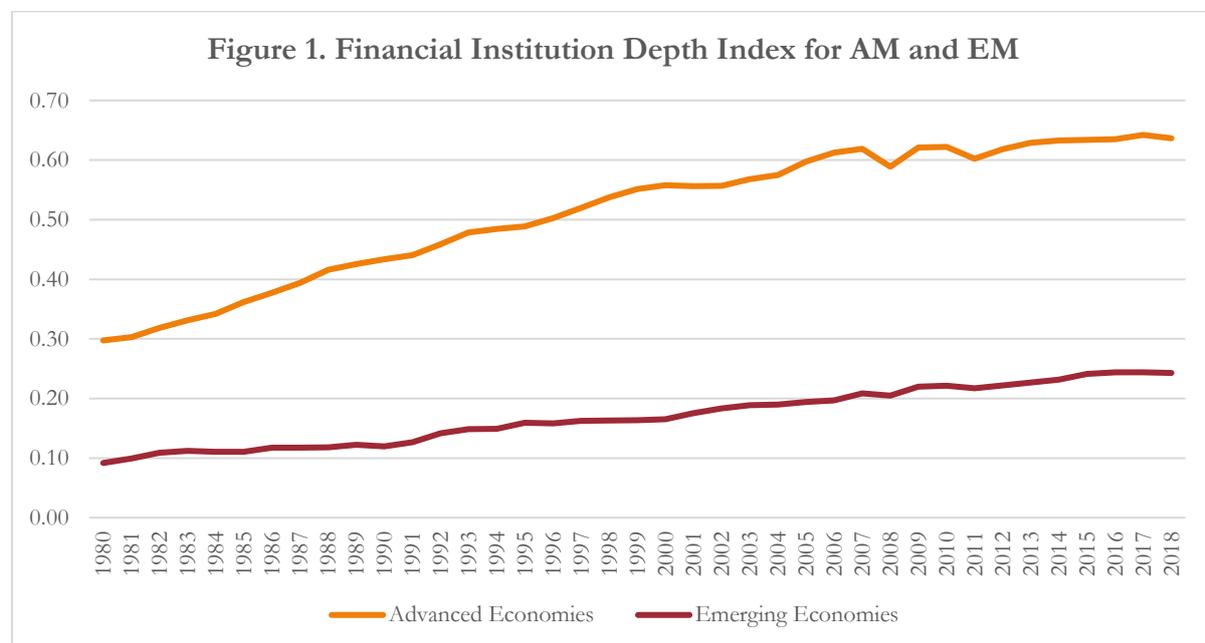
differs widely across economies. Based on data provided by the Global Financial Development Database (GFDD) in 2017, the average rate of private credit to GDP in high-income countries is approximately four times higher than the average rate in low-income countries. Based on this measure, economies with relatively deeper financial systems include many of those countries in Europe; while Canada, Australia, and South Africa are also among those in the highest quartile in terms of private credit to GDP. When considering this measure in emerging economies, the financial system in China ranks in the highest quartile, which is higher than other major emerging economies such as Russia, India, and Brazil.

Extensive literature has documented that a high ratio of private credit to GDP is in general, associated with higher economic growth (see, Beck et al., 2004; Demirgüç-Kunt & Levine, 2008; Levine, 1998; among others). For instance, as argued by Demirgüç-Kunt and Levine (2008), financial depth, which is approximately measured by private credit to GDP, has strong statistical links to long-term economic growth. Similarly, using the same indicator for financial development, Beck et al. (2007) find that financial development also helps the poor disproportionately. They find that more significant financial sector development helps the incomes of the poor to grow faster than average per capita growth, which lowers income inequality as well. In addition, based on their estimates, 60 per cent of the impact of financial development on the poorest quintile works through aggregate growth, and 40 per cent works through alleviation in income inequality.

In contrast, Gould et al. (2016) find that private credit to GDP has no explanatory power in describing growth in lower to middle-income segment of the distribution (bottom 40 per cent) or even aggregate income growth. Nevertheless, they agree that financial sector development, when defined broadly, is associated with higher long-term growth. Besides, IMF (2017) argues that a high ratio of private credit to GDP is not necessarily a good thing as higher growth in private credit is also associated with a greater probability of banking crises. However, Gould et al. (2016) argue that although countries with higher levels of financial development can suffer the largest falls in growth during crises, the crises-induced negative effect does not offset the benefits of financial development to long-term growth.

Among the financial development literature, there is an arguably more comprehensive measure but with more inferior coverage of countries and periods used as an alternative to private credit to GDP in terms of financial depth – the deposit money banks' assets to GDP. It is inclusive of

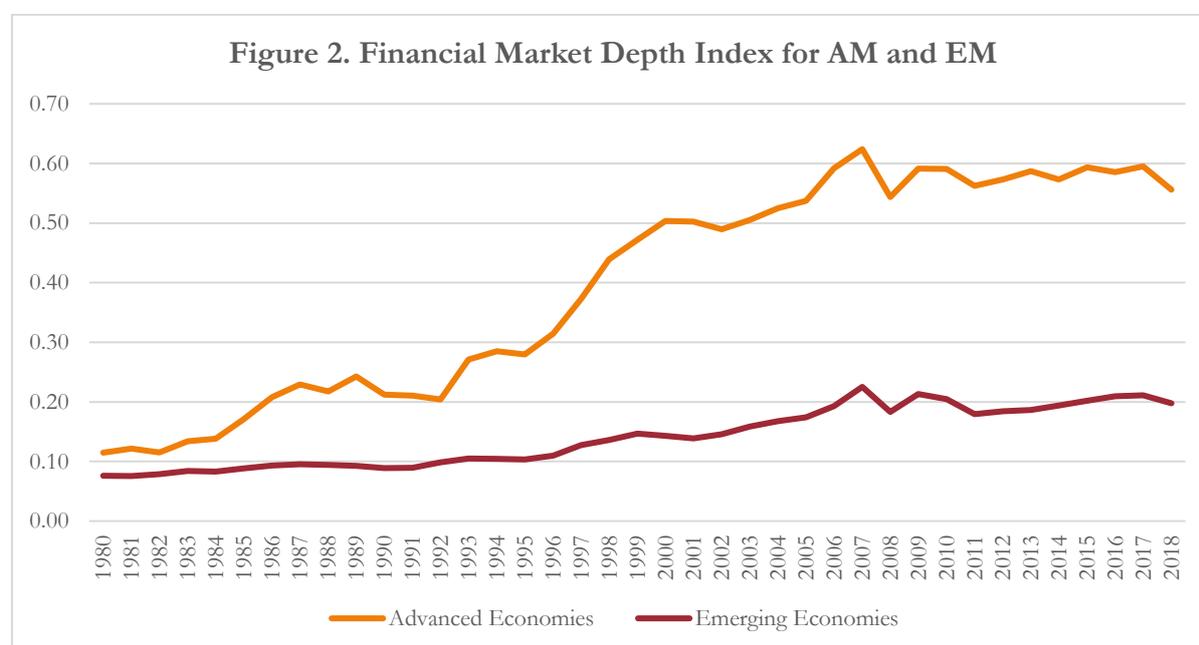
credit to the private sector, credit to government, and bank assets. Additionally, given that most of the emphases were placed on banks among previous literature, issues with non-bank financial institutions (NBFIs) that were highlighted by the most recent crisis also started to divert researchers' focus to those NBFIs. One of the significant proxies that are of particular interests to researchers is the total assets of NBFIs to GDP. Total assets of NBFIs are comprised of pension fund assets, mutual fund assets, insurance company assets, and life/non-life insurance premiums. Nonetheless, the data coverage in terms of NBFIs is much less comprehensive than that of banks. *Figure 1* below compares the trend for advanced and emerging economies in terms of financial institution depth, based on the aggregated index that consists of a number of the discussed financial development indicators.



Source: Author's calculation based on the dataset provided by IMF (2020)

In terms of the depth of a financial market, it is a common approach to estimate using a combination of both stock and bond market's data. Earlier work of Levine and Zervos (1998) suggests that the trading of firms' ownership claims in an economy is closely tied to the rate of economic development. The most general approach in the literature to estimate the size of a stock market is to use the stock market capitalisation to GDP, and for estimating the size of a bond market is to employ outstanding volume of private debt securities to GDP. The sum of the two, thereby, produces the size of a specific financial market. Additionally, among countries, the variation of the size of their financial markets are significant, either in terms of the size of the country or the income level. For instance, the average value of this summed ratio

for Poland was 25.3 per cent during 1996-2017⁵, while it was 187.7 per cent for Malaysia. In the same period, the average was 27.1 per cent for lower-middle-income countries and 57.5 per cent for upper-middle-income countries, while the average for high-income countries was approximately 113 per cent. Moreover, when the economies are big in size, their financial markets are likely to play a relatively larger role than the ones in small economies. The spread of the highest quartile of the worldwide distribution covers not only developed economies like the US, UK, Canada, and others but also major emerging economies, like China, Malaysia, and Chile, for instance. *Figure 2* below compares the trend for advanced and emerging economies in terms of financial market depth, based on the aggregated index that consists of several discussed financial development indicators.



Source: Author's calculation based on the dataset provided by IMF (2020)

3.2.1.2. Financial Access

One of the significant characteristics of an effective functioning financial systems is its ability to allocate limited available capital based more on the prospective quality of the projects and based less on the entrepreneurs' accumulated wealth and social connections. Moreover, if other conditions are fulfilled, a better and effective functioning financial system that overwhelms

⁵ The results are based on author's own calculations using the data extracted from the Global Financial Development Database provided by World Bank (2020a) during 1996-2017.

market frictions will be more efficient in identifying and funding the most promising businesses, rather than large businesses and wealthy individuals. Therefore, to develop more informative proxies of financial development, it is beneficial to move beyond one of the financial system dimensions, financial depth, and to consider other dimensions of the financial system, such as financial access.

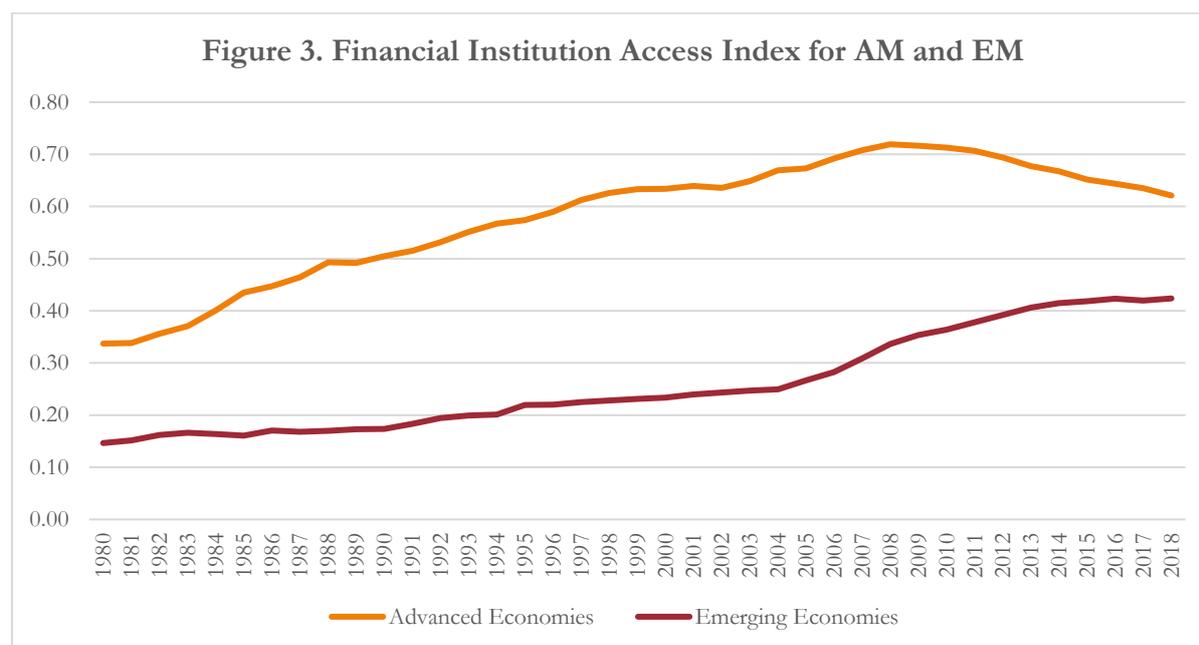
Financial access is defined as the degree to which individuals/firms could have access and use financial services (Beck et al., 2009). Concerning the accessibility of financial institutions, a commonly used proxy is the number of bank accounts (per 1,000 adults). Others include the number of bank branches (per 100,000 adults) which contains commercial banks only and the percentage of firms with line of credit, which either includes all firms or only small firms. All those proxies do have specific weaknesses. For instance, with the latest development in internet and mobile banking, certain areas have experienced branchless banking, which made the number of bank branches to become gradually misleading. While it has not been an issue for another proxy, the number of bank accounts; though it faces its own limitations, one of them in specific - it cannot correct for the fact that individual customers may possess multiple accounts in a single bank or different banks.

Most of the data in the Global Financial Development Database (GFDD) for this dimension are extracted from the recently established Financial Access Survey (FAS) Database, which is based on the earlier work produced by Beck, Demirguc-Kunt, et al. (2007). Moreover, the newly constructed Global Financial Inclusion (Global Findex) Database also provides a portion of the data for this dimension. According to the Global Financial Development Database, there is a wide dispersion in access to financial institutions across economies. From 1996-2017⁶, the number of bank accounts per 1,000 adults for lower-middle-income countries was 554.8, for upper-middle-income countries was 685.5, and for high-income countries was 1153.8.

In addition, as Čihák et al. (2012) argue, the variable that focuses on account penetration – the percentage of adults that have at least one account at a formal financial institution – could also measure the financial service accessibility. Once again, we also observe substantial differences in this variable when comparing high-income and middle-income economies. It

⁶ The results are based on author's own calculations using the data extracted from the Global Financial Development Database provided by World Bank (2020a) during 1996-2017.

was about 89 per cent in high-income economies while 24 per cent in middle-income economies. On a global scale, the number of adults that claimed they do not have a formal account was around 2.5 billion, the majority of whom reside in low- and middle-income economies. *Figure 3* below compares the trend for advanced and emerging economies in terms of financial institution access, based on the aggregated index that consists of several aforementioned financial development indicators.

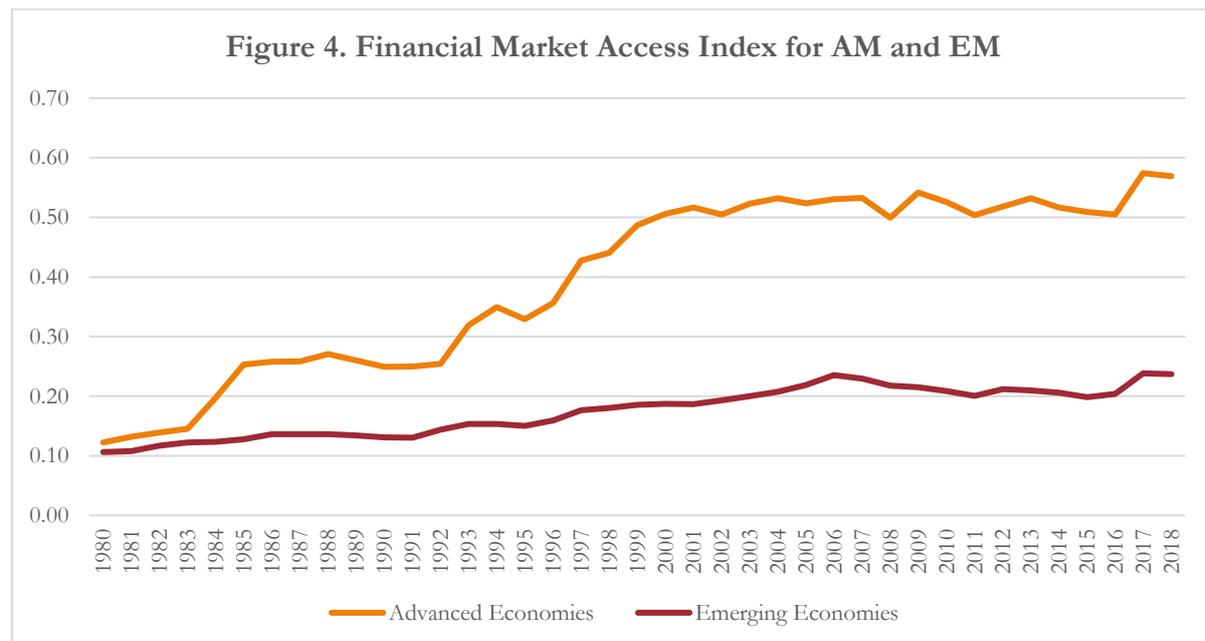


Source: Author's calculation based on the dataset provided by IMF (2020)

Data that measures the accessibility of financial markets are relatively scarce in the database. The common proxies used to estimate access to stock and bond markets are measures of market concentration, as a higher degree of concentration reflects more significant difficulties for newer or smaller issuers to access (Čihák et al., 2012). There are several proxies that fall into this category. For instance, the percentage of value traded outside of top 10 traded companies, the percentage of market capitalisation outside of top 10 largest companies, the government bond yields, the ratio of domestic to total debt securities, and the ratio of new corporate bond issues to GDP.

Based on observations of the above-mentioned proxies using the Global Financial Development Database, we find the differences between the developed and developing economies of most of these proxies are significant whereas the differences in the percentage of market capitalisation outside of the top 10 largest companies are minimal. This might suggest

that, apart from an economy's income level, other factors such as the size of the economy are also influential. A typical example would be emerging economies like China and India that have large economies in size, and their financial markets are very dispersed, which made this proxy variable for the two economies scoring in the top quartile. *Figure 4* below compares the trend for advanced and emerging economies in terms of financial market depth, based on the aggregated index that consists of a number of the discussed financial development indicators.

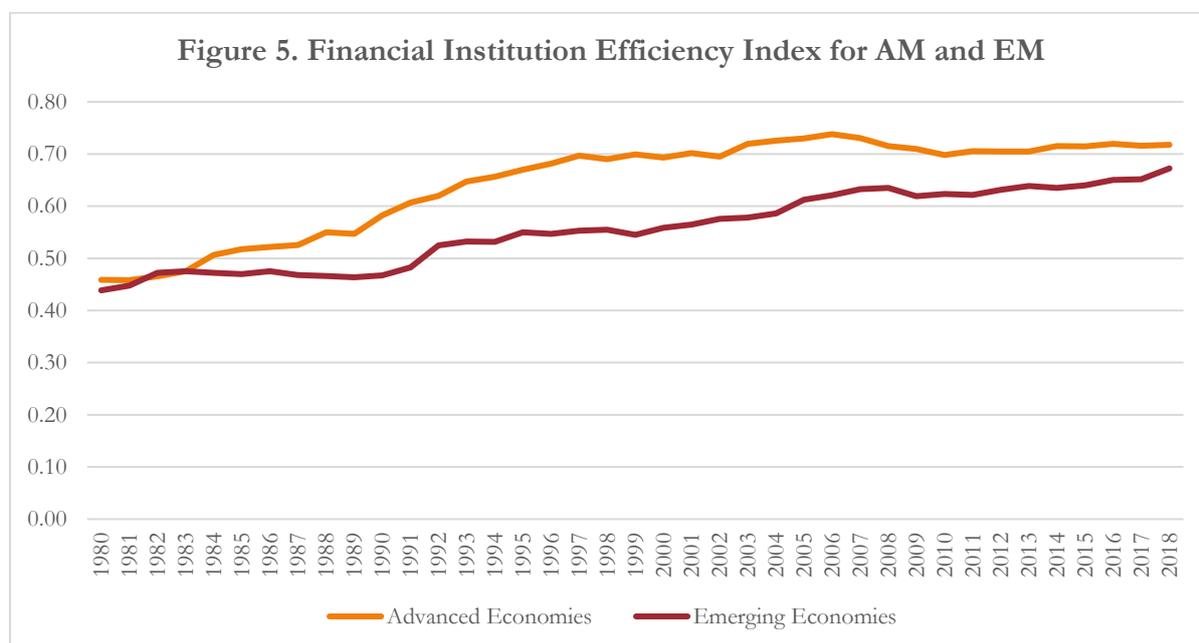


Source: Author's calculation based on the dataset provided by IMF (2020)

3.2.1.3. Financial Efficiency

Financial efficiency refers to the cost of obtaining finance that can be measured by a range of proxies for financial institutions and financial markets. For instance, common proxies in terms of the financial institutions include the overhead costs to total assets, the net interest margin, the lending-deposits spread, and the profitability. The profitability proxy, which contains returns on assets and equity, attracts more attention in the literature, as more efficient financial institutions tend to be more profitable than those who are not. In fact, the relationship between their efficiency and profitability are not necessarily closely related. Inefficient financial systems could also generate considerably high profits if they operate during an economic upturn, while otherwise efficient systems may generate losses during an economic downturn. *Figure 5* below compares the trend for advanced and emerging economies in terms

of financial institution efficiency, based on the aggregated index that consists of a number of the discussed financial development indicators.

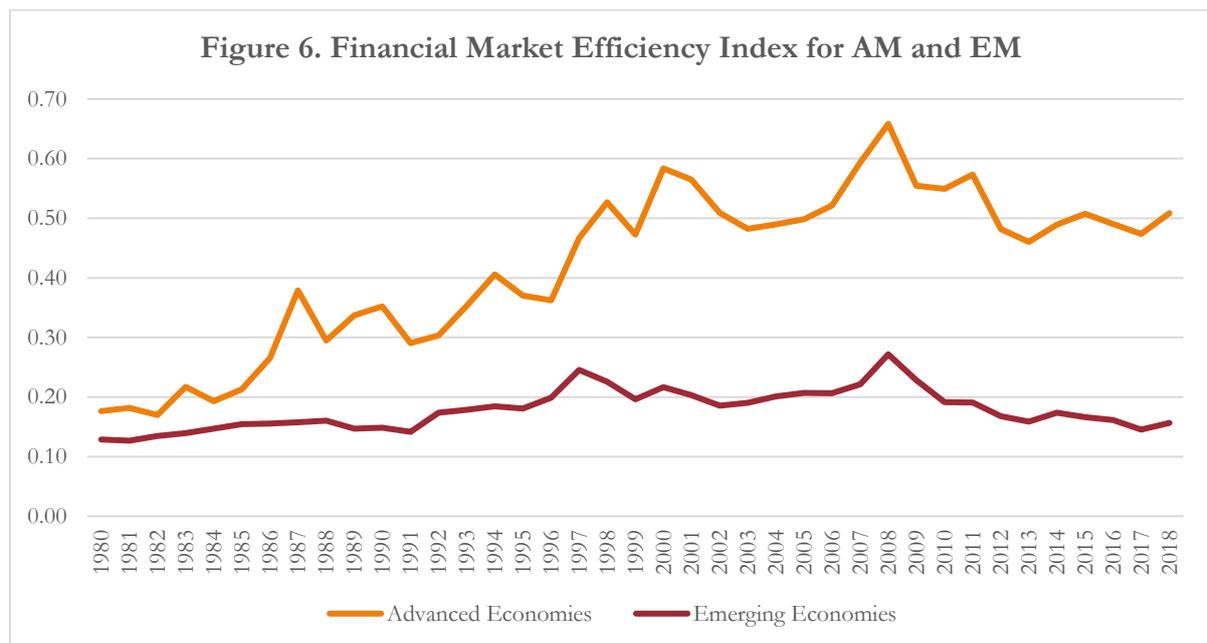


Source: Author's calculation based on the dataset provided by IMF (2020)

Concerning the measures of financial markets, a general approach is to use the turnover ratio, that is, the ratio of the stock market's annual turnover to its capitalisation. Thiel (2001) suggests that the logic of using this variable is that higher turnovers are usually associated with more liquidity, which in turn, enables the market to be more efficient. For the bond market, a general approach is to use the tightness of the bid-ask spread and the turnover ratio, though, the latter suffers more from incomplete data. The above variables have been frequently used in the literature, though there are still other proxy variables for measuring efficiency in financial markets, one example being, the price synchronicity, which is calculated as a degree of co-movement of individual stock returns in an equity market. The purpose of this proxy is to capture the information content of daily stock prices, as an efficient market requires prices to be informative about the performance of individual firms. Another example would be, the private information trading, defined as the percentage of firms with trading patterns that arise from trading conducted through privately obtained information. Its calculation is based on the examination of daily price-volume patterns and helps indicate the prevalence of trading in a stock based on private or privileged information. Finally, the real transaction cost, conducted based on daily return data of the listed stocks, would be another example of a proxy variable. It is not only designed to estimate the transaction costs associated with trading a

particular security, but also to help to determine the efficiency barriers in the market. All the above variables are constructed by compiling and statistically processing firm-level data from a variety of market sources.

Based on observations from the stock market turnover ratio, still, we find a wide dispersion across economies during 1996-2017⁷. The average ratio for high-income countries was 53.3 per cent, for lower-middle-income countries was 37 per cent and for upper-middle-income countries was 42.1 per cent. Besides, for economies that scored higher include not only the developed economies mainly located in Europe and North America but also the emerging economies like China (189.4%), Brazil (59.4%), India (106.8%), Thailand (76.5%) and others. *Figure 6* below compares the trend for advanced and emerging economies in terms of financial market efficiency, based on the aggregated index that consists of a number of the discussed financial development indicators.



Source: Author's calculation based on the dataset provided by IMF (2020)

⁷ The results are based on author's own calculations using the data extracted from the Global Financial Development Database provided by World Bank (2020a) during 1996-2017.

3.2.1.4. Financial Stability

The most commonly used measure for evaluating financial stability is the z -score, which explicitly compares buffers (capitalisation and returns) with risk (volatility of returns). It measures precisely, the solvency risk of banks, which indicates the probability of the value of a bank's assets becoming lower than the value of its debt. The z -score is defined as $z \equiv (k + \mu)/\sigma$, where k denotes equity capital as per cent of assets, μ denotes return as per cent of assets, and σ denotes the standard deviation of return on assets that acts as a proxy to measure return volatility. According to Beck et al. (2000), Čihák and Hesse (2010), Laeven and Levine (2009), the z -score is negatively associated with the probability of a financial institution's insolvency in most cases. In other words, a higher z -score implies a lower probability of insolvency and vice versa. It has gained vast popularity among relevant studies.

One of the advantages of the z -score is, it allows us to compare the risk of default for different groups of institutions that may differ in ownerships or objectives, but still face the risk of insolvency. Yet, one of its inherent limitations is data quality, as the computation process relies heavily on the underlying accounting and auditing framework; financial institutions can smooth out this reported data, resulting in misleading z -score. Consequently, the stability assessment of the financial institutions will be overly optimistic as the z -score treats each financial institution separately, potentially overlooking the risk that a default in one of the institutions may induce loss to other institutions within the system.

Moreover, there are other proxy variables to measure financial stability, such as the nonperforming loan ratio and excess credit growth. The former is better known than the z -score in earlier literature, but it remains a lagging indicator of soundness (Čihák & Schaeck, 2010). The latter emphasises more on the excessiveness (Kaminsky & Reinhart, 1999), and it is easier to measure the growth of credit than to define ex-ante if the growth is excessive or not. A credit boom in the financial market always raises alert for potential banking and currency crisis (Asli Demirgüç-Kunt & Detragiache, 1998, 2002). According to Eichengreen and Bordo (2003), about 75 per cent of the credit booms in emerging economies were associated with banking crises, while 85 per cent of the booms were associated with currency crises.

In terms of financial markets stability measures, the most commonly used proxy variable is market volatility. Other proxy variables such as skewness of stock returns could be used when

markets have more negatively skewed distributions of stock returns, as such distributions are more likely to deliver large negative returns that jeopardise the market when facing instability. The vulnerability to earnings manipulation is also indicative in terms of stability concerns, as it is derived from many characteristics of the information reported in companies' financial statements. It is defined as the percentage of firms listed on the stock exchange that are susceptible to manipulation. Developed economies that typically feature with lower figures such as the US has less than 10 per cent of its firms having issues concerning earnings manipulation. In contrast, almost all firms in developing economies experienced manipulations of their accounting statements.

3.3. Concluding Remarks

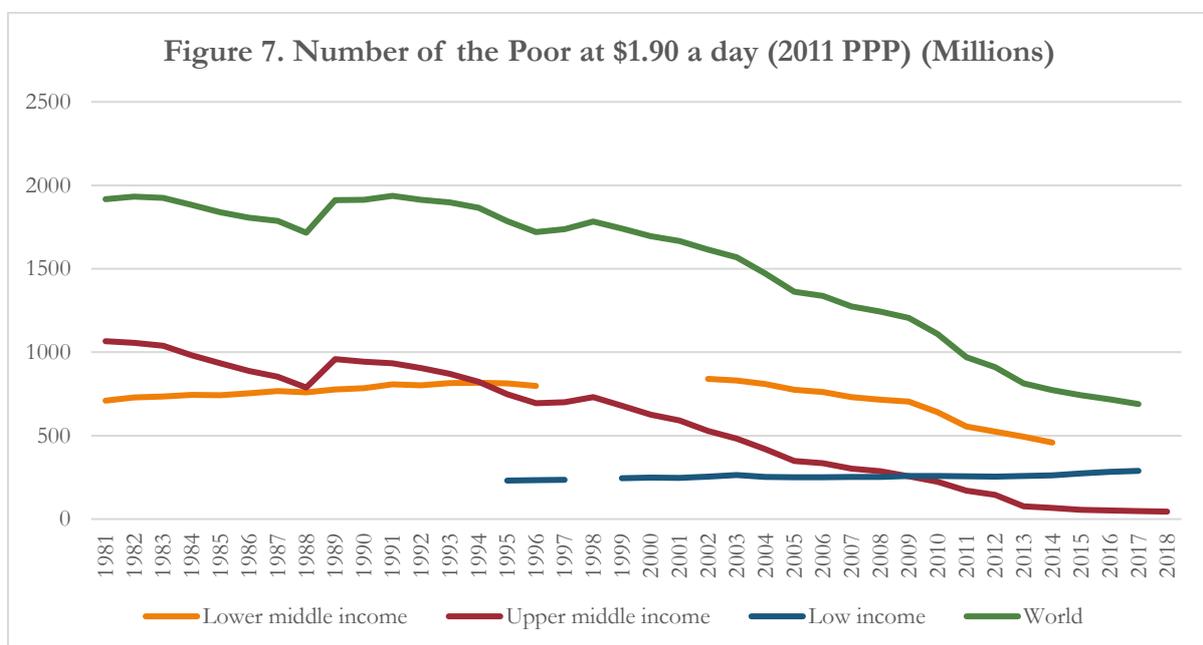
Given the above framework and observations of the proxy variables from the dataset provided by the Global Financial Development Database, one basic yet important actuality is the significant differences between the four characteristics of a financial system across countries. It further emphasises the very different and separate facets of financial systems that each dimension captures. Thus, the most appropriate approach to investigating the financial systems is to consider all the dimensions simultaneously.

4. Poverty Concept and Its Measuring Framework

Intending to defeat poverty, the World Bank (WB) has set policies that 'make poverty a dream' at the core of its agenda for years. In 2013, the WB announced two goals that would guide its development work worldwide. The first was the eradication of extreme poverty. More precisely, it was the target by 2030 to reduce the extremely poor of the world population, defined as those living on less than \$1.25⁸ per day in 2005 PPP (purchasing power parity), to below 3 per cent. The second was the boosting of shared prosperity, defined as promoting the growth of per capita real income of the poorest 40 per cent of the population in each country (World Bank, 2017c).

⁸ *Note:* The International Poverty Line has subsequently been revised in 2015 to \$1.90 per person per day in 2011 PPP.

Overall, there has been marked progress on reducing poverty over the past decades, yet the number of people living in extreme poverty on a global basis remains unacceptably high. The objective of defeating world poverty has not been accomplished. *Figure 7*⁹ below depicts the general trends of poverty reduction for the world as a whole and for the countries with different income levels during 1980-2018. Globally, the number of the poor living at \$1.90 a day (2011 PPP) decreased dramatically from 1916.6 million in 1981 to 689.1 million in 2017. For upper-middle-income countries, the poor population decreased from 1065.8 million in 1981 to 44.8 million in 2018, and for lower-middle-income countries, it dropped from 709.1 million in 1981 to 458.6 million in 2014. Nevertheless, for low-income countries, the poor population increased from 230.7 million in 1995 to 288.8 million in 2017.



Sources: Author's calculation based on the dataset provided by World Bank (2020b)

4.1. Poverty: Its History and Present

Traditionally, poverty has been mainly considered in terms of income, and this view continues to be the defining core of the concept till today. Nevertheless, 'income' itself as a term is as complex as 'poverty' is and needs to be carefully and precisely delineated when defined. A comprehensive and accurate measure of income includes not only the earned financial gain that is a more general understanding but also includes resources like assets, income in kind and

⁹ The data were subtracted from the World Bank Poverty and Equity database from 1980 to 2018.

subsidies from employment and public services. In general, people who are deprived of income and other resources needed to meet the necessary conditions of life could be defined as living in poverty. 'Other resources' in this concept refer to a broad range of things, such as diets, material goods, amenities, and services that enable them to play their social roles, fulfil their obligations, and take part in the relationships and customs that are required by society.

It has been a primary human preoccupation to understand and to alleviate poverty for centuries. Since the late 1800s, three alternative conceptions of poverty, which emerged and evolved, built the foundation for subsequent poverty related international and comparative works. Those poverty conceptions rely largely on the ideas of subsistence, basic needs and relative deprivation. The use of 'subsistence' to define poverty has been heavily criticised since it suggests that physical needs are the primary needs for people, without taking into account any form of social needs (Townsend, 2010). As a matter of fact, people, in reality, are not as simple as individual organisms that require only the replacement of sources of physical energy. There are other socially demanding roles such as workers, spouses, parents, and friends that require them to fulfil as well. Additionally, shifts in social activities and demand patterns lead to rapid changes in physical needs. The needs for material goods, their relevance to the society, and even the goods themselves are also consistently changing over time. Physical needs, thereby, turn out to be socially determined in various ways. Nevertheless, meeting such physical needs as the satisfaction of hunger is still a priority in Sub-Saharan Africa, where half of the world extreme poor live, and many other Least Developed Countries (LDCs), due to the lack of elaborate social institutions and services and scant resources. Such needs have been categorised as part of 'absolute' poverty (namely, 'extreme' or 'severe' poverty).

In the late 1970s, the second conception of poverty derived from 'basic needs' emerged and gained its popularity among researchers. It was strongly supported by the International Labour Organisation (ILO) as it extends the coverage of the 'subsistence needs' concept by including two more elements: minimum consumption needs of families and essential facilities/services provided by and for the society. In terms of families' minimum consumption needs, they include adequate food, clothing and others. In terms of facilities and services, they include the provision of safe water, health care, education, sanitation, etc. The 'basic needs' moved beyond the previous phase that considered solely the material needs for individuals' physical survival and efficiency.

In the late 20th century, the third conception, 'relative deprivation' was formulated. 'Relativity' in this term refers to both income and other resources, as well as material and social conditions. Over the years, the 'relativity' of meanings of poverty has come to be recognised in part, if not comprehensively. Since given the rapid changes societies have experienced, and the laws, obligations, and customs that once applied are no longer suited for people living in the present, poverty standards that devised at some historical date are outdated and hard to be justified under new conditions (A. Kuper & J. Kuper, 2010). Moreover, during the globalisation process, the people and their standards of living are closely tied and related. Yet, inequalities within and between countries are growing. Consequently, by merely updating any historical benchmark of poverty based on some price indices, this concept has received a fair share of criticism.

To effectively define poverty, the World Bank adopted a rule-of-thumb measure in 1990 that marked US\$ 370 per year per person at 1985 prices for all the poor developing countries as a threshold level. This was conceptualised as the 'dollar a day' poverty line. Although the value of this crude indicator changes over time, it still fits for its practicality purpose that works as a convenient interim measure of poverty. Nevertheless, with new perspectives on poverty consistently emerged and challenged the conventional focus on measures of income and consumption as the defining condition for poverty, studies on poverty began to recognise it as a complex set of interrelated deprivations (Brandolini et al., 2010; M. C. Nussbaum & Sen, 1993; Thorbecke, 2013). More importantly, with the help of these alternative perspectives, the researchers have refocused the poverty concept as a human condition that reflects failures in various dimensions of life. In particular, failures like hunger, illness, unemployment and many others all add up to an assault of human dignity. Therefore, the elimination of poverty requires not only strategies for economic growth and redistribution, but also strategies to supply more direct interventions toward various areas (e.g., education, health care, social justice, etc.) that might improve human conditions of the poor. It is recognised that, although the above ideas are not new, what is relatively new is their emerging as a consensus among policymakers, public and development specialists, who now analyse poverty in terms of opportunities, empowerment and vulnerability. Poverty, as a public policy concern, no matter at the global, national or community level, is now widely considered to be a multidimensional problem. The consensus can also be reflected by the conceptual shift of the World Bank's World Development Reports (WDR) since 1980, as well as the development and adoption of the

Human Development Index (HDI)¹⁰ that was introduced by the United Nations Development Programme in its first Human Development Report (HDR) in 1990.

To adequately measure human poverty and its entrenched complexities, UNDP HDR developed the three-dimensional Human Poverty Index (HPI) in 1997, which was later replaced by the Multidimensional Poverty Index (MPI) in 2010. The MPI is argued to be a significant analytical breakthrough to elevate the discussion of human deprivations beyond income poverty (UNDP, 2016). This composite measure that is calculated for 102 developing countries approaches poverty from both capability and human development perspectives and helps to enrich the understanding of poverty. The theoretical framework of the MPI was constructed based on the deprivation side of human development. It enables the MPI to capture more the nuanced, previously unquantifiable 'human poverty' that includes being refused of basic choices and opportunities to enjoy a healthy and free life, to enjoy a satisfactory living standard, and to enjoy a community life (i.e., freedom in culture and religion choices). Therefore, compared to the conventional one-dimensional measure of poverty that focuses on failures to obtain basic capabilities needed for functioning – i.e., 'income poverty' – the 'human poverty' approach enables the MPI to reveal more about the depth and overlapping nature of people's non-income deprivations. According to HDR 2016, almost 1.5 billion people in the developing countries for which the MPI is calculated, suffer from multidimensional poverty, and 53.9 per cent of them reside in South Asia and 33.5 per cent in Sub-Saharan Africa. Many people who live in developed countries also suffer from such multidimensional poverty.

Even though the MPI provides more comprehensiveness than previous income poverty measures when measuring deprivations in human lives, it still struggles to capture them all thoroughly. For instance, the five 'instrumental freedoms' as suggested by Nussbaum and Sen (1993) that make up the core of a life of dignity, has not been fully covered by the MPI. They are economic facilities, social opportunities, political freedom, security and guarantees for transparency. Moreover, income poverty and human poverty tend to have a relatively weak correlation, and there may be large discrepancies in human poverty within countries with similar levels of income poverty. For instance, according to HDR 2016, the population living below \$1.90/day (PPP) during 2005-2014 was 21.2 per cent for India, while its MPI was 55.3

¹⁰ Poverty in the first HDR was defined as the lack of choices and opportunities in several critical areas, such as education, health, and voice related to democratic processes.

per cent. And for other emerging economies such as China, its income poverty during the same period was 1.9 per cent while its human poverty was 5.2 per cent. Yet, for countries like the Philippines and Indonesia, they had higher income poverty (13.1 per cent and 21.2 per cent respectively) but lower human poverty (6.3 per cent and 5.9 per cent respectively). Also, countries that have a similar level of income poverty, such as Mexico (3 per cent) and Morocco (3.1 per cent), see a large difference between their human poverty levels, at 6 per cent and 15.6 per cent respectively.

Although the concept of poverty has evolved to a multidimensional level, monitoring of poverty still relies extensively on the income measures. At the global level, the current \$1.90/day (PPP) measure developed and updated regularly by the World Bank is the one that is consistently used to monitor sizes and trends in global poverty. At the national level, the poverty threshold lines are mostly defined following country-specific household income. For researchers, the commonly used poverty measures also rely heavily on the income and consumption-based international and national measures. Though a wide range of other indicators are also used at both global and national levels, it is the income measures that enjoy the most recognition to gauge trends overall.

4.2. Comparing the Four Poverty Approaches

The standard economic approach to measuring poverty is to use the data on annual income per capita to calculate the headcount, or the proportion of the population under poverty (Atkinson, 1987). However, regardless of the simplicity this method has provided for economists, one of the significant shortcomings for this approach is the simple ignorance of other dimensions of poverty (Lindert & Williamson, 1985). Up to now, no universal approach to measuring poverty has been reached, and assessments of it are typically clouded in conceptual and methodological uncertainties (Ravallion, 1992). In the previous section, we have briefly reviewed multiple approaches to defining poverty, which can be summarised as monetary, capability, social exclusion and participatory approaches. Differences in the nature of these approaches provided varied definitions and identifications of poverty and the poor population, which may lead to different policy implications. A detailed comparison between the four approaches is provided in the following sections.

4.2.1. The Monetary Approach (MA)

The monetary approach is the most commonly used measurement of poverty, which identifies and measures poverty by assigning a monetary value to it (Dewilde, 2008). In general, this approach expresses itself in the form of poverty lines, where lines are drawn up with threshold levels of income (or consumption) required to purchase a given set of goods and services that are indispensable to life. Therefore, people who have shortfalls in income (or consumption) from some poverty lines are regarded as living in poverty.

There are many controversies regarding the appropriateness of using income or consumption-based proxy measures. As argued by Johnson et al. (2005), during the beginning and later periods of life, consumption levels would usually be higher compared to the middle period, when income would usually be higher. Moreover, although poverty lines that are drawn based on levels of consumption are arguably better when compared to poverty lines that are based on income, however, they still use income as the gauge to determine poverty status.

In addition, the monetary approach presumes the poor to spend their money on all goods and services that are indispensable to survival, without purchasing any items that are not basic necessities. However, the poor could never be clearly differentiated from the non-poor with this assumption, since for instance, nutritionally-based poverty can be determined by a number of factors such as metabolic rates, activities, gender and many others, which makes it difficult to track the level of income that is actually required to secure any particular level of nutrition. More importantly, to define poverty by means of a line at a specific point in time would unavoidably delineate two groups of people that should be highlighted; one is the group who has income close to the lines but fluctuates across the year due to seasonality reason, and the other one is those at risks and vulnerable to becoming poor. As a matter of fact, individuals and families can move 'in and out of poverty' quite often, since fluctuation is observed for not only their levels of remuneration and necessary expenses but also the statuses of employment. Therefore, the monetary approach which uses a unique poverty line is not an ideal method to clearly and effectively distinguish the poor from the non-poor. In the following sections, the other three approaches will be discussed and examined if they could address and compensate for some of the perceived shortcomings of the monetary approach.

4.2.2. The Capability Approach (CA)

The capability approach does not use monetary income as a measure of well-being; instead, it emphasises more the freedom-related indicators for a valuable life. Sen (1980) initially developed this approach in response to his and many others' critiques of the single-dimensional poverty measures that are solely focused on consumption and income; it has thence become particularly relevant in the poverty discourse. Moreover, this approach has inspired and led to future developments of poverty measures towards a multidimensional framework. Poverty in this context is defined as failures to attain certain basic capabilities, i.e., the ability to adequately satisfy specific valuable functionings (Laderchi et al., 2003). 'Functionings' refer to the various things a person succeeds in 'doing or being', such as participating in the life of society, being healthy, and so forth, while 'capabilities' refer to a person's real or substantive freedom to achieve such functionings; for example, the ability to take part in the life of society (Sen, 1999, p. 75). The defining core of this approach is the capabilities a person has, irrespective of whether he/she chooses to exercise these or not (Hick, 2012).

Theoretically, this approach provides a more appropriate path in defining poverty compared to the monetary approach, given that its framework is built based on the lives that people actually live and the freedoms they enjoy. Nevertheless, as Laderchi et al. (2003) argue, how to translate the capability approach into an operational framework for poverty evaluation raised several issues. For instance, the most fundamental issue relates to the definition of essential capabilities, as in Sen's work, neither a specific list of minimally essential capabilities nor guidelines for drawing up a universal list has been provided. According to Alkire (2002), leaving the specification blank was deliberate to allow societies to make their own judgements on the selection of capabilities so that the composed lists can be more relevant to various persons and cultures. However, the attempts that have been made specifically to define basic capabilities by various scholars received a substantial amount of criticisms as the suggested general lists to reflect the 'good life' characteristics are based on conceptions of the late-20th century high-income western countries rather than those mid- and low-income developing countries (see, for example, Alkire, 2002; Nussbaum, 2000). Moreover, most of the characteristics of a full human life on those lists are defined at a very general level with no specific cut-off points for defining deprivation. Therefore, defining operational measures of the capability approach poses a number of methodological issues.

4.2.3. The Social Exclusion Approach (SE)

The social exclusion approach describes a marginalisation and deprivation process when individuals and groups of people that are willing to, but failed to take part in society, participate in shaping that society, and share the benefits derived from that society. The approach was initially developed in industrialised countries to describe such a process can also arise in those countries with comprehensive welfare systems. It was later extended to developing countries. Burchardt et al. (1999) define social exclusion as occurring when a person is excluded if he/she is: *i*) geographically resident in a society; *ii*) but for reasons beyond his/her control cannot participate in normal activities of citizens in that society; and *iii*) willing to do so. Barry (1998) argues that a person can be deemed as being excluded, provided conditions *i*) and *ii*) are met, irrespective his/her desirability to participate or not. According to Atkinson and Hills (1998), there are three primary features of the social exclusion approach: *i*) relativity (i.e., exclusion is relative to a particular society); *ii*) agency (i.e., they are excluded as a result of the action of an agent or agents); and *iii*) dynamics (i.e., both current circumstances and future prospects are relevant). Room (1999) further adds another feature that is argued to be intrinsic to the social exclusion approach - *iv*) multidimensionality, as this approach focuses on how individuals and groups of people are deprived in more than one dimension.

Poverty status in the context of social exclusion as argued by Cannan (1997), is a function of an individual's relationship with the broader society, especially as manifested in the degree of integration. In other words, this approach is socially defined. It is often a characteristic of groups, such as the aged or specific ethnic groups. This relational emphasis guided exclusion related analysis to a more in-depth study towards the structural characteristics of society and the situation of marginalised groups (e.g., ethnic minorities or the landless), rather than the individual characteristics and circumstances that the monetary and capability approaches focus on. Moreover, as the poor, relative to the rich, are not capable in many ways to improve their current situation (i.e., deprived relative to the norm) without some redistribution of opportunities and outcomes, the social exclusion approach further leads to a focus on distributional issues (Wacquant & Gans, 1997). In addition, this approach also highlights the excluders as well as the excludees, from the agency aspect of social exclusion, and bestows the primary responsibility for improving the situation on the former. It is again in contrast to the previous approaches that describe a world without analysing or attributing responsibility (Atkinson & Hills, 1998).

The social exclusion approach is possibly the most difficult one to use for interpreting the poverty concept under review. Numerous difficulties from its conceptual and analytical aspects arose due to its broad coverage in territories, which raised interminable academic debates. For instance, it is extremely difficult to justify what are the defining features or to identify appropriate norms to provide the benchmarks of exclusion in different societies. As Micklewright (2002, p. 7) concludes, 'exclusion is a concept that defies clear definition and measurement'. Moreover, Saunders and Tsumori (2002) argue that a broader scope of this approach could induce everyone to become or to be considered as socially excluded. In this case, the non-poor, as identified by other approaches, may also experience social exclusion. More importantly, all households may be regarded as enduring some degree of social exclusion once the poverty-deprivation connection falls apart, in which case the analytical practicality of this approach will then be significantly restricted (Marsh & Mullins, 1998). Nonetheless, it is still the only approach that focuses inherently on the processes and dynamics that allow deprivations to arise and persist (Laderchi et al., 2003).

4.2.4. The Participatory Approach (PA)

The participatory approach understands poverty through the economic, political, social, and cultural environment of a locality and assumes that the poor are capable of understanding and analysing their own situations. This approach, as argued by Chambers (1994, p. 953), is defined as 'a growing family of approaches and methods to enable neighbourhoods to share, enhance, and analyse their knowledge of life and conditions, to plan and to act'. Unlike conventional poverty estimates (e.g., monetary and capability estimates) that have been criticised for being externally imposed, and for not considering the views of the poor themselves. The participatory approach that has a particular focus on locality helps it to mostly avoid the externally imposed standards and gets people themselves to participate in decisions concerning the implications for being poor, as well as the magnitude of poverty (Chambers, 1994). In addition, as Laderchi et al. (2003) argue, the locality focus also enables this approach to provide sufficient help in solving several difficulties that are encountered by other approaches. For instance, it helps the monetary approach to define an appropriate minimum basket of necessities; it helps the capability approach to define a generic list of basic capabilities; and it helps to determine if the social exclusion approach could be applied to a specific society and identify its key elements.

Both World Bank and IMF adopted this approach as a complementing element in their poverty assessments since the late 1990s.

The participatory approach is undoubtedly complex and contains multidimensional analysis that includes causes, processes and outcomes of poverty as perceived by the poor. In practice, how to successfully operationalise this approach raised many challenges. The theoretical, conceptual and methodological foundation that the participatory approach was built on received numerous criticisms, especially after its flourishing period in the 1990s. For instance, Booth et al. (1998) argue that this approach suffers from an apparent 'selectivity' issue in practice – where the views of the poor cannot be fully considered and reflected when shaping plans and designing development strategies, which is against the intention of the participatory approach. Cornwall (2000) describes the principles adopted by this approach that causing the 'selectivity' issue as 'optimum ignorance' (find out as much as you need to know now) and 'appropriate imprecision' (there is no need to know everything exactly).

Moreover, another fundamental issue arises from heterogeneity in the community, as usually, a community may have multiple voices. If that is the case, the question is whose voices are being heard. This approach has no agreed way to resolving them to arrive at a single community view. As Vieira da Cunha and Junho Pena (1997) argue, certain groups are sometimes fearful of voicing against dominant members of the community so that the participate approach tends to tolerate and reinforce existing social relations. Additionally, Laderchi (2001) summarised the main arguments against the use of this approach that are mostly on limitations in its methodological foundation, shortage of scientific rigour, naivety about the complexity of communication processes, group dynamics and power relations, and underestimation of the costs of participation. Nonetheless, provided all the limitations as mentioned above could be addressed, this approach offers an excellent opportunity for poverty-related research to hear genuinely different voices that speak from those impoverished people and about realities that are not configured by development discourse and institutions (White & Pettit, 2004).

4.3. Concluding Remarks

Once again, as the above discussions indicate, no consensus in terms of what poverty components are and how poverty could be measured has been reached. Since each of the

approaches derives from a different perspective on what constitutes a good life and a fair and just society, definitions on poverty differ evidently. The group of people that counts as poor is likely to differ according to the approach and the precise methods employed by each approach. Low levels of poverty, according to one approach, may coexist with high levels of poverty according to another. Therefore, empirical evidence on poverty rates across countries and regions differ distinctively according to the approach adopted. In addition, as each approach employs its own measures of deprivation that are closely related, complete independence of one measure from another may not even exist.

Poverty definitions and measurements have important implications for targeting and assessing the poor, as well as relevant policymaking that aims to alleviate poverty. The considerable lack of empirical overlaps between the different approaches to poverty means that making developmental policies according to only one type of poverty will involve serious targeting errors. For instance, from a policy perspective, the implications of using the monetary approach suggest that the solution for poverty is to facilitate the poor to generate money incomes. The development of the poor's capabilities may also be recommended, but only in the context of increasing their productivity and hence incomes. Moreover, the implications of using the capability approach suggest to emphasise more on a broader range of mechanisms concerning the provision of public goods, improvement in goods allocation, and the more efficient use of goods to achieve health, nutrition and education, as well as money income as a means for promoting basic capabilities. Additionally, this approach can also be extended to political, cultural life and other spheres, rather than solely on those material terms listed in the context of essential capabilities.

Essentially, the monetary and capability approaches are individualistic so that policies derived from those approaches tend to focus on individual access to resources or transfers. Both approaches are fundamentally concerned with absolute poverty in most developing countries (Laderchi et al., 2003). In contrast, in the social exclusion approach and also to a considerable extent in the participatory approach, the prime emphasis when defining policy priorities is placed on group characteristics. For example, social exclusion draws attention to the need to decompose and hence eliminate exclusionary factors by redistribution and anti-discrimination policies such as correcting racial discrimination or citizenship restrictions. In general, the discussions suggest that in order to reflect concerns for a multidimensional poverty concept, to use methods that combine different approaches when identifying and targeting the poor should

be widely adopted. Definitions do matter, and clearer and more transparent definitions of poverty are essential prerequisites of any development policy that puts poverty reduction at its centre (Riddell, 2004).

5. The Financial Development-Poverty Alleviation Channels

The battle against poverty is considered as one of the main objectives of the development policies and strategies (UNDP, 1990, 2016; United Nations, 2009). Consequently, international institutions such as the World Bank (WB), and the International Monetary Fund (IMF), direct their policies and efforts towards the reduction of poverty. Being the 'brain' of the economy, as suggested by Stiglitz (1993), the financial system undertakes the tasks of resource allocations across space and time in an environment of uncertainty. Meanwhile, for the last few decades, the development in financial sectors, as Tridico (2010) argues, has disproportionately boosted incomes of the poorest quintile and reduced income inequality. Nevertheless, it is still highly likely that the benefit of financial development for the poor in certain countries is undermined or even offset by *i*) the increases in inequality, which may accompany the growth (A. V. Banerjee & Newman, 1993; Claessens & Perotti, 2007), *ii*) a higher probability of having financial crises that is induced by financial development (Jeanneney & Kpodar, 2011; Kaminsky & Reinhart, 1999; Laeven & Valencia, 2013, 2018), *iii*) the increases in macroeconomic instability, and *iv*) other factors, such as trade openness, public expenditure, legal rules, civil liberty, political instability, and among others.

Therefore, the following sections aim to identify the positive and negative channels through which development in the financial sector affects poverty in theory (empirical evidence that corresponds to these channels are discussed in detail in subsequent chapters accordingly). On the one hand, this chapter argues that financial development contributes to poverty reduction directly through facilitating transactions and enabling the poor to benefit from financial services that increase their income (i.e., interest earned from saving products) and enhance their abilities to undertake profitable investments and other activities; and indirectly through promoting economic growth. On the other hand, to the extent that the financial development process may trigger instabilities at its various stages, the poverty reduction achievements will be patently undermined by unstable macroeconomic environments and malfunctioning financial institutions often found in developing countries, especially given the fact that the poor

are generally more vulnerable than the rich in those terms. For a better visualisation of all major channels of the finance-poverty nexus *section 5* discusses, we develop a concise chart (see *Chapter 1 Appendix A*).

In what follows: *sub-section 5.1* discusses theoretical arguments for direct positive impacts of financial development on the income of the poor beyond its effect through economic growth¹¹. *Sub-section 5.2* looks at the theoretical arguments for indirect positive impacts of financial development on the income of the poor through economic growth. Finally, *sub-section 5.3* discusses how macroeconomic instability and crises could act as channels that disproportionately hurt the poor¹².

5.1. Direct Links Between Financial Development and Poverty Alleviation

Most commonly, borrowing is indispensable to investments in physical capital or human resources and helps insulate spending against external shocks. Nevertheless, one of the most critical and limiting financial factors faced by the poor is a credit constraint (Aghion & Bolton, 1997; A. V. Banerjee & Newman, 1993). Lacking sufficient access to financial services has become significantly crucial in explaining the persistence of poverty (Levine, 2008). The role of financial development has been a key debate in poverty reduction strategies and questions regarding the presence and nature of the finance-poverty nexus have been the subject of a considerable interest. Still, no definite conclusions have been produced, either from the existing theoretical models or empirical findings.

In theory, there are many ways that financial development could contribute to the reduction of poverty directly. Firstly, it could increase the accessibility of formal finance to the poor by tackling the causes of financial market deficiency (i.e., informational asymmetries, costs associated with transaction and contract enforcement; Stiglitz, 1993; Jalilian & Kirkpatrick, 2002). Secondly, the development in finance sectors also helps the poor to accumulate savings and to access bank loans to start small businesses, which widens their access to financial

¹¹ A detailed discussion of existing empirical literature in terms of this direct link is given in the subsequent *Chapter 2*.

¹² A detailed discussion of existing empirical literature in terms of these indirect links is given in the subsequent *Chapter 3*.

services and generates more employment and higher incomes, thereby reducing poverty (Odhiambo, 2009; World Bank, 2001).

Market failure in developing countries, as argued by Stiglitz (1993), is one of the fundamental causes of poverty. Deficiencies of financial markets, such as informational asymmetries and transaction associated costs, provide the poor with significant obstacles from borrowing against future earnings to invest. By tackling those market attributes, the development in financial sectors could vastly enhance the exposure and accessibility of formal finances to the poor, particularly for a small-scale lending. Moreover, World Bank (2001) also emphasises the importance of improving financial access to the poor segment of the population in its World Development Report, particularly in credit and insurance-against-risk services. It argues that such improvements could further help the poor not only to strengthen their productive assets but also to accelerate their actualisation of sustainable livelihoods. Given the potential benefits the poor might gain when they can actually access appropriate financial services, natural barriers between financial services and the poor that provide significant obstructions for the whole process need to be eliminated. Based on this fact, existing literature has identified two main channels that financial development could take to directly affect poverty: the capital conduit effect and the threshold effect.

5.1.1. The Capital Conduit Effect

Initially proposed by McKinnon (1973), the capital conduit effect considers an economy with a lack of organised financial markets and an absence of distinctions between savers and investors. In most developing countries, investors are themselves savers, and their financial systems are also featured with scarce or no external funding at all. The apparent weakness in external funding encourages the poor in particular to focus more on the accumulation required in the form of real assets or as cash reserves, so as to provide sufficient coverage to spending that is associated with private investments. This behaviour may help the poor to achieve a better deal of self-financed investments to total investments. Moreover, on the basis of self-financing, the relationship between money and real assets can be regarded as complementary, as in general, the real yields of money detention increase in pace with the incentives to invest. In other words, it indicates that real yields of money increase, which encourages the poor to hold money and consequently, a large part of the investment, will be self-financed. This effect reflects the

concept of money as a 'capital conduit' (Boukhatem, 2016). In the same context, McKinnon demonstrates that the reserves of money are essential to capital formation, which indicates that liquid savings and capital accumulations vary in the same direction. More importantly, McKinnon (1973) argues explicitly that financial sector development increases the rate of domestic savings, which lowers the cost of borrowing and thus stimulates investment, especially when developing economies experience financial repression. Therefore, the importance of a developed financial system in providing opportunities for deposits and financial services to all economic agents, particularly for the poor in order to diversify self-financing possibilities should be noted.

5.1.2. The Threshold Effect

From another perspective, the threshold effect was derived from the direct relationship between financial development and poverty based on the following hypothesis: 'as the financial system develops, it may extend its service to the poor'. In other words, it implies that in order for a financial system to provide adequate services and to benefit the poor, it has to reach a threshold level of efficiency and competitiveness in its service provisions. The poor segment of the population in developing countries face many constraints that are limiting or even preventing their access to financial services. These constraints include the existence of physical constraints, the lack of sufficient guarantees, and the shortage of financial institutions that are specialised in providing financial services to the poor. Finance could have an unendurable impact on the poor if credit is a privilege only enjoyed by the wealthy population (Greenwood & Jovanovic, 1990). As a result, financial development could relax those constraints faced by the poor and enhance their abilities to perform productive investments. The amelioration in credit access promotes not only the increasing opportunities for the poor to participate in productive activities but also to raise their income/consumption, and thereby to improve their social well-being.

5.1.3. Loosening Credit Constraints and Facilitating (Human Capital) Investment

All in all, both the capital conduit and threshold effect discussed in *sections 5.1.1* and *5.1.2* can directly and collaboratively contribute to poverty alleviation in a form that manifested from providing and broadening the poor's access to financial services.

Underdeveloped credit market contributes to continued poverty, higher inequality and slower economic growth (Fields, 2001). The poor, small & medium-sized businesses (SMEs), and the sizeable informal sectors (i.e., microenterprises that include primarily household-based small businesses in rural or urban areas) are particularly financially constrained due to informational asymmetries, lack of savings or the collateral to access bank credit (A. V. Banerjee & Newman, 1993; Zhuang et al., 2009). From the lenders' perspectives, they are unwilling to grant loans to the poor, micro, small & medium-sized businesses (MSMEs) for the following reasons: *i*) lending to the MSMEs that usually require small credits induce higher marginal costs than to the wealthy and large businesses that usually have more immense credit needs (Chigumira & Masiyandima, 2003); *ii*) the poor and MSMEs are also less able to provide sufficient collateral against loans; *iii*) the above two reasons could further reduce the lenders' incentives when considering possible loan defaults associated adverse cost implications.

Consequently, the credit constraints as mentioned above impede the poor from exploiting self-development opportunities to get out of poverty and the MSMEs from exploiting investment opportunities to survive and grow, thus slowing aggregate growth by keeping capital from flowing to its highest-value use.

Financial development, therefore, by continuously innovating and providing more extensive and powerful financial intermediaries to endure the costs associated with informational asymmetries, transactions costs, and contract enforcement costs, provide easily accessible financial services and small credit in particular to those in need (Stiglitz, 1993). The improved formal finance accessibility and the eased credit constraints, on the one hand, enables the poor to draw down accumulated savings or to borrow money to invest in human capital, self-development opportunities or to start microenterprises. Human capital has been argued to have a substantial poverty alleviation effect as it promotes economic benefits such as equality in income distribution, enhances productivity, and reduces the unemployment rate (Becker, 1975, 1995; Olopade et al., 2019; Santos, 2011). On the other hand, financial development allows more entrepreneurs – primarily those less well-off – to obtain external finance and improve capital allocation (Rajan & Zingales, 2003).

In developing countries, the MSMEs are always considered to be the most apparent hunting ground for poverty alleviation since they are intensive in employment. As one of the most

important pathways to alleviate poverty that generates higher incomes for the poor, job creation can be expanded substantially with the direct impact of financial development on improving the poor's and the MSMEs' access to financial services.

5.1.4. The Role of Microfinance in Alleviating Poverty

During the early stage of financial sector development, the preference on large loans provision of formal financial institutions over small loans that are most commonly needed by the poor and MSMEs may induce high unit costs of small loans. The poor and MSMEs may be impeded to undertake loans, thereby making financial development, in fact, regressive for them (Greenwood & Jovanovic, 1990). Moreover, in countries with underdeveloped financial sectors, formal financial institutions always possess imperfect information of the poor and MSMEs and are likely to reject their loan applications or approve loans but with high lending interest rates. The former shuts the door for these groups to climb up the poverty ladder with external credit. At the same time, the latter may induce the banks with more exposure to higher risks of loan defaults, thereby leading to solvency issues.

The theory of the market for lemons developed by Akerlof (1970) can further compensate for the arguments on the solvency issues mentioned above. Akerlof's theory that initially applied to distinguish between good and bad cars in the automobile market, has laid the foundation for literature addressing imperfect information and uncertainty. It is the first theory that highlighted the problem of 'adverse selection'. According to Akerlof (1970, p. 497), 'credit markets in underdeveloped countries often strongly reflect the operation of the Lemons Principles'. As the theory suggests, when lenders possess no complete information about the risks associated with the borrowers' projects, distinguishing between the 'low-risk and 'high-risk' borrowers may be extremely hard. Therefore, the borrowers on the demand side are motivated to present their projects related information in the best possible way to secure the loans, even if their projects expect a higher probability of default on loans.

Consequently, the 'adverse selection' issue described in Akerlof's study emerges. The lenders now have no intention of distinguishing the 'low-risk' and the 'high-risk', but instead, charging a universal risk premium on top of the interest rate, which raises the borrowing costs to all. Such a bad market equilibrium rate forces the 'low-risk' to gradually withdraw from the market,

leaving the 'high-risk' borrowers continuing to bid for loans pushing the risk premium higher. Therefore, higher risks for lenders as the probability of default increases and higher risks for borrowers as the probability of insolvency increases.

Microfinance – as another manifestation of financial development – thereby emerged and evolved in the credit market, providing small loans targeting the poor, low-income group and MSMEs who lack access to credit. With the aim of lifting the poor out of poverty, microfinance has been regarded as a critical poverty alleviation strategy, which spread rapidly and widely in the last 20 years (Bateman, 2010). Earlier literature shows that microfinance encourages entrepreneurship and increases income-generating activities, empowering the poor, increasing access to health and education, and building social capital among poor and vulnerable communities (Khandker, 2005). The Microfinance Institutions (MFIs) as a channel to reach excluded customers – such as poorer population segments, socially marginalised, or geographically more isolated – to help them become self-sufficient plays a vital role in poverty alleviation. Unlike the formal financial institutions, the MFIs are readily accessible to the poor and MSMEs. Hence, they are not denied of responsive and timely credit and financial service at market rates. More importantly, their conditions for opening accounts and granting credit and financial facilities (when lacking securities) are liberal than those of formal banks and non-bank financial institutions (Iyiola, 2014).

A number of earlier studies on the impact of microfinance on poverty in developing countries that witnessed a rapid growth of MFIs find that microfinance is pro-poor, at least when these MFIs were still not for-profit (see, for instance, Bateman, 2010; Khandker, 2005; Matin et al., 2002). More recently, concerns have been raised about the real value and impact of MFIs on poverty. For instance, Armendariz and Morduch (2010) argue that no clear picture emerges about either the sustainability of MFIs or their impact on poverty alleviation. Kah et al. (2005) and Morris and Barnes (2005) find no clear evidence to support that microfinance is pro-poor. Moreover, contradictory arguments towards the positive impact of microfinance on alleviating poverty are argued to exacerbate poverty in particular contexts (see, for instance, Bateman, 2010; Dichter & Harper, 2007; Karim, 2008; Roodman, 2011a). In fact, the 'microfinance meltdowns' have been reported in Morocco, Nicaragua, Pakistan, Bosnia, Mexico and Lebanon, and most dramatically in the Indian state of Andhra Pradesh, where the entire microfinance industry collapsed in late 2010 (Bateman & Chang, 2012). Bateman (2010) and Karim (2008) argue that when the MFIs business model shifted from non-profit to profit-oriented institutions

since the mid-2000s, their (MFIs) focus is no longer on outreach (i.e., loan provision) but bank performance. The reason for such 'institutional transformation' and 'mission drift' in microfinance institutions, as argued by Wagenaar (2012), is caused by the massive pressure from donors on MFIs to be profitable. The trade-off for such a shift reduces outreach while increases the efficiency of MFIs (Hermes et al., 2011). Sustainability requires these MFIs to favour their profits by focusing more on groups of better-off clients (Beisland et al., 2019). Moreover, the no collateral (or social collateral) policy of microfinance, often heralded as its most innovative aspect, had a darker side when it came to inability to pay. The indebted farmers, in many cases, had to sell off their land to pay back the loan, exacerbating an already high level of vulnerability (S. B. Banerjee & Jackson, 2017).

Undoubtedly, microfinance can increase access of the poor to financial services, credit in particular, and its positive impacts on income, business creation, and poverty are well documented, at least in its early development stage. However, due to the lack of data and rigour in research (i.e., selection bias, Duvendack & Maclean, 2015), significant differences have been presented in terms of its impacts between and within developing economies lead to inconclusive results. Even the World Bank, an influential proponent of microfinance, appears to take a more cautionary stance in recent years, concluding that 'more research is needed to assert whether there is a robust and positive relationship between the use of credit and household welfare, including moving out of poverty' (Asl Demirgüç-Kunt et al., 2007, p. 104). Further research on the impact of microfinance on poverty is needed, as most of the existing literature is conducted under very different institutional settings and with different credit products. Moreover, provided that individual or household welfare is notoriously difficult to measure, biases microanalysis against finding a positive effect of access to microcredit¹³.

5.2. Indirect Growth Link Between Financial Development and Poverty Alleviation

In addition to the direct impacts of financial development on poverty that have been discussed in *section 5.1*, the development in the financial sector could also affect poverty in developing countries through economic growth. Theoretically, arguments for this relationship have

¹³ Considering the data availability issue for microfinance related studies, as well as the ambiguous and inconclusive findings in existing literature as discussed above, we do not investigate the impact of microfinance in our later empirical chapters. Instead, on a micro-level, we investigate the impact of financial inclusion on poverty in *Chapter 4*.

provided sound reasons for why finance reduces poverty. Empirically, however, most of the emphasis focused on the positive effect of financial development on economic growth using different econometric approaches and samples¹⁴.

The 'trickle-down' effect, as argued by Aghion and Bolton (1997), is by far the most significant indirect positive effect that financial development has on eliminating poverty and tackling income inequality. The authors argue that due to the implied positive relationship between financial development and economic growth, capital, in this context, will be rapidly accumulated and made itself available to the poor for prospective investment opportunities, eventually leading to a fall in poverty rates. Many empirical studies are in support of the trickle-down theory (see, Dollar & Kraay, 2004; Fan et al., 2000; Norton, 2002; Ravallion & Datt, 2002). Detailed arguments related to how this 'trickle-down' effect takes place are discussed in the upcoming *section 5.2.1*, which analyses how financial sector development may encourage economic growth.

The fact that financial development promotes economic development has already been well documented, yet the literature on the nexus of financial development and poverty alleviation is still nascent. It has been unclear whether financial development also shrinks poverty. Researchers have not yet determined whether financial development benefits the whole population or if it primarily benefits the rich, or even disproportionately helps the poor. The impact, on the one hand, differs across regions, income levels, and types of the economy (developed vs developing). On the other hand, it is also dependent on many other factors. It is now becoming clear that economic growth may not be a sufficient condition for poverty alleviation. Therefore, besides the 'trickle-down' effect, the way how financial development affects income distribution also acts as a critical determinant in the context of poverty alleviation. Detailed arguments in existing literature regarding this issue are discussed in *section 5.2.2*.

¹⁴ For a detailed discussion of existing empirical literature, please see *Chapter 3*.

5.2.1. Financial Development Promotes Growth

In arising to ameliorate market frictions, financial systems naturally affect the resource allocation process across space and time (e.g., the emergence of banks and financial contracts). Imperfections in financial instruments, markets, and intermediaries facilitate the financial system to progress and to continuously lessen the adverse effects that are induced by information-, enforcement-, and transaction-related costs. However, since laws, regulations and policies differ markedly across economies and over time, improvements in any of the five primary financial functions and along any single dimension of the financial system that have been discussed in *section 3* may have different implications for resource allocation and welfare, depending on the other frictions at play in the economy. Therefore, the following sections investigate how financial development indirectly affect poverty alleviation through the economic growth channel by analysing the impacts of its five financial functions on economic growth.

5.2.1.1. Producing information ex-ante about possible investments and allocating capital effectively

Individual savers always face high costs that are procured during the process of evaluating firms, managers, and market conditions ahead of making investment decisions. This accumulation of costs prior to investment later disadvantages them in collecting, processing, and producing information on possible ventures, and savers would be reluctant to invest in activities about which there is little reliable information. High information costs may keep capital from flowing to its highest value use.

Financial intermediaries may reduce the costs of acquiring and processing information and thereby improve resource allocation (Boyd, 2008; Boyd & Prescott, 1986). Such costs faced by each individual provide sufficient incentives for a group of individuals to form financial intermediaries that undertake the costly process of researching investment possibilities for others. By improving accessibility to the information on firms, managers, and economic conditions, financial intermediaries can accelerate economic growth, since better, cheaper and more reliable information on firms shall induce a more efficient allocation of capital (Greenwood & Jovanovic, 1990). Moreover, by identifying the best production technology, financial intermediaries may also boost the rate of technological innovation by identifying

those entrepreneurs with the best chance of successfully initiating new goods and production processes (Blackburn & Hung, 1998; Asli Demirgüç-Kunt & Levine, 2008; Galetovic, 1996; Giordano & Guagliano, 2014; King & Levine, 1993; Morales, 2003).

Stock markets may also stimulate the production of information about firms. Accompanied by larger and more liquid markets, agents may have more incentive to expend resources to research firms as it is easier to profit from this information by trading in such an environment (Gorton & Andrew, 2002; S. J. Grossman & Stiglitz, 1980; Holmström & Tirole, 1993; Kyle, 1984). In other words, larger and more liquid markets will boost incentives to produce this valuable information with positive implications for capital allocation (Beck, 2003; Merton, 1987).

5.2.1.2. Monitoring investments and exerting corporate governance after providing finance

Corporate governance is the system by which firms are directed and controlled and is integral to understanding economic growth as well as the role of financial factors. The degree to which a firm's capital providers can exert effective monitoring and influence on how that firm uses the capital have crucial impacts on both savings and allocation decisions. A firm's efficiency in resource allocation will be improved if its shareholders and creditors could have effective monitoring of the firm and facilitate its manager to maximise the firm's value. In comparison, if the firm has no financial arrangements that strengthen corporate governance, it may prevent its capital from flowing to profitable investments and hinder the mobilisation of savings from different agents to the firm.

In terms of financial intermediaries, several studies note well-functioning financial intermediaries that facilitate corporate governance to have overall positive impacts on economic growth. For instance, by skimping on monitoring costs, the reduced credit rationing and improved corporate governance of financial intermediaries will boost productivity, capital accumulation and economic growth (Bencivenga & Smith, 1991; Gross, 2002). Moreover, Harrison et al. (1999) suggest that financial intermediaries facilitate the flow of resources from savers to investors in the presence of informational asymmetries with positive growth effects. Also, in regard to innovative activities, De La Fuente and Marín (1996) demonstrate that

financial intermediaries arise to undertake the incredibly costly process of monitoring innovative activities, that improves credit allocation among competing technology producers with positive ramifications on economic growth.

5.2.1.3. Facilitating trading, diversification, and management of risk

The existence of information and transaction costs encourages financial contracts, markets, and intermediaries to emerge to ease of trading, hedging and pooling of risk with implications for resource allocation and growth. In traditional finance theory, much of the emphasis is placed in cross-sectional diversification of risk. Financial systems may mitigate the risks associated with individual projects, firms, industries, regions, and countries. Banks, mutual funds, and securities markets all act as carriers for trading, pooling, and diversifying risk. The ability of the financial system to provide risk diversification services could affect long-run economic growth by altering resource allocation and saving rates. Intuitively speaking, the financial market creates opportunities for savers to diversify risks easily. It prompts a portfolio shift toward projects with higher expected returns, even if most of the savers are risk-averse and high-return projects tend to be riskier than low-return projects (Greenwood & Jovanovic, 1990).

Cross-sectional risk diversification, when considering technological changes, can also stimulate innovative activities (King & Levine, 1993). While engaging in innovation is risky, agents are still tirelessly attempting to make technological advances to gain a profitable market niche. Since the ability to hold a diversified portfolio of innovative projects reduces risk and promotes investment in growth-enhancing innovative activities, financial systems that ease risk diversification can accelerate technological change and subsequently, economic growth.

Another type of risk is liquidity risk, where ‘liquidity’ refers to the cost and speed with which agents can convert financial instruments into purchasing power at agreed prices. Liquidity risk emerges due to the uncertainties associated with converting assets into a medium of exchange. Informational asymmetries and transaction costs may restrain liquidity and thus intensify liquidity risk. These frictions create incentives for the emergence of financial markets and institutions that reinforce liquidity. Moreover, the standard link between liquidity and economic development arises because a long-run commitment of capital is generally essential for high-return projects. Additionally, savers do not like to relinquish control of their savings

for an extended period. Thus, if the financial system does not intensify the liquidity of long-term investments, less investment is likely to occur in the high-return projects, and vice versa. In addition, with liquid capital markets, savers can hold liquid assets (e.g., equity, bonds, or demand deposits) that they can quickly and easily sell if they seek immediate access to their savings. Simultaneously, capital markets transform these liquid financial instruments into long-term capital investments. Levine (1991) shows that the endogenous formation of equity markets to provide liquidity can affect economic growth. In other words, with liquid stock markets, equity holders can readily sell their shares, while firms have permanent access to the capital invested by the initial shareholders. By facilitating trade, stock markets reduce liquidity risk. As stock market transaction costs fall, more investments occur in illiquid, high-return projects. If illiquid projects enjoy sufficiently large externalities, then greater stock market liquidity induces faster steady-state growth.

Financial intermediaries may also enhance liquidity, reduce liquidity risk, and influence economic growth. This is because banks could offer liquid deposits to savers and undertake a mixture of liquid, low-return investments to satisfy demands on deposits that are illiquid, high-return investments. By providing demand deposits and choosing an appropriate mixture of liquid and illiquid investments, banks provide comprehensive protections to savers against liquidity risk while simultaneously facilitating long-run investments in high-return projects and therefore accelerate growth (Bencivenga & Smith, 1991).

5.2.1.4. Pooling of savings

It is a costly process to agglomerate capital from disparate savers to investment. During the process of mobilising and pooling savings, financial systems have to overcome the transaction costs associated with collecting savings from different individuals and the informational asymmetries associated with making savers feel comfortable to relinquish control of their savings. Financial systems that are more effective in mobilising and pooling the savings could profoundly affect economic development by increasing savings, exploiting economies of scale, and overcoming investment indivisibilities. This is because, many production processes would be constrained to economically inefficient scales if they have no access to multiple investors, and many projects require a massive injection of capital that is beyond the means or inclination of any single investor (Sirri & Tufano, 1995). Alongside the direct effect on capital

accumulation, better savings mobilisation can improve resource allocation and boost technological innovation.

5.2.1.5. Easing exchange

Financial arrangements that lower transaction costs can promote specialisation, technological innovation, and economic growth. Since it is expensive to evaluate the attributes of goods that make barter exchange very costly, an easily recognisable medium of exchange may arise to facilitate exchange (King & Plosser, 1986; S. Williamson & Wright, 1994). More importantly, the resulting decline in transaction and information costs is not necessarily a one-time descent when economies move from the barter system to the currency system, as those costs may continue to decline through financial innovation.

According to the model developed by Greenwood and Smith (1997) that describes the connections between exchange, specialisation and innovation, they argue that the costly process for each transaction can encourage financial arrangements that lower transactions costs to facilitate more effective specialisations. In this way, markets that promote exchange encourage productivity gains. There may also be feedback from these productivity gains to financial market development. If there are fixed costs associated with establishing markets, then higher income per capita implies that these fixed costs are less burdensome as shares of per capita income. Thus, economic development can urge the development of financial markets.

5.2.2. The Income Distribution Effect

Financial development can contribute indirectly to reducing poverty through its impact on economic growth; however, this relationship is based on the assumption that once economic growth has occurred, it would inevitably lead to reduced poverty (Dhrifi, 2013b). Strategies that focused on growth as a prerequisite to poverty alleviation have been criticised, as a high rate of economic growth has been found to coexist with the maintenance of poverty, and some countries are even in worse economic states than prior to the attempts to reduce poverty (Prokopenko & Holden, 2001). Consequently, how strong income growth may have been converted to human development in the form of poverty reduction not solely depends on the 'trickle-down' effect, but also other factors at play as well, such as income distribution.

In terms of the 'trickle-down' effect, Aghion and Bolton (1997) argue that a steady-state distribution is expected when the economy achieves sufficiently high rates of capital accumulation. However, they further indicate that to ultimately achieve efficient resource distribution, relying only on the trickle-down mechanism is far from sufficient. In terms of income distribution, an increasing number of studies have shown that inequality may play a crucial role in the transformation of growth to poverty reduction (see, Adams, 2004; Easterly, 2001; Fosu, 2009, 2010, 2017; Kalwij & Verschoor, 2007; Ravallion, 1997). Income distribution, which acts as an intermediate factor, could be worsened and result in a disproportionate percentage of gains from the growth being transferred to the non-poor, rather than to the poor. Therefore, in this case, redistribution and other development policies (financial development policy included) together with institutional changes are able to kick in and play as principal channels to guide growth to be more effective in tackling poverty and inequality, and to lead the economy to realise its long-run efficiency. Besley and Burgess, (2003) further enhance the point by arguing that, even with the absence of faster economic growth, redistribution policies are still evidently more effective in confronting the above matters. For instance, to redistribute the higher incomes from growth, increased government revenues can be used to transfer payments and improve the resources accessible for the poor (Fowowe & Abidoye, 2013).

Earlier studies on income distribution that emphasise natural economic law intended to describe how income distribution changes with economic growth. The Kuznets' law is perhaps the best known, commonly paraphrased as follows: Income distribution must get worse before it gets better (the inverted U-shaped curve). In contrast, Fields (1989) argues that the focus of Kuznets' law is on relative inequality, rather than absolute poverty. He further argues that studies in support of the Kuznets' law draw conclusions mostly from cross-sectional data (see, Adelman & Morris, 1975; Loehr & Powelson, 1981). Studies of time-series data find little evidence to link growth and inequality. According to Fields (1989), inequality increases for approximately half of the time period measured and decreases for the other half, either through analysis by the GINI coefficient or by the Lorenz curve. The evidence he presents shows no tendency for inequality to increase or decrease systematically with economic growth, and more importantly, different income groups have benefited from economic growth approximately in proportion to their original incomes. Nevertheless, as argued by Alesina and Rodrik (1994), Clarke (1995), and Persson and Tabellini (1994), when a country experiences high initial

income inequality, redistribution of the wealth accumulation does not benefit the poor that overall slows the poverty reduction process and growth. More recent studies conducted by Dollar et al. (2016), Dollar and Kraay (2004), Kraay (2004) and among others, are all in favour of the arguments raised by Fields (1989). Their studies present no evidence that distribution adversely affects the poor during economic growth, and they further argue that growth has made a significant contribution to lifting the low income out of poverty.

It has been observed that economic growth is an indispensable and prominent factor in determining falling or increasing poverty. That being said, inequality also plays a crucial role in poverty behaviour in a large number of countries. Consequently, the countries that have been using economic growth as the dominant driver of poverty reduction could still further the process by employing relative favourable income distribution (Fosu, 2010). According to OECD (2014) and Ravallion (2001), one of the most direct policy tools of redistribution is to redistribute through taxes and benefits. Nevertheless, they also emphasise that, if relevant policies are appropriately targeted and focused on the most effective tools for poverty and inequality alleviation, redistribution per se does not lower or damage economic growth in any way. For instance, OECD (2014), Saint-Paul and Verdier (1993, 1996) and many others advise that redistribution policies that focus on families with children and youth might yield the best possible outcome (e.g., education). This particular target is where critical decisions on human capital investment are made and should promote skills development and learning across people's lives, which then should generate a growth-promoting effect. In comparison, if such policies are not well targeted with effective tools employed, they may lead to a waste of resources and generate inefficiencies. For instance, as argued by Saint-Paul and Verdier (1993, 1996), policies that levy higher taxes to redistribute the wealth would lower the rate of return on private assets, which in turn restricts capital accumulation and slows growth and poverty reduction.

Moreover, idiosyncratic attributes of countries also need to be considered and emphasised to achieve more efficient policymaking, given the fact that no countries experience the same patterns of economic growth, income distribution and institutional changes. In general, high initial levels of inequality prohibit economic growth from maximising its effectiveness in reducing poverty, whereas rapidly declining inequality reduces poverty directly for a given level of growth. In addition, Kraay (2004) identifies three potential sources of pro-poor growth: *i*) a high growth rate of average incomes; *ii*) a high level of sensitivity of poverty to growth in

average incomes; and *iii*) a poverty-reducing pattern of growth in relative incomes. Institutions and policies that promote economic growth are found on average to lift incomes of the poor equiproportionally, however, no specific policies are found that are particularly ‘pro-poor’ other than through their direct effects on overall economic growth (Dollar et al., 2016).

5.3. Indirect Macroeconomic Instability and Crisis Links Between Financial Development and Poverty Alleviation

The development process of financial sectors and its contribution to poverty alleviation, either through its direct impacts discussed in *section 5.1* or its indirect impact in *section 5.2*, could be profoundly weakened by macroeconomic instability. The banking sectors in developing economies are particularly vulnerable to volatility in terms of trade, exchange rates and interest rates, with macroeconomic shocks contributing to banking crises and sudden changes in relative prices undermining the value of asset portfolios of banks (Asli Demirgüç-Kunt & Detragiache, 1998; Kaminsky & Reinhart, 1999; Loayza & Rancière, 2004).

5.3.1. The Macroeconomic Instability Channel

One of the most significant poverty-enhancing macroeconomic phenomena that injudicious financial market policy can generate is inflation. It was clearly reflected from the episodes of hyperinflation that characterised many countries in Latin America in the 1980s and Eastern Europe and Former Soviet Union (FSU) countries after the collapse of the Soviet Union. The relationship between inflation and poverty subsequently generated an increasing body of literature. This kind of literature consistently concludes that the levels of inflation and inflation variability have a negative impact on overall income inequality and so as poverty alleviation (Easterly & Fischer, 2001; Rewilak, 2017; Sarel, 1997).

The most obvious direct impact of inflation on poverty is through affecting real wages of households' income. Since real wages are often expressed in nominal terms, and they rarely increase as fast as prices do, their real value may therefore be reduced. Similarly, the real value of non-wage income, such as pensions, grants and others, may also be reduced. Therefore, in the absence of access to sufficient financial instruments, such as indexation or hedging, the

poor segment of society who have their income set in nominal terms are more vulnerable to inflation.

Another direct impact of inflation on income and poverty is the 'inflation tax', which represents a transfer of resources from holders of currency and non-interest-bearing deposits to governments. It emerges due to their loss of real value. Moreover, the incomplete indexation of the tax systems is yet another possible channel for the impact of inflation on income. Inflation-induced increases in marginal income taxes – when tax brackets are less than fully adjusted for inflation – transfer resources from taxpayers to the government. Also, inflation may cause nominal interest earnings to rise as investors demand compensation for the declining purchasing power of money. However, because nominal returns are taxed as income, inflation reduces the after-tax return to savings and transfers resources from savers to the government. As argued by Cardoso (1992), this direct impact of inflation is likely to affect the middle-income groups to a greater extent than low-income groups. Since the middle-income groups generally have their income defined in nominal terms while the people living below the poverty line have little savings (if any) and only negligible average cash holdings, which allows the poor to avoid strong direct effects of inflation. Inflation is likely to wipe out the savings of the middle-income groups and reduce their real income; hence the number of poor may increase, and inequality may be widened. Therefore, a low and predictable rate of inflation is more likely to contribute to financial development, economic growth and poverty alleviation.

Thus, in order for financial markets to flourish and to retain the positive impacts of financial development on poverty reduction, macroeconomic stability is a necessary condition, and macroeconomic volatility should be minimised to alleviate its adverse impacts on the financial system.

5.3.2. The Crisis Channel

Financial integration, as argued by Kose et al. (2009, 2011), can deliver certain benefits to countries with various income levels in the form of improved macroeconomic performance, greater risk-sharing and institutional development. However, for countries that passed threshold levels of income – as most advanced economies have – the gains are quantitatively and relatively minor in scale when compared with gains achieved by developing and emerging

economies. More importantly, less developed economies notably benefit more significantly from financial integration in the long-term (Kose et al., 2009, 2011).

Nevertheless, the 1990s emerging-market crises and the 2008-2009 global financial and economic crisis led to a much more sceptical view of full-scale financial integration for those economies. It is now well recognised that a high degree of financial integration may entail considerable short-term costs (see, Obstfeld, 2009; Prasad & Rajan, 2008; Rodrik, 1998, 2000). For instance, the magnitude of the capital inflows to some developing economies in recent years resulted in abrupt reversals, which would cause profound financial instability and sharp increases in poverty rates. Countries with imprudent sovereign debt management, improperly sequenced capital account liberalisation, and poorly regulated domestic financial systems suffer the most.

After the financial liberalisation, one of the channels through which financial integration can be related to crises is the countries' exposed financial systems, which may become subject to market disciplines exercised by both domestic and foreign investors. When countries have closed economies, unsound fundamentals could only be monitored and reacted by domestic investors, rather than by the joint force of both domestic and foreign investors when they have open economies. Even though the exposed financial systems might prompt countries to try to improve and achieve sound fundamentals in the long term, they might also generate crises when fundamentals deteriorate. Moreover, since investors might overreact to changes in fundamentals by being either over-optimistic in good times or over-pessimistic in bad ones, even small changes could trigger sharp alterations in investors' appetite for risk that directly related to their investment decisions.

In countries with sound financial systems, financial integration could still lead to crises if there are imperfections in international financial markets, which represents the second channel through which financial integration may be related to crises. Those imperfections, in conjunction with other factors or alone, could lead to bubbles, herding behaviour, speculative attacks, and crashes, among others. For instance, if investors have reason to believe that the exchange rate is unsustainable, they might speculate against the currency, which can lead to a self-fulfilling balance of payment crisis regardless of market fundamentals (Obstfeld, 1986). Moreover, liberalised economies may also face problems of over-borrowing when the

government have implicit guarantees; this kind of problem mainly caused by moral hazard also increases the likelihood of crises (McKinnon & Pill, 1997).

Financial integration could also lead to crises due to external factors, even in countries with sound fundamentals or in the absence of imperfections in international capital markets. External factors are critical determinants of capital flows into developing economies. As an integrated financial system becomes dependent on foreign capital, sudden shifts in foreign capital flows that do not necessarily depend on country's fundamentals can create financing difficulties and economic downturns (Calvo et al., 1993; Reinhart & Calvo, 2000).

Furthermore, financial integration could also lead to crises through the international contagion phenomenon, namely by shocks transmitted across countries (Prasad et al., 2003). Up to now, three broad channels of contagions have been identified in the literature. According to Schmukler (2004), these are real links, financial links, and herding behaviour. *i*) Real links are usually associated with trade links, such as when two economies trade among themselves or if they compete in the same external markets, a devaluation of the exchange rate in one of the countries could deteriorate the other country's competitive advantage. Therefore, both economies will likely end up devaluing their currencies to re-balance external sectors. *ii*) Financial links exist when two economies are connected through the international financial system. For instance, when one economy is faced with a negative shock, the value of the collateral held by leveraged institutions might fall. Those institutions, when faced with margin calls, would have to increase reserves by selling part of their valuable holdings on the countries that are still unaffected by the initial shock. This mechanism transmits the shock to other economies. *iii*) Finally, financial markets might transmit shocks across countries due to herding behaviour or panics. Asymmetric information plays an essential role at the root of this behaviour, since information is costly for investors. Therefore, for those investors who are not fully informed always try to infer future price changes based on how other markets are reacting. For instance, a change in Thailand's asset prices might be useful information for estimating future changes in Indonesia's asset prices. Additionally, in the context of asymmetric information, what the other market participants are doing might convey information that the uninformed investors do not have. This type of reaction leads to herding behaviour, panics, and 'irrational exuberance' (Schmukler, 2004).

5.3.2.1. The Relationship between Crises and Poverty

As all the lessons that the crisis-hit countries have demonstrated, financial meltdowns are detrimental to economic growth and extremely costly to the poor among developing economies (A. Harrison & McMillan, 2007). For instance, the currency crisis occurred in 1997, raised the poverty rates in Indonesia by at least 50%. Aiming to retain the benefits brought on by international financial integration and to provide extra protection against these unrestricted foreign capital flows, developing economies are alerted to create reliable institutions and to pursue macroeconomic stabilisation policies (including the use of flexible exchange rate regimes).

With rising global concerns over the possible combination of banking failures and reductions in domestic lending, reductions in export earnings, and reductions in financial flows to developing countries, brought on by financial crises, private sector investments and household consumption will likely result in a considerable reduction. Governments will then have to reduce their expenditure to compensate for the high cost of raising funds coupled with less tax revenue. Together, low investment, consumption and government expenditure could spell higher unemployment and poverty rates across the developing world (Dolphin & Chappell, 2010; Ravallion & Chen, 2009) .

Thus, there are several channels through which financial crises could affect poverty and income distributions. Firstly, a financial crisis will lead to falls in the earnings of workers in both formal and informal sectors due to the job losses in the formal sectors and reduced demand for services in the informal ones. The reduced working hours and cuts in real wages adversely affect the earnings of the poor. Moreover, entry of unemployed formal-sector workers into the informal sectors also puts additional pressure on the informal labour market (Atinc & Walton, 1998; Lustig, 2000; Schneider & Morley, 1996).

The second channel would be through relative price changes. After depreciation of a currency, the price of tradable goods and services rise relative to non-tradable goods and services, which lead to a fall in earnings of those employed in the nontrade sectors. On the one hand, the currency depreciation may also boost export demand. Employment and earnings as a result, in sectors producing exportable goods increase, thereby offsetting some of the losses due to the decline in GDP. On the other hand, the depreciated currency may affect the price of imported

food, e.g., increasing domestic food prices. This increase, in turn, hurts poor individuals and households who are net consumers of food (Baldacci et al., 2002).

The third channel would be through fiscal retrenchment. Since crises may lead to cuts in government spending, which then impact the volume of publicly provided critical social services (such as social assistance outlays) and limit the access of the poor to these services at a time when their incomes are already declining (Lanjouw & Ravallion, 1999). Lastly, changes in the value of assets and in interest rates may also have a significant impact on income distribution that affects the poor. The increased exposure to volatile shocks that are associated with financial openness may translate into higher domestic interest rate (due to the increased risk of default), lower domestic output, and thus higher poverty rates (Agénor, 2003; Agénor & Aizenman, 1998). The increased volatilities raise expected intermediation costs and lead domestic financial institutions to either increase domestic interest rates or to ration credit to maintain expected profits. Indeed, what this argument implies is not that financial integration per se is undesirable, but rather that financial integration should be accompanied by adequate reforms of the domestic financial system to minimise the adverse effects of volatility on output, employment, and poverty.

5.4. The Employment and Entrepreneurship Channels

Other than those direct and indirect links through which financial development affects poverty mentioned earlier, its impact can also manifest through other indirect channels such as its direct impact on employment, business opportunities and urbanisation. Moreover, as one of the direct channels through which financial development can help alleviate poverty, microfinance also contributes significantly to poverty alleviation indirectly via the employment and entrepreneurship channels¹⁵.

On the one hand, in emerging markets, self-employed contribute significantly to the workforce. Over 50% of the workforce are self-employed compared to less than 14% of advanced economy workers (World Bank, 2017d). Considerable evidence suggests that financial

¹⁵ Note, our emphasis is placed on the indirect links of growth and crisis between financial development and poverty, and we do not empirically investigate this channel in the following chapters. We still include this channel in the literature review section, though briefly for complementary purpose, to draw the whole picture of the finance-poverty nexus.

development facilitates entrepreneurship (see, Dehejia & Gupta, 2019; Klapper et al., 2006; Schmalz et al., 2017). Financial development influences the poor directly to undertake self-employment. As argued by the occupational choice model of Evans and Jovanovic (1989), financial development drives away liquidity constraints and encourages individuals to become self-employed. It is particularly true when considering the direct facilitating impact of financial development on microfinance that have been discussed in *section 5.1.4*. Provided that in developing countries, where even established firms are likely to be financially constrained, limiting their ability to hire workers, entrepreneurship may arise in the absence of employment opportunities (Dehejia & Gupta, 2019).

On the other hand, financial development, via loosening liquidity constraints and improving credit provision, can affect firm-level and aggregate employment directly. When there is a mismatch between payments to labour and the ultimate generation of cash flow, firms will need to finance their labour activity throughout the production process¹⁶ (Benmelech et al., 2011). Moreover, as labour is not solely a variable factor of production but rather a fixed or quasi-fixed cost component, such fixed costs include investments associated with hiring and training activities (Hamermesh & Pfann, 1996; Oi, 1962). Due to the capital-labour complementarities in the production process, when firms lack internal funds due to constrained external finance, employment is adjusted for the decline in capital.

Financial development can also influence employment through an indirect effect of the relationship between financial development and economic growth that has been discussed in *section 5.2.1*. Due to its growth facilitating effect, the demand for labour in the formal sector may increase when an economy develops.

Given the close link between poverty and environment¹⁷, the lack of employment and income-generating opportunities outside agriculture incentivise the poor at working age to actively

¹⁶ The argument that firms must finance labour payments is similar to that found in the literature on financial constraints and inventory investment (the capital-labour complementarities in the production function): firms must finance inventory investment during the production process (Greenwald & Stiglitz, 1986).

¹⁷ In developing countries, about three-quarters of the poor people clustered in ecologically fragile areas (i.e., rural area), with low agricultural potential (UNDP, 1990).

looking for formal/informal employment opportunities in more developed urban areas. As the urban areas tend to have higher average wage income, more self-employment opportunities, and better welfare provisions (e.g., education and health care), the rural-urban migration process speeds up. In fact, financial development can also quicken up the process because of the aforementioned growth-enhancing effect that generates more employment opportunities. The lifted credit constraints may also offer the poor more opportunities to undertake self-employment opportunities in urban areas. In addition, given the rapid urbanisation in recent decades, the urbanisation spillovers can also promote entrepreneurship. The cities' population density generates externalities and opportunities for increasing returns and positively affects entrepreneurial initiatives (Dutta & Sobel, 2018).

6. Summary and Conclusions

This chapter proposed a conceptual framework concerning the relationship between financial development, economic growth, financial crises, and poverty alleviation. By beginning with reviewing the financial development concept from a functional perspective and its measuring framework, conclusions can be drawn as follows: the development in financial sectors have significant contributions in facilitating economic growth, and a sound financial system supports growth through mobilising and pooling savings; producing information ex-ante about possible investments and allocating capital; monitoring investments and exerting corporate governance; facilitating trading, diversification, and management of risks; and facilitating exchange of goods and services. A large amount of empirical evidence from either cross-country or country-specific studies are in support of this consensus; even though there are methodological problems associated with many of them, the evidence is overwhelming despite the criticisms. Moreover, considering that the financial development concept is more targeted towards a broad and conceptual level with no single straightforward measure to evaluate how well financial institution and financial markets perform, we thereby proposed to measure it using the 4x2 framework of financial systems. We have summarised and compared a variety of measures for the four essential characteristics of financial institutions and financial markets (i.e., access, depth, efficiency and stability) based on a large compilation of empirical literature to illustrate the multidimensional nature of financial systems.

Regarding the poverty concept and its measuring framework, the conventional approach is to define poverty as deprivations of income and other resources that are needed to obtain the conditions of life. Nevertheless, we explored beyond the rudimentary definitions by reviewing and comparing three alternative conceptions of poverty, i.e., the subsistence concept, basic needs concept, and relative deprivation concept. The subsistence concept treats physical needs for people as the primary needs and received numerous critics for taking no consideration of social needs. The basic needs concept then began to exert wider influence by including two more elements: minimum consumption needs of a family and essential services provided by and for the community at large. Later on, the relative deprivation concept has come to be recognised due to the 'relativity' that applies to not only income and other resources, but also material and social conditions. These alternative perspectives have refocused the concept of poverty as a human condition that reflects failures in many dimensions of human life. The shift to a multidimensional idea of poverty leads to no worldwide agreement on its definition. We also reviewed and discussed four different approaches in measuring poverty; they are monetary, capability, social exclusion and participatory approaches. They do have different implications for policy as well as for targeting the poor, since they identify different people as being poor, and the considerable lack of overlaps empirically between the different approaches to poverty indicates that targeting according to one type of poverty will produce serious targeting errors in relation to other types.

Furthermore, we have reviewed and discussed theoretical literature on the channels through which financial development affect poverty alleviation. It is widely agreed that financial development could directly support poverty alleviation via several channels that have been identified, such as broadening the poor's access to finance; facilitating transactions; reducing the costs of remitting funds; providing the opportunity to accumulate assets and smoothen consumption; and enabling the poor to better cope with shocks, thus mitigating the risk of falling into poverty. Moreover, the role of financial sector development in facilitating growth and indirectly supporting poverty alleviation is also a significant channel. By improving any of the five primary financial functions and along any single dimension of the financial system would have positive impacts over resource allocation and welfare, depending on the other frictions at play in the economy. Higher economic growth could therefore benefit the poor by creating more jobs, enabling the government to allocate more financial resources on social spending, and increasing funds available to the poor for investment.

Last but not least, we reviewed the macroeconomic instability and crisis channel through which financial development could adversely affect poverty since finance also brings risks. In that section, we focused specifically on the role financial integration plays and identified several channels through which financial integration may lead to crises. For instance, financial integration exposes the domestic financial systems to market disciplines exercised by both domestic and foreign investors, where unsound fundamentals in most of the developing economies might generate crises when they deteriorate. Alternatively, imperfections in international financial markets may also generate crises in countries with sound financial systems by creating bubbles, herding behaviour, speculative attacks, or other external factors, such as foreign capital flows, economic cyclical movements, and diversification of investments or through the international contagion phenomenon. All of the above factors could have an adverse impact on poverty and income distribution through their influence on the labour market, relative price and government spending.

CHAPTER 2 – FINANCE-POVERTY NEXUS: THE DIRECT LINK BETWEEN FINANCIAL DEVELOPMENT AND POVERTY ALLEVIATION

1. Introduction

While *Chapter 1, section 5.1* offered the theoretical insights regarding the direct impact of financial development on poverty, this chapter continues this discussion, focusing first on an overview of empirical studies in this field to identify some potential gaps in the literature and, second, addressing them further in the present chapter via examining the direct effect of financial development on poverty.

As Levine (2008) argues, the lack of access to financial services is one of the main factors explaining persistent poverty. If financial markets were perfect, individuals would face no barriers when accessing formal finance and will be allowed to fund better education, training, business opportunities and many other activities that may improve their income situations (Beegle et al., 2003; Jacoby & Skoufias, 1997; Singh & Huang, 2015). In this framework, development of the financial sector provides equal opportunities for the poor to eliminate the importance of initial wealth in determining their future income and achieving sustainable livelihoods (Jalilian & Kirkpatrick, 2002; Stiglitz, 1993).

Zhuang et al. (2009) are also in favour of this argument by claiming that one of the most important channels through which financial sector development contributes to poverty alleviation directly is increased access to financial services. On the one hand, they argue that development and improvement in financial services facilitate transactions, reduce costs of remitting funds, and provide opportunities to accumulate assets and smooth incomes. On the other hand, they argue that the provisions of these services enable the households that are vulnerable to adverse situations to better cope with economic shocks, thus mitigating risks of falling into poverty (Claessens & Feijen, 2007). Financial development can improve the opportunities for the poor to access formal finance by addressing the causes of financial market failures such as information asymmetry (Stiglitz, 1993). Also, financial development can enable the poor to start microenterprises, which generate more employment and higher income, thereby reducing poverty.

However, from a financial deepening perspective, Clarke et al. (2006) and Seven and Coskun (2016) suggest that such a development would favour the rich, as financial institutions operate in settings where complete information is often unavailable. In this context, projects from entrepreneurs that have different probabilities of success are indistinguishable, and the information asymmetry requires banks to screen applications so as to grant loans only to the most promising projects (Singh, 1992). As the financial sector becomes more robust and more competitive, it may have more incentives and capacity to bear the high costs of small credits (Rajan & Zingales, 2003). Therefore, in early stages of the financial sector development, the poor may not have the opportunity to fully enjoy the development associated benefits. Additionally, Greenwood and Jovanovic (1990) are also in support of this argument by concluding that the relationship between financial development and poverty is likely to be nonlinear. In other words, they argue that income inequality first rises as the financial sector develops but then declines as more people gain access to the system.

A number of existing studies attempt to investigate the direct link between financial development and poverty alleviation using various approaches; however, no universal consensus has been reached on whether financial development is pro-poor. The empirical evidence suggests that the direct effect of financial development on poverty is sensitive to the proxy used for the measurement of financial development and poverty. More importantly, the majority of previous studies neglect the multidimensional nature of financial development and poverty and consider mainly the financial system depth dimension and poverty in absolute terms. Simple ignorance of their multidimensional natures produces not only inconclusive results but also misleading policy implications.

This chapter, therefore, attempts to fill this gap by examining the direct effect of financial development on poverty – using a comprehensive approach that incorporates a wide range of financial indicators based on the 4x2 financial system characteristics framework and both absolute and relative poverty measures. We investigate such effect on a panel of 75 developing countries during 1986-2015 by using the two-step system GMM dynamic panel estimator. We find that financial development has a direct and significant poverty alleviation effect for all dimensions of the financial system considered (e.g., depth, efficiency, and stability). More specifically, the depth of financial institutions is found to have a more profound effect in tackling both absolute and relative poverty.

2. An Overview of the Empirical Literature

Given the embedded core functions of financial development – improving deposit and credit facilities and optimising resources allocation – financial development should contribute directly to poverty alleviation. However, a number of empirical studies examining such a direct relationship between financial development and poverty alleviation provide mostly controversial and inconclusive results (see, for example, Beck, Demirgüç-Kunt, et al., 2007; Boukhatem, 2016; Jalilian & Kirkpatrick, 2002, 2005; Jeanneney & Kpodar 2011; among others).

For instance, Beck et al. (2004) investigate the finance-poverty nexus using a panel dataset of 58 developing countries during 1980-2000. When controlling for the average rate of economic growth, they find that countries with better-developed financial intermediaries (measured as the ratio of private credit to GDP) experience faster declines in both poverty and income inequality. They also find that financial development disproportionately boosting the income of the poor. In another study, Beck, Demirgüç-Kunt, et al. (2007) also find that financial development through formal financial system affects the poor disproportionately and their results further hold when conditioning on GDP per capita growth and allowing for potential non-linearities.

Using panel data for a sample of 42 developing countries, Jalilian and Kirkpatrick (2002) capture the direct, non-growth effects from finance to poverty – a unit change in financial development improves the growth prospects of income of the poor by almost 0.4 per cent. In addition, Honohan (2004) also finds a robust direct effect of financial development on poverty alleviation after controlling the indirect effect through growth. He suggests that a 10 percentage-point increase in the ratio of private credit to GDP would lead to a 2.5-3.0 percentage points reduction in poverty incidence. However, as Arestis and Caner (2009) argue, Honohan's analysis is too aggregative to be fully convincing and the measures of financial development used in that study are weak. Most empirical studies based on cross-country regressions suggest a significant poverty reduction effect of financial development, although these have been criticised for the poor data quality and inadequate control for the endogeneity (Dhrifi & Maktouf, 2013; Ho & Odhiambo, 2011; Singh & Huang, 2015; Uddin et al., 2014).

A number of country-specific studies that focus on such direct effect also reach similar conclusions when using financial deepening indicators such as bank assets to GDP, private credit to GDP and M3 to GDP. For instance, Uddin et al. (2014), who use a financial deepening index¹⁸ and utilise quarter frequency data over the period of 1975-2011 for Bangladesh, find that a long-run relationship between financial development and poverty reduction exists and financial development helps to reduce poverty, but its effect is not linear. Similarly, Rehman and Shahbaz (2014), who use quarter frequency data in case of Pakistan over the period of 1972-2011, find that financial development when proxied by an index of financial deepening¹⁹ causes poverty reduction. Odhiambo (2009, 2010a) and Quartey (2008) reach the same result for African countries such as South Africa, Zambia, and Ghana, respectively.

In contrast, some studies find that financial development does not contribute to poverty alleviation. Arestis and Caner (2010) find no statistically significant effect of capital account liberalisation on poverty in developing countries, when controlling for the possible growth effect. Fowowe and Abidoye (2013) examine the direct and indirect effects of financial development on poverty and income inequality in African countries by using the GMM method. They claim that financial sector development does not seem to contribute to poverty alleviation, but trade openness and low inflation do. Singh and Huang (2015) investigate the relationship on a panel of 37 countries during 1992-2006 and find that financial deepening leads to deteriorating income inequality and increasing poverty, in a case where strong protection in ownership rights is lacking. Kaidi et al. (2019) use the three-stage least squares method to examine the relationship between financial development, institutions quality and poverty, on a sample of 132 countries observed over the 1980–2014 period. They find that financial sector development does not improve the situation of the poor when using both banking and stock market indicators as financial development proxies (e.g., private credit to GDP, liquid liabilities to GDP, or stock market capitalisation to GDP and stock market turnover ratio to GDP).

As Jeanneney and Kpodar (2011) argue, even if financial development has a direct effect on reducing poverty, such contribution is conditional on transmission channels. For instance, they find that if financial development is measured by the ratio of liquid liabilities to GDP, the

¹⁸ This index consists of liquid liabilities (M3) to GDP, domestic credit provided by banks to GDP, private credit to GDP, M2/M1 and stock market capitalisation to GDP.

¹⁹ This index consists of four indicators – real stock market capitalisation (of listed companies) per capita, broad money supply (M2) per capita, real narrow money supply (M1) per capita, and real domestic credit to private sector per capita.

relationship between financial development and poverty alleviation is positive. Nevertheless, the association turns out to be statistically insignificant if the private credit to GDP is used as the financial development proxy. They conclude that the poor benefit primarily from the ability of the banking system to facilitate transactions and provide saving opportunities rather than from greater access to credit. Similarly, for more recent studies, Boukhatem (2016) employs data for 67 low- and middle-income countries for the period 1986-2012, and finds that financial development has a positive and direct effect in improving the well-being for the poor. He concludes that an increase of 1 percentage point in the liquidity ratio M3/GDP leads to an improvement of 0.65 percentage point of the standard of living of the poorest 20% of the population. However, the estimated results are dependent of the indicator used to measure the level of financial development and poverty (e.g., the impact of bank credits to GDP on the well-being for the poor is not significant).

Moreover, the benefits of financial development are not generated spontaneously, and they require policies aimed at macroeconomic stability and institutional reforms to accompany the process of financial sector development (Singh & Huang, 2015). The effect of financial development on poverty alleviation varies with the level of economic development (Jalilian & Kirkpatrick, 2005). A certain threshold level of financial development is required for an economy before it can get the full benefits and reduce the risks of capital account liberalisation (Uddin et al., 2014).

For a better overview of the existing empirical studies that primarily focus on the direct effect of financial development on poverty alleviation, we have composed a literature summary for some of the most recent and relevant works regarding such relationship (see, *Chapter 2 Appendix A*). It summarises both cross-country and country-specific studies. In accordance to this literature summary, we observe the following: regardless of an estimation technique and sample data used, *i*) a good number of the empirical literature find a significant and positive poverty alleviation effect of financial development. However, *ii*) many of these studies show that this poverty alleviation effect is conditional on proxies used for both financial development and poverty, which is in line with the argument raised by Jeanneney and Kpodar (2011). Moreover, *iii*) except a fairly limited number of studies that take into consideration the multidimensional nature of the financial system and poverty, almost all of them investigate the finance-poverty nexus by only using proxies of financial development in the depth dimension (i.e., mostly financial institution depth, or a combination of both financial institution and

market) and absolute poverty measures (i.e., poverty headcount ratio or poverty gap). More importantly, *iv*) these findings on the finance-poverty nexus are far from conclusive and vary depending on a number of factors, such as selected proxies, adopted methodologies, etc. Therefore, to reach conclusive results, it is almost certain that financial development needs to be investigated with a combination of other appropriate policies and to use more than linear regression models to capture its complementary dynamics (Beck, Demirgüç-Kunt, et al., 2007).

Given a clear gap in the existing studies as discussed above, this chapter complements the previous literature on the finance-poverty nexus by providing new cross-country empirical evidence for developing and emerging economies specifically. Moreover, other than simply focusing on the direct effects of financial development on poverty in a specific dimension, i.e., depth or efficiency, the study further explores all four dimensions of financial development, based on the 4x2 matrix discussed earlier. Meanwhile, the study also uses different measures of poverty to reflect its multidimensional nature.

3. Econometric Model

Based on theoretical analysis on poverty discussed in *Chapter 1* and to assess the direct impact of financial development on poverty, we adopted a poverty model that builds largely on previous literature (see, Arestis & Caner, 2010; Dhrifi & Maktouf, 2013). Our baseline specification can be formulated as follows:

$$Pov_{i,t} = \alpha + \beta Pov_{i,t-1} + \gamma FD_{i,t} + \delta \mathbf{X}_{i,t} + u_i + \vartheta_t + \varepsilon_{it} \quad (1)$$

Pov is the proxy variable for poverty, FD is the proxy variable for financial development, \mathbf{X}_{it} is a vector of explanatory variables (discussed further in detail within the section of 4.3 of *Chapter 2*, 'Other Controls') that includes, for instance, inflation rate, trade openness, per capita GDP growth rate, per capita GDP, GINI Index of inequality, public spending, and school enrolment. u_i are unobserved country-specific effects, ϑ_t are time-specific effects, and ε_{it} is the error term, where i is the individual dimension of the panel (country) and t is the temporal dimension. The inclusion of the lagged dependent variable, $Pov_{i,t-1}$ on the right-hand side allows this study to model the dynamic process of underlying poverty incidence and to account for inertia effects.

The relationship between financial development and poverty might be driven by reverse causation (Beck, Demirgüç-Kunt, et al., 2007). For instance, reduction in poverty might stimulate demand for financial services. To control for potential biases, we use a dynamic panel estimator, which could address a variety of shortcomings that the OLS regression could not. For instance, cross-country regressions do not fully control for unobserved country-specific effects; even using standard two-stage least squares regressions and using instruments for financial development, this does not control for the endogeneity of other explanatory variables, which may bias the coefficient estimates on financial development. Moreover, pure cross-country regression does not exploit the time-series dimension of the data either. More importantly, given the specification in equation (1), the inclusion of a lagged dependent variable could bias the coefficient estimates.

Therefore, considering the presence of dynamics and endogenous regressors in panel estimation, both of the generalised least squares estimator and the fixed effect estimator cannot produce consistent estimates (Baltagi, 2013). We thereby use a Generalised Method of Moments (GMM) panel estimator developed for dynamic models by Arellano and Bond (1991) and Arellano and Bover (1995), which takes into account country-specific effects and control for endogeneity, measurement errors, and omitted variables in the OLS regression.

The standard approach to tackling the problem of the potential endogeneity of all explanatory variables, measurement errors and omitted variables is to use the system GMM estimator, built on the first-differenced GMM. The idea is 'to take first differences to remove unobserved time-invariant country-specific effects, and then instrument the right-hand-side variables in the first-differenced equations using levels of the series lagged one period or more, under the assumption that the time-varying disturbances in the original levels equations are not serially correlated' (Bond et al., 2001, pp. 2–3). In other words, the system GMM estimator provides a combination of the previously first-differenced equations with suitable lagged levels as instruments, and an additional set of equations in levels with suitable lagged first-differenced as instruments. As Blundell and Bond (1998) argue, the system GMM initially proposed by Arellano and Bover (1995), may better suit and outperform the first-differenced GMM when the lagged dependent variable persists. Moreover, the first-differenced GMM is always biased when the sample size is small and when the instruments are weak (Blundell et al., 2000).

The system GMM approach has another advantage in tackling the endogeneity of the explanatory variables, which is to use appropriate lags of these variables rather than some external instruments to control for potential endogeneity in models. Moreover, endogeneity can also emerge from two other possible causes – measurement error and omitted variable bias; but this type of issue could be tackled by using alternative measures of financial development. The economic justification for the use of instruments is that, even though countries with higher levels of financial development may have relatively more stable macroeconomic environments and a high degree of civil liberties, financial development may not be the cause producing these outcomes. There could be an omitted variable that is driving financial development. Also, a more stable political environment with a high purchasing power may promote financial development as more people demand financial services. Instruments help us to determine if financial development is causing the improved poverty measures. In that case, they must be uncorrelated with the error term yet are correlated with financial development (Beck, Demirgüç-Kunt, et al., 2007).

Such a system gives consistent results under the assumption that the error term ε_{it} exhibits no serial correlation higher than order one and is uncorrelated with the instruments. This assumption could be tested with the Arellano and Bond test. Failure to reject the null hypothesis implies that the second-order serial correlation can be discarded. Moreover, the credibility of estimates crucially depends on the appropriateness of the instruments, and we have to make sure that the lagged values of the explanatory variables are valid instruments in the poverty equation. We, therefore, test the validity of the instruments by applying the Hansen test of over-identifying restrictions (OIR), where the null hypothesis is that the instrumental variables are not correlated with the residual. Failure to reject the null hypothesis implies that instrumental variables are not correlated with the residual and are satisfying the orthogonality condition required, which supports the overall validity of the instruments. We test for the validity of these assumptions and present these test results later in this section.

To evaluate the empirical predictions advanced by the variety of theoretical models on the relationship between financial development and poverty alleviation, we would ideally like to construct measures of the ability of financial systems to ameliorate information and transaction costs, ease risk management, and facilitate resource mobilisation. Considering the fact that both financial development and poverty concepts are featured by multidimensionality – therefore are difficult to quantify particularly for a broad cross-section of countries over the past three

decades – details regarding the selection of approximate proxies are discussed in the following section.

4. Data and Variables

For our econometric model, we employ a panel of 75 developing countries based on classifications given by the World Bank²⁰, with the inclusion of 23 countries that are categorised as Emerging Economies based on the classifications given by MSCI Emerging Economies Index. Unlike other empirical studies that cover a more comprehensive range of countries, including both developing and developed countries, we focus on the sample of less developed countries in order to mitigate the heterogeneity problem. Doing so also yields more salient results from the policy viewpoint, as the nexus between financial development and poverty is vigorously debated in developing countries. Moreover, the period covered by this chapter is from 1986 to 2015 because many financial systems in developing countries had started to develop as they were freed from government regulations in the 1980s (Pill & Pradhan, 1997).

When conducting studies related to developing and emerging economies, limited available data on variables of interest is a long-lived issue faced by researchers and scholars. Admittedly, since this chapter covers an extensive period and countries, it is unavoidable that this study also suffers from this issue. The number of observations varies depending on the availability of data for the proxy variables used for financial development, poverty and other controls. Consequently, following Arestis and Caner (2010), we take the average of the variables over five-year intervals to maximise the number of country-observations, as well as to purge the empirical estimates from the effect of short-run disturbances. Thus, the panel includes observations with a maximum of six periods and only countries with observations for at least two consecutive periods are kept for further investigations. Most of the data for proxy variables of financial development are collected from the World Bank Global Financial Development Database prepared by World Bank (2017b) and the data for poverty proxy variables and

²⁰ For the full list of selected developing countries, please refer to *Chapter 2 Appendix: B*.

macroeconomic environment are extracted from the World Bank Development Indicator prepared by World Bank (2017d)²¹.

4.1. Measures of Poverty

In many developing countries, a significant shortcoming of the poverty analyses is that time series are very limited and cover very few years. The most often used poverty indicators in the literature include the annual per capita income, the annual per capita household consumption expenditure, the rate of the population living at (or below) \$3.01/ \$1.90 per day, and the GINI Index. However, some of these series failed to extend over the entire period from 1985-2015 and cover the countries of our selection.

One classical measure of poverty accounts for the number of people living with an income below a threshold line based on the minimum amount of resource to sustain life. In keeping with standard development literature, we use the poverty headcount ratio based on \$3.10 and \$1.90 a day. This ratio simply counts the number of people with per capita income/consumption below the poverty line. One of the prominent criticisms regarding this indicator is that it does not reflect the intensity of poverty – individuals with income/consumption levels marginally below the poverty line are counted as being poor just as individuals with levels much further below the poverty line. Therefore, we employ a second measure of poverty, namely, the poverty gap index to reflect such kind of information. The higher the index, the farther the average poor is from the poverty line. This measure characterises how far below the poverty line lies the average income of the poor and provides some sense of distribution. Unlike the headcount ratio, this indicator captures a decrease or increase in the income of the poor even when it does not cross the poverty line. As our dependent variable, we use the poverty headcount ratio and the poverty gap index considered at the \$3.10/\$1.90 poverty lines.

It is also worth noting that the headcount ratio and the poverty gap index based on the daily \$3.10 and \$1.90 provide only measures of absolute poverty and fail to reflect the ‘breadth’ of poverty. In other words, they do not take into account other dimensions of poverty²². For

²¹ For details of variables description and data sources, please refer to *Chapter 2 Appendix C*.

²² For full discussions regarding different poverty approaches, please refer to *Chapter 1, section 4.2. Comparing the Four Poverty Approaches*.

reasons mentioned above, we also use the income share of the poorest quintile as an additional indicator of poverty to reflect the extent of relative poverty and increasing levels of this indicator imply that a higher share of the income is accruing to the poorest 20 per cent of the population. Because this index assesses the relative income of the poor in terms of the society's income, it is closely concerned with distributional issues.

4.2. Measures of Financial Development

Various measures have been used in the literature to proxy the level of financial development, ranging from interest rate to monetary aggregates to the ratio of the size of the banking system to GDP (Al-Awad & Harb, 2005; Bist & Read, 2018; Khan & Senhadji Semlali, 2000; among others). Given the multidimensional concept of financial development, to sufficiently measure financial development, the methodology behind selecting appropriate variables has become one of the most crucial deciding factors in the finance-poverty empirical literature. Most of the literature has used one or multiple proxies of a single dimension.

One of the most commonly used proxies is the ratio of private credits to GDP, which measures the level of financial resources provided by domestic money banks to the private sector as a share of GDP (see, Ang & McKibbin, 2007; Cull et al., 2013; Kappel, 2010; among others). It might be a good indicator of financial development in less developed countries, where traditional borrowing and lending activities are the key businesses in financial intermediation because stock markets are either underdeveloped or non-existent.

However, given the sophisticated and multidimensional nature of financial intermediations, especially during its booming development era in emerging economies, financial development has become a more complex concept which means that to measure using only one or multiple proxies of a single dimension is no longer adequate. Therefore, employing both bank-based and market-based financial proxies in more dimensions to capture a complete picture of financial development is essential. However, researchers do not have direct measures of the degree to which a financial system, as a whole, performs its essential functions. Due to the lack of sufficient data across countries and the differences between economies, a comprehensive index or principal component better represents 'what is broadly meant by financial development' is not feasible (Ang & McKibbin, 2007; IMF, 2004). Therefore, as previously

discussed in *Chapter 1*, we use the financial development measurement framework – the 4x2 matrix – to measure the level of financial sector development while still considering its multidimensional character.

In general, the 4x2 matrix of financial system characteristics is a useful way of visualising the multidimensional nature of development in the financial sector, as every proxy variable is designed to capture certain vital features of the financial system. Only investigating its depth would be insufficient since deep financial sectors do not necessarily provide high levels of financial access. Similarly, investigating only its efficiency would not be sufficient because highly efficient financial sectors are not necessarily more stable than the less efficient ones, and so on. It is therefore essential to use a measurement framework that captures all the 4x2 components; each dimension of the financial system deserves equal considerations in our study.

Moreover, for each of the dimensions covered by the 4x2 matrix, several variables are available to be used as proxies. Those variables in the same dimensions work complementary or even additive to each other, and they could also 'compete' to measure similar things in slightly different ways. For instance, complementary variables such as the total assets of banks to GDP and total assets of non-bank financial institutions to GDP are expressed in the same units and complement each other; they could be added to obtain a proxy of total assets of financial institutions to GDP. For 'competing' variables that measure similar things but differ in terms of their comprehensiveness, such as private sector credit to GDP and total assets of financial institutions to GDP, they both are proxies for financial institutions' size. Nevertheless, they differ in terms of their comprehensiveness and country coverage, with private sector credit to GDP covering a smaller set of assets but being available for a large number of economies.

Therefore, our general approach during the selection of our proxies is to both take into account the variables that appear more frequently in the extant literature and to select one of the competing variables with the most generous country and time coverages. The rationale behind this method is that the competing indicators tend to be highly correlated, though not perfectly. For instance, the correlation coefficient for bank private credit to GDP and deposit money banks' assets to GDP is 0.98, and for liquid liabilities to GDP and deposit money banks' assets to GDP is 0.91 in our dataset. More information can be found in *section 5.2, Correlations*.

Meanwhile, data pertaining to the stock and bond markets as well as the insurance companies in some low- and middle-income countries is too superficial and insufficient for researchers to conduct empirical studies on these sectors. Since the financial systems of the majority of low- and middle-income countries are dominated by banking activity (bank-based financial systems), where their financial markets are less developed when compared with the developed countries; therefore, the level of financial development should not be measured by the same indicators for both types of countries. Moreover, banks of low- and middle-income countries are more likely to identify profitable investments, monitor managers, facilitate risk management and mobilise savings. Those services have proven to be particularly beneficial for less developed countries (Gambacorta et al., 2014). Hence, considering the reasons listed above, we have only selected a few proxies with extra cautions for measuring the development of financial markets. Detailed discussions regarding the selection of proxy variables of both financial institutions and financial markets in all dimensions are given as follows.

For the financial access dimension, as Jalilian and Kirkpatrick (2002, 2005) and Stiglitz (1993) argue, financial development can directly contribute to poverty alleviation by improving the opportunities for the poor to access formal finance and to enable them to achieve a sustainable livelihood. Nevertheless, due to deficiency in data within the financial access dimension for developing economies during the selected period, our proxies for financial access, such as the bank accounts per 1,000 adults, bank branches per 100,000 adults and market capitalisation excluding top 10 companies to total market capitalisation (%) have insufficient data coverage. Therefore, this dimension is excluded from our following empirical analyses.

Regarding the financial depth dimension, we incorporate various proxies (such as liquid liabilities to GDP (%), private credit by deposit money banks to GDP (%), deposit money banks' assets to GDP (%) and stock market capitalisation to GDP (%)) to measure the level of financial development in both financial institutions and financial markets. 'Liquid liabilities,' interpreted as the broadest definition of money (M3) as a proportion of GDP, is used to measure the liquid liabilities of the banking system in the economy. It is a more appropriate indicator for financial depth when compared to the other two monetary aggregates, M1 and M2, in a situation where the economies under consideration have underdeveloped financial systems; the former is more related to the ability of the financial system to channel funds from savers to borrowers, whereas the latter pertains more to the ability of the financial system to provide transaction services (Khan & Senhadji Semlali, 2000). A higher liquidity ratio indicates a

higher intensity in the banking system under the assumption that the size of the financial sector is positively associated with financial services (King & Levine, 1993). It is worth noting that the ratio of liquid liabilities to GDP tends to focus more on the liability side of the financial system, which is generally used to test for the McKinnon conduit effect, as discussed in *Chapter 1, section 5.1*. It does not consider one of the most relevant financial services – credit allocation.

Because of this shortcoming, we also include private credit by deposit money banks to GDP (%) as a further complementary proxy for financial development, which is widely used in related literature (see, for example, Beck, Demirgüç-Kunt, et al., 2007; King & Levine, 1993; Levine, 2008; Seven & Coskun, 2016). It expresses the value of credits granted by financial intermediaries to private sectors as a share of GDP and comprises credit to private firms and households from banks and non-bank financial intermediaries. A high ratio of this proxy indicates not only a higher level of domestic investment but also a higher development level of the financial system. Since financial systems that allocate more credit to the private sector are more likely to be engaged in researching borrower firms, exerting corporate control, providing risk management control, facilitating transactions, and mobilising savings, which all require a higher degree of financial development (Levine, 2004). This indicator is a useful proxy variable for the extent to which private sector agents have access to financial intermediations or more specifically, access to loans. Moreover, by excluding credit to the public sector, it has the advantage of measuring more accurately the role of financial intermediaries in channelling funds to productive agents and possibly to the poor.

In addition, we also include the deposit money banks' assets to GDP as a proxy for financial depth. Since it includes credit to both private sector and central, state and local governments, as well as bank assets, it is argued to be a more comprehensive measure and is often used as an alternative to the private credit to GDP (see, Beck, Demirgüç-Kunt, et al., 2007; Honohan, 2004). The higher the proxy, the higher the degree of dependence upon the banking sector for financing. In other words, a higher level of domestic credit provided by the banking sector shall lead to a higher level of financial development, as banks are more likely to provide the five financial functions (Levine, 1997). Regarding the financial depth dimension within the financial market, we use the most common choice in the literature, stock market capitalisation ratio to approximate the size of stock markets.

Concerning the financial efficiency dimension, we initially selected some of the proxy variables that are representative to measure the development of financial institutions. Such as the bank return on assets (% , after-tax), bank return on equity (% , after-tax) and the frequently used commercial-central bank asset ratio that captures the efficiency with which banks provide financial functions (Beck, Demirgüç-Kunt, et al., 2007; Beck & Demirguc-Kunt, 2009; Dollar & Kraay, 2002; King & Levine, 1993). However, due to the inadequate data coverage of these proxies, we have no choice but to exclude them from our empirical analyses. In the meantime, as an alternative approach, we employ the stock market turnover ratio (%) as a proxy variable to measure the efficiency of financial markets. It measures the total value of shares traded during the period divided by the average market capitalisation for the period (Levine & Zervos, 1998).

For financial stability, the proxy variables we choose cover both financial institutions and financial markets – bank z -score and stock price volatility. The bank z -score captures the probability of default of a country's commercial banking system, and it compares the buffer of a country's commercial banking system (capitalisation and returns) with the volatility of those returns. Meanwhile, the stock price volatility index is the average of the 360-day volatility of the national stock market index.

Finally, we include one additional proxy variable on the bank side, the bank concentration. It is a ratio that measures the total assets of the three largest banks in each country against the total banking sector assets. It captures the degree of concentration in the banking industry, where empirical evidence on low- and middle- income countries shows its determinative role to financial development.

4.3. Other Controls

In addition to the proxies for measurement of financial development and poverty, we also include a set of control variables that are commonly used in the finance-poverty literature. For instance, we include the GDP per capita indicator that measures a country's income level and the GDP per capita growth. The rationale for the inclusion of the latter is to control for the indirect impacts of financial development on poverty, as previously discussed in *Chapter 1, section 5.2* that financial development may contribute to poverty alleviation through its

growth-enhancing effect. Therefore, the regressions are then able to investigate the direct effect of financial development on the changes in poverty beyond any impact of economic growth.

Moreover, we incorporate the consumer price index that acts as a proxy for inflation to control for macroeconomic instability and price distortions. We further include the ratio of trade (import + export) to GDP (%) to capture the degree of international openness, given the fact that many developing economies rely heavily on international trades to achieve economic growth while financial liberalisation and development are still in progress. Considering that some countries may use expansionary or contractionary fiscal policies for steady economic growth by adjusting government spending, we also include the ratio of general government final consumption expenditure to GDP (%), as it measures the size of the real sector and the weight of fiscal policy in a country. Meanwhile, it could also be used to control for public policies which transfer income from the wealthy to the poor, such as state subsidies or public expenditure on education and health care. However, as argued by Paternostro et al. (2012), the impact of public consumption expenditure on poverty is somewhat ambiguous, and it largely depends on the extent to which public resources are employed.

In addition, we include a measure of human capital proxied by the gross secondary enrolment rate, since education is a crucial determinant of poverty alleviation (Zamurrad Janjua & Ahmed Kamal, 2011). Lastly, we include an indicator that measures income inequality and has been typically used in the literature, the GINI Index. It measures deviations from perfect income equality, that is based on the Lorenz curve. It is expressed as a percentage and ranges from 0 to 1, where the higher the value the greater the income inequality. The beneficial impact of financial development on the poor is thought to depend on the level of inequality, and a higher share of benefits from financial development are expected to accrue to the poorest if inequality is low (Cepparulo et al., 2017).

5. Estimation Results

5.1. Overview of the data

Table 1. Summary Statistics illustrates descriptive statistics for the largest sample available. According to the table, the poverty rates that are measured by the poverty headcount

ratio and poverty gap vary considerably across countries. For example, the poverty headcount ratio at \$3.10 a day ranges from a minimum of 0 to a maximum of 95.29. The poverty gap at \$3.10 a day ranges from a minimum of 0 to a maximum of 67.49. Among all poverty indicators, the income share of the poorest quintile has the fewest observations - 291, and it has the least variations at a minimum rate of 0.84 and a maximum rate of 11.83 with a mean rate of 5.69. Fewer people are classified as the extreme poor based on this indicator when compared with using the other standards of assessment.

In terms of the proxy variables for financial development, all have over 200 observations except the stock price volatility that has the least number of observations, 158. In general, the proxies that measure the financial depth dimension have the best data coverage. Meanwhile, there are still considerable variations regarding those proxies across countries. For instance, the stock market capitalisation has the most variations where its minimum rate is 0.27, and maximum rate is 684.54. The large variations reflect the difference in the level of stock market development for emerging economies. The bank z-score, on the contrary, has the least variation that ranges from a minimum rate of 0.67 to a maximum rate of 49.60.

Other controlled macroeconomic variables, again, also demonstrate considerable variations across countries, where the GDP per capita growth, GINI Index, and government consumption experienced less distinct variations when compared to GDP per capita, inflation and trade. *Table 1* below shows detailed information regarding all variables included in this study.

Table 1. Summary Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Poverty headcount at \$3.10 (2011 PPP)	307	38.41	29.54	0	95.29
Poverty headcount at \$1.90 (2011 PPP)	307	22.50	23.38	0	87.11
Poverty gap at \$3.10 (2011 PPP)	307	17.35	16.74	0	67.49
Poverty gap at \$1.90 (2011 PPP)	307	8.79	10.96	0	51.93
Income share of the poorest quintile	291	5.69	2.17	0.84	11.83
GDP per capita (2011 PPP)	388	3639.27	3855.93	285.69	20288.69
Economic growth	384	2.11	2.88	-13.38	12.85
Gini index	291	43.06	9.22	19.40	65.76
Inflation	375	51.83	315.55	-2.99	4810.81
Government consumption	382	13.41	4.48	4.14	34.39
Trade	385	70.87	35.64	13.94	241.02
Education	380	99.38	20.49	25.56	165.65
Private credit by deposit money banks to GDP (%)	381	28.88	24.35	1.25	143.47
Deposit money banks' assets to GDP (%)	381	35.88	26.94	2.62	152.59
Liquid liabilities to GDP (%)	380	37.79	24.94	5.74	176.41
Stock market capitalization to GDP (%)	257	32.08	56.90	0.27	684.54
Bank lending-deposit spread	317	9.30	7.61	0.17	51.56
Stock market turnover ratio (%)	253	33.61	55.79	0.06	393.53
Bank z-score	260	12.57	9.00	0.67	49.60
Stock price volatility	158	25.31	15.68	5.23	116.35
Bank concentration (%)	248	65.83	19.36	22.46	100

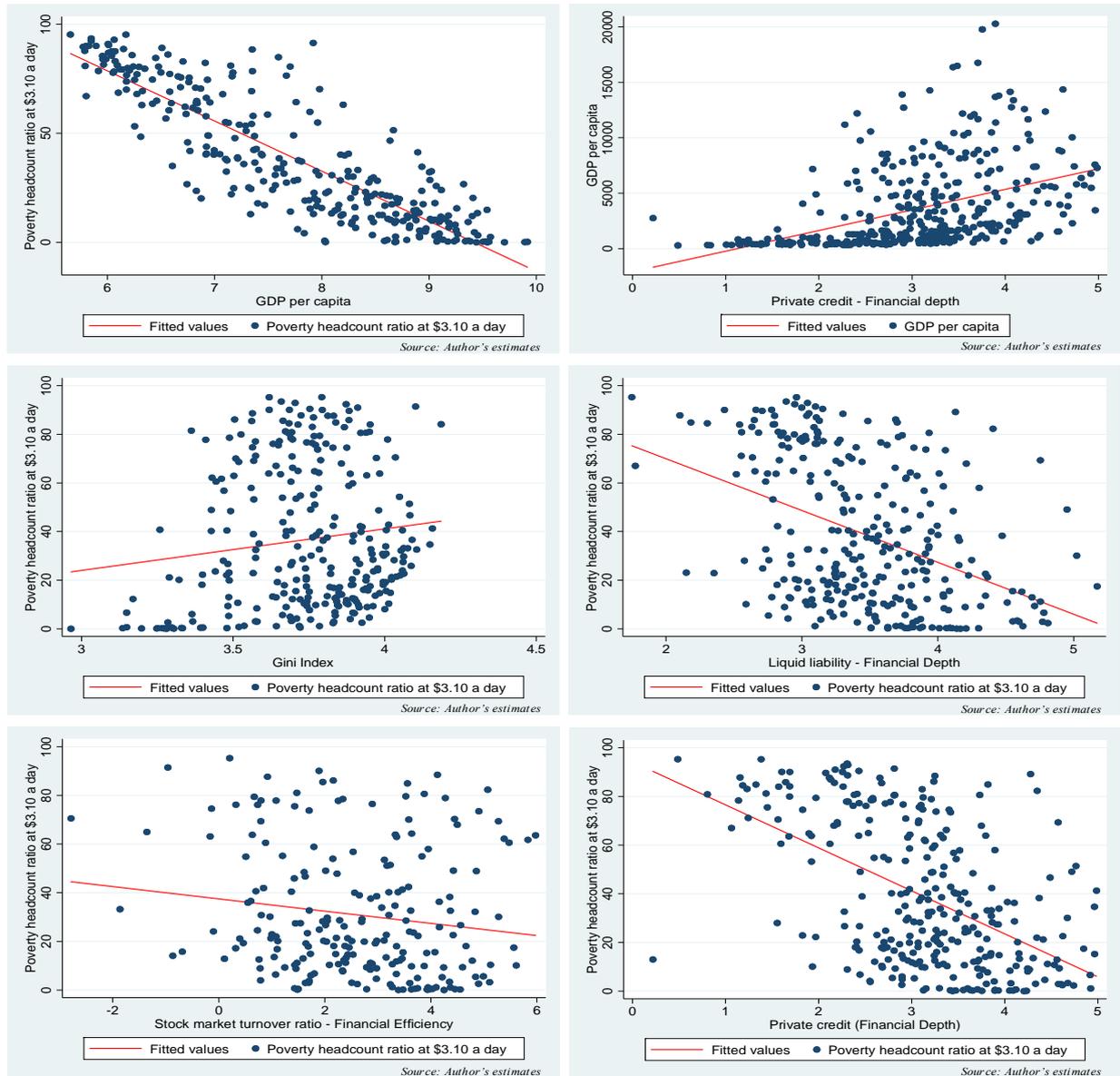
Notes: The table illustrates summary statistics of all the variables used for empirical analysis. All variables are in percentage form (except GDP per capita) and averaged over a five-year period. Poverty headcount ratio at \$3.10/1.90, Poverty gap at \$3.10/1.90 and Income share of the poorest quintile are the dependent variable.

Source: Author's calculations.

5.2. Correlations

The following *Figure 1* presents correlations using scatterplots for the main proxy variables for poverty, financial development and macroeconomic environment. For instance, the real GDP per capita is negatively correlated with poverty headcount ratio at \$3.10/day (-0.784) and positively correlated with private credit (0.142). The former suggests that countries with higher income levels tend to have lower poverty rates and the latter suggests that countries with higher income levels tend to have more developed financial sectors. In terms of the correlations between the selected poverty proxy and financial development proxies, the poverty headcount ratio at \$3.10/day is negatively correlated with the private credit (-0.325), bank assets (-0.337) and liquid liability (-0.248), indicating that countries with more developed financial systems experience a faster reduction in the number of people below the \$3.10 poverty line. Besides, the poverty headcount ratio at \$3.10 is positively correlated with the GINI Index (0.192), illustrating that a higher level of inequality may harm the poor and obstruct them from benefiting the positive impact contributed by economic growth and financial development. For detailed correlations concerning all variables included in our analyses, please refer to *Chapter 2 Appendix D*.

Figure 1. Correlation Scatterplots



5.3. Empirical Results and Discussions

On the basis of the rationale for our econometric model presented in *section 3*, our approach to conducting the following empirical analyses relies on a dynamic panel regression framework. While some limitations apply, it still enables us to provide a full-scale characterisation of the effects of financial development on poverty alleviation at the macroeconomic level.

We employ the system GMM dynamic panel data estimator developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998), together with computation of the robust two-step standard errors method that proposed by Windmeijer (2005) to tackle the endogeneity issue and the presence of unobserved country fixed effects. This approach addresses the issues of joint endogeneity of all explanatory variables in a dynamic formulation and potential biases induced by country-specific effects.

In evaluating the empirical predictions advanced by the variety of theoretical models on the relationship between financial development and poverty alleviation, we ideally prefer to construct measures of the ability of financial systems to ameliorate information asymmetries, ease risk management, and facilitate resource mobilisation. Financial development, however, is a multidimensional concept that is difficult and complicated to quantify, particularly for a broad cross-section of countries over three decades. To assess our results, we have included as many proxy variables of financial development as we possibly and reasonably could, with the intention of presenting the broadest picture to reflect its multidimensional nature.

All regressions include time dummies to account for time-specific effects, and they are insignificant in most of the specifications. In all runs, the lagged proxy variables for poverty are treated as predetermined variables (e.g., weakly exogenous), as they are likely to be correlated with their past and possibly current realisations of the error term. We further assume that the GINI Index, GDP per capita, GDP per capita growth, inflation and proxy variables for financial development are endogenous variables, while other controlled variables are treated as exogenous variables.

We estimate eight specifications in total as illustrated in *Table 2-10, Panel A*, all formed by system GMM estimates, by testing the impacts of each individual proxy variable of financial development on poverty. Within each specification, we have five sub-specifications, using different proxy variables of poverty measurements. In this respect, *column 1-5* of each table represent regressions on poverty headcount ratio at \$3.10 a day, poverty headcount ratio at \$1.90 a day, poverty gap at \$3.10 a day, poverty gap at \$1.90 a day and income share held by the lowest 20% respectively.

Two tests are conducted concerning the validity of the corresponding system GMM estimates in each specification as illustrated in *Table 2-10, Panel B*, by testing the Hansen *J*-test and the

Arellano and Bond $AR(2)$ test. The p -values of the Hansen J -test are significantly greater than any acceptable level of significance; failure to reject the null hypothesis indicates that the instruments are valid²³. This finding holds for all the estimated specifications. Therefore, we have reason to believe that the instruments used in estimations are appropriate and orthogonal to the residuals. Meanwhile, the results of the Arellano and Bond $AR(2)$ tests further confirm that the residuals are free from the problem of second-order serial correlation. No further commentaries on these aspects are given when we interpret the results of the estimated specifications for brevity concerns.

Observing the results of the considered financial development proxy variables and key determinants to poverty at a macro level, we find that they are both mostly consistent with the previous empirical studies and also in agreement with our theoretical expectations²⁴. Notably, we find that the estimated coefficient of the one-period lagged proxy variable of poverty is positive and statistically significant for all specifications with a value less than or just above one, except when measuring the impact of financial development from the depth perspective (liquid liabilities, private credit and bank assets) for the poorest quintile. The statistically significant estimates of the lagged poverty proxy variables support the choice of using the dynamic panel techniques and further imply that for countries who had high poverty rates in the last five years may still facing poverty issue in the next five years – the effect of persistent poverty²⁵, but with decreasing rates – the effect of poverty reduction.

Given that the emphasis of this study is placed on the impact of development in the financial sectors on poverty alleviation, the results in terms of the financial development proxy variables are discussed individually in the following sections, and the results in terms of other controlled proxy variables will be discussed at a later stage.

²³ With an exception of the Hansen J -test performed in *Table 4, Column 5*, the p -value implies a failure to reject the null hypothesis at 5% significant level.

²⁴ For extra robustness of our estimations, although our dataset is averaged over five-year intervals, we still include a crisis dummy variable following Dollar and Kraay's (2002) approach that treats 5-year periods with negative per capita GDP growth as a proxy for crises. In summary, the estimated results are broadly consistent with our initial findings without the crisis dummy. More importantly, in all specifications, the crisis dummy presents no statistically significant impact on our poverty indicators. The results for all specifications are presented in the *Chapter 2 Appendix E*.

²⁵ Please note, the dataset in this study is averaged over a five-year period.

5.3.1. Liquid liabilities to GDP as the financial development indicator

As *Table 2* demonstrates, when using the liquid liabilities to represent the level of financial development, its impact on poverty as we observed from the associated coefficient estimate in *column 1* is statistically significant with a negative sign. The coefficient estimate implies that a one per cent increase in liquid liabilities reduces the poverty rate by 4.5 per cent. This ‘poverty alleviation’ impact of liquid liabilities only holds when we use the poverty headcount ratio at \$3.10 a day, but not for the other absolute poverty measures, such as the poverty headcount ratio at \$1.90 a day and poverty gap at \$3.10 a day, as the estimated coefficients fail to reach conventional levels of statistical significance (see results given in *columns 2-4*). The finding regarding the poverty alleviation effect of financial development is in line with the results obtained by Akhter and Daly (2009), whose study uses a fixed effect vector decomposition method to estimate the financial development-poverty nexus. Our result is also consistent with the findings of Jeanneney and Kpodar (2011) that provide evidence for a significant and negative impact of broad liquidity on the poverty rate when measured by a headcount index.

More importantly, as observed from *column 5*, the coefficient estimate is statistically significant with a positive sign, implies that a one per cent increase in liquid liabilities raises the income share of the poorest quintile by 0.48 per cent. This finding suggests that increasing liquid assets in the financial system alleviate relative poverty, since the poorest quintile are more sensitive to income changes caused by the direct impacts of financial development and may improve their savings/consumption when they are more exposed to the improved financial services. This result is in line with the finding in *column 1* when poverty is measured in the poverty headcount ratio at \$3,10 a day. More significant liquid liabilities do lead to a decrease in the poverty rate and an increase in the income share of the poorest 20%.

Table 2. System GMM estimates for direct financial development effect - Liquid Liabilities to GDP

	(1)	(2)	(3)	(4)	(5)
	Poverty headcount (\$3.10 a day)	Poverty headcount (\$1.90 a day)	Poverty gap (\$3.10 a day)	Poverty gap (\$1.90 a day)	Income share (lowest 20%)
Panel A: estimation results					
y _{t-1}	0.852*** (-0.113)	0.715*** (-0.139)	0.720*** (0.127)	0.592*** (0.087)	0.227 (0.165)
Liquid liabilities	-4.512** (-1.945)	-1.798 (-1.992)	-1.583 (-1.673)	0.128 (1.133)	0.475** (0.221)
GDP per capita	-3.827 (-3.187)	-3.229 (-2.944)	-2.370 (-1.679)	-1.436* (0.842)	-0.397* (0.216)
GDP growth	-0.566* (-0.322)	-0.298 (-0.266)	-0.271 (0.271)	-0.155 (0.172)	0.045 (0.027)
Inflation	-0.008 (-0.014)	-0.002 (-0.005)	-0.003 (0.005)	-0.002 (-0.004)	0.002 (0.008)
Gini Index	-12.870 (-13.257)	18.540 (-12.926)	12.189 (7.591)	7.334* (4.315)	-8.062*** (1.289)
Education	-1.344 (-6.828)	-4.497 (-8.222)	-1.371 (5.660)	-1.221 (4.091)	0.423 (0.645)
Trade	0.161 (-1.939)	0.511 (-1.371)	0.260 (1.246)	-0.220 (0.712)	-0.332** (0.155)
Government Consumption	4.655 (-3.713)	7.271*** (-3.137)	4.063** (2.161)	2.646 (1.745)	0.287 (0.331)
Constant	-5.192187 (-45.232)	-34.303 (-32.839)	-23.358 (29.232)	-13.450 (17.899)	34.636*** (8.215)
Panel B: diagnostic tests					
AR(2) (<i>p-value</i>)	0.886	0.558	0.466	0.762	0.685
Hansen test (<i>p-value</i>)	0.444	0.637	0.518	0.850	0.390
Observations	206	206	206	206	201
Countries	60	60	60	60	57
Instruments	38	38	38	38	32

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.2. Private credit to GDP as the financial development indicator

Table 3, as seen below, demonstrates how the amount of credit offered by financial intermediaries to the private sector affect poverty. The estimated coefficient of private credit is negative and statistically significant when using poverty headcount ratio at \$3.10 a day as the poverty proxy, indicating that a higher level of credit allocation to private sector lowers the level of poverty. Specifically, the estimate suggests that a one per cent increase in the credit to the private sector would reduce the poverty rate by 3.97 per cent. This finding is in line with those by Akhter et al. (2009), Akhter and Daly (2009), Beck, Demirgüç-Kunt, et al. (2007), Honohan (2004), yet in contrary to findings by Jeanneney and Kpodar (2011) and Perez-Moreno (2011), which document an insignificant impact of private credit on the headcount

index. Meanwhile, when using other absolute poverty measures, the results yield no support for a poverty alleviation effect of financial development.

In addition, regarding the effect of financial development on relative poverty when using the income share of the poorest as the poverty proxy variable (see *column 5*), the coefficient estimate of the private credit is positive and statistically significant. It implies that a one per cent increase in the private credit raises the income share of the poorest quintile by 0.41 per cent. This finding suggests that increasing credit to the private sector promotes alleviation in relative poverty, consistent with findings by Beck, Demirgüç-Kunt, et al. (2007) and Jalilian and Kirkpatrick (2005), in which the impact of private credit on the income share of the poorest quintile has been determined to be positive and significant.

Table 3. System GMM estimates for direct financial development effect - Private credit to GDP

	(1) Poverty headcount (\$3.10 a day)	(2) Poverty headcount (\$1.90 a day)	(3) Poverty gap (\$3.10 a day)	(4) Poverty gap (\$1.90 a day)	(5) Income share (lowest 20%)
Panel A: estimation results					
y _{t-1}	0.872*** (0.104)	0.711*** (0.143)	0.734*** (0.125)	0.617*** (0.086)	0.226 (0.156)
Private credit	-3.970*** (1.370)	-1.268 (1.153)	-1.223 (0.937)	-0.104 (0.625)	0.412* (0.223)
GDP per capita	-1.627 (-3.004)	-0.256 (2.896)	-1.572 (1.578)	-1.136 (0.835)	-0.443** (0.201)
GDP per capita growth	-0.541 0.386	-0.258 (0.248)	-0.263 (0.222)	-0.152 (0.170)	0.066 (0.040)
Inflation	-0.001 (-0.016)	0.003 (0.009)	0.000 (0.007)	-0.000 (0.003)	0.002 (0.007)
Gini Index	2.377 (-12.681)	15.021 (11.795)	7.430 (7.610)	6.309 (4.099)	-7.623*** (1.493)
Education	-1.094 (-6.553)	-4.455 (7.631)	-0.745 (5.462)	-1.216 (3.680)	-0.053 (0.815)
Trade	-0.545 (-1.610)	0.082 (1.543)	-0.376 (1.270)	-0.215 (0.654)	-0.324 (0.203)
Government Consumption	2.533 (-3.123)	6.297* (3.176)	3.164 (2.113)	2.341 (1.550)	0.161 (0.255)
Constant	19.800 (-41.874)	-24.643 (35.663)	-11.741 (28.159)	-11.576 (13.312)	36.154*** (8.051)
Panel B: diagnostic tests					
AR(2) (<i>p-value</i>)	0.657	0.661	0.556	0.773	0.375
Hansen test (<i>p-value</i>)	0.642	0.642	0.612	0.869	0.522
Observations	206	206	206	206	201
Countries	60	60	60	60	57
Instruments	38	38	38	38	26

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.3. Deposit money banks' assets to GDP as the financial development indicator

The results regarding the deposit money banks' assets to GDP are given in *Table 4* below. This proxy variable is highly correlated to the private credit to GDP, as shown in *Chapter 2 Appendix D. Matrix of Correlations*, but arguably more comprehensive. The estimated results are similar - the coefficient of deposit money banks' assets is negative and statistically significant when using poverty headcount ratio at \$3.10 a day as the poverty proxy, indicating a higher level of deposit money banks' assets – in another word, a higher degree of dependence upon the banking sector for financing promotes poverty alleviation. Specifically, the estimate suggests that a one per cent increase in deposit money banks' assets reduces poverty rate by 4.04 per cent. This finding is consistent with Donou-Adonsou and Sylwester (2016), who argue that a higher level of domestic credit provided by the banking sector shall lead to a higher level of financial development that reduces poverty because the banks are more likely to provide the five primary financial functions that were discussed earlier. Nevertheless, this positive poverty alleviation effect has not been found in other specifications in the context of absolute poverty.

Moreover, concerning relative poverty, the estimated coefficient in *column 5* is positive yet insignificant, contradicting the findings of Beck, Demirgüç-Kunt, et al. (2007), who find a negative and significant impact of the deposit money banks' assets on the income growth of the poorest quintile of the population. The reason for such a contrast could lie in the difference in sample compositions, as our sample consists of developing countries only but theirs comprises of both developing and developed countries that have more extensive and more diversified financial systems.

Table 4. System GMM estimates for direct financial development effect - Deposit money banks' assets to GDP

	(1)	(2)	(3)	(4)	(5)
	Poverty headcount (\$3.10 a day)	Poverty headcount (\$1.90 a day)	Poverty gap (\$3.10 a day)	Poverty gap (\$1.90 a day)	Income share (lowest 20%)
Panel A: estimation results					
y_t-1	0.867*** (0.100)	0.726*** (0.138)	0.749*** (0.117)	0.617*** (0.083)	0.223 (0.258)
Deposit money banks' assets	-4.043** (1.710)	-1.579 (1.592)	-1.435 (1.243)	-0.224 (0.937)	0.476 (0.338)
GDP per capita	-2.354 (2.919)	-2.617 (2.842)	-1.711 (1.503)	-1.220 (0.800)	-0.419* (0.247)
GDP per capita growth	-0.650* (0.339)	-0.296 (0.257)	-0.301 (0.262)	-0.157 (0.159)	0.072 (0.059)
Inflation	-0.006 (0.016)	0.002 (0.008)	-0.001 (0.007)	-0.000 (0.004)	0.001 (0.010)
Gini Index	6.000 (13.756)	17.798 (12.269)	9.421 (7.681)	7.461* (3.925)	-7.954*** (2.783)
Education	0.280 (6.246)	-4.019 (8.350)	-0.140 (5.550)	-1.534 (3.981)	0.115 (1.330)
Trade	-0.865 (1.846)	0.328 (1.367)	-0.243 (1.338)	-0.128 (0.653)	-0.356 (0.233)
Government Consumption	3.252 (3.337)	6.383** (3.039)	3.403 (2.191)	2.347 (1.597)	0.158 (0.509)
Constant	6.902 (46.292)	-36.658 (30.288)	-21.172 (28.564)	-13.711 (11.315)	36.347** (14.363)
Panel B: diagnostic tests					
AR(2) (<i>p-value</i>)	0.999	0.570	0.456	0.733	0.277
Hansen test (<i>p-value</i>)	0.567	0.638	0.582	0.876	0.089
Observations	206	206	206	206	201
Countries	60	60	60	60	57
Instruments	38	38	38	38	32

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.4. Stock market capitalisation as the financial development indicator

Regarding the financial depth dimension within the stock market, the most common choice in the literature to approximate the size of stock markets is the stock market capitalisation ratio. The results are given in *Table 5* below. The estimated coefficients of stock market capitalisation are negative yet insignificant when using the absolute poverty measures, and the coefficient is positive yet insignificant when using the relative poverty measure. The obtained estimates suggest that the development of the stock market that is measured by size does not have any significant role in poverty alleviation, regardless of the poverty measures used. This finding is in line with Honohan (2004) who also finds no evidence for a statistically significant impact of stock market capitalisation on the poverty rate. One possible explanation for the lack of statistical significance is that equity markets are not sufficiently developed in low- and middle-income countries to have any significant impact on poverty alleviation.

Table 5. System GMM estimates for direct financial development effect - Stock market capitalisation to GDP

	(1) Poverty headcount (\$3.10 a day)	(2) Poverty headcount (\$1.90 a day)	(3) Poverty gap (\$3.10 a day)	(4) Poverty gap (\$1.90 a day)	(5) Income share (lowest 20%)
Panel A: estimation results					
y _{t-1}	0.874*** (0.126)	0.865*** (0.191)	0.830*** (0.187)	0.681*** (0.248)	0.211*** (0.064)
Stock market capitalisation	-0.536 (1.342)	-0.230 (1.330)	-0.163 (1.129)	-0.445 (1.429)	0.009 (0.056)
GDP per capita	-2.184 (2.860)	0.168 (2.858)	-0.595 (2.232)	-0.445 (1.429)	-0.321*** (0.102)
GDP per capita growth	-1.297* (0.659)	-0.795 (0.503)	-0.613* (0.357)	-0.262 (0.184)	-0.015 (0.021)
Inflation	-0.267 (0.062)	-0.015 (0.036)	-0.016 (0.027)	-0.012 (0.020)	-0.004* (0.002)
Gini Index	1.595 (10.179)	1.064 (9.111)	1.510 (6.755)	5.303 (5.774)	-7.688*** (0.589)
Education	-10.792 (8.810)	-9.326 (8.541)	-5.987 (6.498)	-4.795 (3.731)	0.431 (0.400)
Trade	-1.684 (1.497)	-0.935 (1.137)	-0.920 (0.941)	-0.287 (0.891)	-0.058 (0.148)
Government Consumption	1.984 (3.764)	0.026 (3.570)	0.432 (2.717)	0.781 (0.701)	0.052 (0.167)
Constant	69.862** (31.935)	45.325 (31.375)	33.003 (22.849)	8.408 (19.897)	33.893*** (3.216)
Panel B: diagnostic tests					
AR(2) (<i>p-value</i>)	0.331	0.228	0.443	0.778	0.358
Hansen test (<i>p-value</i>)	0.376	0.290	0.279	0.428	0.806
Observations	166	166	166	166	163
Countries	49	49	49	49	47
Instruments	38	38	38	38	56

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.5. Bank lending-deposit spread as the financial development indicator

For financial intermediaries, efficiency is primarily constructed to measure the cost of intermediating credit. The efficiency measure for the financial institutions that we have analysed in this section is the bank lending-deposit spread. It is a simple difference between the average nominal lending rate and the average nominal deposit rate, where the former is the rate charged by banks on loans to the private sector and the latter is the rate offered by commercial banks on three-month deposits. In general, there is a substantial difference between the cost of financial intermediation in high- and low-income countries, and it has been observed that the financial systems in developing countries exhibit higher bank lending-deposit spread rates than those in developed countries (Kroszner, 1998; A. Saunders et al., 2000). A high rate

of bank deposit-lending spread acts as an impediment to the expansion of financial intermediation necessary for economic development and poverty alleviation (Mujeri & Younus, 2009). The higher the rate, the higher the cost of credit to the borrowers would be for any given deposit rate. A substantial bank lending-deposit spread primarily reflects inefficiencies in intermediations. Nevertheless, the estimated coefficients of bank lending-deposit spread in all specifications, as reported in *Table 6* below, are not statistically significant.

Table 6. System GMM estimates for direct financial development effect - Bank lending-deposit spread

	(1)	(2)	(3)	(4)	(5)
	Poverty headcount (\$3.10 a day)	Poverty headcount (\$1.90 a day)	Poverty gap (\$3.10 a day)	Poverty gap (\$1.90 a day)	Income share (lowest 20%)
Panel A: estimation results					
y _{t-1}	0.979*** (0.134)	0.910*** (0.138)	0.896*** (0.210)	0.810*** (0.176)	0.344*** (0.095)
Bank lending-deposit spread	1.887 (2.138)	3.643 (2.877)	-1.268 (2.254)	2.404 (1.902)	-0.191 (0.153)
GDP per capita	2.131 (2.980)	-0.347 (3.090)	-2.274 (3.646)	-0.981 (2.009)	-0.312** (0.122)
GDP per capita growth	-1.373** (0.587)	-0.787** (0.333)	-0.350* (0.309)	-0.349* (0.192)	0.017 (0.022)
Inflation	0.003 (0.034)	-0.000 (0.111)	-0.003 (0.101)	-0.025 (0.060)	0.001* (0.006)
Gini Index	-13.637 (14.287)	1.837 (7.801)	-1.087 (8.021)	2.068 (4.479)	-6.426*** (1.258)
Education	3.939 (11.341)	-7.325 (12.127)	7.715 (11.301)	-2.379 (8.214)	0.112 (1.018)
Trade	-2.792 (2.158)	-0.156 (3.502)	-1.692 (2.044)	-0.381 (1.747)	-0.104 (0.186)
Government Consumption	-1.902 (3.806)	-0.431 (4.566)	1.638 (3.922)	-1.047 (2.173)	-0.182 (0.275)
Constant	31.469 (43.251)	25.977 (77.033)	-7.464 (54.115)	12.098 (51.979)	30.001*** (3.103)
Panel B: diagnostic tests					
AR(2) (<i>p-value</i>)	0.982	0.178	0.108	0.179	0.385
Hansen test (<i>p-value</i>)	0.605	0.636	0.635	0.713	0.812
Observations	179	179	179	179	175
Countries	53	53	53	53	51
Instruments	38	38	32	38	32

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.6. Stock market turnover ratio as the financial development indicator

On the efficiency side of the financial market development, the most common choice in the literature is the stock market turnover ratio. The estimated results are given in the following *Table 7*. The coefficient estimate of the turnover ratio is negative and statistically significant when using the poverty headcount ratio at \$1.90 a day, while insignificant otherwise.

It indicates that a more liquid stock market is associated with lower (absolute) poverty. Specifically, the estimate suggests that a one per cent increase in the stock market turnover ratio reduces poverty rate by 2.64 per cent when using poverty headcount at \$1.90 a day as the poverty proxy.

Also, the coefficient appears to be positive in the regression on relative poverty (*column 5*), suggesting that a higher level of liquidity in the stock market reduces poverty by increasing the income share of the lowest 20%, though this effect is statistically insignificant. These findings are contradictory to those by Rashid and Intartaglia (2017), who conclude that the turnover ratio is positively correlated with the poverty rates when using absolute poverty measures, and negatively correlated with poverty when using relative poverty measures. In all cases, their estimates are not statistically significant.

Table 7. System GMM estimates for direct financial development effect - Stock market turnover ratio

	(1) Poverty headcount (\$3.10 a day)	(2) Poverty headcount (\$1.90 a day)	(3) Poverty gap (\$3.10 a day)	(4) Poverty gap (\$1.90 a day)	(5) Income share (lowest 20%)
Panel A: estimation results					
<i>y</i> _{t-1}	1.024*** (0.161)	1.006*** (0.136)	0.987*** (0.152)	0.905*** (0.212)	0.217*** (0.054)
Stock market turnover ratio	-2.865 (2.257)	-2.643** (1.253)	-1.890 (1.250)	-1.446 (0.864)	0.086 (0.058)
GDP per capita	0.383 (4.024)	2.053 (2.353)	0.662 (1.967)	0.680 (1.074)	-0.416*** (0.140)
GDP per capita growth	-0.633 (0.838)	-0.173 (0.383)	-0.092 (0.251)	-0.000 (0.198)	-0.015 (0.021)
Inflation	0.003 (0.053)	0.016 (0.050)	0.017 (0.038)	0.003 (0.022)	-0.005*** (0.002)
Gini Index	-14.057 (18.113)	-10.255 (8.263)	-7.789 (7.017)	-3.990 (4.561)	-6.902*** (0.801)
Education	-4.299 (12.935)	-8.070 (7.956)	-4.144 (6.940)	-5.369 (6.667)	0.387 (0.498)
Trade	-3.184 (2.263)	-2.915* (1.487)	-2.368 (1.598)	-2.006* (1.188)	0.069 (0.124)
Government Consumption	3.289 (4.751)	2.046 (4.216)	1.102 (2.988)	0.309 (1.817)	0.138 (0.264)
Constant	80.465** (35.572)	70.949** (27.890)	53.813** (20.757)	45.410** (18.280)	30.918*** (3.797)
Panel B: diagnostic tests					
AR(2) (p-value)	0.854	0.517	0.442	0.283	0.664
Hansen test (p-value)	0.407	0.436	0.468	0.717	0.668
Observations	163	163	163	163	160
Countries	47	47	47	47	45
Instruments	38	38	38	38	50

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.7. Bank z -score as the financial development indicator

Considering the stability dimension for financial institutions, the bank z -score has gained enormous attention as a measure of individual financial institution's soundness (Boyd & Runkle, 1993; Čihák & Hesse, 2010; Asli Demirgüç-Kunt et al., 2008). The popularity of the z -score stems from the fact that it is inversely related to the probability of a financial institution's insolvency, i.e., the probability that the value of its assets becomes lower than the value of its debts.

The estimated coefficients remain negative in regressions with the absolute poverty measures, which suggest that a higher z -score of the financial institutions, i.e., a lower probability of insolvency, is beneficial for poverty alleviation. Then, the coefficient estimate turns positive in the regression with the relative poverty measure (see, *Table 8, column 5*), which indicates that a higher z -score raises the income share held by the poorest. However, these effects are statistically insignificant.

Table 8. System GMM estimates for direct financial development effect - Bank z-score

	(1)	(2)	(3)	(4)	(5)
	Poverty headcount (\$3.10 a day)	Poverty headcount (\$1.90 a day)	Poverty gap (\$3.10 a day)	Poverty gap (\$1.90 a day)	Income share (lowest 20%)
Panel A: estimation results					
y_t-1	0.841*** (0.103)	0.758*** (0.139)	0.773*** (0.134)	0.962*** (0.164)	0.404*** (0.109)
Bank z-score	-1.011 (6.191)	-3.563 (4.731)	-2.793 (3.724)	-0.250 (1.892)	0.088 (0.336)
GDP per capita	-2.901 (3.443)	-3.075 (2.440)	-2.366 (2.159)	-0.101 (1.678)	-0.131 (0.136)
GDP per capita growth	-0.121 (0.700)	-0.030 (0.345)	-0.173 (0.253)	-0.214 (0.355)	0.009 (0.026)
Inflation	0.277 (0.264)	0.237 (0.179)	0.184 (0.141)	-0.079 (0.294)	0.006 (0.026)
Gini Index	-0.445 (13.460)	23.965 (22.465)	17.287 (10.849)	-6.927 (5.097)	-6.023*** (1.390)
Education	-2.250 (9.985)	-7.019 (14.741)	-3.973 (8.670)	5.787 (4.281)	0.123 (0.421)
Trade	-4.133 (2.527)	0.300 (2.690)	0.348 (1.901)	-1.556 (1.397)	-0.116 (0.146)
Government Consumption	3.021 (2.762)	5.046 (3.094)	3.400 (2.368)	-0.360 (1.598)	-0.071 (0.154)
Constant	45.645 (49.283)	-40.658 (49.843)	-31.984 (35.304)	8.414 (30.690)	26.888 (5.432)
Panel B: diagnostic tests					
AR(2) (p-value)	0.702	0.460	0.349	0.740	0.629
Hansen test (p-value)	0.131	0.776	0.756	0.320	0.277
Observations	175	175	175	175	171
Countries	59	59	59	59	56
Instruments	34	35	35	27	39

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.8. Stock price volatility as the financial development indicator

Stock market volatility is the most commonly used proxy variable for financial market stability. This variable is based on the empirical fact that market prices contain expectations of future cash flows and growth rather than solely current fundamentals. Therefore, stock prices may be more volatile in the future. In particular, the estimated coefficient of stock price volatility is negatively and statistically significant in the regression on poverty headcount ratio at \$3.10 a day (see, *Table 9, column 1*). This result indicates that a one per cent increase in the stock price volatility reduces poverty by 4.48 per cent. The rest of the estimated coefficients when using other absolute and relative poverty measures remain insignificant.

Table 9. System GMM estimates for direct financial development effect - Stock price volatility

	(1)	(2)	(3)	(4)	(5)
	Poverty headcount (\$3.10 a day)	Poverty headcount (\$1.90 a day)	Poverty gap (\$3.10 a day)	Poverty gap (\$1.90 a day)	Income share (lowest 20%)
Panel A: estimation results					
y_t-1	0.939*** (0.074)	0.979*** (0.095)	0.955*** (0.080)	0.872*** (0.085)	0.412** (0.160)
Stock price volatility	-4.489* (2.629)	-3.609 (3.674)	-2.521 (2.902)	-2.153 (1.436)	0.090 (0.365)
GDP per capita	0.545 (1.795)	3.205 (1.903)	1.999 (1.661)	0.730 (1.467)	-0.589*** (0.197)
GDP per capita growth	-0.196 (0.525)	-0.671* (0.375)	-0.473* (0.268)	-0.055 (0.249)	0.026 (0.053)
Inflation	0.300* (0.176)	0.001 (0.124)	0.006 (0.081)	0.008 (0.051)	-0.020 (0.042)
Gini Index	-8.858* (5.192)	-3.755 (5.201)	-3.170 (4.143)	0.900 (5.335)	-5.872*** (2.040)
Education	9.985 (9.514)	-1.781 (10.513)	-1.729 (7.861)	-5.750 (8.115)	1.308 (1.276)
Trade	-0.735 (1.991)	-1.377 (1.634)	-1.280 (1.642)	-0.868 (0.658)	-0.036 (0.445)
Government Consumption	2.683 (4.912)	-1.719 (2.185)	-1.076 (1.812)	0.627 (3.157)	0.146 (0.624)
Constant	-15.904 (56.817)	14.500 (56.704)	17.438 (49.365)	25.147 (18.082)	23.706** (11.403)
Panel B: diagnostic tests					
AR(2) (p-value)	0.266	0.951	0.751	0.657	0.574
Hansen test (p-value)	0.893	0.671	0.552	0.648	0.541
Observations	111	111	111	111	108
Countries	33	33	33	33	31
Instruments	38	38	38	38	20

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.9. Bank concentration as the financial development indicator

Bank concentration captures the degree of concentration in the banking industry. Previous empirical evidence on low- and middle- income countries shows that bank concentration is a significant determinant of financial development. In most of the developing countries, an oligopolistic banking sector could reduce the level of competition, hence leading to the extraction of monopolistic rents from savers and investors. Moreover, a high level of bank concentration may be attributed to extensive regulation and dominance of state-owned banks with their lack of competitiveness, lower usage of technology, and inadequate risk management systems, and altogether these may facilitate a situation where overly inefficient banks charge high fees in order to maintain their bureaucratic apparatus. All the above factors, as argued by Dorrucchi et al. (2009), could negatively affect the process of poverty alleviation. In contrast,

several studies show positive effects of concentration in terms of efficiency gains that might have a positive effect in poverty alleviation, as they believe that only the banks that are more efficient and operating at optimal economies of scales are more likely to gain greater concentration (see, for example, Berger, 1995; Lambson, 1987; Peltzman, 1977). By 'efficient', they refer to the banks that have lower costs, higher profits and bigger market shares due to better management and more advanced technologies used. Nevertheless, the estimated coefficients on bank concentration are statistically insignificant in all the considered cases, as demonstrated in *Table 10* below.

Table 10. System GMM estimates for direct financial development effect - Bank concentration

	(1)	(2)	(3)	(4)	(5)
	Poverty headcount (\$3.10 a day)	Poverty headcount (\$1.90 a day)	Poverty gap (\$3.10 a day)	Poverty gap (\$1.90 a day)	Income share (lowest 20%)
Panel A: estimation results					
y_t-1	1.004*** (0.117)	0.685*** (0.087)	0.775*** (0.150)	0.823*** (0.184)	0.355*** (0.119)
Bank concentration (%)	2.521 (5.212)	-2.419 (4.953)	-3.345 (4.191)	-2.847 (4.600)	0.465 (0.635)
GDP per capita	2.149 (3.223)	-0.628 (1.703)	-1.521 (1.668)	-0.672 (1.472)	-0.012 (0.146)
GDP per capita growth	-1.036** (0.513)	-0.367 (0.411)	-0.307 (0.323)	-0.299 (0.375)	-0.006 (0.025)
Inflation	0.406 (0.243)	0.251* (0.131)	0.137 (0.137)	0.021 (0.170)	-0.002 (0.019)
Gini Index	-0.505 (8.652)	14.166 (9.967)	13.796 (8.277)	-1.579 (4.630)	-6.166*** (1.137)
Education	-1.170 (6.306)	-6.697 (8.056)	-3.742 (7.250)	3.589 (5.570)	-0.059 (0.472)
Trade	-1.877 (2.540)	-1.633 (2.956)	0.674 (1.825)	0.089 (1.461)	-0.131 (0.150)
Government Consumption	0.836 (2.840)	0.306 (2.303)	2.413 (1.742)	0.336 (1.345)	-0.231 (0.193)
Constant	-20.652 (46.3274)	0.045 (46.119)	-16.872 (48.026)	5.062 (33.249)	26.214*** (5.231)
Panel B: diagnostic tests					
AR(2) (p-value)	0.279	0.724	0.481	0.654	0.537
Hansen test (p-value)	0.216	0.249	0.725	0.202	0.244
Observations	171	171	171	171	167
Countries	58	58	58	58	55
Instruments	46	58	35	34	34

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

5.3.10. Other Variables.

In terms of the effect of other controlled variables on poverty, for instance, the GDP per capita growth is found to have a poverty alleviation effect that subject to poverty measures used. Specifically, we find that the estimated coefficients of GDP per capita growth are negative and statistically significant for several specifications, mostly when regressing on the poverty headcount ratio at \$3.10 a day and the poverty gap at \$3.10 a day. Such findings imply that economic growth reduces absolute poverty and provide evidence in favour of the pro-poor impact of growth that is supported by many empirical studies, including Dollar and Kraay (2004) and Kraay (2006). Meanwhile, the impact of economic growth on relative poverty is more or less ambiguous. The positive yet insignificant signs in some specifications might suggest that economic growth reduces relative poverty. In contrast, the negative yet insignificant signs might suggest that economic growth increases relative poverty. A possible explanation of the latter is that the output growth improves living standards at an aggregate level, but it may not ensure the equivalent distribution of income. Instead, it may at least, at an early state, shift resources from the poorest to the richest, increasing the relative poverty in the country. This finding appeals for further examinations to understand the effects of growth on relative poverty at different levels of income.

Moreover, it is also crucial to value the impacts of other controlled variables on poverty by observing the estimated results. For instance, the coefficient estimates of the GINI Index are positive and statistically significant in some of the specifications for absolute poverty. Specifically, when we use the liquid liabilities (*Table 2, column 4*) and the deposit money banks' assets (*Table 4, column 4*) as financial development proxy variables, an increase in the GINI Index that represents greater income inequality worsens absolute poverty. Meanwhile, in terms of its impact on relative poverty that is measured by the income share of the lowest 20%, the coefficient estimates are negative and statistically significant for most of the financial development proxies. It further enhances our findings that greater income inequality reduces the income share held by the poorest quintile.

Additionally, the coefficient estimates of inflation are significant with positive signs in regressions on the poverty headcount ratio at \$3.10 a day when using the stock price volatility as the financial development proxy; and in the regression on the poverty headcount ratio at \$1.90 a day when using the bank concentration. This finding indicates that a higher rate

of inflation is damaging to poverty alleviation when using absolute poverty measures. Moreover, the coefficient estimates of trade are statistically significant with negative signs in two of the regressions when using the stock market turnover ratio as the financial development proxy, and also when using the liquid liabilities as the financial development proxy. Similarly, government consumption is significantly and positively related to poverty when we use liquid liabilities, private credit and deposit money banks' assets as proxies for financial development. Nevertheless, education is insignificantly related to poverty whatsoever.

6. Summary and Conclusions

In this chapter, we focus more on the empirical investigations side of the relationship between financial development and poverty alleviation to support the conceptual framework that was constructed in *Chapter 1*. The results of the existing empirical literature are controversial and inconclusive, as, on the one hand, some studies suggest that the degree of financial development has a strong and positive impact on the income of the poor, though on the other hand, other studies find that financial development does not affect the poor, or that its contribution to poverty alleviation is contingent on many factors such as transmission channels, macroeconomic stability and institutional quality. The reason for the controversy and inconclusiveness is likely the fact that different studies use different proxies for financial development and poverty and rely on different methodologies. Therefore, in order to reach more conclusive results, this chapter further conducts an empirical analysis that considers more dimensions of financial systems in developing economies based on the 4x2 matrix of financial system characteristics, and uses different measures of poverty to reflect its multidimensional nature.

Based on the panel dataset of 75 developing countries from 1986 to 2015, the main estimation results using the system GMM dynamic panel data estimator are concluded as follows: the impact of the financial sector development on poverty is dependent on not only the proxy variables used for financial development but also on the nature of the chosen poverty measures. Specifically, we find evidence in favour of a positive role of financial sector development in reducing absolute poverty (poverty headcount ratio at \$3.10 a day) when using financial development indicators that measure the financial depth dimension of financial institutions, such as the liquid liabilities to GDP (M3), private credit to GDP, and deposit money bank's

assets to GDP. Meanwhile, when using the liquid liabilities to GDP (M3) and private credit to GDP as financial development indicators, the positive effect of financial development on relative poverty measured by the income share of the lowest 20% is also a sign of poverty alleviation as income share of the poorest quintile of the population increases. In other words, financial sector development could reduce both absolute and relative poverty in this context. Our results also suggest that the development in the financial stability²⁶ and efficiency²⁷ dimensions of financial markets promotes reductions in absolute poverty when using the poverty headcount ratio at \$3.10 a day and poverty headcount ratio at \$1.90 a day, respectively. The rest of the chosen financial development proxy variables of both financial institutions and financial markets, neither significantly affect absolute nor relative poverty. For a better overview, *Chapter 2 Appendix F* summarises our main findings discussed above.

There are few things worth mentioning before suggesting policy-making implications. Firstly, as discussed above, the effect of financial development on poverty alleviation are captured mainly by measures related to financial institutions other than financial markets in our studied sample. For developing countries, financial institutions development, which may depart way ahead of the development of financial markets, exerts a more substantial impact on poverty. Financial institutions are generally assigned more responsibilities in the early stage of financial sector development, and they are designed to address financial constraints for the low-income population. Secondly, we also find that these indicators that are significantly associated with poverty alleviation primarily reflect the financial system's role in enhancing liquidity provision. In general, as we have discussed in *Chapter 1, section 5.2.1*, the five key functions financial system plays in an economy, there are two primary roles it plays can be clearly theorised via channels that alleviate poverty – liquidity provision and risk transformation/diversification – and it is observed that financial development's augmenting role in liquidity provision has a significant impact on poverty when compared to others. The poor's physical and human capital investments are severely subject to liquidity constraints; improved financial intermediation is beneficial as it offers a higher return on their savings and more readily available credits. Financial systems' ability to provide transaction services and saving opportunities and the role

²⁶ See *Table 9, column 1*, when using the stock price volatility as the financial development indicator.

²⁷ See *Table 7, column 2*, when using the stock market turnover ratio as the financial development indicator.

financial intermediaries play in channelling funds to productive agents and the poor are indeed helpful for the poor in supplying money balances or credits.

The findings of this chapter provide important insights and implications for policymakers. Our findings suggest that in developing economies, the banking sectors' reforms are evidently more effective in tackling absolute and relative levels of poverty. The policymakers should therefore place more emphasis on bank-based policies rather than on capital market-based policies in order to reduce poverty, for instance, liberalising interest rate and loosening reserve and liquidity requirements. Moreover, the findings also suggest that more liquid liabilities would be helpful in reducing absolute and relative poverty. Thus, the government should take more measures to increase liquid assets in the economy. Furthermore, the findings also suggest that more credit to the private sector helps in mitigating poverty in the economy. Therefore, the government should provide an environment that would favour channelling funds to the private sector. In addition, regarding the findings concerning relative poverty that is measured by the income share held by the poorest 20 per cent, our results suggest that the poorest seem to benefit from the financial development as much as other income groups. In other words, the bank-based financial policies perhaps provide the best recipe to concurrently tackle absolute as well as relative poverty.

CHAPTER 3 – DECOMPOSING THE EFFECT OF FINANCIAL DEVELOPMENT ON POVERTY

1. Introduction

Chapter 1, the conceptual chapter of this thesis, provides the theoretical background unveiling both direct and indirect impacts of financial development on poverty through the two main channels: economic growth and financial crisis. In this chapter, we move the discussion further to focus on the empirical evidence that examines both effects while demonstrating that so far, the previous attempts to decompose those effects are rather limited. This chapter proposes to fill this gap in the extant literature by developing a model which allows to decompose the holistic effect of financial development on poverty. Both its impacts through the direct channel and indirect channels (via growth and crises channels) are examined and evaluated, and the result shall unfold the truth of the finance-poverty nexus and answer the question of whether financial development is truly pro-poor.

There are two contrasting views of financial development in terms of its indirect effect on poverty. In one view, financial development is beneficial to the poor because it fosters economic growth, which thereby reduces poverty by the trickle-down effect (Jalilian & Kirkpatrick, 2002, 2005; Jeanneney & Kpodar, 2011). However, in its majority, the finance-growth analysis has one noticeable disadvantage: it relies heavily on the estimation of linear growth effects of financial development and therefore captures only the average growth effect across the booms and busts generated by financial development. According to another view, financial sector development, when not embedded in a sound institutional environment (i.e., without adequate regulation, corporate governance, and many other factors that are crucial for financial development), encourages risk-taking behaviour, generates financial fragility and increases the probability of a financial crisis, which is evidently associated with severe recessionary consequences and detrimental impact on the poor (Abdin, 2016; Akhter & Daly, 2009; Jeanneney & Kpodar, 2011; Ranciere et al., 2006). The latter strand of views is not without its criticisms, as it tends to overstress the severity of the output costs associated with the financial crisis and largely ignores the relevant growth benefits during tranquil times.

In addition to both views mentioned above, some studies argued that there might be a nonlinear relationship between financial development and economic growth/the probability of a crisis.

For the finance-growth relationship, Deidda and Fattouh (2002), Hung (2009), Masten et al. (2008), Rioja and Valev (2004), Samargandi et al. (2015), Shen and Lee (2006), and among others, all find a nonlinear relationship between financial development and economic growth. More specifically, they find that the relationship between banking development and economic growth exhibits an inverse U-shape. In other words, financial development first promotes economic growth until a level of financial development is reached, after which further financial development decreases economic growth. For instance, Cecchetti and Kharroubi (2012), find that finance starts to slow down the economic growth once bank credit to the private sector exceeds 90% of GDP. Arcand et al. (2015) find that once the ratio of private credit to GDP exceeds a threshold of about 110% for high-income countries, the finance-growth relationship turns negative; their finding is consistent when utilising different types of country/industry level datasets.

For the finance-crisis relationship, Dabla-Norris and Srivisal (2013) and Easterly et al. (2000) argue that, although a deeper financial system or greater credit provision is significantly associated with less volatility, such a relationship appears to be nonlinear. In other words, when financial systems become more prominent relative to GDP, the associated increase in risks become more critical that reduce stability. Xun Zhang et al. (2018) also argue that although the increase of finance quantity measured by the quantity of credit (private credit to GDP) is undoubtedly beneficial to economies and may help alleviate the probability of crises. Still, since domestic credit is also considered as leverage, excess leverage leads to a higher probability of currency crisis, asset price collapse, and banking crisis. In the context of the financial sector development, financial liberalisation is also found to have a nonlinear effect on the probability of a crisis (Daniel & Jones, 2007). Lower financial liberalisation levels are associated with a higher probability of a crisis. Yet, this probability declines sharply when higher liberalisation levels are reached (Hartwell, 2017).

Therefore, given the two contrasting views mentioned earlier, it is essential to analyse the effects of financial development in a unified way, though each perspective has undoubtedly produced its own set of policy implications; researchers who emphasise the long-run growth effects of financial development advocate pro-financial development policies, while those who see its negative impact via a financial fragility channel warn against excessive financial development. Such clear disadvantages, as argued by Ranciere et al. (2006), encouraged us to

provide an empirical foundation that brings these two views together by introducing an integrated framework that quantifies and contrasts the dual effects of financial development and its direct impact on poverty altogether.

As this study has already provided a comprehensive and in-depth analysis of the direct effect of financial development on poverty reduction, theoretically and empirically²⁸, this chapter steers the analysis to focus more on its indirect effect on poverty through the economic growth channel and the financial crisis channel.

2. Financial Development and Poverty Alleviation – The Indirect Links

As previously discussed, the debate on the role of financial development on poverty alleviation has been primarily divided into two strands. One relates to its association with economic growth, while the other relates to its association with financial instability. By strengthening the economic growth in a long run, financial development helps to reduce poverty (see, for example, Dewi et al., 2018; Dhrifi, 2013b; Jalilian & Kirkpatrick, 2002, 2005; Jeanneney & Kpodar, 2005, 2011), but it may also induce excessive risk-taking behaviours and therefore macroeconomic volatility, which would lead to more frequent and devastating crises, damaging the poor or even dragging people who are already close to the poverty line into poverty (see, for example, Abdin, 2016; Akhter & Daly, 2009; Jeanneney & Kpodar, 2011; Loayza & Ranciere, 2004).

2.1. The Indirect Growth Channel

2.1.1. The Finance-Growth Nexus

In the field of development economics, the connection between the operation of the financial system and economic growth is one of the most heavily researched and debated topics (Zhuang et al., 2009). Numerous academic papers attempt to conceptualise the mechanism of how the financial sector development affects domestic savings, capital accumulation, technological

²⁸ For a detailed theoretical discussion, please refer to *Chapter 1, Section 5(5.1)*; and for a detailed empirical analysis and discussion, please refer to *Chapter 2*.

innovation and hence long-run growth rate, or vice versa; and empirically test these linkages including identifying directions of the causality and their relative importance using cross-country, country specific, and industry- and firm- level data (see, for example, cross-country studies by Levine et al., 2000; country specific studies by Allen et al., 2005; Guiso et al., 2002; Wright, 2002; and industry-, firm-level studies by Beck et al., 2005; Cetorelli & Gambera, 2001; Love, 2003; Wurgler, 2000).

Earlier literature reveals significant disagreements on the finance-growth nexus. For instance, Robinson (1952) argues that finance responds to demands from the real sector rather than causes growth – 'where enterprise leads, finance follows'; and Lucas (1988) also dismisses finance as an 'overstressed' determinant of economic growth. However, scholars including Goldsmith (1969), Gurley and Shaw (1955), McKinnon (1973), Schumpeter (1934) and many others all emphasise the critical role that finance plays in understanding economic growth. Finance has been proven to play a prominent role in the endogenous growth theory, through its positive impact on the levels of capital accumulation and savings (P. Romer, 1986), or via enhancing technological innovation and consequently productivity growth (Aghion & Howitt, 1992; Bertocco, 2008; G. M. Grossman & Helpman, 1991; P. Romer, 1989). The contribution of financial sector development to economic growth, as argued by M. H. Miller (1998), is 'a proposition too obvious for serious discussions'.

Recent studies tend to agree on the fact that finance sector development plays a vital role in facilitating and sustaining growth. During the last three decades, there has been an explosion of empirical studies investigating the finance-growth nexus using cross-country and other data with new and more advanced econometric tools. Despite the absence of complete unanimity of results, several conclusions can be drawn based on the recent empirical evidence. Levine (2004) summarises them as follows: *i*) countries with better functioning banks and financial markets grow faster; a simultaneity bias (i.e., a reverse causality) does not seem to drive this conclusion; and *ii*) better-functioning financial systems ease the external financing constraints that impede firm and industrial expansion, suggesting that this is one mechanism through which financial development matters for growth.

2.1.2. The Growth-Poverty Nexus

There are different views towards the growth-poverty nexus in the earlier literature, such as the prevalent Kuznets's inverted-U hypothesis. It suggests that economic growth may increase income inequality at the early stage of development but reduce it at the mature state of industrialisation (Kuznets, 1955, 1963). The asset-rich classes who can self-finance or have easy access to finance would reap the early harvest of industrialisation and thus gain a higher share of the economic pie, leaving the poor disadvantaged.

More recently, scholars have reached some consensus on the idea that economic growth reduces absolute poverty through several possible channels: *i*) 'growth effect', which stems from a change in the average income; and *ii*) 'distributional effect' caused by shifts in the Lorenz curve holding average income constant (Datt & Ravallion, 1992; Dollar et al., 2016; Kakwani, 2000). The 'growth effect' is found to explain the largest part of the observed changes in poverty (Abdin, 2016). As suggested by the very prominent trickle-down theory, the growth benefits would either trickle down to the poor through job creation, wage differentials reduction and other economic opportunities or create the necessary condition for the broader distribution of the economic and social benefits of growth (Galor & Tsiddon, 1996; Todaro & Smith, 2020). Aghion and Bolton (1997) also state that the benefits of developed financial sectors trickle down via the redistribution of wealth from the rich to the poor. This trickle-down theory is extensively supported by various empirical investigations (such as Datt & Ravallion, 1992; Dollar et al., 2016; Dollar & Kraay, 2004). Financial development can thus impact poverty as well as incomes of the poor indirectly through promoting economic growth, which then reduces poverty (Caprio & Honohan, 2001).

Economists also agree that the imperative of growth for combatting poverty should not be interpreted to mean that 'growth is all that matters'. Fields (2001) emphasises that in the last 20 years the research based on a cross-section of countries has shown that, countries with a higher per capita income or consumption exhibit less poverty, though the extent that the growth impacts poverty reduction depends not only on growth rate but also on the level of inequality. Growth is necessary but is, by itself, not sufficient for poverty reduction; more societal elements are required to help the growth benefits to be translated to the poor, such as public assistance and targeted distribution (Dollar & Kraay, 2002; Lipton & Ravallion, 1993; Lustig et al., 2002; Somavia, 2003). Regardless of variations in an overall one-to-one relationship

between inclusive economic growth and an average increase in income of the poorest households (UNDP, 2013), it is clear that economic growth acts as a major but not the only tool for combating poverty.

2.2. The Indirect Financial Crisis Channel

2.2.1. The Vulnerable Financial System and the Poor

Beyond the financial sector's influence on growth through facilitating capital accumulation and technological change, it has also featured prominently in influencing susceptibility to business cycles (Cline, 2015). Sustained economic growth requires a stable macroeconomic environment, and the financial sector's remarkable ability to reduce risks through risk-sharing and diversification may enable an economy to better support growth. Nonetheless, a well-developed financial sector may also unintentionally and simultaneously offer an excellent opportunity for speculation and bubbles that can increase volatility and the risk of financial crises (Akhter & Daly, 2009; Easterly et al., 2001; Jeanneney & Kpodar, 2005). In the aftermath of financial development, the propensity to banking and currency crises increases (see, Demirgüç-Kunt & Detragiache, 1998; Glick & Hutchison, 1999; Loayza et al., 2018; Kaminsky & Reinhart, 1999).

Over the last few decades, emerging economies that were hit by waves of financial crises highlighted the danger that was embedded in their newly liberalised and developed financial sectors, namely the inadequate domestic restructurings within an increasingly globalised financial system (Arner, 2007). Moreover, another key factor in play – institutions, which should have overwatched and provided firm support to financial sectors, also carried its own hazards. These hazards have already been proved to be detrimental to financial sector development, and they include but are not limited to poor regulation and supervision, weak corporate governance and excessive deposit insurance. The recent global financial crisis indicates that even the most sophisticated financial system cannot prevent a financial crisis when the regulatory and supervisory framework fail to keep up with the pace of financial innovation (Zhuang et al., 2009). Systemic banking crises are highly disruptive events which lead to sustained declines in economic activity, financial intermediation, and ultimately in welfare (Laeven & Valencia, 2018). Additionally, it is usually the poor that are more vulnerable to disruptions in the financial systems compared to the rich (Rewilak, 2018). It is then the

reason that academics and policymakers devote significant efforts to develop models to attempt to predict crises and to design policies to resolve them and mitigate their economic and social impacts.

Financial crises are associated with periodic macroeconomic instabilities that are highly disruptive for economies to perform everyday functions. Those distortions caused the emerging economies to suffer from sufficient frequency, and recently, more and more advanced economies have had to deal with those distortions with no exception. The costs associated with crises that are laid on the poor (e.g., increase in the level and depth of poverty) are mainly depending on the size of the macroeconomic impact experienced by the country (Alexander, 2010; Ravallion & Chen, 2009). The East Asian crisis of the late 1990s, for instance, was mainly driven by weak financial sectors and caused the public sectors to endure the costs of restructuring financial sectors²⁹ (e.g., the most crucial component being fiscal costs associated with bank recapitalisation) to as high as 56.8 per cent of GDP in Indonesia; 31.2 per cent in the Republic of Korea; 43.8 per cent in Thailand; and 16.4 per cent in Malaysia³⁰ (Laeven & Valencia, 2012). During severe economic downturns, a sharp fall in output along with a rapid increase in unemployment make the low skilled workers usually the first to lose their jobs. The global financial crisis of 2007 began with problems in the banking sector, where at a later stage, public debt increased to bail out financial institutions, debt crises emerged with further negative repercussions for the poor. During 2007-2009, the United States had an output loss of 31 per cent and an increase in public debt of 23.6 per cent of GDP; Ireland had an output loss of 40.7 per cent and an increase in public debt of 72.8 per cent; and Greece had an output loss of 43 per cent and an increase in public debt of 44.5 per cent (Laeven & Valencia, 2012). In Greece, a prolonged period of austerity reduced the state's ability to create adequate safety nets for those in need, further depressing their welfare.

²⁹ Bank restructuring costs are defined as gross fiscal outlays directed to the restructuring of the financial sector, such as recapitalisation costs. Yet, asset purchase and direct liquidity assistance from the Treasury are excluded (Laeven & Valencia, 2012).

³⁰ Laeven and Valencia (2012) defines a sufficient condition for a country's crisis episode to be regarded as systemic when either of the following criteria has been met: *i*) its fiscal restructuring costs (gross) of the banking sector is sufficiently higher than 5 per cent of GDP; or *ii*) its banking system exhibits significant losses resulting in a share of nonperforming loans above 20 per cent or bank closures of at least 20 per cent of banking system assets.

2.2.2. Types of Financial Crises

Although various types of crises exist and have their own tremendous adverse impacts on the poor in those affected economies, they are often directly or indirectly inter-related and could occur simultaneously, or sequentially. The following section discusses three major and arguably the most influential types of crises when considering the magnitude of crises impact³¹ that are summarised by Laeven and Valencia (2012, 2013, 2018): system banking crisis, currency crisis and sovereign debt crisis.

i. System Banking Crisis

This term commonly refers to a credit crunch that happens when a negative shock hits the financial system, and as a result of the liquidity-hoarding by banks. It is usually the case for capitalised banks, under the circumstances of low profitability and uncertainty about credit quality. Banks in response may raise the cost of credit to compensate for their losses of the interest income (short-term borrowing costs, in particular) and may cut supply in credit to minimise their exposure to uncertainty. Consequently, such liquidity hoarding measures will worsen the situations of households and businesses with bank credit in the short run, and damp investment – hence economic growth – in the long run. In the worst-case scenario, when confidence in the banking sector completely evaporates, bank-runs and capital outflow may occur that require immediate resolutions. For instance, short-term bank closures and strict capital controls may be implemented to protect the banking sector until it fully restores its public confidence. The Greek crisis in 2015 closed the banks for 21 days, and the Cypriot crisis in 2013 closed the banks for eight days with a deposit freeze measure that was put in place for 14 months (Laeven & Valencia, 2018, Appendix Table 3). These extreme measures are not only disruptive to the overall functioning of the economy but could also severely harm the poor who may not have access to other assets that the rich do to help them during such times (Fallon & Lucas, 2002; ODI, 2009). Based on estimates provided by Rewilak (2017) that uses a comprehensive database on systemic banking crises during 1970-2011 developed by Laeven and Valencia (2013), it is found that a banking crisis may reduce the income of the poor by 10.6 per cent.

ii. Currency Crisis

³¹ Other types of crises: asset bubbles, inflation crisis, etc.

Currency crises happen when there is a substantial devaluation³² in the nominal value of the currency. If the country is actively involved in international trade, the devaluated currency causes imported goods to become more expensive. If a large proportion of the imports have inelastic demand, such as food, energy and other necessities, the massive surge in inflation may be harmful to the economy. Not to mention the severe damage it may do to the poor, who spend a far more significant proportion of their overall income on such necessities than the more affluent (Baldacci et al., 2002). Besides, inflation will further reduce the purchasing power of the poor, since the poorest in society are often associated with low paid jobs with little to no bargaining power, or are on a fixed income such as pensions.

Moreover, when considering low-income countries other than households, the adverse impact of a currency crisis may be significantly amplified if they are serving foreign-denominated debt, as the government will pose rigorous cost-saving measures to repay those revaluated debts. The situation deteriorates if the government attempts to defend its currency by raising domestic interest rate – a typical step for policymakers to prevent capital outflows. In turn, this increases repayment on personal debts from domestic borrowers, which was widespread during the East Asian crisis in 1997. Currency crises, as argued by Rewilak (2017), have the most devastating effect on the poor that are estimated to reduce the income of households sit in the lowest quintile by 14.9 per cent.

iii. Sovereign Debt Crisis

Sovereign debt crises arise when a government cannot pay back its governmental debt, which could be both internal and external. The adverse impacts of the crisis to the domestic citizens and the poor are quite similar to those sprung from the first two types of crises. A government's specific measures to regain ability for repayment to public debts includes either a reduction in government spending or an increase in tax or a combination of both. If the government decides to tighten fiscal policy by cutting public spending, there may then be a freeze in public sector wages and a reduction in pro-poor public services³³. Cutbacks in government spending on education, healthcare, and social security programmes are associated with falling incomes for the poorest group, and poverty, as argued by Baldacci et al. (2002), is particularly sensitive to

³² Laeven and Valencia (2012) define a currency crisis as a nominal depreciation of the currency with regard to the U.S. dollar of at least 30 per cent that is also at least ten percentage points higher than the rate of depreciation in the year before.

³³ Affluent members of the society might not use such public services as they could afford private health insurance, send their children to fee-paying schools, etc.

a decrease in government spending on healthcare after a financial crisis. If the government decides to impose higher taxes, such as income tax, their impacts may not be fully transmitted to the poor if the increases are progressive. For instance, in 2010 the UK introduced a new 50 per cent top rate of income tax on incomes over £150,000 (later reduced to 45 per cent in 2013) that aimed to raise tax revenues more heavily on higher income individuals (Bozio et al., 2015). However, if a higher consumption tax is implemented, citizens across all income groups will be affected. For instance, the UK increased its main rate of VAT from 17.5 per cent to 20 per cent from 2011, as well as many other high-income countries like France, Ireland, Italy and Spain. Given its relatively narrow VAT base, the UK's increase in the main rate of VAT was extremely distortionary for consumers in all income groups (Bozio et al., 2015). Rewilak (2017) finds that sovereign debt crises have a significant adverse impact on the poor in high-income countries, and his estimate suggests that a debt crisis may reduce the income of the lowest quintile by 17.1 per cent.

2.2.3. The Relationship Between Crisis and Poverty

In the previous section, we have discussed how crises may place severe strains on the poor in the context of different types of financial crises. The following section discusses these channels in detail, supporting the discussion with more empirical evidence from earlier literature.

A slowdown or collapse in economic activity – from investment to trade and remittances – has turned the financial crisis into a social crisis (Alexander, 2010). A pearl of conventional wisdom is that the poor suffer disproportionately to the non-poor in periods of crisis (Demetriades et al., 2017; Dollar & Kraay, 2002). During the 1994-96 Mexican crisis, the average household income in a constant 1994 prices as recorded by the Mexican National Income and Expenditure Surveys, dropped by 31 per cent, while the average household consumption dropped by 25 per cent. The survey during the crisis period further witnessed a surge in the incidence of poverty between the level in 1994 and 1996 – the poverty headcount ratio for extreme poverty rose from 10.6 per cent to nearly 17 per cent, reversing the gains made between 1992-1994. The poverty gap had a similar experience in the pre- and the post-crisis periods (Baldacci et al., 2002).

As previously discussed, Rewilak (2017) investigates episodes of banking, currency and debt crisis across 61 countries from 1973-2011, using the database produced by Laeven and Valencia (2013), to measure the crisis impact to the well-being of the poorest³⁴. His study uses various approaches for estimation, and the one with the most emphasis is a dynamic panel data estimator, i.e., system Generalised Method of Moments (GMM). The results of the study suggest that currency crises reduce the income of the poorest by 14.9%, followed by 10.6% for banking crises. In terms of the debt crises, only the income of the poorest living in wealthier countries is found to be affected. Moreover, Gerry et al. (2014) demonstrate that currency crises may increase mortality rates; when the poor suffer adverse income shocks associated with crises, combined with increases in food prices, their nutritional levels fall, and their health levels deteriorate. Additionally, Habib et al. (2010) find that the 2007 global financial crisis curbed the poverty reduction process in the Philippines and reversed the poverty reduction process in Mexico. These results complement the study by Ravallion and Chen (2009), which demonstrate that the 2007 crisis will add a further 53 million people to the number living below \$1.25 a day globally, and that whilst aggregate poverty rates are still expected to fall over time, they will do so at a slower rate.

Contrary to arguments related to adverse impacts of the financial crisis on the poor, Baldacci et al. (2002) argue that the poorest in society may not ultimately feel the burden of financial crises, as they usually possess no property or other tangible assets that may lose a significant amount of nominal value during such economic downturns. Nevertheless, the study also suggests that the poorest in society are still more vulnerable to end up worse off due to a crisis since the negative impact of a crisis may dismiss workers in formal sectors and forced them to enter informal sectors. Then the poor may confront the non-poor competitors who are generally better educated and more productive; thus, the poor eventually may be crowded out of the labour market.

The lack of real-time household survey data has placed quite a constraint for researchers to accurately track and measure the crises' impacts on poverty, in terms of those developing and emerging economies from a microeconomic perspective. Therefore, to bypass this constraint, Habib et al. (2010) propose a practical approach to measure the impact of the 2007 global financial crisis on several developing and emerging economies – the microsimulation approach.

³⁴ It is measured by the income of the lowest quintile of the population.

In this study, Habib et al. (2010) assess and compare the poverty and distributional effects for Bangladesh, Mexico and the Philippines with and without crisis for the same year, or pre- and post-crisis years and conclude that the aggregate poverty for all three economies increased both in level and depth. For instance, when compared with what would have occurred without the crisis, Bangladesh and the Philippines were expected to have an increase in the poverty rate in 2010 of 1.2 and 1.5 percentage points respectively. Moreover, Mexico's 7 per cent contraction in GDP in 2009 was projected to grow by 3 per cent in 2010, and the cumulative impact was projected to raise the poverty rate by as high as four percentage points between 2008 and 2010 (pre- and post-crisis years). Furthermore, Habib et al. (2010) also conclude that income shocks were not only relatively large in the fourth to seventh deciles of the income distribution in all three countries³⁵, but also in the first to second deciles (the poorest 20 per cent) for Mexico. On average, the poorest 20 per cent of Mexican households suffered a per capita income loss of about 8 per cent (5 per cent for the entire population).

3. Financial Development and Poverty – An Empirical Decomposition

In terms of the indirect impacts of financial development on poverty, two possible channels – economic growth and financial crisis, have been discussed with the theoretical background and empirical evidence in the previous sections. The two channels have rather divergent natures, which also give rise to the two separate strands – the growth view and the crisis view – that existing literature on this topic have generally bifurcated into. Undoubtedly each view generates its own set of policy implications that provides only a fraction of the effect of financial development, and this partial view may also bias the attitudes of certain policymakers towards financial sector development. For instance, the growth view that mainly focuses on the growth channel relies heavily on the estimation of the linear growth effects of financial development, but the linear approach captures only the average growth effects across the booms and busts generated by financial development. Similarly, the crisis view focuses mainly on the crisis channel, which stresses the severity of the crisis-associated output costs to the poor, but it largely ignores the growth benefits of financial development during tranquil times. Therefore, researchers who emphasise the long-run growth effect advocate pro-financial

³⁵ This is consistent with the finding suggested by Ravallion (2010), where the middle-income groups in developing countries are more exposed to crisis shocks than the rest of the population.

development policies, while researchers who concentrate on crisis-associated costs caution against excessive financial development (Ranciere et al., 2006).

In this section, we propose a methodology to decompose the total effect of financial development on poverty alleviation into three channels: a direct channel between financial development and poverty alleviation, an indirect growth channel, and an indirect crisis channel. The growth channel captures the impact of financial development on poverty through its growth-enhancing effect. In contrast, the crisis channel captures its impact on changing the frequency of crises and the associated crises costs. The main advantage of using this approach is that it provides a comprehensive and coherent framework that allows us to examine whether financial development benefits or worsens the poor when considering all channels simultaneously. In other words, it enables us to compare financial development induced direct impacts to the poor with the expected growth benefits to the poor in tranquil times, and with the crisis costs stemming from a greater vulnerability to crises.

3.1. Model Specification and Empirical Strategy

The main aim of this study is to assess both the direct link and indirect links between financial development and poverty. However, though the former could be explicitly evaluated by estimating the coefficient of financial development in an equation where poverty serves as a dependent variable (i.e., in a construct of a single equation), the latter cannot be assessed in such a straightforward setup. Therefore, one solution, and this is the primary identification assumption of this paper, consists in thinking the problem not in a single-equation space, but as a system of simultaneous equations that jointly determine all dependent variables. The equations in that system are therefore mechanically related, as the contemporaneous errors associated with each dependent variable are correlated, which is a reasonable assumption for the data process. Estimating the system provides more efficient estimates, as it takes into account the correlations between the error terms and therefore adds information onto the error structures. The most basic form of a joint-system estimation is the Seemingly Unrelated Regression Equations (SURE) model, proposed by Zellner (1962). It is a system containing several individual relationships that are linked because of their disturbances being correlated. Meanwhile, it leads to more efficient estimations when equations in the system do not have the

same set of explanatory variables and are not nested, compared to estimating each equation separately with OLS.

Considering that the primary purpose of this study is to decompose the total effects of financial development on poverty into direct and indirect effects with the latter transmitted through facilitating economic growth and increasing the probability of financial crises, we assume that financial development is the only explanatory variable that is common to all equations in the system, and equations that are included in the system should contain:

1. a poverty equation – measures the direct impact of financial development on poverty, the direct impact of economic growth on poverty, and the direct impact of financial crises on poverty;
2. a growth equation – measures the direct impact of financial development on growth; and
3. a crisis equation – measures the direct impact of financial development on the probability of causing financial crises.

Given the above background, we estimate simultaneously the cross-effects of financial development, economic growth, financial crisis and poverty using the model with structural equations as set below:

$$Poverty_{i,t} = \alpha_p + \beta_{pf}FD_{i,t} + \beta_{pg}Growth_{i,t} + \beta_{pc}Crisis_{i,t} + \beta_{px}\mathbf{X}_{i,t} + \beta_{pz}\mathbf{ZP}_{it} + \varepsilon_{i,t} \quad (1)$$

$$Growth_{i,t} = \alpha_g + \beta_{gf}FD_{i,t} + \beta_{gx}\mathbf{X}_{i,t} + \beta_{gz}\mathbf{ZG}_{it} + \eta_{i,t} \quad (2)$$

$$Crisis_{i,t} = \alpha_c + \beta_{cf}FD_{i,t} + \beta_{cx}\mathbf{X}_{i,t} + \beta_{cz}\mathbf{ZC}_{it} + \vartheta_{i,t} \quad (3)$$

where $Poverty_{i,t}$ is the poverty proxy for country i in year t , $Growth_{i,t}$ is the proxy for economic growth for country i in year t , and $FD_{i,t}$ is the proxy for financial development for country i in year t . Meanwhile, $\mathbf{X}_{i,t}$, $\mathbf{ZP}_{i,t}$, $\mathbf{ZG}_{i,t}$, and $\mathbf{ZC}_{i,t}$ are vector variables where $\mathbf{X}_{i,t}$ represents a standard set of macroeconomic variables in the literature and are identical for all three equations; $\mathbf{ZP}_{i,t}$, $\mathbf{ZG}_{i,t}$, and $\mathbf{ZC}_{i,t}$ each represents a set of equation specific variables acting as exogenous/instrumental variables to their corresponding dependent variables that are determined outside the system to mitigate identification and endogeneity problems.

The crisis model treats the crisis dummy $Crisis_{i,t}$ as an endogenous variable which depends on the realisation of an unobserved latent variable $W_{j,t}^*$ in the following way:

$$Crisis_{i,t} = \begin{cases} 1 & \text{if } W_{it}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

$$W_{j,t}^* = \alpha \mathbf{X}_{i,t} + b \mathbf{ZC}_{i,t} + cFD_{i,t} + \mu_{i,t}$$

The latent variable W_{jt}^* is assumed to depend linearly on a set of controlled macroeconomic variables $\mathbf{X}_{i,t}$, a set of instrumental variables for the crisis, $\mathbf{ZC}_{i,t}$, the financial development variable $FD_{i,t}$, and on a random component $\mu_{i,t}$. Under the assumption that $\mu_{it} \sim N(0,1)$, the crisis model can be rewritten as:

$$Crisis_{i,t} = \begin{cases} 1 & \text{with probability: } \Pr(W_{i,t}^* > 0) = \Phi(\alpha \mathbf{X}_{i,t} + b \mathbf{Z}_{i,t} + cFD_{i,t}) \\ 0 & \text{with probability: } \Pr(W_{i,t}^* \leq 0) = 1 - \Phi(\alpha \mathbf{X}_{i,t} + b \mathbf{Z}_{i,t} + cFD_{i,t}) \end{cases} \quad (4)$$

where Φ is the cumulative distribution function of a standard normal. Thus, the parameter of the crisis model can be estimated using a probit model.

For the poverty model (1), coefficient β_{pf} measures the direct impact of financial development on poverty, while β_{pg} measures the direct impact of economic growth on poverty, and β_{pc} measures the direct impact of financial crisis on poverty. For the growth model (2), coefficient β_{gf} measures the direct impact of financial development on economic growth, and for the crisis model (3), coefficient β_{cf} measures the probability of experiencing financial crises as the financial sector develops.

Therefore, those indirect impacts of financial development on poverty could be obtained by the product of $\beta_{pf} * \beta_{gf}$ for the channel of economic growth, and the product of $\beta_{pf} * \beta_{cf}$ ³⁶ for the channel of financial crisis. In this set-up, the impact of financial development on poverty is composed of three effects: *i*) a direct effect on poverty conditional on a standard set of control variables and some specific poverty-related variables; *ii*) an indirect effect reflecting the growth

³⁶ As it is a probit crisis model, we use the estimate of average marginal effect of financial development on the crisis probability.

benefit on the absence of financial crisis; and *iii*) an indirect effect reflecting the crisis cost associated with a higher propensity to financial crises.

Ultimately, we would be able to produce an overall assessment on whether the financial development induced growth benefit outweighs the crisis cost to the poor. More importantly, we could further obtain the total effect (direct + indirect) of financial development on poverty alleviation to determine whether development in financial systems is beneficial to the poor, in a more comprehensive framework that this study provides.

3.2. Estimation Procedure

Given the potential endogeneity of financial development to poverty, growth and crisis, to address this issue before proceeding with the estimation of the simultaneous equations is a priority. The instrumental variable and the control function approach are most commonly adopted methods (Blundell et al., 2013). In simple specifications of the linear simultaneous model, all two approaches generate consistent, often analytically identical estimators (J. A. Hausman, 1983).

Considering the quadrilateral relationship between the four variables of interest, the task of finding valid instrumental variables that highly correlate with financial development, yet are uncorrelated with poverty, growth and crises is extremely challenging. Therefore, following the control function approach, we adopt a similar strategy that breaks the whole estimation procedure into two stages. The first stage is to regress the financial development proxy on a set of standard macroeconomic variables in order to obtain the predicted value of the financial development proxy, which could act as its own instrument in the proposed simultaneous equations system. The second stage is to substitute the financial development proxy in all equations with its predicted value and use the Conditional Mixed Process (CMP) procedure developed by Roodman (2011) which is explicitly designed to deal with the model we proposed. Details for each stage is discussed in the following sections.

Stage one: to address the endogeneity concern as mentioned above, and to obtain the predicted value of financial development proxy that can be used as a valid instrument of the proxy itself in the second stage, we adopt the system Generalised Method of Moments (GMM) approach. The benefit of using GMM rather than Fixed/Random effects under the concern for

endogeneity is evident, and the study has already summarised this in *Chapter 2, Section 3: Econometric Model*. The GMM panel estimator, developed by Arellano and Bond (1991) and Arellano and Bover (1995), outweighs the OLS regression estimates with embedded advantages in dealing with country-specific effects and in controlling for endogeneity, measurement error, and omitted variable bias. The System GMM estimator that builds on the first-differenced GMM features the idea that ‘to take first differences to remove unobserved time-invariant country-specific effects, and then instrument the right-hand-side variables in the first-differenced equations using levels of the series lagged one period or more, under the assumption that the time-varying disturbances in the original level equations are not serially correlated’ (Bond et al., 2001). In other words, the System GMM estimator provides a combination of the previously first-differenced equations with suitable lagged levels as instruments, and an additional set of equations in levels with suitable lagged first-differenced as instruments. As argued by Blundell and Bond (1998), the System GMM as initially proposed by Arellano and Bover (1995) outperforms the first differenced GMM in the case of persistence in the lagged dependent variable. Moreover, the first-differenced GMM is always biased when the sample size is small and when the instruments are weak (Blundell et al., 2000).

Such a system gives consistent results under the assumptions that the error term exhibits no serial correlation higher than order one and are uncorrelated with the instruments. The first assumption could be tested with the Arellano and Bond test. Failure to reject the null hypothesis implies that the second-order serial correlation can be discarded. Moreover, the credibility of estimates crucially depends on the appropriateness of the instruments, and we have to be certain that the lagged values of the explanatory variables are valid instruments in the equation. Therefore, for the second assumption, we test the validity of the instruments by applying the Hansen test of over-identifying restrictions (OIR), where the null hypothesis is that the instrumental variables are not correlated with the residual. Failure to reject the null hypothesis implies that instrumental variables are not correlated with the residual and are satisfying the orthogonality condition required, which supports the overall validity of the instruments. The results for both tests concerning the validity of the corresponding System GMM estimates in the specification indicate that the estimates are valid. The p -value of the Arellano and Bond $AR(2)$ test, 0.944, confirms that the residuals are free from the problem of second-order serial correlation. Meanwhile, the p -value of the Hansen J statistic, 0.160, suggests that the instruments are valid. The first stage estimated results for the System GMM, and corresponding diagnostic tests’ results are reported in *Chapter 3 Appendix A*.

Hence, we are confident to proceed further to obtain the predicted value of financial development proxy, which could be used as an instrumental variable for financial development and can be treated as exogenous to all corresponding dependent variables in our system.

Stage two: we substitute the financial development proxy in the simultaneous equations model with its predicted value that was instrumented in the first stage in order to contain endogeneity. Therefore, the model for estimation is updated as follows:

$$Poverty_{i,t} = \alpha_p + \beta_{pf}\widehat{FD}_{i,t} + \beta_{pg}Growth_{i,t} + \beta_{pc}Crisis_{i,t} + \beta_{px}\mathbf{X}_{i,t} + \beta_{pz}\mathbf{ZP}_{it} + \varepsilon_{i,t} \quad (5)$$

$$Growth_{i,t} = \alpha_g + \beta_{gf}\widehat{FD}_{i,t} + \beta_{gx}\mathbf{X}_{i,t} + \beta_{gz}\mathbf{ZG}_{it} + \eta_{i,t} \quad (6)$$

$$Crisis_{i,t} = \alpha_c + \beta_{cf}\widehat{FD}_{i,t} + \beta_{cx}\mathbf{X}_{i,t} + \beta_{cz}\mathbf{ZC}_{it} + \vartheta_{i,t} \quad (7)$$

The above model has equations with continuous (eq. 5 and 6) and binary (eq. 7) dependent variables. The poverty equation (5) can be regarded as a structural equation that contains two endogenous variables which also act as dependent variables in the growth and crises equations. In contrast, the growth equation (6) and crises equation (7) are reduced form equations, with instrumental variables introduced to identify the structural equation model. In this case, the model above is a limited information maximum likelihood model that could be adequately estimated by the Conditional Mixed Process (CMP) developed by Roodman (2011). CMP is suitable for estimating equations with different types of dependent variables. At its core, CMP is a SURE (Seemingly Unrelated Regression Equations) estimator that treats the equations as related to each other only in having errors that jointly normally distributed.

Also, we follow a similar approach used by Ranciere et al. (2006) in terms of avoiding weak identification in the model. As discussed earlier, each equation in the system is accompanied by its own set of exogenous/instrumental variables and the selection for the model specification is done using Akaike information criterion. In the CMP estimation, we introduce all those sets of equation specific exogenous/instrumental variables in their first, second and third lags. Then, we select the specification that minimises the Akaike criterion.

3.3. Data and Definitions of Key Variables

The sample consists of 155 countries in total, containing 34 advanced countries, 67 emerging and developing countries, and 54 low-income countries that are grouped based on the classification criteria used by the International Monetary Fund³⁷. Since the model of this study has to incorporate a wide range of data covering different aspects, the primary dataset was drawn from various data sources that have time and country coverage discrepancies. By merging different datasets that cover information on financial crises, measures of financial development, macroeconomic development, institutional quality and many other controls, we have managed to construct the dataset that covers the period of 1986 - 2016. For a complete description of the dataset (e.g., data sources, and definitions and constructions of variables in use), please refer to *Chapter 3 Appendix B*. In the following section, we discuss in detail of all the variables included in the model by starting with the financial development proxy that presents in all equations.

Financial development is a multidimensional concept and focusing on one dimension would neglect the complexity of its nature and simplify its impact on poverty. However, due to data limitation and with a primary interest in decomposing the total effect of financial development on poverty by different channels, this chapter will not follow the approach taken in *Chapter 2* that uses multiple proxies represent different dimensions. Instead, with a clear focus on the financial depth dimension, we use here one of the most prevalent proxies in the literature - private credit by deposit money banks to GDP (%). There has been a near consensus on the selection of the financial development indicator (Bayar, 2017). The use of private credit is consistent with most studies (see, for instance, Azra et al., 2012; Beck et al., 2004; Beck, Demirgüç-Kunt, et al., 2007; Chemli, 2014; Fowowe & Abidoye, 2013; Honohan, 2004; Jalilian & Kirkpatrick, 2005; Jeanneney & Kpodar, 2005, 2011; Kheir, 2018).

Poverty equation. The dependent variable is the household final consumption expenditure per capita (constant 2010 US\$). In contrast to those of advanced countries, time-series data on poverty in many emerging and developing and low-income countries are incredibly scarce, as most of the countries in these categories only started to record data on poverty in the late 90s. Several proxies for measuring poverty in monetary terms have been used in previous literature;

³⁷ For a full list of countries, please refer to *Chapter 3 Appendix E, Sampled Countries*.

for instance, some used the database of Deininger and Squire (1996) and Lundberg and Squire (2003) that provide income and headcount data for the poor, as well as the GINI coefficient. Others used the annual per capita income, and a majority of studies used the poverty headcount ratio living under certain threshold levels or poverty gap at certain threshold levels. Unfortunately, these series do not extend over the entire period from 1986-2016, the decades that the study is interested in, and these proxies are not without criticism too. For instance, the monetary poverty measures in these previous pieces of research pay no attention to other dimensions of poverty, as we have discussed in *Chapter 1*. In addition, the constraint placed by data availability for the estimation of the study conducted in *Chapter 2* encourages us to find a better alternative.

Studies have shown that consumption expenditure by the poor is usually more stable than income (see, Ravallion, 1992, 1998, 2003). More importantly, the data of household final consumption expenditure is available over the entire period of our study. It is consistent with the definition proposed by the World Bank, which defines poverty as ‘the inability to reach the subsistence level of life’ measured in terms of basic consumption needs (World Bank, 1990). The most used poverty headcount ratio is also calculated based on consumption and income (UNECE, 2017). Moreover, this variable was used by several authors including Bayar (2017), Chemli (2014), Dhrifi (2013a), Kaidi and Mensi (2017), Odhiambo (2009), Quartey (2008), Ravallion and Datt (2002), Rehman and Shahbaz (2014), Sehrawat and Giri (2016), and Uddin et al. (2014).

The set of macroeconomic controls, $\mathbf{X}_{i,t}$ for the poverty equation, is standard among studies on poverty. It includes GDP per capita income that reflects a country’s income level in a given year; trade openness that could effectively capture the degree of a country’s international openness, given the fact that many emerging and developing countries rely heavily on international trade; inflation, which represents macroeconomic policy and the choice of this variable is legitimised by the importance of adopting appropriate macroeconomic policy in the context of financial development, and more importantly, it is a factor worsening poverty as it has a negative impact on the real value of assets and the purchasing power of household incomes (Jeanneney & Kpodar, 2011); and other general determinants of poverty, such as government consumption, that not only measures the size of the real sector and the weight of fiscal policy, but is also used to control for public policies that transfer income from the wealthy

to the poor, such as state subsidies or public expenditure on education (Paternostro et al., 2012); and human capital (Zamurrad Janjua & Ahmed Kamal, 2011).

The poverty equation further contains three control variables that are absent from the rest of the equations in the system, ZP_{it} : GINI Index (lagged), mobile subscriptions (lagged) and latitude of a capital city. They are included to provide additional controls to address the issue of endogeneity and model identification. The reason for the inclusion of the GINI Index is because it typically acts as an indicator measuring income inequality. Based on the Lorenz curve, it measures deviations from perfect income equality, and it is expressed as a percentage and ranges from 0 to 1 – perfect equality to perfect inequality. Whether the poor could enjoy the full benefit that financial development provides depends greatly on the level of inequality – a higher share of benefits are expected to accrue to the poorest if inequality is low (Cepparulo et al., 2017). In terms of mobile subscriptions, according to Demirguc-Kunt et al. (2015), approximately two billion adults globally have no access to financial services delivered by formal financial institutions. With the recent rise of accessibility to mobile phones in developing countries, these mobile devices see increasing importance in their roles of facilitating bidirectional communication and as tools for promoting financial inclusion for the previously unbanked population (Kanobe et al., 2017). The social benefits of the poor who use mobile phones, as argued by Bhavnani et al. (2008), have a multi-dimensional positive impact on sustainable poverty reduction. Those benefits include but are not limited to facilitating entrepreneurship and job search that may help to lift the poor out of poverty, and reducing information asymmetries by enabling users to access arbitrage, market or trade opportunity that they otherwise would have missed out on (Jensen, 2007). For the latitude of a capital city, using natural or geographic variables are a common approach among development literature when facing difficulties in finding valid instruments. For instance, studies have used variables such as the distance from the equator (McCleary & Barro, 2006), the number of rivers (Hoxby, 2000), and rainfall (Miguel et al., 2004). All of these instrumental variables are not affected by the variables being explained and are clearly external (Deaton, 2010). The same reasoning applies for the latitude of a capital city, given that the temperate zones have more productive agriculture and healthier climates, which has enabled population in such countries to become wealthier (Landes, 1998); and this variable has no direct associations with neither economic growth nor financial crises. According to Beck et al. (2004), the absolute value of the latitude of a capital city, as well as the legal origins of countries and the religious composition of the population are all validated as appropriate instruments in the finance-poverty nexus.

Growth equation. The dependent variable is the GDP per capita growth (annual %). It is a standard measure to use GDP per capita growth as the proxy to capture economic growth. Given its extensive coverage in terms of countries and periods provided by the World Bank, this variable is suitable for the purpose of this study. Moreover, aside from the same set of macroeconomic controls in $X_{i,t}$ across all equations in the system, the growth model further contains two instrumental variables that distinguish itself from the rest of the equations in the system. They are proxies for bureaucracy quality and law and order that measure different components of institutional quality for the countries of interest. The source for the institutional quality data is the dataset produced by International Country Risk Guide (ICRG, 2018) – Political Risk Component, Table 3B. Those two proxies are most relevant and have the most coverage of countries and periods for the dataset of this study. The political risk rating of ICRG aims to provide a means of assessing the political stability of the countries that are interested on a comparable basis. The ICRG assigning risk points to a pre-set group of factors termed political risk components. The minimum number of points that can be assigned to each component is zero, while the number of points depends on the fixed weight that component is given in the overall political risk assessment. In every case, the lower the risk points total, the higher the risk, and the higher the risk points total, the lower the risk; the two selected political risk components follow the same rule. Besides, the bureaucracy quality component has points ranging from 0-4 and weights 4/100, while the law and order component has points ranging from 0-6 and weights 6/100.

There are several alternative sources for cross-country institutional quality indicators, and the most widely used one is the Worldwide Governance Indicators (WGI) (Marino et al., 2016). They report on six dimensions of governance for more than 200 countries for 1996-2018. The main reason for not using these indicators is that their time coverages cannot fulfil the needs of this study, and another reason is that these variables have been highly criticised in recent literature. For instance, the critics who suggest that WGI lacks comparability across countries and over time, given its methodology used – aggregating the governance ratings of more than thirty expert assessments, firm and household surveys. It may be subject to biases in expert assessments and correlated perception errors (Arndt & Oman, 2006), and there are fewer cross-country comparable firm and household surveys available. It is a ‘subjective’ rather than ‘objective’ measure of institutions (Arndt & Oman, 2006; Knack, 2007; Svensson, 2005).

Besides, an actual change in the governance may not be the only reason for a change in a country's rating on the WGIs. Other reasons may include changes in the sources' perceptions of the quality of governance without an actual change in the quality of governance; changes in other countries' governance ratings; or even changes in the number and composition of sources from one year to the next. For a detailed discussion regarding WGIs limitations, see, for example, Arndt and Oman (2008, 2006). However, as claimed by Kaufmann and Kraay (2008), most of the criticisms have been justified to be invalid (see, Kaufmann et al., 2007).

As one of the critical shock absorbers, bureaucracy quality tends to minimise revisions of the policy when the government changes. High points are generally credited to countries with strength and expertise in bureaucracy to govern without drastic changes in policy or interruptions in government services. In those high points (low risk) countries, the bureaucracy tends to be autonomous from political pressure and to have an established mechanism for recruitment and training, to some degree. In those low points (high risk) countries, a change in policy may give rise to traumatic effects on the government in terms of policy formulation and daily administrative functions, due to the lack of the cushioning effect of a strong bureaucracy.

'Law and Order', a single component that is formed by two elements, and the two elements are assessed separately with each being scored from zero to three points. The 'Law' element is associated with strength and impartiality of the legal system, while the 'Order' element is related to the level of widespread observance of the law. Thus, a country can enjoy a high rating in terms of its judicial system but a low rating if it suffers from a very high crime rate, given the law is routinely ignored without effective sanction.

North (1990) defines institutions as the rules or constraints on individual behaviour, which could be formal (political constitutions, democratic rules, executive power) or informal (societal norms, culture, religion). Greif (2006) extends this definition to include all forms of economic organisations as well as the set of beliefs that shapes the interactions between economic agents. The quality of institutions tends to play a crucial role in the growth process and human welfare (Kaufmann et al., 1999; Rodrik, 2008; Sokoloff & Engerman, 2000). Such quality has a direct impact on human development such as economic prosperity, health and education; it also regulates and mediates the effects of cultural factors (Gaygısız, 2013). Weak institutions tend to scare away investments and disrupt capital accumulation and production, all of which negatively affect growth and thus welfare (Easterly & Levine, 1997). Therefore,

having these institutional proxies in the growth equation as instrumental variables that have a direct impact on growth but no evident direct impact on poverty and financial crises is reasonable and consistent with the previous empirical literature.

Crisis equation. The dependent variable is a binary variable that takes a value of one if there is a systemic banking crisis in country i , year t and equals to zero otherwise. To define, identify and record financial crises, researchers have conducted a wide range of approaches over the years. For instance, Caprio and Klingebiel (2003) propose an indicator for systemic banking crises based on whether the aggregate value of the banking system liabilities exceeds the value of its assets. Glick and Hutchison (1999) propose an indicator to define currency crises, based on whether there have been substantial changes in an index of currency pressure, measured as a weighted average of real exchange rate changes and reserve losses. C. D. Romer and Romer (2017) take a narrative approach to identify episodes of financial crises among 24 OECD countries, while Baron et al. (2018) emphasise more on whether the stock prices of banks experience significant declines. To record crisis more precisely, Chaudron and de Haan (2014) propose to use the information on the number and size of bank failures to determine the timing of banking crises.

In general, all these studies note essential similarities with the crisis-dating methodology of Laeven and Valencia (2018) and to the extent that the samples overlap. Moreover, compared to databases produced by others, such as Caprio and Klingebiel (1996) and Reinhart and Rogoff (2009), the one created by Laeven and Valencia (2018) has several clear advantages. Firstly, the logic for their approach reduced the use of subjective criteria in identifying those episodes; secondly, the thresholds they chose for policy intervention helped them focus more on systemic events, where subjectivity in the identification of crises is further reduced. Lastly, it is a relatively simple definition that allows for a consistent implementation across periods and countries of different income levels. Not to mention that their dataset has a broader coverage of countries and a more extended period. It has become the standard reference for information on banking crises worldwide and covers all episodes during the period 1970-2017. *Chapter 3 Appendix C* presents the dates and durations of systemic banking crises for the selected countries in this study.

The set of macroeconomic variables ($\mathbf{X}_{i,t}$) for the crisis equation is the same as other equations discussed earlier. It further includes two instrumental variables that distinguish itself from others in the system: the bank z -score and bank return on assets. These two variables are inversely related to financial fragility, and the reason for inclusion is to determine whether financial fragility makes a crisis significantly more likely, since most of the emerging economies have created crumbly financial systems in their development processes due to inadequate regulation, supervisions, corporate governance, and other factors.

Z-score that measures the distance of the whole banking system from insolvency under the assumption that bank profits are normally distributed is a country-level analogue of the z -score of each individual bank (Laeven & Levine, 2009). In the work of Fielding and Rewilak (2015), the results for estimating an unbalanced panel of 121 countries over 1999-2011 using a dynamic probit model suggest that: the country-level distance from insolvency (z -score) is not itself a perfect predictor of banking crises, given its insignificance. They further argue that crises can be triggered long before a country gets close to insolvency. Therefore, insolvency is a sufficient but not necessary condition for the presence of a crisis. Laeven and Valencia (2013) also argue that, a crisis can occur when there are bank runs that do not lead to insolvency. In other words, bank runs might be triggered even when the banking system is still a long way from insolvency. For instance, an expectation of a government intervention that freezes bank deposits may trigger bank runs. Such expectations might be raised simply by a poorly performing banking sector, and for this reason, we include the second inverse-fragility measure: bank return on assets.

3.4. Empirical Results

3.4.1. Overview of Data and Correlations of Variables

Table 1. Overview of Data illustrates descriptive statistics for the largest sample available. According to the table, the poverty proxy – per capita household final consumption expenditure in constant 2010 US\$ – has almost 4,000 observations and ranges from \$121.17 to \$41566.03. For the financial development proxy, it has over 4,500 observations and ranges from 0.14% to 906.38%. For the economic growth proxy, it has over 4,500 observations and ranges from as low as -62.23 annual percentage growth to as high as 140.5 annual percentage growth. Additionally, the dummy variable for financial crisis has the most coverage of 4,805

observations, where zero indicates no crisis and one suggests a crisis for a given country in that year. Please see the table below for descriptive statistics of all included variables.

Table 1. Overview of Data

	N	Mean	Median	St.Dev	Min	Max
Household Final Consumption Expenditure per capita (constant 2010 US\$)	3888	6582.42	2623.81	8552.79	121.27	41566.03
Private Credit by Deposit Money Banks (% of GDP)	4630	40.18	25.6	43.13	.14	906.38
Economics Growth (annual %)	4673	1.98	2.2	6.79	-62.23	140.5
Financial Crisis	4805	.08	0	.27	0	1
GDP per capita (constant 2010 US\$)	4675	11111.77	3758.56	16648.3	133.97	111968.4
Inflation, Consumer Prices (annual %)	4398	50.41	5.2	470.1	-18.11	23773.13
Government Expenditure (% of GDP)	4390	15.69	15.18	6.64	.91	92.6
School Enrollment, Secondary (% gross)	4633	68.27	75.59	33.65	3.6	163.93
Gini Index	3622	40.32	39.5	9.12	21	65.8
Mobile Cellular Subscriptions (per 100 people)	4773	38.21	7.95	48.68	0	240.8
Latitude of Capita/90 (Absolute Value)	4805	.29	.24	.2	.01	.72
Bank α -score	3855	12.58	10.54	8.68	-2.62	95.28
Bank Return on Assets (% of GDP)	3829	1.9	1.54	2.62	-24.12	66.26
Bureaucracy Quality	3738	2.2	2	1.17	0	4
Law and Order	3738	3.71	4	1.44	0	6

Notes: The table illustrates summary statistics of all the variables used for empirical analysis in their original form, and those statistics are rounded to two decimal places.

Source: Author's own calculations.

Table *Matrix of Correlations* attached in *Chapter 3 Appendix D* presents correlations for all proxy variables in the model. Based on this table, we could conclude as follows: consistent with earlier works (see, Honohan, 2004), the financial development proxy positively correlates with the poverty proxy – per capita household consumption expenditure. The economic growth proxy has a negative correlation with the poverty proxy, while the financial crisis proxy has a positive correlation with the poverty proxy. In terms of correlations between financial development and economic growth and financial crisis, it is found negatively correlated with the former and positively correlated with the latter. Please refer to *Chapter 3 Appendix D* for details.

For the CMP estimation, there are 3,607 country-year observations in the sample in total. The results are reported in the following table: *Table 2. SURE Regression Results using CMP Modelling Approach*. For the marginal effects of the crisis equation, the results are reported in

the following table: *Table 3. Marginal Effects of the Crisis Equation in the CMP*. In general, our estimations show that financial development has a significant and positive poverty reduction effect. Its direct and positive impact in raising per capita household consumption expenditure, i.e., poverty alleviation, is more substantial than its indirect growth benefits. Meanwhile, its indirect crisis-induced costs to the poor through increasing the probability of having a systemic banking crisis could be offset by the sum of its positive direct impact and positive indirect impact through boosting economic growth. Detailed results are discussed in the following section.

3.4.2. Results for the Poverty Equation

As reported in *Table 2, Panel A*, most of the estimated coefficients of variables in the poverty equation are statistically significant at 1% significance level with intuitive signs, except no significance is found for the geographic instrumental variable. The result related to the direct impacts of financial development on household consumption expenditure is captured by the coefficient estimate of financial development indicator – private credit by deposit money banks (% of GDP). The result suggests that the financial development proxy is positively and statistically significant (at 1% significance level) related to the household final consumption expenditure. When the financial development proxy increases by 1 per cent, the household consumption expenditure is expected to increase by 1.05 per cent when holding other variables constant. This estimation is consistent with findings of Beck et al. (2004), Honohan (2004), Jalilian and Kirkpatrick (2005), Jeanneney and Kpodar (2005) and many others that all find a direct relationship between financial development and poverty alleviation exists independent of the indirect effect through growth.

Moreover, the economic growth variable, which represents the growth channel, is positively and statistically significant (at 1% significance level) related to the household final consumption expenditure. When economic growth increases by 1 per cent, the per capita household consumption expenditure is expected to increase by 1.52 per cent. This result is consistent with the findings of Dollar et al. (2016) and Dollar and Kraay (2004) – higher levels of growth rates are associated with low levels of poverty rates, which confirms the theoretical predictions providing the leading role economic growth plays in poverty alleviation.

In contrast, the financial crisis variable, which represents the crisis channel, is negatively and statistically significant (at 1% significance level) related to the household final consumption expenditure. The movement of the crisis dummy from zero to one suggests that, when a country experiences a financial crisis in a given year, the household consumption expenditure is generally 12.7 per cent lower compared to a scenario that no financial crisis occurs. This result again confirms the theoretical predictions regarding the detrimental effect of the crisis on poverty and is consistent with findings by Rewilak (2018), which suggest that banking crises may reduce the income of the poor by approximately 10 per cent.

In terms of the macroeconomic controls, per capita GDP and inflation are positively and statistically significant (at 1% significance level) related to the household final consumption expenditure. The coefficient estimate for per capita GDP – income level, suggests that households residing in high-income countries tend to have high consumption expenditures, and vice versa. The coefficient estimate for inflation suggests that a higher rate of inflation tends to increase household consumption expenditure, as inflation makes the cost of living more expensive, and households may use consumption, especially in durable goods as a hedging mechanism, against inflation. Many studies capture its significant effect on stimulating consumption expenditure, yet mostly from a perspective of inflation expectations (see, for example, Bonsu & Muzindutsi, 2017; Eggertsson, 2006; Feldstein, 2002; J. K. Hausman & Wieland, 2014; Krugman, 1998). Moreover, other proxies such as openness to trade is negatively and statistically significant (at 1% significance level) related to household final consumption expenditure. To justify the negative sign of the trade proxy, we borrow the argument from Ural Marchand (2017). He finds that international trade reduces the prices of consumption goods for importing countries, as well as real wages in certain sectors that lead to a loss of wage income for particular segments of the population, that may all lead to a reduction in household consumption expenditure. As the focal point for this study is to decompose the total effect of financial development on poverty, our emphases are placed on proxies of poverty, economic growth and financial development, as well as those equation-specific exogenous/instrumental variables. Therefore, no further implications for the estimates of macroeconomic controls are discussed in the following sections.

For the three exclusively included control variables in the poverty equation, the lagged GINI Index and the lagged mobile subscriptions are all statistically significant at 1% level. In contrast, the geographic variable presents no significance. The result for the GINI Index suggests that

when holding all other variables constant, a 1 per cent increase in inequality is associated with a reduction in household consumption expenditure by 0.11 per cent. It supports and is consistent with theoretical predictions in terms of the determinism of the distribution of income in poverty alleviation; reducing inequality through a better redistribution of wealth is vital when tackling poverty. The result for the number of mobile subscriptions suggests that it raises household final consumption expenditure, though the magnitude of the effect is negligible. Bhavnani et al. (2008) and Kanobe et al. (2017) find that mobile telephony plays a positive role in poverty alleviation by enhancing communications, reducing information asymmetries and facilitating financial inclusion.

3.4.3. Results for the Growth Equation

In *Table 2, Panel B*, all coefficient estimates of the growth equation are statistically significant at 1% level, except for the proxies of financial development and government expenditure that are statistically significant at 5% level; trade openness, human capital, and bureaucracy quality have no significant effects. The result in terms of the direct impacts of financial development on economic growth by the indicator of financial development – private credit by deposit money banks (% of GDP) – is positively and statistically significant (at 5% significance level) related to the per capita GDP growth. The estimated coefficient suggests that when financial development proxy increases by 1 per cent, the economic growth is expected to increase by 0.01 per cent when holding other variables constant. This result is consistent with findings of Levine et al. (2000), Loayza and Rancière (2004), and those of many others that all confirmed the direct growth-enhancing effect of financial development. Although the magnitude of the effect may seem relatively small, it can be explained by our sample compositions. As our sample consists of 67 emerging and developing countries and 54 low-income countries out of 155 countries that the growth-enhancing effect might be suppressed by their relatively weak legal environments, macroeconomic environments and regulation of financial systems.

For the instrumental variables that we have included specifically for the growth equation, only the coefficient estimate of law and order is positive and statistically significant at 1% level. This suggests that a higher level of institutional quality tend to be beneficial for economic growth. To be more specific, a one-unit increase in rating (higher rating lower risks) in the law

and order component shall induce a 0.12 per cent increase in economic growth when holding all other variables constant.

3.4.4. Results for the Crisis Equation

As reported in *Table 2, Panel C*, all coefficient estimates from the probit crisis equation are statistically significant at 1% significance level and have economically meaningful signs except for government expenditure, which is significant at 5% level, and trade openness, which presents no significance. In particular, countries that have higher levels of financial development tend to increase the probability of experiencing financial crises, compared to those countries with less developed financial sectors; high levels of inflation rates also tend to increase the probability of experiencing financial crises. Meanwhile, for countries with high-income levels, high government expenditure levels and high human capital levels tend to relate to lower probabilities of having financial crises. Besides, for the instrumental variables that were specifically included for the crisis equation, bank z-score and bank return on assets, the two financial fragility related proxies all evidently have an inverse relationship with the likelihood of having financial crises.

Since the probit crisis model is non-linear, the marginal effect of a change in one variable on the crisis probability depends on the value of the other variables. For our purpose, we are interested in the average marginal effect of financial development on the crisis probability, and it is shown along with the marginal effect at each outcome for all independent variables in the probit model in the following table, *Table 3*. All of the estimated coefficients are statistically significant at 1% significance level, except the government expenditure proxy which has a statistical significance at 5% level, and the trade openness variable presents no statistical significance. The result related to the direct impact of financial development on crisis probability suggests that, on average, financial sector development is associated with an increase in the probability of a systemic banking crisis by 0.27 percentage point³⁸. Unsurprisingly, inflation is also associated with an increase in the probability of a systemic banking crisis by 0.26 percentage point. Meanwhile, most of the macroeconomic control variables are associated with a decrease in the probability of a systemic banking crisis. For

³⁸ The unconditional probability of a systemic banking crisis is 7.72% in our sample.

instance, the proxy estimates for income level, government expenditure and human capital tend to reduce the probability of a crisis by 0.06 percentage point, 0.05 percentage point, and 0.13 percentage point respectively.

For the instrumental variables that we include specifically for the crisis equation, bank z -score and bank return on assets, the two variables that are inversely related to financial fragility, are statistically significant at 1% level with economically meaningful signs. The estimated result suggests that bank z -score, the variable that measures the country-level distance from insolvency is itself a predictor of banking crises for our sampled countries. However, crises can be triggered long before countries get close to insolvency. The average marginal effect of bank z -score is approximately -0.0361; in other words, a one percentage point increase in average bank z -score will reduce the probability of a crisis by approximately 0.04 percentage point. Moreover, in addition to the bank z -score, the bank return on assets also acts as a predictor of banking crises – a more profitable banking sector is significantly less prone to crises. The average marginal effect of bank return on assets is approximately -0.01; in other words, a one percentage point increase in average returns on assets will reduce the probability of a crisis by approximately 0.01 percentage point. This result is consistent with the estimates obtained by Fielding and Rewilak (2015), which suggest that the marginal effect of bank return on assets on the probability of a crisis is about -0.01. Yet, they find no significance for the estimates of bank z -score.

Table 2. SURE Regression Results using CMP Modelling Approach

	Panel A		Panel B		Panel C	
	Poverty Eq (1)		Growth Eq (2)		Crisis Eq (3)	
	(ln_hfc)		(ln_growth)		(crisis dummy)	
	Coef.	Robust Std.Err	Coef.	Robust Std.Err	Coef.	Robust Std.Err
Financial Development	1.0460***	0.0562	0.0104**	0.0046	2.0692***	0.5600
Financial Crisis	-0.1270***	0.0467				
Economic Growth	1.5192***	0.5734				
GDP per capita	0.5562***	0.0176	-0.0052***	0.0014	-0.4720***	0.1744
Openness	-0.1357***	0.0089	0.0002	0.0007	-0.0868	0.0753
Inflation	0.4973***	0.0420	-0.0115***	0.0030	1.9976***	0.3536
Government Expenditure	-0.2156***	0.0161	-0.0074**	0.0013	-0.3630**	0.1510
Human Capital	-0.3317***	0.0248	0.0012	0.0020	-1.0259***	0.2356
Constant	0.3261**	0.1571	0.0813***	0.0087	-7.5645***	0.0000
Extra Controls for Eq(1)						
GINI (lag)	-0.1117***	0.0229				
Mobile (lag)	0.0069***	0.0017				
Latitude of Capital	0.0149	0.0335				
Extra Controls for Eq(2)						
Bureaucracy Quality			0.0000	0.0005		
Law and Order			0.0012***	0.0004		
Extra Controls for Eq(3)						
Bank α -score					-0.2807***	0.0517
Bank Return on Assets (second lag)					-0.1152***	0.0389
Obs			3,607			
/lnsig_1		-1.5896***			0.0252	
/lnsig_3		-3.9084***			0.0125	
/atanhrho_12		0.4827***			0.1687	
/atanhrho_13		-0.3739***			0.0616	
/atanhrho_23		-0.2369***			0.0313	

Notes: ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The figures reported in the column for standard errors are asymptotically robust to the presence of heteroskedasticity. In the CMP process, the 'robust' sandwich-type formulas work equivalently to bootstrapping to control for heteroskedasticity (Roodman, 2011).

Source: Author's calculation.

Table 3. Marginal Effects of the Crisis Equation in the CMP

	dy/dx	Delta-method Std.Err.
Financial Development	0.2661***	0.0755
GDP per capita	-0.0607***	0.0232
Openness	-0.0112	0.0097
Inflation	0.2569***	0.0489
Government Expenditure	-0.0467**	0.0200
Human Capital	-0.1319***	0.0314
<i>Extra Controls for Eq(3)</i>		
Bank $\tilde{\alpha}$ -score	-0.0361***	0.0069
Bank Return on Assets (second lag)	-0.0148***	0.0049
<i>Obs</i>		2,100

Notes: ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

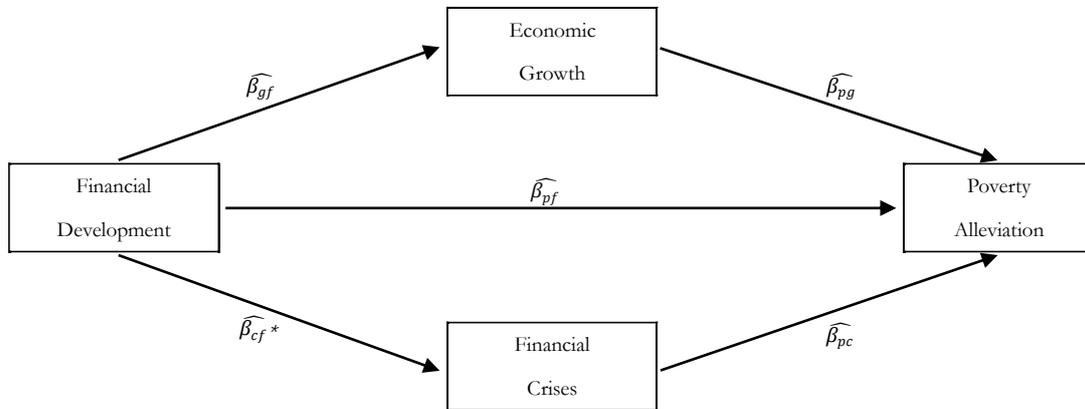
Source: Author's calculation.

Next, we compute the indirect growth benefit of financial development on per capita household final consumption expenditure by multiplying the estimate of the growth benefit of financial development ($\widehat{\beta}_{pg}$ in the poverty equation) by the estimate of the direct impact of financial development on growth ($\widehat{\beta}_{gf}$ in the growth equation). This indirect growth benefit of financial development is equivalent to 0.02 percentage point on annual per capita household final consumption expenditure. It means a one percentage point increase in financial development proxy is associated with a rise of 0.02 percentage point in per capita household consumption expenditure, through the economic growth channel. In terms of the indirect crisis cost of financial development on per capita household consumption expenditure, it is computed by multiplying the estimate of the crisis cost of financial development ($\widehat{\beta}_{pc}$ in the poverty equation) by the estimate of the average marginal effect of financial development on the crisis probability³⁹: $E\{\Phi(\widehat{\alpha}\mathbf{x}_{i,t} + \widehat{\mathbf{b}}\mathbf{z}_{i,t} + \widehat{c}) - \Phi(\widehat{\alpha}\mathbf{x}_{i,t} + \widehat{\mathbf{b}}\mathbf{z}_{i,t})\}$. This indirect crisis cost of financial development is equivalent to -0.03 percentage point on annual per capita household consumption expenditure. It suggests that the indirect crisis cost outweighs the indirect growth benefit of financial development on per capita household consumption expenditure marginally by 0.01 percentage point, during the crisis period.

³⁹ The average marginal effect of financial development on the crisis probability that is given in *Table 3*, 0.2661.

Figure 1 illustrates how financial development may affect poverty both directly and indirectly through economic growth and financial crisis, based on our model.

Figure 1. Interactions Among Financial Development, Economic Growth, Financial Crisis, and Poverty Alleviation



Note: * indicates $\widehat{\beta}_{cf}^*$ is the average marginal effect of Financial Development on Crisis probability that is estimated in Table 3.

Source: Author's own work.

Considering the direct impact of financial development on per capita household final consumption expenditure, which is captured by the estimate $\widehat{\beta}_{pf}$ in the poverty equation, we are confident to conclude that the direct positive effect of financial development on per capita household consumption expenditure by far outweighs its indirect negative effect through a higher propensity for financial crises. More importantly, the total effect (direct + indirect) of financial development on improving the per capita household consumption expenditure is positive and slightly over one percentage point, a magnitude in line with previous estimates in the finance-poverty literature. Table 4 below summarises the decomposed effects of financial development on poverty.

Table 4. Decomposition of The Effects of Financial Development on Poverty

	Financial Development
Direct Poverty Alleviation Effect	1.05%
Indirect Effect through Economic Growth	0.02%
Indirect Effect through Financial Crisis	-0.03%
Total Poverty Alleviation Effect	1.04%
χ^2 - test: total poverty alleviation effect $\neq 0$	
p-value	0.00

Source: Author's own calculations.

In addition, one thing worth noting is that the computation of the indirect effect through the financial crisis channel in *Table 4*, we used the average marginal effect to capture the impact of financial development on the probability of a financial crisis. The financial development proxy variable we used, the *private credit by deposit money banks asset (% of GDP)*, ranges from 0.14% to 906.38% (see *Chapter 3, Table 1, Overview of data*). As we have discussed previously, excessive private credit may induce a higher probability of a financial crisis that may exacerbate the crisis associated cost and dampen the total effect of financial development on poverty. In *Table 4*, we demonstrated that when private credit to GDP is moderate, the overall pro-poor impact of financial development on poverty is strong. However, when the private credit to GDP ratio is very high, whether the overall pro-poor impact will be severely reduced and turns negative needs a further investigation.

We then calculate the marginal effect of financial development on the probability of a crisis for countries with private credit to GDP ratios at the 90% percentile of distribution. We find that these countries with a much higher value of private credit to GDP ratio exhibit an increased probability of a systemic banking crisis. In this case, financial development for these countries is associated with an increase in the probability of a crisis by 0.487 percentage point (0.2661 when using the average marginal effect). The indirect crisis associated costs of financial development thereby increased to -0.06 percentage point (-0.03 when using the average marginal effect) on annual per capita household consumption expenditure. Therefore, countries with a much higher private credit to GDP ratio experience a moderately higher probability of a financial crisis and the associated cost. Nonetheless, the total effect (direct + indirect) of financial development on improving the per capita household consumption expenditure remains strong and positive for these countries. It is 1.01% (1.04% when using the average marginal effect).

3.5. Discussions

So far, our empirical findings from the above analyses successfully decomposed the total effect of financial development on poverty and differentiated the impact by its transmission channels. The channel where financial development directly contributes to reducing poverty plays a dominant role in explaining the total effect. While the indirect channel, through its promotion on economic growth, has a positive impact on poverty alleviation, the magnitude of this effect

is marginally outweighed by the other indirect channel – financial crises. Even though countries that undergo a certain level of development in financial systems are evidently more exposed to a higher probability of having financial crises, and the crises can have tremendous negative consequences not only on the economy as a whole from a macroeconomic perspective, but also on individuals and households from a microeconomic perspective; financial crises, regardless of their types, are still rare events in either financially developed and developing countries and their estimated effect towards damaging the poor remains modest. More importantly, the total effect of financial development on poverty alleviation in terms of household final consumption expenditure, as the empirical results of this study suggest, is significant and positive.

4. Conclusions

In this study, to provide a comprehensive analysis in terms of the financial-poverty nexus, we have studied the topic from a different perspective. We decomposed the effects of financial development on poverty into three extrinsically distinct yet intrinsically related components – the direct effect of financial development and its indirect effects through the economic growth channel, and the financial crises channel on poverty alleviation. This is what really makes this study distinct from existing literature, as most of them tend to focus mainly on either the direct link (see, for example, Beck et al., 2004; Honohan, 2004) or indirect links (see, for instance, Dhrifi, 2013a; Jalilian & Kirkpatrick, 2002). The finance-poverty nexus, unlike the finance-growth nexus, finance-crisis nexus, growth-poverty nexus, and crisis-poverty nexus, receives less considerations by scholars and policymakers than others. More importantly, in contrast with those more prevalent topics that have near consensus among researchers in terms of the relationships (e.g., financial development is pro-growth, growth is pro-poor, the crisis is against-poor, and so on), there is no absolute consensus on whether financial development is pro-poor.

The underlying reasons for the lack of agreement on this topic are relatively easy to determine. As studies that emphasise more on the direct channel between financial development and poverty alleviation and an indirect channel via economic growth tend to neglect the fact that crises are more likely to happen during the course of development in finance sectors (especially concerning countries with unsound financial system regulations, corporate governance and many other critical determinants of a healthy financial system); and the crises associated costs

may pose a devastating impact on the poor. Therefore, conclusions and policy implications that were drawn from those studies can hardly be regarded as an international lesson that applies to all. Meanwhile, their results may also be extensively subject to country-specific characteristics (see, for example, Beck et al., 2004; Beck, Demirgüç-Kunt, et al., 2007; Dhrifi, 2013a; Honohan, 2004; Jalilian & Kirkpatrick, 2002). For studies that emphasise more on the indirect crises link of financial development tend to focus more on its association with crises and the related costs to the poor during those turbulent periods. However, crises are only occasional, and their adverse effects are largely curable in the aftermaths if specific policies are appropriately implemented and targeted. Conclusions and policy implications drawn with underestimated growth benefits in poverty alleviation during tranquil periods and from a long-run perspective may mislead the audience to caution against excessive financial development (see, for example, Akhter & Daly, 2009; Jeanneney & Kpodar, 2005; Rewilak, 2018). Therefore, taking into account all the above weaknesses of the existing literature, this study stands out when answering the question that has been raised for years – is financial development pro-poor?

Thus, using a Seemingly Unrelated Regression Equations (SURE) model that was estimated by the Conditional Mixed Process (CMP) approach, we investigated the finance-poverty nexus of a sample of 155 countries, containing 34 advanced countries, 67 emerging and developing countries and 54 low-income countries. To address the endogeneity concerns that arose from the quadrilateral relationship between financial development, economic growth, financial crises, and poverty, we followed the control function approach and divided the estimations of this study into two stages, where the first-stage incorporates the system Generalised Method of Moments (GMM) approach to obtain the predicted value of financial development proxy that enters into the second-stage SURE model estimations using the CMP approach.

Overall, the estimated results have identified several key findings: *i*) financial development as measured by private credit by deposit money banks (% of GDP) has a direct positive effect on poverty alleviation as measured by per capita household final consumption expenditure; *ii*) financial development encourages economic growth, which in turn facilitates the reduction of poverty; and *iii*) financial development associates with a higher probability of having crises that come with costs. When considering all channels, the direct effect of financial development plays a dominant role in explaining the finance-poverty nexus, while the financial-development-induced-crisis costs marginally outweigh the growth benefits from a household

expenditure perspective. More importantly, the main finding of this study in terms of the total effect of financial development on poverty alleviation is positive and significant and suggests a slightly above one percentage point increase of household final consumption expenditure. In other words, financial development is indeed pro-poor, a finding that is consistent with many finance-poverty related studies such as Beck, Demirgüç-Kunt, et al. (2007), Cepparulo et al. (2017), Honohan (2004), and Jeanneney and Kpodar (2005, 2011).

Nevertheless, one thing to bear in mind when considering the findings from indirect channels (economic growth and financial crises) is that while financial development encourages a faster average long-run growth in per capita household consumption expenditure during tranquil periods, it also raises the probability of having financial crises that would expose the poor more to severe contractions in economic output and household consumption expenditures during crises. This is not to say that financial development is not suitable for the poor considering its associated costs, as the empirical analysis of this study suggests otherwise, but to suggest the policymakers to pay extra attention to those rare, costly events that have severe recessionary effects.

All in all, this study successfully draws a conclusion that confirms the positive effect of financial development on poverty alleviation. However, there are still many other aspects that have not been examined due to data limitation. For instance, as this study focuses mainly on the financial system development in the depth dimension and neglects the fact that the financial system is multidimensional and containing other dimensions such as access, efficiency and stability. Therefore, it is valuable for researchers and policymakers to investigate the finance-poverty nexus further from different or all dimensions by developing a multidimensional financial development index when data availability improves. Besides, the results of this study also provide a firm basis on which to undertake more focused, micro-empirical investigations of how specific financial sector policies and programmes can be implemented as effective instruments for achieving poverty alleviation in emerging, developing and low-income countries.

CHAPTER 4 – FINANCIAL INCLUSION AND POVERTY: A CASE STUDY OF CHINA

1. Introduction

In *Chapter 1*, in addition to conceptualising the whole finance-poverty framework, we discuss microfinance as a direct⁴⁰ and indirect⁴¹ channel through which financial development may alleviate poverty. In *Chapter 2*, we investigate the direct impact of financial development on poverty alleviation. In *Chapter 3*, we further investigate its indirect impact on poverty through two channels of the essence – economic growth and financial crisis. So far, the three chapters have completed a whole picture in explaining the mechanism on the role that financial sector development plays in poverty alleviation.

All conclusions and policy implications, as mentioned earlier in the previous chapters, are raised based on the analyses from a macroeconomic perspective, and it is assumed that certain financial products and services are available to households when in need. Nevertheless, from a microeconomic perspective, whether financial development contributes to lift the poor is determined by their own choices, and more importantly, this decision-making process is primarily subject to the level of inclusiveness of financial sector development. In other words, an inclusive financial sector development may lessen or even eliminate specific barriers for the poor to access financial products and services. As it may provide them with additional help during precarious times (such as consumption smoothing), and provide self-development opportunities that may lift them out from poverty once for all during tranquil times (such as loans for business/agricultural activities).

Financial development, as we defined in the previous chapters, is a process of reducing the costs of acquiring information, enforcing contracts and making transactions by establishing financial institutions. Measuring financial development in this context is broadly referred to the use of conventional aggregated measures on a macro level in the literature. For instance, the most commonly used ones are domestic credit to private sector (% of GDP), deposit money

⁴⁰ Please refer to *Chapter 1, section 5.1.4 The Role of Microfinance in Alleviating Poverty*, for a detailed discussion of how financial development directly alleviates poverty via microfinance.

⁴¹ Please refer to *Chapter 1, section 5.4 The Employment and Entrepreneurship Channels*, for a detailed discussion of how microfinance promotes employment and entrepreneurship and acts as an indirect channel alleviating poverty.

banks' assets to GDP (%), stock market capitalisation (% of GDP), broad money supply (M2) to GDP ratio, the number of ATMs or bank branches per capita/million people, etc⁴². Those prevalent measures, however, may not be informative enough for researchers and policymakers to perceive and understand whether or how individuals and households can take advantages of financial opportunities, especially when financial services are available. Failure to capture the above micro-level dynamics may severely limit the capability of a financial sector to unleash its potentials in poverty alleviation both directly and indirectly, regardless of its level of development.

Financial inclusion on a micro-level, in this case, may perfectly complement the role financial development plays in explaining whether or how individuals and households can benefit from financial services when available. In a broader term, the World Bank (2015) defines financial inclusion as the share of individuals and firms that uses financial services. More specifically, it means that individuals and firms that have access to useful and affordable financial products and services to meet their transaction, payment, saving, credit and insurance needs; and those financial products and services should be delivered responsibly and sustainably. Acting as an insurance for individuals and households to build resilience when facing adverse shocks by creating opportunities for their consumption smoothing, especially for the most vulnerable ones, financial inclusion is one of the most critical factors contributing to the overall economic development of a country. In addition, financial inclusion may also provide a certain level of support for helping those with other basic needs, such as education and health services (Bruhn & Love, 2009). The marginalised and the poor are deemed to be the most significant beneficiaries of financial inclusion, who lack this opportunity at the first place (Demirguc-Kunt et al., 2018). Measuring financial inclusion typically refers to the use of micro-level indicators such as the access to various financial instruments (e.g., transaction account) of an individual or household.

Despite the crucial role that financial inclusion plays, it has gained attention from policymakers in both developed and developing countries only recently (Mallick & Zhang, 2019). The United Kingdom, exemplifying developed countries, launched its Financial Inclusion Commission for the promotion of financial inclusion in 2015. It has two core objectives: *i*) advocating and prioritising financial inclusion in the context of public policies; and *ii*) bringing forward

⁴² For a detailed discussion of macro-level financial development indicators, please see *Chapter 1*.

deliverable policy proposals to make the UK a more financially inclusive society (Financial Inclusion Commission, 2015). In the same year, China, as an example of emerging economies, has introduced its first national strategic plan to develop financial inclusion. The State Council of the Chinese government detailed the guiding concept, basic principles and objectives of financial inclusion promotion in the *Financial Inclusion Plan 2016-2020*. The plan further outlined a series of policy and supporting measures in respect of institutions, products, infrastructure, law, regulation, education and publicity, and lays out arrangements for the implementation, coordination and pilot projects of financial inclusion (State Council, 2015).

China, despite its enormous achievements in economic and financial development, remains a developing country with a large number of rural poor. Ending poverty is one of the significant tasks for China to achieve sustainable development. Under the rural vitalisation strategy (also known as *sannong*), agriculture-, rural areas-, and rural people-related issues are fundamental to China as they directly concern a country's stability and people's wellbeing. Therefore, the Chinese government has always adhered to the development-oriented poverty alleviation strategies. Under these strategies, the method of poverty alleviation has shifted from 'blood transfusion' to 'blood creation'; the poor, with the help of those pro-poor policies, should ultimately depend on their hard work to lift themselves out of poverty and get wealthier (Y. Yang & Fu, 2019). Inclusive financial development under this framework can play a critical role in poverty alleviation. First of all, poverty entails more manifestations than just a lack of income and productive resources to ensure one's sustainable livelihood. It also includes limited access to education, health care and other essential services, social discrimination and exclusion and many others⁴³. Secondly, the poor do not have enough money to strengthen nutrition, to improve welfare, to develop productions, and more frequently, they are excluded by formal financial sectors when financial services are needed. All of the above factors lead to vicious cycles (Bihari, 2011). Therefore, inclusive finance can increase the poor's access to financial services with an equal chance and at an affordable cost (G. Corrado & L. Corrado, 2017). It is also vital for inclusive finance to gauge programme effectiveness and guide their development strategy in a rapidly changing economic environment to tackle poverty issues that may arise in various dimensions. Following the policy of the United Nations on multidimensional poverty alleviation, developing inclusive finance targeted the poor in rural areas has become a pivotal financial policy for China to promote inclusive economic growth.

⁴³ Detailed poverty manifestations are discussed in *Chapter 1*.

Therefore, in the context of targeted poverty alleviation, this chapter investigates the role that financial inclusion plays in China for poverty alleviation. The contribution of this chapter is shown below. First, the empirical assessment of the impact of financial inclusion on poverty alleviation in China received less attention in the existing literature. Most studies have focused on broader topics related to China's finance sector development and economic growth. With little (or even a lack of) focus on the newly emerged financial inclusion topic when considering poverty-related issues, especially from a microeconomic perspective using household survey data. Second, given China's enormous achievements in economic development, financial development, and in particular, poverty alleviation, its financial inclusion experience in the context of poverty alleviation is of great significance to other emerging and developing economies facing similar puzzles: whether and how to promote financial inclusion to combat poverty issues. Third, we have built a new multidimensional financial inclusion index to capture the impact of development in financial inclusion on poverty in China more comprehensively and accurately. The constructed index consists of all four dimensions as conceptually defined by the World Bank (2015): transactions, savings, credit and insurance. Besides, to provide a rigid criterion on household financial inclusion status, the index incorporates six indicators drawn from answers based on many household finance survey questions to reflect all aspects of the inclusiveness of a financial sector: checking account, debt, equity, loan, credit card, and commercial insurance. Lastly, the current study uses the latest, and arguably the most representative household finance survey data that covers 40,010 Chinese households in 2017. To the best of our knowledge, this is the first study that uses this survey data in its latest wave. It gains us a significant advantage in terms of data quality and sample size due to the continuous improvement in survey design and level of sophistication in questions.

Given the above, this study examines the effect of financial inclusion combined with household characteristics on household income. We then provide several robustness measures to test the sensitivity of our results. The analysis of financial inclusion's impact on household income elicits several findings: firstly, the impact of financial inclusion on household income is significant and positive across all households regardless of income levels; secondly, financial inclusion has the most potent positive effect for the impoverished households, and its effect weakened as household income increases.

The following sections are arranged as follows: *Section 2* discusses the critical elements of financial inclusion; *Section 3* provides an essential background of China in terms of its poverty dynamics and financial inclusion experiences; *Section 4* provides a detailed literature review; *Section 5* overviews the data and methodology; *Section 6* discusses empirical strategy used and *Section 7* discusses the empirical results, before the conclusion is drawn in *Section 8*.

2. Key Elements of Financial Inclusion

In the last few decades, the concept of financial inclusion has been continuously and considerably advanced from its initial focus on product- and institution-specific microcredit and microfinance. The latest evolutionary development of the concept has broadened to a national and global policy objective level with embedded multidimensionality that encompasses a range of products and consumer segments, financial service providers, delivery channels, government actors, and stakeholders.

The definition of financial inclusion on a global scale differs across national and global stakeholders and varies from simple to complex. For instance, the most basic and straightforward definition, according to the World Bank (2014) is 'the share of individuals and firms that use financial services'. As for the Center of Financial Inclusion, it reveals the definition in a multidimensional vision: 'access to a full suite of financial services, to everyone who can use financial services; that provided by a range of providers with robust financial infrastructures and clear regulatory frameworks' (Center for Financial Inclusion, 2011). The Global Partnership for Financial Inclusion describes financial inclusion as 'a state in which all working-age adults, including those currently excluded by the financial system, have effective access to the following financial services provided by formal institutions: credit, savings, payments, and insurance'; and by meaning 'effective access' it refers to 'a convenient and responsible service delivery, at a cost affordable to the customer and sustainable for the provider, with the result that financially excluded and underserved customers can access and use formal financial services' (GPFI, 2011, p. 8). On the national level, China's *Plan for Advancing the Development of Financial Inclusion (2016-2020)* begins by noting that 'Financial inclusion means providing financial service for all social strata and groups with appropriate and valid financial services, at affordable cost, based on the principle of opportunity equality and commercial sustainability' (State Council, 2015). Small and micro

businesses, peasants, urban low-income groups, impoverished groups, the disabled, the aged and other special groups are the focus of the financial inclusion in China.

Given the above definitions, four elements stand out which are deemed to be fundamental and crucial for financial inclusion: accessibility, diverse and appropriate products, commercial viability and sustainability, and responsibility and safety.

i. Accessibility

It is a crucial driver of financial inclusion. It refers to the one's ability to access financial products and services conveniently. In other words, it means a consumer has sufficient physical proximity to access points (e.g., branches, agents, and ATMs) for the selection and uptake of a range of financial products and services when needed. Recently, mobiles and computers based remote access channels are increasingly relevant to complement or even substitute the role traditional channels play in particular functioning of a financial sector. Lack of physical accessibility generates significant transaction costs for underserved consumers (e.g., direct costs of transportation, indirect costs for lost time) that not only contradicts the purpose of financial development to reduce costs, but also limits overall value proposition of financial products and services as tools to meet daily financial needs. Improving the accessibility of financial products and services increases consumer use and may also have many follow-on benefits of financial inclusion, such as an increase in income, productive investment and employment (see, Bruhn & Love, 2014; Burgess & Pande, 2005).

ii. Product Diversity and Appropriateness

Financial inclusion requires to satisfy the needs of particular customer segments, especially for those unserved and underserved consumers. To better serve its purpose, a range of diversified, appropriately designed and purposed led product and services that can be provided at a reasonable cost are essential. The Center for Financial Inclusion flags several vital aspects that must be evaluated considerably in terms of the appropriateness – affordability, convenience, product fit, safety, dignity of treatment, and client protections. The appropriateness is also a pivotal force for the unserved and underserved to use those products and enter the formal financial sector. On the contrary, inadequately designed products and services will neither induce significant uptake nor

long-term usage, and they may harm low-income consumers (World Bank, 2014). Also, conventional financial products and services are not well suited to the needs of low-income consumers, a simplified and low-cost version without unnecessary features may encourage better uptakes, such as no-frill basic accounts that have no or low monthly fees, with no additional features (e.g., overdraft facilities).

Those two key elements of financial inclusion, as mentioned above, focus more on the consumer perspective – the fulfilment of needs. However, the other two elements – commercial viability and sustainability, and responsibility and safety – focus more on the provider perspective. As it might pose another real challenge to develop a sustainable financial ecosystem in which financial products and services can be provided cost-effectively and sustainably over the long term.

iii. Commercial Viability and Sustainability

Financial systems which successfully pave the way for those previously unserved and underserved consumers to be inclusive to formal financial sectors may still fail to meet the long-term objective of financial inclusion if they do not do so sustainably. A diverse, competitive, and innovative marketplace is decisive for financial inclusion to reach a sustainable level since a majority of commercial banks alone are unlikely to provide the full range of financial products and services to all consumer segments. It is equally important to encourage and collaborate with other types of providers to participate and contribute to financial inclusion, such as rural banks, financial cooperatives, microfinance institutions, postal banks, payment service providers, mobile network operators, and fintech companies.

iv. Responsibility and Safety

Lastly, to responsibly deliver financial products and services to consumers and to ensure the policy objectives of financial inclusion align with those of financial stability and market integrity, are also crucial for the development of long-term financial inclusion. Financial sector authorities should oversee the sector and assess the risks and trade-offs continuously among these various policy objectives to balance. Besides, to improve the levels of financial capability of the unserved and underserved might also be considered as part of the responsibility shared by the providers and financial sector authorities, since low levels of financial capability prevent responsible uptake and

usage of financial products and services, regardless of the level of other segments of financial inclusion. Financial capability in the above context is defined as one's internal capacity to act towards its best financial interest. It consists of knowledge, attitudes, skills, and many other things that affect one's understanding, selecting and using financial products and services that fit its need. Individuals with low levels of financial capability may distrust the formal financial sector and may stay unaware of the potential benefits from using its products and services. Therefore, improved financial capability can lead to increased uptake and usage of financial products and services to effectively meet the needs of consumers. In terms of safety, financial consumer protection plays an essential role in building trust in the financial system, particularly for those new entrants to the formal financial sector. Core elements of financial consumer protection include, but not limited to, complete disclosure and transparency of the terms and conditions of products and services, fair treatment of consumers. Consumers need to be assured that by engaging with the formal financial sector, their needs could be best met without compromising their interests.

3. The Essential Background of China

3.1. Poverty Dynamics in China

The poverty reduction progress in China over the last few decades is remarkable, and such a drastic decline is evident across many approaches to measuring poverty, from national or international poverty lines whether in terms of income or consumption, to the absolute number, incidence, depth, and severity of poverty (World Bank, 2017a).

Measured by the new international poverty standard of US\$1.90 per day in 2011 PPP, the national poverty headcount ratio fell from 88.32% in 1981 to 1.85% in 2013 and then further dropped to 0.5% in 2016, and by urban and rural areas, the ratio fell from 59.43% to 0.51% and 95.59% to 3.38% respectively from 1981 to 2013 (World Bank, 2017a, 2020c). Measured by China's official *2010 Poverty Standard*⁴⁴, the number of poor (10,000) since 1978 fell from 77,039 to 5,575 in 2015, and the incidence of poverty fell from 97.5% to 5.7 % from 1981 to

⁴⁴ It is RMB 2300 (in 2010's constant price) per person each year (National Bureau of Statistics of China, 2019)

2013 (World Bank, 2017a). Moreover, the income share held by lowest 10% fell from 3.5% in 1990 to 2 % in 2000 and increased to 2.7 % in 2016 (World Bank, 2020c).

The country's social indicators have improved significantly since the economic reforms. For example, the average life expectancy at birth increased from 66 in 1980 to 76.3 in 2015, according to the latest NBSC data; the infant mortality rate has dropped from 42.1 in 1991 to 7.4 per thousand live births in 2018 (World Bank, 2020c). The adult literacy rate improved from 66% in 1982 to 97% in 2018 (World Bank, 2020c).

While remarkable achievements have been made in China's poverty alleviation, China remains the world's largest developing country facing unprecedented challenges in narrowing the economic gaps between rural and urban areas and across regions. In 2018, the ratio of urban income to rural income (rural income as 1) was 2.69 (NBSC, 2019), and as of 2015, the poverty rate was 1.8%, 6.2%, and 10% in eastern, central and western China respectively (NBSC, 2016).

The relatively high incidence of poverty and severe financial exclusion in most of the remote or rural areas of China has always been crucial for poverty alleviation (UNDP, 2016a). Based on the transformation of China's overall development patterns and the institutional changes concerning poverty alleviation between 1978 and 2020, we summarise the poverty alleviation efforts into four phases as below.

i. The First Phase - Rural Reform (1978-1985)

The economic reforms and opening-up measures that performed in China since 1978 played an indispensable role in its economic development and poverty alleviation. Meanwhile, a series of rural-focused institutional reforms that pointed toward rural production/distribution systems and procurement prices started to influence rural areas.

The fundamental institutional change was the land reform, characterised by the implementation of the household contract responsibility system in rural China, which greatly stimulated farmers' incentive for economic activity (Ho & Odhiambo, 2011). The rural household contract responsibility system empowered farmers, thereby putting rural economies on a fast track of development. Farmers had their income grew rapidly, and the size of the rural poor population reduced rapidly during this period.

By the official *2010 Poverty Standard* of China, the incidence of poverty declined sharply from 97.5% in 1978 to 78.3% in 1985 (World Bank, 2017a). It was the period of the most rapid decline in poverty incidence in China (UNDP, 2016a).

ii. The Second Phase - National Targeted Poverty Reduction Programs (1986-2000)

The focal point of the economic reforms and opening-up measures since the mid-1980 started to shift from rural areas to urban areas, which deepened the industrialisation and marketisation of cities consistently. Nevertheless, the three rural specific issues began to emerge (i.e., issues related to agriculture, rural areas, and farmers).

In 1986, the central government established the State Council's Leading Group for Economic Development in Poverty-stricken Areas⁴⁵. The specially designed organisation aimed to plan and carry out poverty alleviation projects.

In 1994, the central government established the *Seven-Year Priority Poverty Alleviation Programme in China*, which explicitly proposed to pool all available human, material, and financial resources and mobilise all social forces to basically solve the food and clothing issues for 80 million rural poor in 7 years. This *8-7 Plan* had a clear focus on three main programmes – subsidised loans, food-for-work, and government budgetary grants (Wang et al., 2004). Moreover, to better attain the plan's target, it also employed a series of preferential policies and concrete measures, such as to accelerate the development and utilisation of uncultivated land by leasing or transferring the right to its use⁴⁶. In this context, China started to tackle the poverty issue county by county. By far, it is the only national poverty alleviation initiative with a clear set of goals and a concrete time frame among all developing countries globally (UNDP, 2016a).

In this phase, the central government's development efforts had successfully taken over the role in poverty alleviation when the pro-poor effect of economic growth weakened in the very beginning. The anti-poverty plan had been elevated to a national strategy with greater determination and increased anti-poverty efforts.

⁴⁵ It was renamed as the State Council's Leading Group for Poverty Alleviation and Development (LGOP) in 1993.

⁴⁶ See. The State Council's LGOP: A Summary of China's Poverty Alleviation and Development in Rural Areas, China Financial & Economic Publishing House, 2003, p. 4 and p.33

By the official *2010 Poverty Standard* of China, the number of poor (10,000) fell from 66,101 in 1985 to 46,224 in 2000; and the incidence of poverty declined sharply from 78.3% in 1985 to 49.8% in 2000 (World Bank, 2017a).

iii. The Third Phase - New Century Rural Poverty Alleviation Plan (2001-2010)

In this phase, the Chinese economy embraced with an annual average growth rate of 10.5% with its Gross Domestic Product (GDP) climbing from the sixth to the second largest in the world. The urban and rural residents also experienced a sharp increase in income, thanks to the continuous advancement in national industrial infrastructure and the steady consolidation of agricultural foundations. The expansion in economic and fiscal capacity, along with the development in the agricultural industry, all helped to advance the rural areas.

Significant policy shifts were witnessed during this period, aiming to balance development gains between urban and rural areas and across different regions. In 2001, the Chinese Government officially issued the *Outline for Poverty Alleviation and Development of China's Rural Areas (2001-2010)*⁴⁷ to facilitate and aid the implementation of specific poverty alleviation policies. For instance, policies that help the poor to develop speciality and competitive agricultural products, to promote the industrialised agricultural operations, to advance production and living conditions of the poor areas, to increase budgetary funds and loans for poverty alleviation (e.g., relief loans for developing crop cultivation, poultry raising, and activities that help to raise the incomes of the poor), to improve the sci-tech and cultural qualities in the poor areas (e.g., adult education and training for advanced and practical techniques, guaranteed nine-year compulsory education), and many other gradually introduced policies. The integration of the strategies for building the new countryside, developing the less-developed central and western regions, enabled China to pursue a balanced anti-poverty strategy. Meanwhile, with the rapid development of non-governmental organisations, social assistance in the form of donations and volunteering services increased significantly. A trinity work pattern for poverty alleviation was gradually established,

⁴⁷ See. The State Council: *Outline for Poverty Alleviation and Development of China's Rural Areas (2001-2010)*, 2001. <http://www.fao.org/faolex/results/details/en/c/LEX-FAOC155200/>

that fiscal, industrial and social policies began to play their roles respectively (UNDP, 2016a).

By the official *2010 Poverty Standard* of China, the number of poor (10,000) fell from 46,224 in 2000 to 16,567 in 2010; and the incidence of poverty declined sharply from 49.8% in 2000 to 17.2% in 2010 (World Bank, 2017a).

iv. The Fourth Phase – (2011-present)

In this phase, the central government regards poverty alleviation as a necessary and crucial manifestation of a human-centred approach to governance, and it has become integral for the government to stimulate domestic demand, accelerate the transformation of economic growth patterns and promote sustainable economic development in the long run. It has also been used as an essential measure to balance rural/urban areas development and regional development, to secure and enhance people's livelihood and to enable inclusiveness in the sharing of the achievement of reform and development. For instance, in response to the risen competitions in international markets and difficulties associated with the traditional labour-intensive industry in exporting, enterprises in more developed, eastern coastal areas are encouraged to steer their focus to domestic markets and start to invest in those underdeveloped areas. There has been a clear trend of capital and technology transfer to those underdeveloped areas, that could help to scale up China's inclusive development.

The *Outline for Rural Poverty Alleviation and Development (2011-2020)*⁴⁸ levelled up the poverty alleviation objective from solving the basic needs of the impoverished (e.g., food, clothing, medical care and housing) to helping them to achieve further development needs, as well as the proposition of policies and measures in terms of poverty reduction acceleration, ecological environment improvement, development capacity enhancement and development gap narrowing. While making provisions for increasing fiscal support for poverty alleviation, the outline also emphasised planning for the trinity work pattern for poverty alleviation (i.e., the joint force of fiscal, industrial and social sectors). More importantly, the outline highlighted the role

⁴⁸ See. National Outline for Rural Poverty Alleviation and Development (2011 -2020). People's Publishing House, 2011. <http://www.iprcc.org/Index/warehouse/id/4298.html>

financial sector plays in poverty alleviation by pointing out the need of a continuous improvement in the national policy of granting pro-poor loans, promoting innovation in financial products and services, and encouraging the microcredits provision for production activities. In addition, the outline also encouraged the development of specific agricultural insurance policies and credit rating systems in impoverished areas. This framework for poverty alleviation financing is gradually consummating.

By the official *2010 Poverty Standard* of China, the number of poor (10,000) fell from 16,567 in 2010 to 5,575 in 2015; and the incidence of poverty declined sharply from 17.2 % in 2010 to 5.7 in 2015 (World Bank, 2017a).

Along with the evolved poverty alleviation strategies over time, the role financial sector plays also changed. In general, anti-poverty policies in China has undergone a shift from an assistance-oriented approach to a development-oriented approach. While the financial sector has also transformed from an approach of simple one-way and free use funds transfer to an approach of two-way and paid use pro-poor loans/microcredits that aimed not only to build, enhance capacity for the poor, but also to achieve a generation of dynamism for poverty alleviation.

3.2. Financial Inclusion Experience of China

The financial inclusion experience of China has evolved in multiple stages. One of the explicitly prioritised policies in the early 1950s was to expand financial services accessibility, with the establishment of the rural credit cooperative (RCC) – was launched to offer credit services exclusively to rural households; and the establishment of the Agricultural Bank of China (ABC) – to raise funds from the rural areas and to support industrialisation and agricultural production (XUECHUN Zhang et al., 2010). While the ensuing series of financial sector reforms and liberalisation in the following decades is important in the context of understanding China's most recent experiences, it is outside the scope of this study as those reforms have been slow and ineffective and have lagged behind general economic reform⁴⁹. The following section focuses mainly on the latest phase that started from the early 2000s.

⁴⁹ Sparreboom and Duflos (2012) provide a useful overview of the development of China's financial sector since 1949, including the relevance for financial inclusion.

Before the early 2000s, the rural credit cooperatives (RCCs) and the postal saving system (resumed in 1986) were the only major financial service providers left for rural residents, as the marketisation and privatisation of the financial sector led to the closure of a vast number of financial service outlets in rural areas. According to X. Zhang et al. (2010), on average of the remaining active service outlets at the end of 2005, there were only 23 depository institution outlets per county, two outlets per township, and one outlet for over 50 villages⁵⁰. Given the RCCs' limited capacity to provide sufficient physical access to basic banking services that partially caused by a legacy of unsustainable nonperforming loan ratios; the extremely limited range of financial products and services the postal saving system provided (funds transfer and saving); and the banks' primary focus on providing loans to state-owned firms⁵¹; a significant market gap for those underserved and unserved individuals and firms widened along the course of the rapid economic development.

In the early 2000s, to support the national goals of social harmony and sustainable development, financial sector authorities⁵² steered their attention towards the improvement in banking sector's commercial viability and emphasised the importance of inclusive financial sector development. There are three key objectives that the Central Government spare no effort to pursue, which are also reflected in its financial inclusion policies – universal access to basic banking services, productive credit for rural households, and bank credit for micro and small enterprises (MSEs) (Sparreboom & Duflos, 2012).

The persistently unfulfilled needs of formal financial products and services for the underserved and unserved population forced financial authorities to find alternative ways to provide basic banking services to those who reside mainly in rural and remote areas across the western and central regions of China. Meanwhile, the banking sector, under the guidance of financial authorities, also actively engaged in the process to ensure the availability of minimal financial

⁵⁰ Administrative units in China from largest to smallest include province, city, county, town, and village. According to the China Statistical Yearbook - 2016, China comprises 334 prefectures/cities, 2,850 counties, and 39,789 towns. According to PBOC's Overall Developments of Payment Services in Rural Areas (2015), in China's rural areas, the average population per county is approximately 420,000; the average population per town is approximately 28,700, and the average population per village is approximately 900.

⁵¹ According to Tsai (2006), the proportion of loans granted to private firms counted less than 1 per cent of bank loans in 2005.

⁵² The financial sector is overseen by one central bank (the People's Bank of China [PBOC]) and three specialised regulatory and supervisory authorities: China Banking Regulatory Commission (CBRC), China Securities Regulatory Commission (CSRC), and China Insurance Regulatory Commission (CIRC). The Ministry of Finance (MoF) is also actively involved in various fiscal policies to support financial inclusion.

services in all townships and villages (CBRC, 2011). In response to the above objectives, ‘traditional’ and ‘new type’ financial service providers have been assigned with different tasks, yet all work toward the same goal – to better serve the financially excluded population.

The whole financial inclusion experience of China is shaped by many participants, and the achievement is built on top of all contributions from not only those financial service providers but also from the policymaker, the economic development, the technology advancement and many others. The effort traditional and new-type financial service providers made are briefly discussed as follows, to demonstrate how they have adapted to shape a more inclusive financial sector.

i. Traditional Financial Service Providers

Here, ‘traditional’ refers to state-owned commercial banks (e.g., Postal Saving Banks of China – PSBC and Agricultural Bank of China – ABC), joint-stock commercial banks and city commercial banks, rural commercial banks – RCOMBs, rural cooperative banks – RCOPBs, and rural commercial cooperatives – RCCs.

The role that traditional financial service providers play in drastically expanding financial inclusion is vital in a way to extend the physical reach of their service networks. The accessibility has been dramatically improved. For instance: *i)* they have set up specialised branches that benefited from lighter licensing requirement and approval process – community sub-branches and small and micro sub-branches. The two types of specialised branches generally provide similar services, such as accepting deposits and selling financial products that include microloans; but the small- and micro sub-branches have a clear focus on providing those basic financial services to MSEs. Location wise, the prior type locates in residential areas at the county, town and village level, while the latter type locates within clusters of MSEs. *ii)* They have employed agent-based models in rural areas to promote cash withdrawal services; considered many subsidy recipients living in remote areas had been historically constrained to access to various subsidies provided by the government regarding agricultural activities, social endowments insurance and rural cooperative medical insurance⁵³. Currently,

⁵³ According to China Household Finance Survey (CHFS) 2013, there was 40 per cent of all households, and 58 per cent of rural households reported having received some form of subsidy or grant payment in the past year.

those service points also provide person-to-person transfers and are equipped with the POS terminal. The locations for those service points are primarily in retail stores and commune offices. At the end of 2016, the number of agent-based service points reached 983,400 which covered more than 90 per cent of all administrative villages and on average, 1.8 service points per village (World Bank & People's Bank of China, 2018). *iii*) Based on their existing town-level outlets, they have also used mobile service outlets⁵⁴ in surrounding villages aimed to expand accessibility to village residents and to address the 'last mile' in poverty eradication.

As the improvement in physical access and basic account ownerships form only part of financial inclusion, to sustain such inclusiveness also requires tailoring of those financial products and services to fit the needs of consumers, particularly those considered by lenders as creditworthy. The traditional financial service providers have continuously innovated their products from various aspects (access, use and quality) to serve the needs better. For instance, *i*) they have leveraged modern technologies in designing payment products and delivery channels (e.g., noncash payment business and internet-based and mobile payment business) that not only increased the availability of basic payment services substantially but also reduced associated costs and improved conveniences for consumers. *ii*) In response to regulatory authorities' active propelling in lending expansions to the agricultural sector, rural residents and MSEs, traditional financial service providers have innovated the traditional methods of risk assessment and have expanded the scope of acceptable collaterals that previously restricted farmers and MSEs from accessing loans. Under the *Guidelines on Comprehensively Advancing Innovations in Rural Financial Products and Services*⁵⁵ issued in 2010 by PBOC, CBRC and CIRC, government transfers and subsidies have been leveraged innovatively as collateral.

In terms of the insurance sector, service providers have broadened target markets to include the previously underserved and unserved segments. There has been an

⁵⁴ For instance, the regular mobile service outlet refers to a bus equipped with service counters and ATMs that are connected to the host bank network or 'Backpack Bank' team for even more remote areas.

⁵⁵ See. PBOC (People's Bank of China), CBRC (China Banking Regulatory Commission), CSRC (China Securities Regulatory Commission), and CIRC (China Insurance Regulatory Commission). 2010 [No. 198]. Guidelines on Comprehensively Advancing Innovations in Rural Financial Products and Services. Beijing, China.

evolution led by innovations in delivery channels, product designs, and management, as well as regulatory reforms. For instance, the digitalisation of marketing and delivering channels – the ‘online-to-offline’ business model – has increased the availability and uptake of insurance products and services. Meanwhile, in line with the incentives of central and local governments regarding agricultural insurance products (e.g., provision of premium subsidies to farmers), those providers developed innovative insurance products tailored to farmers’ agricultural related activities and their livelihoods, such as weather index insurance, price index insurance, crop yield insurance, income insurance, and agricultural product quality insurance. According to CIRC, income generated from insurance premiums exceeded US\$ 465 billion in 2016, which represents a 27.5 per cent year-on-year growth (World Bank & People’s Bank of China, 2018).

Also, given RCC had the most widely distributed service outlets in rural areas of China and its historically predominating role in serving *sannong*⁵⁶ and facilitating financial inclusion, its reform in 2013 was also remarkable. The Central Government initiated the reform that relieved the ‘cooperative’ nature of RCCs and aimed to transform them into more market-oriented and commercially viable and sustainable financial enterprises with sufficient capital and substantial compliance. As part of the reform, two new institutional forms were created for the same purpose, and many RCCs have transformed into these forms – Rural Commercial Banks (RCOMBs) and Rural Cooperative Banks (RCOPBs). At the end of 2016, the RCCs’ nonperforming loan ratio (%) declined from 36.9 in 2002 to 7.3, the net earnings increased from US\$ -0.9 billion in 2002 to US\$ 7.8 billion, and the balance of *sannong*-related loans increased to US\$ 402 billion (World Bank & People’s Bank of China, 2018).

ii. New-type Financial Service Providers

The China Banking Regulation Commission (CBRC) issued policy guidance in 2006 to encourage the establishment of three new types of rural financial institutions. For instance, village and township banks (VTBs), rural mutual credit cooperatives (RMCCs) and microcredit companies (MCCs). These new-type providers have an explicit target population and relatively light regulatory requirements for establishment. In some sense,

⁵⁶ The government’s broad three-pronged policy of serving the agricultural sector, rural development, and rural residents.

their establishments can be viewed as an extension of and a complement to traditional financial service providers; and to promote competition at the rural level in serving the financial needs of rural residents, micro, small, and medium-sized firms.

In late 2006, the national pilot programme for VTBs was initiated, followed by the issuance of the *Provisional Rules for Management of Village/Town Banks* in January 2007. VTBs are permitted to accept deposits, loans for various terms, domestic settlements, bill acceptance and discount, interbank borrowing, bank card issuance, government bond underwriting, agent service of fund receipt/payment and insurance. As of 2016, the total number of VTBs in operation was 1,519, with 65 per cent located in the central and western regions of China. The total loan balance of VTB's were US\$ 105 billion, and the total balance of loans related to *sannong* activities and MSEs were US\$ 98 billion accounted for 93 per cent of the total loan balance. Also, loans that were less than US\$ 750,000 accounted for 80 per cent of all VTB loans (World Bank & People's Bank of China, 2018).

In 2005, the PBOC initiated the pilot programme for MCCs. Later in 2008, PBOC and CBRC jointly issued the *Guidelines on Pilot for Microcredit Companies*⁵⁷. One of the features of MCCs is, they do not engage in savings, only in loans. More importantly, they are encouraged to focus on serving farmers, agriculture and rural areas and MSEs. By the end of 2016, there were 8,673 MCCs in operation with a total loan balance reached US\$ 139 billion (World Bank & People's Bank of China, 2018).

In 2006, the pilot programme for RMCCs initiated and in the following year, CBRC issued the *Provisional Rules for Management of Rural Mutual Cooperatives*⁵⁸. The primary objectives upon its establishment were to unite farmers to facilitate their self-development through the mutual funding approach; to fill gaps in available financial services and to address issues in rural areas' access to finance (the poverty-stricken and economically lagging areas in particular). Moreover, RMCCs are linked with villages or farmers' specialised cooperatives and provide services to members only, such as

⁵⁷ See. CBRC (China Banking Regulatory Commission) and PBOC (People's Bank of China). 2008 [No. 23]. *Guidelines on Pilots for Microcredit Companies*. Beijing, China.

⁵⁸ See. CBRC (China Banking Regulatory Commission). 2007 [No. 7] (Issued). *Provisional Rules for Management of Rural Mutual Cooperatives*. Beijing, China.

handling their deposits, loans and settlement, as well as buying and selling government debts and financial bonds. By the end of 2016, RMCCs' total number of memberships had reached 60,000 across 16 provinces, with deposit balance reached US\$ 405 million and loan balance at US\$ 285 million that has US \$270 million loans to farmers (96.8 per cent) (World Bank & People's Bank of China, 2018).

The above new-type rural financial service providers have their features and advantages that have been leveraged to compensate for the scope traditional financial service providers find it challenging to reach and serve. For instance, VTBs are located in counties or towns, RMCCs are located in rural areas, and many MCCs are located in areas or communities where MSEs concentrate. Compared to traditional providers, they also have a clear market position and key target customer groups. VTBs and MCCs mainly serve farmers and MSEs, while RMCCs mainly serve their members that consist of villages and farmers' specialised cooperatives. Besides, they have also benefited from fewer management hierarchies and more accessible and faster loan approvals to better serve the financial needs of the targeted groups in a frequent and timely manner. In general, China's financial inclusion experience shares many common features with other countries' when serving the underserved and the unserved populations, such as the use of agents and the establishment of new types of institutions. Nevertheless, its country-specific features also set it apart from others, such as the significant role assigned to development-oriented financial service providers and policy banks. In addition, the rapid increase in nonbank digital payment platforms linked to e-commerce and social networks that this study has not covered, also contribute in shaping its unique experiences (World Bank & People's Bank of China, 2018).

4. Literature Review

The effect of financial inclusion on poverty has only gained its well-deserved attention among policymakers and researchers in the past few years, and the literature on the impact of financial inclusion on poverty remains inconclusive. From what we have learned about the financial inclusion experience of China as well as other emerging and advanced economies, their efforts to promote financial inclusion have been deemed successful (Churchill & Marisetty, 2019; GPFI, 2010, 2011; Loukoianova et al., 2018). Many financial inclusion indicators have been

improved dramatically. For instance, the Global Findex database shows that 69 per cent of adults worldwide have a bank account in 2017, up from 51 per cent in 2011. In advanced economies, 94 per cent of adults have an account, while in developing economies, 63 per cent do (Demirguc-Kunt et al., 2018). Despite the popularity in promoting financial inclusion and the success it achieved in some ways, one fundamentally important question remains unanswered. Does financial inclusion enhance wellbeing and alleviate poverty? A limited number of studies have empirically examined this research question at the individual or household level⁵⁹.

Some studies argue that inclusive financial development enables the poor to access to savings, credit, and other financial products and services that help them to combat poverty directly. For instance, Kabeer (2005) finds that development in microfinance in South Asia can and does make vital contributions to the economic productivity and social welfare of poor women and their households by financial empowerment. G. Corrado and L. Corrado (2017) and Park Mercado (2015) are also in favour of the argument that: access to finance, credit in particular, enable the poor to access other primary services and social opportunities, help them to cope with unexpected short-term fluctuations, support them to make long-term consumption and investment decision; and more importantly, enable them to participate in productive economic activities that help in poverty alleviation. Based on a qualitative review of a series of cases studies regarding inclusive financial sector development across the developing countries, Chibba (2009) concludes that the increasing availability of financial institutions among those countries worked significantly well as a conduit between financial inclusion and poverty alleviation. Some studies also propose that inclusive financial sector development could further enhance the promotion of economic development and the optimisation of income distribution; which in turn, help the growth of income and poverty reduction indirectly through the ‘trickle-down effect’ (Beck, Demirgüç-Kunt, et al., 2007). Park and Mercado (2015) construct their own financial inclusion indicator for 37 developing Asian economies and find that financial inclusion significantly reduces poverty and lowers income inequality. Their findings also suggest that the level of financial inclusion is greatly influenced by demographic characteristics, as well as governance and institutions quality of economies in developing Asia.

⁵⁹ Research has predominantly focused on the effect of financial development at the macroeconomic level. See *Chapter 1*.

As previously discussed, most of the available studies examine financial inclusion and its implications in the context of a broader topic – financial development, that typically use cross-country macro-level data. Nevertheless, using macro-level data cannot provide useful and detailed insights into how individuals and households are influenced by their choices of inclusion or exclusion from the financial system. Therefore, the use of micro-level data is essential and more appropriate as it helps to explain how individuals and households benefit from financial inclusion. Dimova and Adebowale (2018) use the Nigerian General Household Survey data and find that, access to finance improves household welfare, yet with a side effect - increase income inequality. Churchill and Marisetty (2019) use the latest Indian national survey data and argue that, financial inclusion is likely to contribute to poverty alleviation through multiple channels, and the effect of insurance on poverty weights more than the access to bank accounts and credit. Using data from the Ghana Living Standards Survey in 2016/17, Koomson et al. (2020) find that, an increase in the level of financial inclusion associates with not only a decline in a household's likelihood of being poor by 27 per cent but also prevents its exposure to future poverty by 28 per cent. Using the survey data of China Family Panel Studies (CFPS) for rural China in four waves from 2010 to 2016, Y. Yang and Fu (2019) find that financial inclusion in aspects of permeability⁶⁰, usability⁶¹, and utility⁶² can significantly reduce multidimensional poverty, wherein aspects of quality and affordability has no significant effect. In addition, they also emphasise the importance of labour capacity of the poor as their results suggest, financial inclusion works more effectively for the rural working-age population who has the strongest labour capacity and development potentials. Inclusive finance only addresses poverty issues with economic development prospects and requires its clients to have the potential for development and have the ability to repay the capital and interest, rather than alleviate poverty in a way social assistance does.

With no denying of the positive impact of financial inclusion on poverty alleviation in general, some studies also find that its poverty alleviation effects are different among different poor groups. For instance, Kondo et al. (2008) conclude that in the case of the Philippines, the

⁶⁰ It is manifested in the expansion of the network coverage of financial institutions and the further sinking of financial services, which can extend the financial markets to more remote and more deprived areas.

⁶¹ It is manifested in the increased demand and participation of rural inclusive finance among rural poor people, so that more of them can have access to financial services without the restriction of mortgage conditions.

⁶² It is manifested in the expansion of agricultural credit scale and the enhancement of the capacity to promote agricultural production and rural economic development, which is conducive to letting the poverty alleviation funds exert the maximum benefits, and truly achieve poverty alleviation and deliver genuine outcomes.

slightly low-income families are the main beneficiaries rather than the impoverished families. Similarly, Zhu and Wang (2017) show that the effect of financial inclusion is heterogeneous for different income groups, that is the high-income rural poor benefit more in poverty reduction and income growth relative to low-income rural poor. In addition, Khaki and Sangmi (2017) find that access to finance can alleviate poverty, yet the non-poor households received most of the funds rather than the absolute poor households.

Moreover, several studies also argue that the success of financial inclusion in poverty alleviation is also linked with individual social-demographic characteristics (see, Heenkenda, 2014). Leaving these characteristics, such as gender, unaddressed in policymaking could eventually lead to financial inequality, which is against the purpose of promoting financial inclusion. Based on the 2017 Global Findex data, the disparity between females and males with a financial account is 65% versus 72% (World Bank, 2018). Females have been found to be more likely to be excluded from the formal financial sector in countries where *i*) laws and social norms discriminate against female, *ii*) lower participation of females in the labour market, *iii*) state-owned banks constitute a more significant share in the banking system, among others (for details, see Asli Demirgüç-Kunt et al., 2013; Morsy & Youssef, 2020). The gender gap has persisted despite the recent promotion of financial inclusion, and the gap is argued to be at the largest among the poor: poor females are 28% less likely than poor males to have a formal bank account (Asli Demirgüç-Kunt et al., 2013). Better and more meaningful financial inclusion that reduce gender inequalities may raise females' productivity and earnings and reduce their chances of being poor (Suri & Jack, 2016). Provided that females usually confront more significant barriers to formal banking services and tend to be more credit-constrained than males, enhancing financial inclusion and eliminating gender gaps for access remains a significant challenge in many countries (Morsy & Youssef, 2020).

Although the financial sector in the past few decades, primarily the banking industry, has achieved tremendous growth in volume and complexity and improved significantly in areas related to financial viability, profitability and competitiveness. Bihari (2011) raises concerns that banks have not been able to include a vast segment of the population, especially the underprivileged sections of the society, into the fold of basic banking services. There tends to be a significant overlap between poverty and permanent financial exclusion, as both poverty and financial exclusion result in a reduction of choices which affects social interaction and leads to reduced participation in society (Bihari, 2011). The whole purpose of the development

in financial inclusion is to better serve the underserved and unserved population in a way to provide them with sufficient and tailored financial products and services for their basic needs and self-developments when needed. As the detailed discussion regarding financial inclusion experiences of China presented in *section 3.2*, financial inclusion has been improved dramatically so far, especially for those households living in rural, remote and less developed areas, will this also be the case for the wellbeing of those households, or for all households in general regardless their geographic locations and their demographic characteristics? This paper aims to contribute to this literature by answering whether financial inclusion helps to improve people's lives, especially the poor segment, focusing on household income; and how financial inclusion combined with household characteristics affect household income at the microeconomic level. In addition, we also interest to discover if financial inclusion in China produce any gender difference in improving household welfare.

5. Data and Methodology

In this study, we use the cross-sectional dataset extracted from the China Household Finance Survey (CHFS) of its latest 2017 wave. The CHFS is a biennial longitudinal representative household survey developed by the Survey and Research Center for China Household Finance at the South-Western University of Finance and Economics (SWUFE). The dataset is national representative which includes plentiful information regarding household income and wealth, assets and liabilities, expenditures, social security and commercial insurance, demographics, employment status, the involvement in agricultural and commercial activities and payment habits and many more. The CHFS employs a stratified three-stage Probability Proportion to Size (PPS) random sample design. Its primary sampling units (PSU) includes 2,585 counties (including county-level cities and districts) from all province (including municipalities) in China except Tibet, Xinjiang, Inner Mongolia, Hong Kong, Macau, and Taiwan⁶³. On average, the ratio for the selected counties in Eastern, Central, and Western China was about 37:30:33. Its second stage of sampling involves selecting residential committees from the counties/cities selected in the earlier stage, and the ratio of urban to rural communities selected was 182:139. Lastly, its third stage involves selecting households from the residential committees/villages chosen in the previous stage. Each stage of sampling is performed with the PPS method and

⁶³ For the full list of the 29 provinces (including municipalities), please refer to the *Chapter 4 Appendix A*.

weighted by its population size (see, Gan et al., 2014 for detailed sampling process). In addition, the CHFS also employed a proprietary interview system and management platform based on the cutting-edge CAPI (Computer-assisted Personal Interviewing) system. The integrated system provides a full package for conducting computer-based household interviews which reduce human non-sampling errors by pre-setting the range of possible answers, catching typing errors, and avoiding skipped questions. All the above factors improved its data quality significantly overtime. The CHFS currently contains four waves – 2011, 2013, 2015, and 2017. The latest 2017 survey was carried out on 40,011 households located in 1428 communities (urban and rural) in 355 counties (districts and cities) in 29 provinces (including municipalities) in China. As the number of surveyed households was proliferating in each wave, and households that continuously participated in all years count only a fraction of the total number interviewed in 2017 that could significantly reduce our sample size; as well as the inconsistency in a number of key questions and answers provided across years that are relevant to our study; we then process our analysis with the latest wave that has the most comprehensive coverage in all terms. To our knowledge, CHFS is the most representative survey of Chinese household financial activities; and because of its detailed information regarding household financial activities, its datasets in earlier waves have been researched in many recently published papers (e.g., Cai et al., 2018; Fu et al., 2016; Hu et al., 2020; X. Yang & Gan, 2020). This study, by far, should be the first research that using its latest 2017 wave.

To examine the relationship between financial inclusion and poverty that is measured using household income, the empirical specification is given as below:

$$y_i = \beta_0 + \beta_1 F_i + \beta_2 X_i + \mu_i \quad (1)$$

where y_i is the dependent variable, that refers to Log (Income) - the natural logarithm of household income per equivalent person. That is, with regard to family size, Log (Income) results from each household's total income adjusted by the Oxford Equivalence Scale of family members, where one of the adults in the household has weight 1, the other adult has weight 0.7, and children have weight 0.5 (see, Atkinson & Al., 1995; Miller & Paxson, 2006; Jin, Wu, & Li, 2010; Li, 2018). All income indexes for this study are calculated based on the income per

equivalent person⁶⁴. In addition, as defined by CHFS, household income includes all sorts of income such as wage income, agricultural income, business income, assets income and transfer income.

The variable F_i is the indicator of financial inclusion. The general approach to measure financial inclusion depends on the way it is conceptually defined, and most of the times a single indicator for one of its dimensions is used such as access to bank accounts or access to credit. In our study, considered financial inclusion's multidimensional nature, we incorporate a two-stage approach to defining it. Firstly, we utilise the World Bank's definition of financial inclusivity as 'access to useful and affordable financial products and services when individuals are in need of transaction and payment, saving, credit, and insurance' (World Bank, 2015b). Secondly, following the methodology of Sarma (2015), we look into a number of proxies for the above dimensions (transaction and payments, savings, credit and insurance) that are heavily used in macroeconomic literature and find their microeconomic counterparts as our indicators for the construction of financial inclusion index. For instance, in terms of transaction and payments that represents an individual's capacity to gain access to financial products and services when purchasing goods and services. Macroeconomic studies tend to use the size of the 'banked population' – the proportion of adults that have transaction accounts (Amidžić et al., 2017; Park & Mercado, 2015; Sarma, 2008, 2015; Sarma & Pais, 2011). Its microeconomic counterpart can be measured by a variable that determines whether a household has access to checking accounts. In terms of savings, that refers to current wealth households are willing to give up for future consumption to maximise inter-temporal utility. The macroeconomic approach usually uses deposit per thousand adults (Amidžić et al., 2017); and its microeconomic counterpart can be measured by variables that determine whether a household has access to any term deposits, stocks, funds, bonds, and others⁶⁵. In terms of credit, it refers to the future consumption that households are willing to forgo for current consumption. The macroeconomic approach typically incorporates measures such as the percentage of the

⁶⁴ Using income per equivalent person captures the importance of income to each household more accurately than using income per capita. For instance, Household A has three adult members, and one member has income of \$3000 per month. Household B has one adult and two children, and the adult has income of \$3000 per month. Therefore, the income per capita for both households is \$1000 per month, but the income per equivalent person for A is \$1250 and for B is \$1500. Comparing income per equivalent person between Households A and B suggests that A is more constrained by income and B is slightly richer. This meets reality, because Household A generally consumes much more than B. If using income per capita, the different importance of income between the two households would be overlooked.

⁶⁵ According to Bodie, Merton and Cleeton (2009), financial instruments can be grouped into three categories: debt (term deposit and bond); equity (stocks) and derivatives (futures, forward contracts, swaps); and other financial instruments. We have incorporated both debt and equity but not derivatives to savings, due to the size of households that have derivatives is extremely small of the surveyed households.

population that receive credit (Sarma, 2015). Its microeconomic counterpart can be measured by variables that determine whether a household has any outstanding or paid loans⁶⁶, as well as credit cards. Lastly, in terms of insurance, that refers to products help households to build resilience against covariate and idiosyncratic shocks, such as life, health, and property insurance (Bodie et al., 2009). Macroeconomic studies usually do not engage with insurance controls, yet from a microeconomic perspective, this dimension can be captured by variables that determine if a household has any commercial life, health and other types of insurance.

Given the above, we compute F_i that followed the strategy similar to Churchill and Marisetty (2019), Mallick and Zhang (2019) and Ibrahim and Aliero (2020) in computing the financial inclusion index⁶⁷. F_i is defined as a dummy variable that equals to 1 if a household is financially included and 0 otherwise. Explicitly, we assign each household with a score for inclusion that based on six microeconomic indicators of the four dimensions discussed above. The maximum inclusion score is 100, where the four dimensions are equally weighted, so each dimension has a maximum score of 25 and carries a weight 1/4. In the saving and credit dimensions, there are two indicators each and carry the same weight, 1/8; and in the transaction and payment dimension, as well as the insurance dimension, there is one indicator each and carry the weight of 1/4 (see, *Table 1* below). Then we sum the score achieved from each indicator to obtain the final household financial inclusion score. The mean score achieved for the sample is 34.18, and the median score is 25, and to reflect the multidimensionality better and to show the extent of financial inclusion we apply a similar approach to Churchill and Marisetty (2019) and Ibrahim & Aliero (2020) by using a cut-off score of 50, which is equivalent to 1/2 of the weighted indicators. In this case, we consider a household is financially included if its score is greater or equal to 50, and financially excluded otherwise. We also change the cut-off score to 75 as part of robustness checks, and these results are attached in the *Chapter 4 Appendix H*.

Table 1. Assigned Score and Inclusion Threshold of Each Dimension and Its Indicators

Dimension (Max. Score)	Indicator (Max. Score)	The Household is Financially Included if it has any...	Weight
---------------------------	---------------------------	--	--------

⁶⁶ Loan in our study include any paid/unpaid bank loan in terms of agricultural/business activities, housing, commercial estate, cars, financial products, education, etc.

⁶⁷ The idea for their financial inclusion index was initially borrowed from Dotter and Klasen (2014) and UNDP (2015) in computing the multidimensional poverty index.

Transaction (25)	Checking Account (25)	Checking account	1/4
Saving (25)	Debt (12.5)	Term deposits	1/8
	Equity (12.5)	Stock trading account or funds	1/8
Credit (25)	Loan (12.5)	Unpaid/paid loan for agricultural/business activity, housing, cars, education, financial products, etc.	1/8
	Credit Card (12.5)	Credit card	1/8
Insurance (25)	Commercial insurance (25)	Commercial insurance	1/4

Source: Author's own work.

Moreover, \mathbf{X}_i is a vector variable which contains controls that have been previously found conducive in explaining household income movements. For instance, we include household head age, gender, marital status, educational level, political status (communist and non-communist) and employment status; family size (number of family members); *hukou* (agricultural and non-agricultural)⁶⁸; resident in rural or urban areas; household's owned number of houses and cars; the proportion of children; the proportion of the elderly, and others. In addition, to control for unobserved time-invariant characteristics such as geographical locations, we have also incorporated regional dummy variables (north-eastern, eastern, central, and western). Finally, μ_i is a normally distributed error term with mean equals to zero. *Table 2* below provides summary statistics of variables used in this study:

Table 2. Summary Statistics

	N	Mean	Median	St.Dev	min	max
Household Income (Log) ⁶⁹	39170	9.64	9.95	1.51	3.44	13.35
Financial Inclusion Score (0-100)	39170	34.18	25	19.67	0	100
Financial Inclusion Dummy (0-1)	39170	.25	0	.43	0	1

⁶⁸ The Hukou system is China's unique household registration system that is used to control of internal migration and the management of social protection. It continues to impose an economic-political differentiation between holders of different types but with progressive improvement and unification in recent years.

⁶⁹ Unit of Household income per equivalent person before logged is in RMB10,000.

Whether household has any (1=Yes; 0=No)						
... Checking Account	39170	.85	1	.36	0	1
... Debt such as Term Deposits and Bonds	39170	.18	0	.38	0	1
... Equity such as Stocks	39170	.12	0	.33	0	1
... Loan for business, housing, education, etc.	39170	.25	0	.43	0	1
... Credit Card	39170	.2	0	.4	0	1
... Commercial Insurance	39170	.15	0	.35	0	1
Gender (1=Male; 0=Female)	39170	.79	1	.41	0	1
Age	39170	55.25	55	14.1	24	86
Hukou (1=Agricultural; 0=Non-agricultural)	39170	.52	1	.5	0	1
Rural (1=Rural, 0=Urban)	39170	.32	0	.47	0	1
Marital Status (1=Married; 0=Others)	39170	.85	1	.35	0	1
Education (in yrs.)	39170	9.48	9	3.9	2	22
Communist Party Membership (1=Yes; 0=No)	39170	.12	0	.32	0	1
Employment Type (1=Officials; 0=Others)	39170	.07	0	.25	0	1
Whether household engages in any						
...Business related activities (1= Yes; 0=No)	39170	.14	0	.35	0	1
...Agriculture related activities (1= Yes; 0=No)	39170	.24	0	.43	0	1
Family Size	39170	3.16	3	1.54	1	15
Proportion of Children (Younger than 16)	39170	.11	0	.16	0	.83
Proportion of the Old (Older than 65)	39170	.24	0	.37	0	1
No. of Houses Owned	39170	1.2	1	.52	0	27
No. of Cars Owned	39170	.29	0	.53	0	5

Source: Author's calculations.

Table 3 below provides the correlations of main variables and for all variables, please refer to *Chapter 4 Appendix B*. We have also conducted the multicollinearity test, and the resulted Mean VIF is 1.48 with no variable's VIF greater than 10, which suggests that no multicollinearity arises (see, *Chapter 4 Appendix C*). Moreover, we also performed the Breusch-Pagan test for heteroskedasticity and the resulted *p*-value against the null hypothesis that the variance is homogeneous (see, *Chapter 4 Appendix D*), so we use the heteroskedasticity-consistent standard errors to deal with possible heteroskedasticity in all further regressions.

Table 3. Matrix of Correlations

Key Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Household Income	1.000								
(2) Financial Inclusion Score	0.319	1.000							
(3) Financial Inclusion Dummy	0.268	0.792	1.000						
(4) Account	0.139	0.572	0.219	1.000					
(5) Debt	0.209	0.368	0.291	0.095	1.000				
(6) Equity	0.276	0.487	0.463	0.080	0.181	1.000			
(7) Loan	0.072	0.422	0.328	0.059	-0.046	0.088	1.000		
(8) Credit Card	0.245	0.555	0.543	0.094	0.081	0.322	0.219	1.000	
(9) Insurance	0.146	0.648	0.661	0.078	0.080	0.206	0.129	0.251	1.000

Source: Author's calculations.

6. Empirical Strategy

For our baseline results, we apply a simple Ordinary Least Squares (OLS) technique to examine the effect of financial inclusion on household income. Nevertheless, as OLS only partially reveals the above relationship if we are interested in observing how financial inclusion shapes the household income movement at different points in the conditional distribution of income; Quantile Regressions (QR) technique, in this case, could better serve the purpose. Compared with OLS, QR fits a linear model for conditional quantiles rather than conditional means, and its estimates could capture changes in distribution shape and spread, as well as changes at different points of the income distribution. Therefore, it enables us to study the impact of financial inclusion on different quantiles for the household income distribution and thus provide a more thorough analysis in terms of the relationship between variables of interest. The QR technique has been prevalent among income-related studies (see, Angrist et al., 2006; Autor et al., 2006; Buchinsky, 1994; Chamberlain, 1994; Gosling et al., 2000) and poverty-related studies (see, Alvi & Senbeta, 2014; Bosco, 2019; Habyarimana et al., 2015; Krüger, 2007; Le et al., 2019).

In addition, we hypothesise that financial inclusion leads to more income-earning opportunities, However, it remains plausible for households with rising (higher) income to have more exposure to financial products and services and become more financially included. Therefore, equation (1) may suffer from endogeneity caused by reverse causality and selection bias. To address this potential issue, we apply Rosenbaum and Rubin (1983)'s Propensity Score Matching (PSM) technique considering F_i is a binary variable. PSM has been extensively used in literature using non-experimental data to address endogeneity (see, Awaworyi Churchill &

Smyth, 2017; Bryson, 2002; Churchill & Marisetty, 2019; Dehejia & Wahba, 2002; Zhang & Posso, 2019). In terms of our study, PSM can be effectively used to determine the average effect of the treatment – being financially included, on the outcome variable – household income. In other words, we could then observe how the income of a household would have performed if that household was not financially included. In general, PSM requires firstly, to determine observational covariates and estimate the propensity score that is used to balance the sample; secondly, to select appropriate matching algorithms for the calculation of the treatment effect; and lastly to perform sensitivity tests to determine the robustness of the estimated Average Treatment Effect on the Treated (ATT) (Caliendo & Kopeinig, 2008). We incorporate multiple matching algorithms with replacement⁷⁰ when computing PSM, such as nearest neighbour, kernel, radius, local linear regression and mahalanobis⁷¹.

Moreover, we also incorporate a new method of counterfactual decomposition for QR developed by Melly (2005) aiming to decompose the difference between two observable quantile functions and to investigate to what degree financial inclusion rather than household characteristics affects household income across quantiles. It is similar in principle to the famous Oaxaca/Blinder decomposition of the quantile differences (Blinder, 1973; Oaxaca, 1973). We decompose the difference of household income between two types of households that are distinct in terms of their financial inclusion status, i.e., financially included ($F_i = 1$) households and financially excluded ($F_i = 0$) households. Then the estimated *Effects of Coefficients* measure the extent to which financial inclusion, rather than household characteristics, contributes to differences in household income. While the *Effects of Characteristics* measure the extent to which household characteristics solely contribute to differences in household income across quintiles. For applications using quantile regression that include counterfactual analysis, see for example Chernozhukov et al. (2013), Frölich and Melly (2010), Machado and Mata (2005), and Melly (2005).

Last but not least, considering the nature of financial inclusion dummy variable F_i used in all above analysis, it is highly unlikely for households to be previously excluded from all financial products and services ($F_i = 0$) and then become fully included ($F_i = 1$) in a short period.

⁷⁰ It means an untreated household can be used more than once as a match.

⁷¹ As trade-offs between bias and efficiency exist for using all available matching algorithms and no algorithm dominates in all data situations as argued by Caliendo and Kopeinig (2008); so we decided to use many rather than one to see if results among different algorithms differ substantially.

Moreover, inferences from the above analysis offer only relative income differences associated with financial inclusion across the two groups in a given quantile. Therefore, in order to quantify the real monetary effect in an absolute term that associated with financial inclusion on household income, i.e., how much income can be generated from more participation in the financial sector. We take full advantage of the constructed financial inclusion score as a continuous variable and use the Instrumental Variable (IV) analysis – Two-Stage Least Squares (2SLS) to address the endogeneity of equation (1). The instrumental variables we use are the average financial inclusion scores for households (exclude that particular household) reside in the same rural/urban community (see, Bascle, 2008; Song et al., 2017; Y. Zhang et al., 2020). We argue that the mean financial inclusion score for a community will affect the score of households residing in that community. The reason is pretty straight forward as communications within the community between one household and its close neighbours could easily affect its decision-making process for the uptake and usage of a financial product or service, as well as its financial inclusion score. The mean financial inclusion scores are different across communities and subject to local economic and financial development. Thus, we expect a correlation between the mean financial inclusion score of a community and the score of its residing households. Moreover, the exclusion restriction is satisfied as the mean score of a community has no direct impact on one household's income but has an indirect impact through affecting that household's financial inclusion decision. Relevant validity tests of our instruments are presented in the following section.

7. Empirical Results

7.1. OLS and Quantile Regressions

The estimation results of equation (1) using OLS and QR are presented in *Table 4* as below. *Column (1)* presents the results from OLS while *column (2) - (10)* present the results from QR. We use the heteroskedasticity-consistent standard errors to deal with possible heteroscedasticity across all estimations. For ease of exposition and considering most of the coefficient estimates are consistent with findings in previous literature and adhere to a *priori* expectations, we only discuss the coefficient estimates of financial inclusion in more details.

According to our baseline results using OLS in terms of the relationship between financial inclusion and household income – *column (1)*, it is indicated that the financially included households have more income than those excluded ones and the effect of financial inclusion seems to be relatively large. The coefficient estimates suggest the income of financially included households is approximately 38 per cent higher than those excluded households. The result confirms findings in a number of country-level studies (see, Bruhn & Love, 2009, 2014; Burgess & Pande, 2005; Cull et al., 2013; Koomson et al., 2020). Nevertheless, as previously discussed, households that fall into different income groups might have different distributions corresponding to the set of independent variables and the mean distribution for all income groups offered by OLS may not be sufficient. Therefore, we employ QR that computes various percentage points of the distribution.

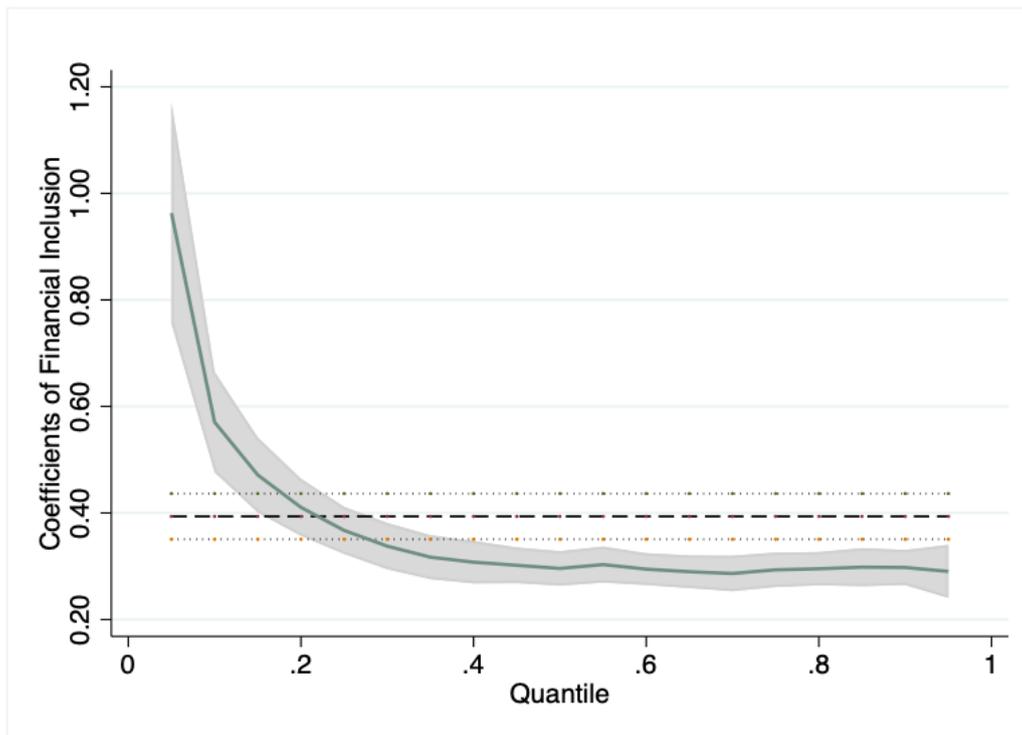
According to QR estimation results listed in *column (2)-(10)*, that corresponds to the 10th – 90th quantile, financial inclusion clearly has a more significant effect on household incomes that fall into lower quantiles. The income of financially included households in the 10th, 20th, 30th, 40th, 50th, 60th, 70th, 80th, and 90th quantiles are generally 59.3, 39.3, 32.5, 29.8, 27.7, 27.3, 27.3, 25.7 and 26.8 per cent higher than those of financially excluded households. Specifically, households that fall into the lowest 10th quantile, i.e., the poorest households, experience the most substantial income difference associated with financial inclusion. Moreover, the magnitude of the effect of financial inclusion decreases along with increases in household income until the 70th quantile. This could suggest that poorer households benefit more from being included in the formal financial sector by using adequate financial products or services to expand their income streams. While wealthier households, on the contrary, may already have a certain level of inclusion and do have other means of income that weaken the financial inclusion effect on their income. The downward sloping trend of financial inclusion start to climb up marginally from the 80th quantile might suggest that the wealthiest households may take full advantages of financial inclusion given their built-up wealth and capabilities in leveraging all financial products and services with income-generating purpose. *Figure 1* below plots the coefficient estimates of the QR (green line) as well as the OLS estimate (black dotted line) with 99 per cent confidence interval bands to show the relationship between financial inclusion and household income by quantile.

Table 4. OLS and Quantile Regressions

	Dependent Variable: Household Income per Equivalent Person (Log)									
	(1) OLS	(2) Q10	(3) Q20	(4) Q30	(5) Q40	(6) Q50	(7) Q60	(8) Q70	(9) Q80	(10) Q90
Fin. Incl. D.	0.380*** (24.552)	0.593*** (16.237)	0.393*** (19.346)	0.325*** (22.150)	0.298*** (23.543)	0.277*** (24.919)	0.273*** (25.190)	0.273*** (26.571)	0.257*** (22.312)	0.268*** (19.541)
Gender	0.001 (0.072)	0.017 (0.421)	-0.015 (-0.611)	-0.007 (-0.405)	-0.011 (-0.765)	-0.016 (-1.221)	-0.021* (-1.754)	-0.013 (-1.164)	-0.012 (-1.047)	0.000 (0.010)
Age	0.001* (1.873)	0.011*** (6.287)	0.006*** (6.535)	0.003*** (4.516)	0.002*** (3.266)	0.001 (0.973)	-0.001 (-1.150)	-0.001** (-2.551)	-0.002*** (-4.255)	-0.003*** (-5.433)
<i>Hukou</i>	-0.499*** (-26.890)	-1.132*** (-19.315)	-0.794*** (-24.407)	-0.595*** (-27.117)	-0.493*** (-29.726)	-0.433*** (-27.415)	-0.375*** (-28.295)	-0.324*** (-24.488)	-0.281*** (-19.265)	-0.240*** (-15.083)
Rural	-0.355*** (-17.915)	-0.446*** (-8.375)	-0.498*** (-12.671)	-0.496*** (-19.991)	-0.473*** (-22.398)	-0.391*** (-21.315)	-0.328*** (-19.236)	-0.277*** (-17.981)	-0.224*** (-13.572)	-0.174*** (-9.938)
Marital Status	0.017 (0.793)	0.141** (2.182)	0.081** (2.547)	0.066*** (2.956)	0.051*** (2.686)	0.042** (2.568)	0.036** (2.309)	0.003 (0.191)	-0.013 (-0.813)	-0.082*** (-4.384)
Education	0.073*** (32.061)	0.113*** (21.126)	0.096*** (28.658)	0.086*** (34.727)	0.075*** (37.685)	0.067*** (38.832)	0.063*** (39.241)	0.059*** (37.999)	0.056*** (35.489)	0.053*** (31.502)
Communist Party	0.162*** (8.611)	0.141*** (3.596)	0.171*** (7.214)	0.153*** (8.936)	0.144*** (9.320)	0.134*** (9.796)	0.116*** (9.363)	0.110*** (8.624)	0.113*** (8.740)	0.121*** (7.405)
Public Official	0.116*** (6.103)	0.266*** (7.235)	0.055** (2.361)	-0.019 (-0.960)	-0.026 (-1.484)	-0.022 (-1.362)	-0.024 (-1.569)	-0.018 (-1.109)	-0.025 (-1.430)	-0.045** (-2.100)
Business	0.010 (0.424)	-0.469*** (-6.141)	-0.050 (-1.606)	0.019 (0.916)	0.066*** (3.420)	0.121*** (7.165)	0.170*** (10.344)	0.232*** (12.823)	0.296*** (16.321)	0.375*** (17.987)
Agricultural	-0.071*** (-3.508)	0.029 (0.594)	-0.055 (-1.587)	-0.113*** (-4.790)	-0.116*** (-5.440)	-0.117*** (-6.158)	-0.093*** (-4.996)	-0.079*** (-4.695)	-0.061*** (-3.463)	-0.032* (-1.672)
Family Size	-0.020*** (-3.431)	0.064*** (4.041)	-0.003 (-0.413)	-0.029*** (-4.614)	-0.042*** (-8.611)	-0.059*** (-12.238)	-0.072*** (-16.313)	-0.080*** (-18.182)	-0.092*** (-20.566)	-0.100*** (-17.887)
Proportion of Children	-0.472*** (-8.953)	-0.692*** (-5.361)	-0.451*** (-6.199)	-0.328*** (-6.286)	-0.257*** (-5.607)	-0.234*** (-5.893)	-0.259*** (-6.889)	-0.249*** (-6.395)	-0.190*** (-4.705)	-0.212*** (-4.021)
Proportion of the Elderly	0.313*** (13.316)	0.518*** (8.182)	0.292*** (7.953)	0.299*** (11.476)	0.312*** (14.774)	0.332*** (17.726)	0.358*** (21.933)	0.362*** (23.157)	0.347*** (21.118)	0.311*** (15.342)
No. of Houses	0.237*** (13.045)	0.227*** (8.818)	0.219*** (10.965)	0.220*** (17.262)	0.216*** (20.340)	0.212*** (22.140)	0.206*** (23.477)	0.204*** (19.408)	0.200*** (20.009)	0.194*** (16.287)
No. of Cars	0.259*** (17.247)	0.227*** (7.693)	0.218*** (13.095)	0.232*** (17.695)	0.234*** (21.569)	0.232*** (23.461)	0.239*** (23.954)	0.245*** (23.628)	0.252*** (24.421)	0.253*** (21.393)
1.region	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
2.region	0.298** (14.463)	0.274*** (4.743)	0.310*** (10.919)	0.311*** (15.415)	0.301*** (17.778)	0.317*** (21.272)	0.332*** (24.597)	0.338*** (25.667)	0.349*** (25.699)	0.333*** (17.644)
3.region	-0.033 (-1.447)	-0.081 (-1.298)	-0.065** (-1.979)	-0.041* (-1.769)	-0.057*** (-2.909)	-0.026 (-1.498)	-0.004 (-0.234)	0.008 (0.559)	0.026* (1.719)	0.018 (0.861)
4.region	-0.104*** (-4.550)	-0.156** (-2.367)	-0.130*** (-3.962)	-0.106*** (-4.525)	-0.110*** (-5.483)	-0.064*** (-3.610)	-0.041*** (-2.682)	-0.021 (-1.431)	0.004 (0.225)	0.005 (0.238)
_cons	8.717*** (145.957)	6.355*** (41.870)	7.712*** (96.725)	8.356*** (140.203)	8.822*** (190.158)	9.189*** (207.625)	9.477*** (231.995)	9.736*** (237.126)	10.022*** (240.981)	10.442*** (218.854)
N	39170	39170	39170	39170	39170	39170	39170	39170	39170	39170
r2	0.290	0.267	0.285	0.287	0.287	0.286	0.283	0.279	0.271	0.259

Notes: Robust *t* statistics in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$
 Source: Author's own calculation.

Figure 1. Quantile Plots



Source: Author's own work.

7.1.1. Propensity Score Matching

Given the concern for endogeneity that might bias our estimates, we use the PSM technique to address the issue as discussed earlier using multiple matching algorithms. Our results summarised in the following *Table 5* show the conclusion regarding the effect of financial inclusion remains valid.

All the matching algorithms are performed with replacement, and the balancing results are convincing given almost all the matched covariates' standardised percentage biases are largely reduced than those unmatched, and are less than 10 per cent threshold level, as well as their t-test statistics have *p*-values that failed to reject the balancing assumption – the means of all the covariates do not differ between the treated and control groups. For details of PSM and balancing test results, please see *Chapter 4 Appendix E* for all matching algorithms used.

According to *Table 5*, the Average Treatment Effect on the Treated (ATT) are all significant at 1 per cent significance level. The Nearest neighbour (k=1) matching algorithm corresponds to an ATT equals to 0.379; the Nearest neighbour (k=4) matching algorithm corresponds to an

ATT equals to 0.379; the Kernel matching algorithm corresponds to an ATT equals to 0.405; the Radius matching algorithm corresponds to an ATT equals to 0.406; the Local linear regression matching algorithm corresponds to an ATT equals to 0.406; and the Mahalanobis matching algorithm with heteroskedasticity-consistent analytical standard errors proposed by Abadie and Imbens (2006) corresponds to an ATT equals to 0.397. Those results are close to the coefficient estimate of financial inclusion from our baseline OLS results, 0.380, which further indicate the robustness of the PSM estimates.

Table 5. Results from PSM with Different Matching Algorithms

Matching Algorithm	ATT (Average Treatment Effect on The Treated)	
	Observed coefficient	Standard error
Nearest neighbour (k=1)	0.379***	0.027
Nearest neighbour (k=4)	0.379***	0.022
Kernel	0.405***	0.020
Radius	0.406***	0.020
Local linear regression	0.406***	0.027
Mahalanobis matching	0.397***	0.018
Baseline result		
OLS	0.380***	0.016

Notes: *** represent significance at the 1 per cent level.

Source: Author's own calculation.

7.1.2. Counterfactual Decomposition

Following the estimation using QR and robustness check using PSM, we extend our analysis by using Melly's (2005) counterfactual decomposition as previously discussed to validate our findings. In essence, it is the conditional distribution estimated by QR that integrated over the range of the covariates to obtain estimates of the unconditional distribution. Then counterfactual distributions can be estimated, allowing the decomposition of changes in distribution into changes in regression coefficients (*Effects of Coefficients*) and changes in the distribution of covariates (*Effects of Characteristics*). We calculate and summarise the results in *Table 6* below, and the full estimates are attached in *Chapter 4 Appendix F*.

According to *Table 6*, for households that fall into the lowest income quantile – the 10th quantile, the proportion of *Effects of Coefficients* (58.0) outweighs the proportion of *Effects of Characteristics* (42.0). This indicates that financial inclusion is the main drive for the income differences between the financially included ($F_i = 1$) and financially excluded ($F_i = 0$) households sit in the poorest quantile, as opposed to other household characteristics.

Meanwhile, for households that fall into the 20th – 90th quantile, the *Effects of Coefficients* are decreasing (from 44.5 to 30.4), whereas the *Effects of Characteristics* are increasing (from 55.5 to 69.6) in explaining the income differences. It suggests that the role household characteristics play surpasses financial inclusion's and have a more significant portion in explaining the differences for non-extreme poor households. These results reveal a finding that is consistent with our previous analysis – financial inclusion has a strong and positive effect on household income that across all income groups, and this effect is at its largest for the extremely poor households and becomes weaker along with increases in household income. In other words, households that have the lowest 10 per cent income benefit more than any other income groups from being included in the formal financial sector.

Table 6. Counterfactual Decomposition

	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Total	100	100	100	100	100	100	100	100	100
Effects of Characteristics	42.0	55.5	62.8	67.6	70.4	71.6	71.5	70.0	69.6
Effects of Coefficients	58.0	44.5	37.2	32.4	29.6	28.4	28.5	30.0	30.4

Notes: Q10-Q90 represent quantiles from 10 to 90.

Source: Author's own calculation.

7.2. Instrumental Variable Regression

Given the above analysis in *section 7.1*, we can observe the effect of financial inclusion on household income is measured in a relative way – within the same income group, the difference in income that associates with financial inclusion. Combined with reasons listed in *section 6*, we then perform another analysis in parallel with the QR estimation and use the Financial Inclusion Score rather than the Financial Inclusion Dummy as our financial inclusion indicator.

Firstly, we conduct a baseline estimation of equation (1) using OLS, where F_i is Financial Inclusion Score and the rest of the independent variables remain the same as our previous section. Since OLS results are biased in the presence of endogeneity as discussed earlier; thus, for robustness, we employ the Two-Stage Least Squares (2SLS) estimator using two instrumental variables – the average financial inclusion scores for households (exclude that particular household) reside in the same rural/urban community. We report the results of OLS and 2SLS in the following *Table 7* column (1) and (2).

To justify the validity of the constructed instrumental variables, we have performed a series of tests. We begin with the test for exogeneity of our instrumental variables. The overidentification test Hansen J -Statistic equals 1.257 with a p -value equals 0.262 that suggests both instrumental variables can be considered as exogenous and uncorrelated with the error term. Then, we test whether our instrumental variables are correlated with the endogenous variable F_i . Based on the first-stage results, Shea's partial R-squared that equals to 0.0424 is greater than the benchmark value of 0.04, and the F -statistics that equals 855.543 with a p -value of 0 is greater than the benchmark value of 10 (rule of thumb). Therefore, our instrumental variables are correlated with the endogenous variable. Moreover, in consideration of the size distortion that may be enlarged by weak instruments when using 2SLS, we also incorporate the weak instruments test and the result suggests that our instruments are not weak, as the F -statistics equals 866.079 that is higher than the critical value of 19.93 if we are willing to accept maximum bias in IV estimator to be less than 10%. Lastly, we also perform the endogeneity test to determine whether our pre-assumed endogenous F_i is, in fact, exogenous to our model. The test statistics have p -values of 0, that suggest F_i is indeed endogenous. For full test results regarding the validity of IVs, please see *Chapter 4 Appendix G*.

According to *Table 7*, comparing the estimates in terms of the effect of financial inclusion on household income between OLS and 2SLS, endogeneity clearly causes a downward bias in OLS estimates as the 2SLS estimated effect is considerably higher⁷². Specifically, as suggested by 2SLS results, when Financial Inclusion Score increases by one, its associated change in household income is 4.7 per cent. In other words, households are encouraged to engage with more financial products and services to boost their income streams. Meanwhile, most of the coefficient estimates of household characteristic are significant at 1 per cent significance level and with signs consistent with findings in previous literature and adhere to a *priori* expectations. For instance, income for households with agricultural *Hukou*, or live in rural areas are generally 34.6 per cent lower and 29.7 per cent lower than those with non-agricultural *Hukou* or live in urban areas. Income for households that joined the communist party or work as public officials are generally 13.4 per cent higher and 7.6 per cent higher than those are not.

⁷² Possible explanations of the downward bias of OLS, as opposed to 2SLS, are arguably similar to the well-studied problem - return to education. See, Card (1999, 2001) for detailed explanations in terms of the reason. For instance, the 2SLS estimates may be larger than the OLS estimates because it is estimating the local average treatment effect (ATE) while OLS estimates the ATE over the entire sample. By contrast, 2SLS estimates the local ATE: the instruments shift the behaviour of a subgroup of households for whom the per capita income is higher than average. In other words, the 2SLS estimates are the effect of increasing financial inclusion score only for the sampled households whose choice of the treatment was affected by the instruments. In contrast, the OLS estimates describe the average difference in household income for those whose financial inclusion scores differs by one point. The 2SLS estimates will be larger than OLS estimates because of heterogeneity in the studied sample.

Table 7. OLS and 2SLS Regressions

	Dependent Variable: Household Income per Equivalent Person (Log)	
	(1) OLS	(2) IV-2SLS
Fin. Incl. S.	0.012*** (32.867)	0.047*** (22.626)
Gender	-0.000 (-0.001)	0.015 (0.774)
Age	0.002*** (2.859)	0.007*** (8.213)
<i>Hukou</i>	-0.478*** (-25.929)	-0.346*** (-15.999)
Marital Status	-0.003 (-0.129)	-0.095*** (-4.091)
Rural	-0.349*** (-17.717)	-0.297*** (-13.933)
Education	0.067*** (29.333)	0.028*** (8.332)
Communist Party	0.159*** (8.469)	0.134*** (6.259)
Public Official	0.111*** (5.864)	0.076*** (3.090)
Business	0.001 (0.024)	-0.079*** (-3.066)
Agricultural	-0.094*** (-4.673)	-0.164*** (-7.507)
Family Size	-0.016*** (-2.779)	0.009 (1.368)
Proportion of Children	-0.496*** (-9.453)	-0.746*** (-12.518)
Proportion of the Elderly	0.317*** (13.618)	0.365*** (14.123)
No. of Houses	0.218*** (12.053)	0.075*** (4.068)
No. of Cars	0.234*** (15.580)	0.018 (0.853)
1.region	0.000 (.)	0.000 (.)
2.region	0.289*** (14.109)	0.201*** (8.659)
3.region	-0.041* (-1.808)	-0.105*** (-4.186)
4.region	-0.121*** (-5.330)	-0.208*** (-8.181)
_cons	8.456*** (140.511)	7.647*** (94.946)
N	39170	39170
r2	0.300	0.147
r2_a	0.300	0.147
F	960.517	712.941

Notes: Robust *t* statistics in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

Source: Author's own calculation.

In addition, following our previous discussion in *section 4. Literature Review* on gender gap in the context of financial inclusion's impacts on household welfare, we also conduct another IV-2SLS estimation following the same approach as above but with an additional interaction term - *Financial Inclusion Score * Gender* – for equation (1). The purpose for the inclusion of the

interaction term is to examine if financial inclusion's positive impact on improving household welfare has a gender disparity⁷³. We report the results of 2SLS in *Chapter 4, Appendix I*. The results broadly hold for all variables of interest⁷⁴. Financial inclusion still has a statistically significant impact on improving household income. The variable of the most interest – *Financial Inclusion Score * Gender* – is statistically significant at 1% level and produce an interesting finding. The estimated coefficient (-0.121) suggests that when Financial Inclusion Score increases by one, its associated change in female-headed household income is 12.1 per cent more than those for male-headed households. In other words, female-headed households benefit more from engaging with more financial products and services. This finding is encouraging as it demonstrates financial inclusion in China has not discriminated against females, at least from the household income perspective. Yet, we still need to interpret this result with caution as 79.26% of the surveyed households in our sample are male-headed, not to mention that surveying household heads potentially concealed gender differences in this part of the analysis.

7.3. Discussions

So far, our empirical findings from the above analyses successfully find the strong and significant positive impact of financial inclusion on household income from various approaches, and more importantly, this effect can be observed for all income groups. The extremely poor households that sit in the centre of this study for the evaluation of financial inclusion's effect in poverty alleviation are undoubtedly the largest beneficiaries than any other income groups; and the income difference for being financially included and excluded, unlike other wealthier households, are mainly driven by their engagements with formal financial products and services, rather than their household characteristics. As income today is still a key determinant of household welfare and an essential indicator for poverty-related studies, we are confident to say that financial inclusion in China, combined with previously discussed its financial inclusion experiences, have been successful in poverty alleviation. This finding is consistent with many micro and macro-level studies such as Bruhn and Love (2009), Chibba

⁷³ We also conduct another estimation with the interaction term in the Quantile Regressions (QR) model to capture the gender differences. The results are broadly consistent with our initial findings, but the interaction term has no statistically significant impact on household income in most of the quantiles. Therefore, we did not report the results here, and we did not perform the consequent analyses using Propensity Score Matching and Counterfactual Decomposition that have been done in *section 7.1.1 -7.1.2*.

⁷⁴ We use the same set of instrumental variables used in our initial IV-2SLS model and follow the same approach to justify their validity. All necessary tests are passed and produce satisfactory results.

(2009), Churchill and Marisetty (2019), Mallick and Zhang (2019), Neaime and Gaysset (2018), Park and Mercado (2015), Sarma and Pais (2011), and many others.

8. Conclusions

In this chapter, we have discussed changes in policy orientations in China regarding poverty alleviation and financial inclusion in the past few decades. The centrepiece that integrates with and connects the two national strategies has changed to promote and encourage ‘blood creation’ rather than ‘blood transfusion’ – implementing pro-poor policies to help the poor to work and to lift themselves out of poverty, and to develop a more inclusive financial sector has always been a crucial part within poverty alleviation. Revisiting the question we raised at the beginning, despite all changes made in policies and improvement in aggregate macro figures, has financial inclusion in China really helped to improve household welfare and to reduce poverty at the household level? From the microeconomic perspective, this study confirms the positive effect of financial inclusion on household income, especially on the most impoverished household that sits in the lowest income quantile.

Using the national representative household finance survey data in its latest 2017 wave, which covers approximately 40,011 households located in 1428 communities (urban and rural) in 355 counties (districts and cities) in 29 provinces⁷⁵ (including municipalities) in China, and constructing a new multidimensional financial inclusion index that captures financial inclusion at the household level from its four dimensions: transaction, saving, credit and insurance, this study investigates the effect of financial inclusion on poverty alleviation, from the income perspective. Taken into account the potential endogeneity issue, we have performed our empirical analysis in two parts. The first part consists of using the Quantile Regression with Propensity Score Matching and Counterfactual Decomposition when treating the Financial Inclusion Dummy as our financial inclusion proxy. The second part consists of using the Two-Stage Least Squares analysis when treating Financial Inclusion Score as our financial inclusion proxy. Both parts produce several new findings: *i*) in terms of the relative effect of financial inclusion on those included and excluded households, income improving effect can be observed

⁷⁵ As we have previously mentioned in *section 5. Data and Methodology*, the CHFS data has no coverage of Xinjiang, Inner Mongolia, among others. With no inclusion of several of these key provinces/municipalities that have been treated as the main battlefield for poverty in China might bias our estimation results.

for all income groups, and the effect is at its largest for the impoverished households that sit in the lowest income quantile. Compared with the wealthier households, the effect of financial inclusion other than household characteristics is the primary drive for income differences between the financially included and excluded households that sit in the lowest quantile. *ii*) In terms of the absolute effect of financial inclusion on household income, our second part of the analyses suggests that, under our multidimensional financial inclusion framework, an increase in financial inclusion score by one associate with an increase in household income by 4.7 per cent. Moreover, female-headed households seem to benefit more than male-headed households from increasingly engaging with financial products and services. As a result, financial inclusion could help in poverty alleviation and policymakers should continue to promote a more diverse and targeted financial inclusion.

Although this study has attempted to demonstrate the inherent association between financial inclusion and poverty alleviation on the basis of their outcomes; there are still many other aspects that have not been examined, such as the impact of financial inclusion on other specific social groups (i.e., the elderly) or with other social-demographical background (i.e., education or financial literacy level). As the promotion of financial inclusion continues and still has a long way to go, it is worth documenting the impact of such mechanisms, which may provide valuable knowledge for the international community.

CHAPTER 5 - CONCLUSIONS

1. Summary of Findings

With a clear focus on developing and emerging economies, this thesis provides a detailed examination of the relationship between financial development and poverty alleviation through both direct and indirect channels. The whole examination comprises three empirical chapters: the first two chapters are based on macroeconomic analyses, and the third chapter is based on a microeconomic analysis.

First, in *Chapter 2*, we provide robust empirical analyses in terms of the direct impact of financial development on poverty alleviation. Considering the multidimensional nature of financial systems and the concept of poverty, we incorporate different measures based on the 4x2 matrix of financial system characteristics to capture the level of financial development in different dimensions, as well as using various absolute and relative poverty measures in our analyses.

We use the two-step system GMM dynamic panel data estimator for a panel dataset which consists of 75 developing countries from 1986-2015. Our findings reveal that, when we control the indirect impact of financial development on poverty through economic growth, its direct impact on poverty depends not only on the dimension of financial development we consider in our study, but also on the type of poverty measures that are chosen. In general, we find that financial sector development has a direct and significant poverty alleviation effect, for all dimensions of the financial system considered (e.g., depth, efficiency, and stability). More specifically, the depth of financial institutions is found to have a more profound effect in tackling poverty, of both absolute and relative ones.

In *Chapter 3*, we continue exploring the finance-poverty relationship beyond the direct channel. Following the literature review in *Chapter 1*, we show that financial development may affect poverty via other channels, including growth and financial fragility channels. We thereby decompose the total effect of financial development on poverty into three extrinsically distinct yet intrinsically related components - the direct effect of financial development and its indirect

effects through the economic growth channel and the financial crisis channel, on poverty alleviation.

We use a Seemingly Unrelated Regression Equations (SURE) model, which is estimated by the Conditional Mixed Process (CMP) approach for a panel dataset of 155 countries, containing 34 advanced countries, 67 emerging and developing countries and 54 low-income countries. We address the potential endogeneity issue by using a control function approach. The estimation is thereby divided into two stages. The first stage incorporates the system Generalised Method of Moments (GMM) approach to obtain the predicted value of the financial development proxy that enters into our second-stage SURE model estimations using the CMP approach. Overall, our results reveal several key findings: *i*) the decomposed results suggest that financial development has a direct positive effect reducing poverty; *ii*) financial development has a positive growth-enhancing effect; and *iii*) financial development is associated with a higher probability of having crises that disproportionately affect the poor. However, when considering all channels simultaneously, the net effect of financial development on poverty alleviation remains positive and statistically significant.

In *Chapter 4*, to complete the 'missing piece' of our comprehensive analysis regarding the finance-poverty nexus, we turn to the financial access dimension to explore the role that financial inclusion plays on poverty at a microlevel in China, which is one of the widely acclaimed successful cases of emerging economies in terms of economic, financial, and poverty reduction achievements. From a macroeconomic perspective, previous chapters explore the direct and indirect impacts of financial development on poverty with the assumption that financial sector development can ultimately enable individuals and households to have appropriate financial products and services when they are in need. Nevertheless, from a microeconomic perspective, whether financial development contributes to lifting the poor out from poverty is determined by their own choices. More importantly, this decision-making process is subject primarily to the level of inclusiveness in the financial sector development.

We investigate the financial inclusion experience and its impact on poverty, specifically in the context of China. We take into account the multidimensional nature of financial inclusion by constructing a financial inclusion index which incorporates all dimensions (e.g., transaction and payments, savings, credit and insurance). We use the cross-sectional dataset extracted from

the China Household Finance Survey (CHFS) of its latest 2017 wave, to examine the effect of financial inclusion combined with household characteristics on household income. We tackle the potential endogeneity issue by performing our empirical analysis in two parts. The first part consists of using the Quantile Regressions (QR) with Propensity Score Matching (PSM) and Counterfactual Decomposition techniques. The second part consists of using the Two-Stage Least Squares (2SLS) analysis. Our results reveal several new findings. For instance, in terms of the relative effect of financial inclusion on those included and excluded households, its income improving effect can be observed for all income groups, and the effect is at its most significant for the impoverished households that sit in the lowest income quantile. Also, for the poorest households, it is the effect of financial inclusion rather than household characteristics that primarily drive such income differences. In terms of the absolute effect of financial inclusion on household income, we find that improvements in households' levels of financial inclusion can positively and significantly increase their income. Moreover, we also find that female-headed households seem to benefit more than male-headed households from increasingly engaging with financial products and services.

2. Contribution to the Existing Literature

Overall, we contribute to the existing literature in several crucially important ways.

i) We take into account the multidimensional nature of the financial development and poverty concept and test the McKinnon conduit effect by investigating the direct impact of financial development on poverty. We incorporate indicators that are exemplars of various financial system dimensions based on arguably the most comprehensive 4x2 financial system characteristics framework. We also incorporate poverty measures that are representative of both absolute and relative levels. This approach enables us to fill the gap of the existing empirical literature on the finance-poverty nexus which have controversial and inconclusive findings in terms of financial development's direct poverty alleviation effect. Different studies focusing on the different dimensions of the financial system using different proxies may offer distinct-different results on its impact on poverty. In addition, simple ignorance of the multidimensional nature of the poverty concept may also produce misleading results as well as policy implications. Therefore, our approach provides a valid and rigorous solution for evaluating this issue.

ii) We decompose the total effect of financial development on poverty alleviation and differentiate the impact by its transmission channels, i.e., the direct channel, the indirect channels through economic growth, and financial crises. We consider the quadrilateral relationship between financial development, economic growth, financial crises, and poverty simultaneously and use the most advanced Conditional Mixed Process (CMP) modelling approach for our empirical analysis. By considering all three channels simultaneously, our study fills the gap in the literature given the fact that most of the studies tend to focus primarily on either the direct link or indirect links. For instance, the growth view and the crisis view tend to generate its own set of policy implications that reveal only a fraction of the effect of financial development, and this partial view may also bias the attitudes of certain policymakers towards financial sector development. Our approach in this context provides a comprehensive and coherent framework to compare the financial development induced direct impacts to the poor with the expected growth benefits to the poor in tranquil times, and with the crisis costs stemming from a greater vulnerability to crises.

iii) With a particular focus on one of the most successful emerging economies and its unique path to shape an inclusive financial sector and to reduce poverty, we explore the history of China's financial inclusion experience and poverty reduction dynamics. We answer the question of whether financial inclusion in China helps to reduce poverty, which might also shed light on other developing economies facing similar poverty issues. In the context of China's experience in combating poverty, most of the literature tend to focus on broader topics such as financial development and economic growth on a macroeconomic level, with little (or even a lack of) focus on the newly emerged financial inclusion topic when considering poverty-related issues, especially from a microeconomic perspective using household survey data. Moreover, our study employs a national representative which is arguably one of the most comprehensive household finance surveys. To the best of our knowledge, it is the first study that uses the data extracted from its latest 2017 wave. Similar to the financial development concept, investigating financial inclusion requires the consideration of its multidimensionality. Most of the existing studies use one or two indicators from one dimension of financial inclusion (e.g., access to bank accounts) to represent a financial system's level of inclusion. However, we construct a multidimensional financial inclusion index that is a composite of six indicators based on answers from a large number of survey questions in all four dimensions as defined by the World Bank (2015): transactions, savings, credit and insurance. Therefore, compared

with other studies, the more rigid criterion adopted to determine a household financial inclusion status enables us to better reflect the true magnitude of financial inclusion's impact on household income, especially for those poorest households. To address potential endogeneity, this study also takes a comprehensive approach that is distinct from others. Using the Instrumental Variable Two-Stage Least Squares (IV-2SLS) approach in addition to the Quantile Regressions (QR) with Propensity Score Matching (PSM) and Counterfactual Decomposition techniques further improves the robustness of our empirical results. Given the fact that valid instrumental variables are extremely difficult to find, we also take full advantage of the household finance survey which was conducted on a community level and constructed two valid instrumental variables for both urban and rural households. Additionally, other than the relative household income improvement effects of financial inclusion captured from the QR, the IV-2SLS also enables us to derive its absolute household income improvement effects. Overall, this approach fills the gap of the literature that received less attention but are increasingly relevant in the context of inclusive development.

To a large extent, when combining the above individual contributions together, the contribution of the whole thesis to the existing literature is even more remarkable. For the finance-poverty nexus, we not only provide a comprehensive and rigorous framework considering all channels available to investigate the impact of financial development on poverty, but also present a holistic picture comprising both macroeconomic and microeconomic perspectives. An approach as such not only provides an accurate and robust guidance to researchers, policymakers and other stakeholders in developing economies on the role of financial development for poverty alleviation on a macro level, it also provides viable measures which can actually be implemented similarly and adapted to their country-specific characteristics on a micro level.

3. Policy Implications

First of all, the policy implications drawn from the whole study is straight forward. Our findings suggest that an effectively functioning financial system is vital for poverty alleviation. The direct positive impact of financial development and the indirect positive impact through promoting economic growth on poverty is nonnegligible. Even though a more developed financial sector offers the opportunity for speculation and bubbles which increase volatility and

the risk of financial crises, crises are still rare. Moreover, although the crises-induced costs are detrimental to the poor in turbulent periods, the consequences of crises can still be rectified if appropriate policies are implemented in time with precise targets. Based on our analyses of all costs and benefits associated with financial development in the long run, the pro-growth effects and pro-poor effects of more significant financial sector development in all dimensions by far outweigh the detrimental effects of a greater incidence of financial crises on the poor. The total effect of financial development on poverty is positive and significant. Therefore, policymakers should not suppress or oppose policies that are in favour of financial sector development. Nevertheless, policymakers should not blindly promote financial sector development without considering their country-specific characteristics in terms of corporate governance, contract enforcement, institutional quality and other macroeconomic conditions.

For policymakers in developing and emerging economies aiming to promote financial development effectively and responsibly and to enjoy the maximised benefits with minimised cost from more developed financial sectors, our findings suggest the followings.

i) Policymakers should promote bank-based policies as viable instruments to combat poverty, other than capital market-based policies. Specifically, our findings suggest that banking sector reforms are beneficial to both the alleviation of absolute and relative poverty. Policymakers should take measures, for instance, to increase liquid assets in the economy, or in conjunction with the prior measure, to provide an environment that is in favour of channelling funds to private sectors. Moreover, a combination of both bank-based policies and fiscal policies would be practical and ideal for providing the best recipe to tackle simultaneously absolute as well as relative poverty. For instance, an increase in public expenditure for education or healthcare accompanied with a moderate liberalisation of banking interest rate may lower the headcount of people living below or near the poverty line, at the same time, increase the income share of the poorest fraction of the population.

ii) Meanwhile, considering the crises-associated costs, policymakers also need to develop a financial system that supports economic growth and poverty alleviation in the context of financial stability. They should develop ways to balance the need for financial sector development and innovation with the need for economic and financial stability. The policy package must take into account the risk of financial instability. In this sense, backed up by our findings, it is crucial to maintain sound macroeconomic condition, as macroeconomic stability

is a necessity for financial institutions and markets to flourish, given volatilities worsen the problems of informational asymmetries and become a source of vulnerability to the financial system. Low and predictable rate of inflation is more likely to contribute to financial development, economic growth and poverty alleviation. In addition, financial sector liberalisation and development policies should also be accompanied by gradual external openness, adequate legal systems, and firm and effective financial regulations and supervision mechanisms.

iii) The case study of China in terms of its financial inclusion experiences when dealing with poverty also provides additional policy implications, especially for those developing economies that focus on financial sector development but fail to include a vast segment of the population that are in most need (e.g., underprivileged sectors of the society). Shaping an inclusive environment promotes and enables the underserved and unserved population to access adequate and low costs financial instruments to invest more in productive assets so that they could work and lift themselves out of poverty. Therefore, inclusive finance in poverty-stricken areas such as rural areas needs to be developed, especially in remote and destitute rural areas. Moreover, those areas should speed up the development of the permeability, usability, and utility of inclusive finance so that to improve its quality and affordability. Policies that could foster constant innovations in financial products and services aimed to reduce transaction costs and improve the quality of financial services should be encouraged—for instance, the development of internet and mobile finance. Last but not least, those policy-oriented and commercial financial institutions, internet and mobile finance institutions should also be encouraged and guided to establish multilevel, broad-coverage, and sustainable regional inclusive financial systems in the most needed areas.

4. Limitations and Further Research

There are typical limitations associated with empirical analyses that we need to keep in mind when interpreting the results, and our study is of no exception. For instance, some of the proxy variables adopted in this study, like in other empirical studies have been subject to criticisms. In particular, for the poverty indicators used in our empirical chapters, although they are seemingly different, they all focus on defining the poverty concept from the monetary approach

which does not fully reflect the multidimensional nature of poverty⁷⁶. There are many controversies regarding the appropriateness of using income- or consumption-based proxy measures both at conceptual and at practical levels. However, we spend a considerable amount of time in *Chapter 1*, arguing that alternative measures are at least as problematic (see, *Chapter 1, section 4*) and their coverage in terms of countries and periods are far from sufficient for our study. Notwithstanding, research studies that explore the finance-poverty nexus using other poverty proxies based on different approaches such as capability, social exclusion, and participatory approaches can be a useful addition, particularly in the context of developing countries.

In *Chapter 2*, the data coverage concerning proxy variables of various dimensions of financial systems and poverty for developing economies poses certain constraints to our analyses. We address this issue by using 'competing' financial development indicators in various dimensions that have the best coverage (see, *Chapter 2, section 3.2*), by taking the average of the variables over five-year intervals to maximise the number of country observations, and only countries with observations for at least two consecutive periods are included in the panel. Nevertheless, we only partially alleviated such a constraint without getting to the root of the problem. Further research on this matter should be encouraged when data availability improves. In *Chapter 3*, our study focuses mainly on financial system development in the depth dimension. It neglects the fact that the financial system is multidimensional which contains other dimensions such as access, efficiency and stability. Therefore, it is valuable for researchers to investigate the finance-poverty nexus further from different dimensions or all dimensions by developing a multidimensional financial development index when data availability improves. In *Chapter 4*, we attempt to demonstrate the inherent association between financial inclusion and poverty alleviation based on their outcomes. There are still many other aspects that have not been examined, such as the impact of specific financial sector policies and programmes, or the impact of financial inclusion on specific social groups (i.e., the elderly) or with other social-demographical background (i.e., education or financial literacy level). As the promotion of financial inclusion continues and still has a long way to go, it is worth documenting the impact of such mechanisms, which may provide valuable knowledge for the international community.

⁷⁶ *Chapter 2* uses the poverty headcount ratio and poverty gap at different threshold levels and income share held by the lowest 20%, *Chapter 3* uses the household final consumption expenditure, and *Chapter 4* uses the household income per equivalent person.

5. Conclusions

In spite of the above inevitable limitations, we demonstrate how this thesis makes a considerable contribution to the existing finance-poverty literature and provides valuable insights for academics and policymakers by exploring four primary and heavily inter-related issues that are central to development economics: financial development (incl. financial inclusion), economic growth, financial crises, and poverty alleviation. These topics have long attracted the attention of economists, social scientists and policymakers. Considering an increasing number of developing economies have put 'sustainable development' into their policy agendas, we believe the role financial sector development plays in this context will soon become more relevant and regain its central position to the current global economy.

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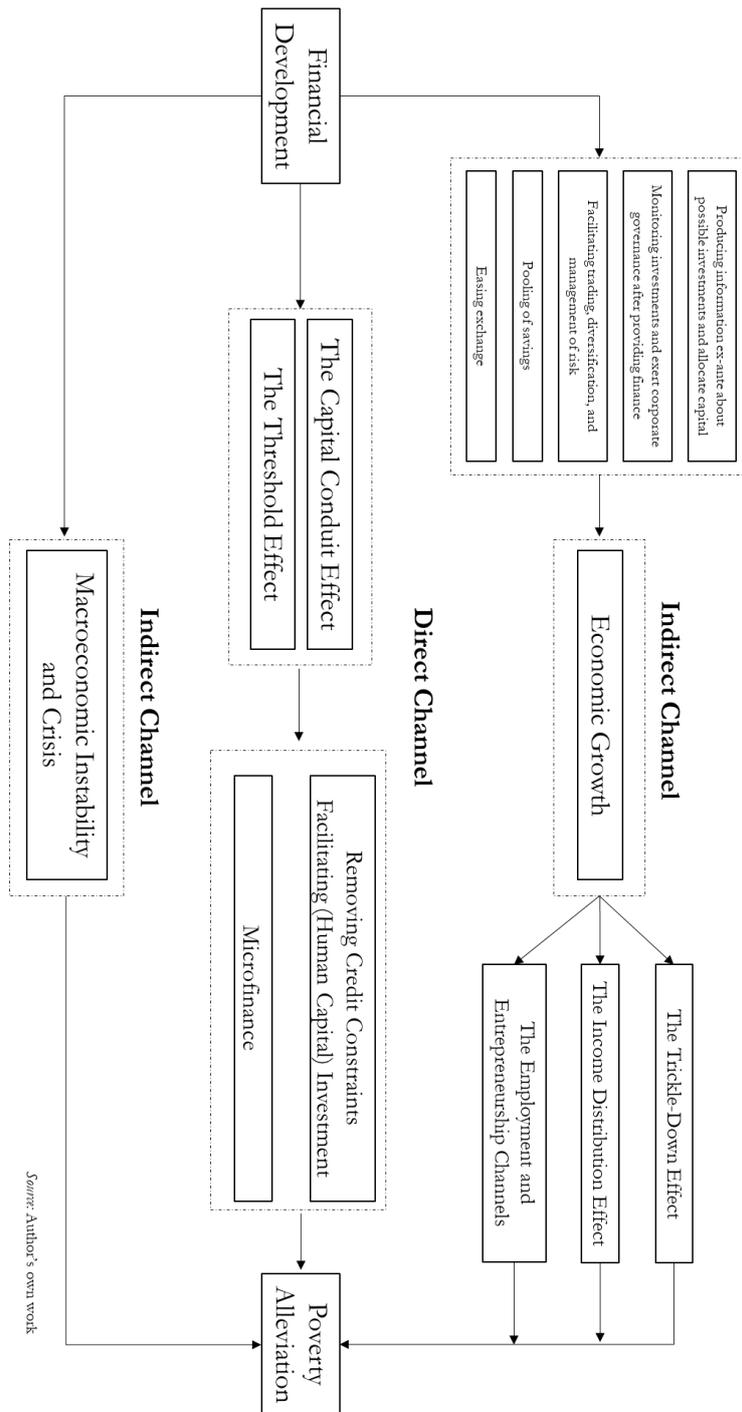
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APPENDIXES

CHAPTER 1

A. An Overview of the Finance-Poverty Channels



CHAPTER 2

A. Literature Summary

Study	Method	FD Indicator Used	Dimension Considered	Any Direct Poverty Alleviation Effect has been identified?
(Jalilian & Kirkpatrick, 2002, 2005)	Panel Regression	1. Net Foreign Asset 2. Bank Assets/GDP	Depth	Yes, this study finds that FD does contribute to poverty alleviation. It also finds that FD does not have much impact on growth prospects of an economy when beyond a certain level.
(Honohan, 2004)	Panel Regression	1. Private Credit/GDP 2. Stock Market Capitalisation 3. Stock Market Turnover	Depth Efficiency	The empirical results of this paper show that the relationship between FD and poverty reduction is sensitive to the choice of proxies used for FD. It finds that FD (when measured by banking depth) is associated with lower poverty ratios. Stock market proxies are not found to have significant impact on poverty.
(Beck, Demirgüç-Kunt, et al., 2007)	Panel Regression	1. Private Credit/GDP 2. Commercial-Central Bank	Depth	Yes, this paper finds that FD disproportionately helps the poor, as the incomes of the poor grow faster than average per capita GDP growth, which lowers income inequality.
(Akhter & Daly, 2009)	Panel Regression	1. M3/GDP 2. Private Credit/GDP	Depth	Yes, this paper finds that FD is conducive for poverty reduction – both channels of financial intermediation namely savings and credit are helpful for poverty alleviation
(Arestis & Caner, 2010)	Dynamic Panel Regression	1. Capital Account Openness Index		No. This study finds that developing countries with more open capital account regimes are more likely to have higher incidence of poverty gap and lower income share of the poorest 20% of the population. Moreover, these effects are significant in most specifications.
(Odhiambo, 2010a)	Causality Test	1. M2/GDP 2. Private Credit/GDP 3. Bank Assets/GDP	Depth	The empirical results of this paper show that the causal relationship between FD and poverty reduction is sensitive to the choice of proxies used for FD. When M2/GDP is used, poverty reduction seems to cause the development of the financial sector. However, when the private credit and the bank assets are used, FD seems to cause poverty reduction, and not the other way round.
(Odhiambo, 2010b)	Causality Test	1. M2/GDP	Depth	Yes, this study concludes that FD in Kenya is pro-poor and pro-savings, as it finds a unidirectional causality from FD to savings and a bi-directional causality between savings and poverty reduction. The results apply irrespective of whether the causality test is conducted in the short-run or long-run dynamics.
(Jeanneney & Kpodar, 2011)	Dynamic Panel Regression	1. Private Credit/GDP 2. M3/GDP	Depth	The findings of this study are conditional on FD proxies used. The direct effect of FD on poverty is significant and stronger than the effect through economic growth, when using M3/GDP. However, the direct effect of such relationship when using private credit is not significant. They also find that financial instability hurts the poor and partially offsets the benefit of financial development.
(Ho & Odhiambo, 2011)	ARDL cointegration	1. Private Credit/GDP 2. M2/GDP	Depth	The causal relationship between FD and poverty reduction in China is sensitive to the proxy used to measure the level of financial development. This study finds that poverty reduction Granger-causes financial development, both in the short run and in the long run, but FD only Granger-causes poverty reduction in the short run.
(Fowowe & Abidoye, 2013)	Dynamic Panel Regression	1. Private Credit/GDP 2. M2/GDP	Depth	No, this study finds both FD indicators have no significant influence on poverty, as well as inequality in African countries.
(Donou-Adonsou & Sylwester, 2016)	Panel Regression	1. Private Credit/GDP 2. Bank Assets/GDP	Depth	The estimation results for this study are dependent of proxies used for poverty. It finds that bank credit has poverty reduction effects when poverty is measured by absolute poverty measures.
(Boukhatem, 2016)	Panel Regression	1. M3/GDP 2. Bank Credit/GDP	Depth	The estimation results for this study are dependent of proxies used for FD and poverty. Specifically, M3/GDP is found to have a significant poverty

				alleviation effect for both absolute and relative poverty. However, for Bank Credit, its effect is only significant for absolute poverty measures.
(Keoh, 2016)	Causality Test	1. Private Credit/GDP	Depth	No, this study finds no direct causal relationship from FD to poverty reduction. FD reduces poverty does not hold for most Sub-Saharan African countries. In other words, an increase in the private credit ratio does not necessarily translate into improved well-being for the poor.
(Seven & Coskun, 2016)	Dynamic Panel Regression	1. Bank-aggregate based on a number of banking indicators (e.g., M3/GDP, Bank Assets/GDP, Private Credit/GDP, etc) 2. Market-aggregate based on a number of stock market indicators. (e.g., Stock Market Capitalisation/GDP, Stock Market Turnover Ratio, etc)	Depth	The estimation results for this study are dependent of proxies used for FD and poverty. For instance, the effect of bank development (bank-aggregate) on the growth of the average income of the poorest quintile is negative and significant – the direct effect of bank development on poverty reduction is negative. Meanwhile, the effect of stock market development (market-aggregate) on poverty reduction, which is measured by the average income of the poorest quintile, in emerging economies is positive and significant. Yet, this effect is insignificant when measure poverty using absolute poverty measures.
(Cepparulo et al., 2017)	Dynamic Panel Regression	1. Private Credit/GDP 2. M3/GDP 3. Bank Assets/GDP	Depth	Yes, this study finds a statistically significant and positive impact of FD on poverty alleviation. The result holds across all alternative measures of FD and poverty.
(Kaidi & Mensi, 2017)	Panel Regression	1. M3/GDP 2. Stock Market Capitalisation/GDP	Depth	No, this study finds that both FD indicators have a significant and negative impact on household final consumption expenditure – FD fails to reach the poorest segments of society.
(Rashid & Intartaglia, 2017)	Dynamic Panel Regression	1. M3/GDP 2. Private Credit/GDP 3. Commercial-Central Bank Ratio 4. Stock Market Turnover ratio 5. Stock Market Capitalisation/GDP	Depth Efficiency	The estimation results for this study are dependent of proxies used for FD and poverty. Specifically, this study finds that FD in the depth dimension (i.e., using M3/GDP and Private Credit/GDP) is pro-poor (i.e., using absolute poverty measures). The rest of the indicators such as stock market related proxies and the Commercial-Central Bank Ratio neither significantly affect the absolute nor the relative poverty.
(Kaidi & Mensi, 2018)	Panel Regression	1. M3/GDP 2. Stock Market Capitalisation/GDP	Depth	The empirical results of this paper show that development of the banking system does not contribute to poverty alleviation, however, development of the stock market is beneficial for the poor.

Source: Author's own elaboration based on literature review

B. List of Countries

List of countries: there are in total 75 countries that is defined as developing economies according to the World Bank classification, and in which there are 23 economies that are defined as Emerging Economics according to the MSCI classification. They are listed as follows: Algeria, Argentina, Bangladesh, Benin, Bolivia, *Brazil*, Burkina Faso, Cambodia, Chad, *Chile*, *China*, *Colombia*, Costa Rica, Côte d'Ivoire, *Czech Republic*, Dominican Republic, Ecuador, *Egypt*, El Salvador, Gambia, Ghana, *Greece*, Guinea, Guyana, Honduras, *Hungary*, *India*, *Indonesia*, Jamaica, Jordan, Kazakhstan, Kenya, *Korea*, Kyrgyz Republic, Madagascar, Malawi, *Malaysia*, Mauritania, Mauritius, *Mexico*, Morocco, Nepal, Nicaragua, Niger, Nigeria, *Pakistan*, Panama, Paraguay, *Peru*, *Philippines*, *Poland*, *Qatar*, Romania, *Russia*, Rwanda, Saudi Arabia, Senegal, Sierra Leone, *South Africa*, Sri Lanka, Swaziland, Tanzania, *Thailand*, Togo, Trinidad and Tobago, Tunisia, *Turkey*, Uganda, Ukraine, United Arab Emirates, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe. Note: Emerging Economies as defined by the MSCI 2017 are written in italic.

Non-included countries: we take the average of the variables over five-year intervals to maximise the number of country observations. Thus, the panel includes observations with a maximum of six periods. Only countries with observations for at least two consecutive periods are included in the panel. For countries that are not meet the requirements are excluded from our empirical analysis, they are Algeria, Jordan, Yemen, Zimbabwe, etc.

C. Selected Proxy Variables and Source of Data

The table below includes all variables and their corresponding sources. More details of those chosen variable are given in the next subsection.

Poverty indicators	Controlled Variables
Poverty headcount ratio at \$3.10 a day (2011 PPP) (% of population)	GDP per capita growth (annual %)
Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	GDP per capita, PPP (constant 2011 international \$)
Poverty gap at \$3.10 a day (2011 PPP) (%)	Inflation, consumer prices (annual %)
Poverty gap at \$1.90 a day (2011 PPP) (%)	General government final consumption expenditure (% of GDP)
Income share held by lowest 20%	Trade (% of GDP)
	GINI Index (World Bank estimate)
	School enrolment, primary (% gross)
<i>Source: World Development Indicators (World Bank, 2017d)</i>	
Financial Development Indicators - Institutions	Financial Development Indicators - Markets
Depth	Depth
Private credit by deposit money banks to GDP (%)	Liquid liabilities to GDP (%) - M3/GDP
Deposit money banks' assets to GDP (%)	Stock market capitalization to GDP (%)
Access (Excluded)	Access (Excluded)
Bank accounts per 1,000 adults	Market capitalization excluding top 10 companies to total market capitalization (%)
Bank branches per 100,000 adults	Value traded excluding top 10 traded companies to total value traded (%)
	Nonfinancial corporate bonds to total bonds and notes outstanding (%)
Efficiency	Efficiency
Bank lending-deposit spread	Stock market turnover ratio (%)
Stability	Stability
Bank z-score	Stock price volatility
Others	
Bank Concentration	
<i>Source: Financial Development database (World Bank, 2017b)</i>	

D. Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) ph31	1.000																			
(2) ph19	0.926	1.000																		
(3) pg3.1	0.955	0.994	1.000																	
(4) pg1.9	0.804	0.958	0.942	1.000																
(5) low20	-0.102	-0.207	-0.199	-0.307	1.000															
(6) liquid	-0.248	-0.315	-0.319	-0.385	0.231	1.000														
(7) bprivate	-0.325	-0.332	-0.350	-0.363	0.061	0.841	1.000													
(8) basset	-0.337	-0.370	-0.383	-0.416	0.096	0.887	0.954	1.000												
(9) mlctcap	-0.182	-0.190	-0.198	-0.203	-0.170	0.456	0.557	0.595	1.000											
(10) turnover	-0.057	-0.191	-0.165	-0.268	0.311	0.402	0.231	0.350	0.273	1.000										
(11) bazscore	0.234	0.221	0.226	0.198	-0.405	0.064	-0.015	0.006	0.188	-0.213	1.000									
(12) spv	-0.201	-0.238	-0.227	-0.224	0.106	-0.198	-0.209	-0.157	0.388	0.388	-0.393	1.000								
(13) bc	0.080	-0.029	-0.015	-0.123	0.066	0.046	-0.032	-0.009	-0.052	0.041	0.082	0.028	1.000							
(14) growth	0.047	0.017	0.010	-0.046	0.164	0.194	0.151	0.091	0.028	0.072	0.115	-0.058	-0.141	1.000						
(15) gdpcc	-0.784	-0.613	-0.655	-0.446	-0.175	0.022	0.142	0.152	0.177	0.052	-0.131	0.216	-0.128	-0.113	1.000					
(16) inflation	0.119	0.113	0.131	0.158	-0.005	-0.407	-0.512	-0.484	-0.451	-0.065	-0.084	0.380	0.124	-0.243	-0.021	1.000				
(17) gini	0.192	0.251	0.251	0.309	-0.968	-0.182	-0.000	-0.026	0.271	-0.269	0.416	-0.156	-0.024	-0.155	0.053	1.000				
(18) edu	-0.198	-0.126	-0.142	-0.059	-0.506	-0.128	-0.005	0.006	0.025	-0.187	0.135	0.125	-0.173	-0.024	0.294	-0.052	1.000			
(19) trade	-0.308	-0.241	-0.274	-0.232	0.336	0.503	0.512	0.446	0.103	-0.065	-0.121	-0.206	0.106	0.170	0.092	-0.169	-0.350	1.000		
(20) gov	-0.461	-0.339	-0.379	-0.264	0.102	0.042	0.085	0.131	0.135	0.087	-0.077	0.106	-0.048	-0.237	0.528	-0.053	-0.164	0.164	1.000	

Source: Author's own calculations

E. SYS-GMM Estimation Results with The Crisis Dummy Variable

System GMM estimates for direct financial development effect - Poverty headcount (\$3.10 a day)

Panel A: estimation results									
y _{t-1}	0.848***	0.867***	0.867***	0.880***	0.951***	1.045***	0.845***	1.053***	1.003***
	(0.112)	(0.104)	(0.099)	(0.110)	(0.132)	(0.166)	(0.100)	(0.139)	(0.113)
Liquid liabilities	-4.468**								
	(1.937)								
Private credit		-3.916***							
		(1.255)							
Deposit money banks' assets			-3.912**						
			(1.567)						
Stock market capitalisation				-0.401					
				(1.065)					
Bank lending-deposit spread					1.384				
					(2.586)				
Stock market turnover ratio						-3.055			
						(2.307)			
Bank z-score							-2.178		
							(5.618)		
Stock price volatility								-3.321	
								(5.676)	
Bank concentration									3.673
									(4.992)
Crisis	-0.161	-0.360	-1.147	-2.280	-3.500	-1.171	-3.583	1.462	-3.398
	(3.746)	(3.675)	(3.577)	(3.918)	(4.576)	(3.914)	(3.505)	(2.462)	(3.134)
GDP per capita	-3.941	-1.720	-2.408	-2.535	0.853	0.431	-3.046	5.633	1.700
	(3.130)	(2.828)	(2.762)	(2.853)	(3.077)	(4.396)	(3.037)	(4.424)	(2.896)
GDP per capita growth	-0.571	-0.533	-0.685*	-1.399**	-1.390**	-0.592	-0.252	-0.786	-1.079**
	(0.346)	(0.357)	(0.346)	(0.688)	(0.640)	(1.231)	(0.507)	(0.480)	(0.466)
Inflation	-0.008	-0.000	-0.006	-0.024	0.007	0.015	0.350	0.132	0.367*
	(0.013)	(0.016)	(0.017)	(0.054)	(0.037)	(0.086)	(0.284)	(0.143)	(0.219)
Gini Index	13.643	3.673	7.063	1.231	-10.804	-12.525	0.840	-4.839	-2.314
	(13.848)	(11.848)	(13.734)	(9.255)	(13.263)	(15.236)	(10.693)	(11.531)	(8.699)
Education	-1.567	-1.505	0.263	-9.633	2.507	-6.135	-2.095	8.678	-0.698
	(7.526)	(6.469)	(6.444)	(7.895)	(12.900)	(12.214)	(10.175)	(15.978)	(6.443)
Trade	0.158	-0.496	-0.762	-1.914	-3.009	-3.232	-3.663	-0.172	-1.881
	(2.070)	(1.646)	(1.952)	(1.588)	(2.262)	(2.728)	(2.712)	(4.373)	(2.490)
Government Consumption	4.567	2.640	3.332	2.680	-0.886	4.198	3.259	0.420	0.862
	(3.839)	(3.047)	(3.434)	(3.862)	(4.353)	(4.163)	(3.240)	(5.985)	(2.868)
Constant	-8.179	17.075	2.423	67.824*	33.629	81.268*	40.194	-63.177	-13.876
	(45.110)	(43.592)	(48.068)	(37.424)	(43.719)	(42.665)	(48.749)	(124.557)	(42.327)
Panel B: diagnostic tests									
AR(2) (p-value)	0.898	0.647	0.982	0.302	0.951	0.821	0.772	0.555	0.542
Hansen test (p-value)	0.424	0.615	0.52	0.405	0.51	0.308	0.33	0.732	0.327
Observations	206	206	206	166	179	163	175	111	171
Countries	60	60	60	49	53	47	59	33	58
Instruments	39	39	39	39	39	39	35	39	47

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

System GMM estimates for direct financial development effect - Poverty headcount (\$1.90 a day)

Panel A: estimation results									
y _{t-1}	0.707***	0.708***	0.717***	0.877***	0.953***	1.014***	0.781***	0.967***	0.672***
	(0.137)	(0.133)	(0.134)	(0.182)	(0.129)	(0.129)	(0.123)	(0.094)	(0.092)
Liquid liabilities	-1.929								
	(2.049)								
Private credit		-1.327							
		(0.952)							
Deposit money banks' assets			-1.615						
			(1.489)						
Stock market capitalisation				-0.117					
				(1.284)					
Bank lending-deposit spread					2.519				
					(2.907)				
Stock market turnover ratio						-2.533*			
						(1.323)			
Bank α -score							-4.367		
							(4.669)		
Stock price volatility								-2.880	
								(4.195)	
Bank concentration									-2.831
									(3.481)
Crisis	1.226	0.869	1.085	-2.416	-4.687	-1.834	-3.016	-0.399	1.352
	(2.591)	(2.604)	(2.546)	(3.932)	(4.910)	(3.349)	(2.460)	(3.135)	(2.111)
GDP per capita	-3.154	-2.324	-2.515	0.305	0.189	1.798	-3.338	3.403	-0.991
	(2.894)	(2.558)	(2.708)	(2.844)	(3.020)	(2.452)	(2.019)	(2.088)	(2.222)
GDP per capita growth	-0.226	-0.227	-0.241	-0.883	-0.851**	-0.317	-0.139	-0.670*	-0.259
	(0.338)	(0.328)	(0.315)	(0.589)	(0.404)	(0.356)	(0.306)	(0.386)	(0.371)
Inflation	-0.002	0.003	0.001	-0.006	0.060	0.028	0.262	0.006	0.232
	(0.005)	(0.009)	(0.008)	(0.037)	(0.103)	(0.056)	(0.186)	(0.116)	(0.164)
Gini Index	19.951	15.609*	19.638*	-1.119	-2.002	-10.755	25.006	-3.906	16.346
	(12.499)	(9.223)	(11.508)	(10.305)	(8.159)	(8.399)	(20.094)	(7.273)	(9.799)
Education	-5.438	-5.163	-4.898	-9.203	-4.755	-6.495	-5.336	-2.280	-7.341
	(8.715)	(7.331)	(8.106)	(8.415)	(9.588)	(6.913)	(13.478)	(11.364)	(7.705)
Trade	0.402	-0.063	0.321	-1.044	-0.028	-2.428	1.264	-1.246	-1.373
	(1.365)	(1.685)	(1.429)	(1.219)	(3.657)	(1.582)	(2.888)	(2.008)	(2.486)
Government Consumption	7.250**	6.293**	6.480**	-0.256	-0.445	1.315	5.532*	-2.227	0.655
	(3.061)	(3.093)	(3.005)	(3.675)	(3.927)	(4.242)	(2.859)	(2.527)	(2.510)
Constant	-34.972	-24.699	-40.443	53.081	24.479	68.554**	-52.093	14.318	-0.529
	(31.181)	(35.791)	(30.087)	(40.451)	(54.983)	(28.688)	(46.350)	(62.989)	(41.182)
Panel B: diagnostic tests									
AR(2) (p-value)	0.576	0.664	0.572	0.167	0.653	0.724	0.429	0.778	0.744
Hansen test (p-value)	0.664	0.679	0.663	0.279	0.642	0.402	0.855	0.651	0.365
Observations	206	206	206	166	179	163	175	111	171
Countries	60	60	60	49	53	47	59	33	58
Instruments	39	39	39	39	39	39	36	39	59

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

System GMM estimates for direct financial development effect - Poverty gap (\$3.10 a day)

Panel A: estimation results									
y _{t-1}	0.705***	0.721***	0.733***	0.848***	0.921***	0.978***	0.941***	0.955***	0.784***
	(0.128)	(0.118)	(0.115)	(0.179)	(0.200)	(0.145)	(0.102)	(0.116)	(0.142)
Liquid liabilities	-1.562								
	(1.619)								
Private credit		-1.156							
		(0.805)							
Deposit money banks' assets			-1.309						
			(1.142)						
Stock market capitalisation				-0.057					
				(1.100)					
Bank lending-deposit spread					-0.919				
					(2.936)				
Stock market turnover ratio						-1.718			
						(1.220)			
Bank α -score							-0.516		
							(1.712)		
Stock price volatility								-2.416	
								(2.984)	
Bank concentration									-3.090
									(4.296)
Crisis	1.037	0.762	0.861	-2.004	-1.869	-1.710	-2.701	-0.054	-0.620
	(1.853)	(1.884)	(1.836)	(2.273)	(5.839)	(2.437)	(2.129)	(1.389)	(1.862)
GDP per capita	-2.361	-1.600	-1.754	-0.468	-2.016	0.493	0.330	1.990	-1.429
	(1.642)	(1.411)	(1.439)	(2.297)	(3.574)	(1.810)	(1.120)	(1.675)	(1.601)
GDP per capita growth	-0.199	-0.204	-0.219	-0.729	-0.392	-0.193	-0.735*	-0.490**	-0.343
	(0.287)	(0.227)	(0.237)	(0.453)	(0.359)	(0.281)	(0.368)	(0.238)	(0.334)
Inflation	-0.004	0.000	-0.001	-0.010	0.020	0.026	0.101	0.008	0.125
	(0.005)	(0.007)	(0.007)	(0.028)	(0.153)	(0.037)	(0.156)	(0.083)	(0.140)
Gini Index	14.174*	9.340	11.972*	-0.786	-2.476	-7.392	0.376	-4.030	13.793
	(7.744)	(6.437)	(6.773)	(8.628)	(9.222)	(6.515)	(7.335)	(4.305)	(8.713)
Education	-2.786	-2.168	-1.706	-5.657	7.039	-4.773	1.669	0.363	-3.263
	(6.112)	(5.604)	(5.663)	(6.753)	(11.069)	(6.043)	(7.144)	(8.567)	(7.292)
Trade	0.203	-0.490	-0.243	-1.090	-1.907	-2.012	-1.002	-1.211	0.813
	(1.268)	(1.294)	(1.295)	(1.073)	(2.288)	(1.573)	(2.335)	(1.412)	(1.896)
Government Consumption	4.170*	3.396*	3.667*	0.019	0.994	0.807	0.996	-1.503	2.402
	(2.135)	(1.946)	(2.047)	(3.006)	(3.845)	(2.865)	(1.405)	(1.952)	(1.703)
Constant	-25.053	-12.954	-24.819	41.086	-0.921	56.339**	-9.582	11.421	-20.900
	(28.694)	(28.387)	(26.965)	(30.567)	(46.086)	(22.078)	(21.183)	(44.676)	(46.244)
Panel B: diagnostic tests									
AR(2) (p-value)	0.484	0.573	0.473	0.328	0.964	0.617	0.687	0.632	0.517
Hansen test (p-value)	0.557	0.654	0.609	0.248	0.569	0.525	0.652	0.684	0.804
Observations	206	206	206	166	179	163	175	111	171
Countries	60	60	60	49	53	47	59	33	58
Instruments	39	39	39	39	33	39	52	39	36

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

System GMM estimates for direct financial development effect - Poverty gap (\$1.90 a day)

Panel A: estimation results									
y _{t-1}	0.587*** (0.089)	0.615*** (0.086)	0.612*** (0.084)	0.709*** (0.228)	0.957*** (0.163)	0.916*** (0.214)	0.952*** (0.160)	0.886*** (0.088)	0.911*** (0.124)
Liquid liabilities	-0.123 (1.115)								
Private credit		-0.114 (0.571)							
Deposit money banks' assets			-0.191 (0.894)						
Stock market capitalisation				-0.258 (0.754)					
Bank lending-deposit spread					1.219 (1.866)				
Stock market turnover ratio						-1.464* (0.752)			
Bank α -score							-0.475 (1.837)		
Stock price volatility								-2.324 (1.628)	
Bank concentration									-2.676 (4.424)
Crisis	0.151 (1.281)	0.034 (1.305)	0.117 (1.303)	-1.258 (1.463)	-3.496 (2.271)	-0.856 (1.729)	-1.273 (1.480)	0.689 (1.392)	-0.771 (2.154)
GDP per capita	-1.415* (0.835)	-1.088 (0.781)	-1.207 (0.818)	-0.111 (1.353)	-0.096 (1.931)	0.755 (1.125)	-0.434 (1.701)	1.017 (1.503)	0.194 (1.925)
GDP per capita growth	-0.139 (0.166)	-0.137 (0.187)	-0.141 (0.159)	-0.311 (0.209)	-0.424 (0.326)	-0.002 (0.193)	-0.212 (0.335)	-0.055 (0.171)	-0.457 (0.362)
Inflation	-0.002 (0.004)	-0.000 (0.003)	-0.001 (0.004)	-0.013 (0.013)	0.040 (0.083)	0.006 (0.020)	0.002 (0.275)	0.022 (0.035)	0.105 (0.188)
Gini Index	8.059* (4.350)	6.817* (4.032)	7.826* (4.115)	2.664 (5.104)	-1.488 (3.722)	-4.322 (3.979)	-5.747 (4.467)	2.615 (5.161)	-1.924 (5.323)
Education	-1.440 (4.154)	-1.487 (3.625)	-1.749 (3.930)	-3.894 (3.328)	0.826 (4.689)	-5.233 (4.258)	6.254* (3.322)	-7.267 (6.332)	2.165 (6.705)
Trade	-0.170 (0.736)	-0.231 (0.656)	-0.109 (0.675)	-0.387 (0.797)	0.858 (2.062)	-2.037 (1.216)	-1.337 (1.500)	-0.740 (0.842)	-0.546 (1.579)
Government Consumption	2.736 (1.686)	2.357 (1.493)	2.359 (1.558)	0.342 (2.634)	-1.906 (2.208)	0.250 (1.795)	-0.025 (1.701)	0.678 (3.262)	1.196 (1.468)
Constant	-16.137 (18.411)	-12.572 (12.568)	-14.454 (11.602)	12.694 (19.925)	1.476 (28.341)	46.058** (19.141)	1.752 (29.008)	22.961 (18.255)	5.281 (40.335)
Panel B: diagnostic tests									
AR(2) (p-value)	0.765	0.761	0.734	0.782	0.384	0.396	0.673	0.379	0.543
Hansen test (p-value)	0.838	0.872	0.872	0.441	0.417	0.808	0.55	0.597	0.626
Observations	206	206	206	166	179	163	175	111	171
Countries	60	60	60	49	53	47	59	33	58
Instruments	39	39	39	39	45	39	28	39	35

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

System GMM estimates for direct financial development effect - Income share (lowest 20%)

Panel A: estimation results									
y _{t-1}	0.200	0.220	0.166	0.206***	0.314***	0.139**	0.395***	0.440***	0.351***
	(0.127)	(0.163)	(0.123)	(0.072)	(0.089)	(0.055)	(0.117)	(0.142)	(0.108)
Liquid liabilities	0.544**								
	(0.260)								
Private credit		0.415*							
		(0.235)							
Deposit money banks' assets			0.404						
			(0.268)						
Stock market capitalisation				0.014					
				(0.076)					
Bank lending-deposit spread					-0.198				
					(0.136)				
Stock market turnover ratio						0.104*			
						(0.058)			
Bank α -score							-0.009		
							(0.301)		
Stock price volatility								0.053	
								(0.293)	
Bank concentration									0.483
									(0.563)
Crisis	0.346	0.277	0.033	0.142	-0.135	0.143	-0.019	0.134	-0.122
	(0.733)	(0.860)	(0.193)	(0.183)	(0.185)	(0.245)	(0.216)	(0.148)	(0.207)
GDP per capita	-0.403*	-0.428*	-0.374***	-0.325***	-0.348***	-0.454***	-0.134	-0.401**	0.001
	(0.203)	(0.214)	(0.122)	(0.101)	(0.110)	(0.146)	(0.148)	(0.154)	(0.134)
GDP per capita growth	0.07	0.084	0.040	-0.008	0.018	0.011	0.011	0.031	-0.018
	(0.051)	(0.058)	(0.031)	(0.021)	(0.016)	(0.028)	(0.026)	(0.032)	(0.036)
Inflation	-0.002	-0.000	0.000	-0.005*	-0.001	-0.005	0.011	-0.013	-0.000
	(0.009)	(0.009)	(0.001)	(0.003)	(0.006)	(0.003)	(0.023)	(0.025)	(0.018)
Gini Index	-8.189***	-7.705***	-6.741***	-7.915***	-6.691***	-7.225***	-5.878***	-5.196***	-6.181***
	(1.247)	(1.756)	(0.994)	(0.776)	(1.077)	(0.833)	(1.350)	(1.667)	(0.976)
Education	0.607	0.104	-0.432	0.596	0.185	0.147	0.100	0.722	-0.087
	(0.722)	(0.882)	(0.399)	(0.377)	(0.528)	(0.497)	(0.433)	(0.863)	(0.466)
Trade	-0.421**	-0.369*	-0.209	-0.040	-0.114	0.103	-0.090	0.045	-0.124
	(0.178)	(0.186)	(0.183)	(0.118)	(0.181)	(0.151)	(0.155)	(0.269)	(0.140)
Government Consumption	0.333	0.170	0.028	0.024	0.213	0.161	-0.066	0.247	-0.262
	(0.263)	(0.245)	(0.175)	(0.186)	(0.228)	(0.276)	(0.157)	(0.366)	(0.178)
Constant	34.420***	35.740***	34.163***	34.047***	31.113***	33.753***	26.478***	21.737**	26.508***
	(8.665)	(10.846)	(5.095)	(3.560)	(3.717)	(3.400)	(5.517)	(10.360)	(5.130)
Panel B: diagnostic tests									
AR(2) (p-value)	0.156	0.135	0.064	0.782	0.384	0.661	0.899	0.515	0.563
Hansen test (p-value)	0.522	0.526	0.449	0.441	0.417	0.798	0.335	0.91	0.417
Observations	201	201	201	166	179	160	171	108	167
Countries	57	57	57	49	53	45	56	31	55
Instruments	33	27	39	39	45	51	40	33	35

Notes: This table shows the main determinants of poverty. Panel A reports the estimates obtained from robust two-step system GMM estimations. The figures given in parentheses are standard errors which are asymptotically robust to the presence of heteroskedasticity and serial correlation within panels. Panel B reports the *p-values* of the Hansen test and the Arellano and Bond test. All regressions include a set of time dummy variables. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Source: Author's own calculation.

	Financial System Depth		Financial System Efficiency		Financial System Stability		Others		
	FI	FM	FI	FM	FI	FM			
	Private Credit	Deposit Money Banks' Assets	Liquid Liabilities	Stock Market Capitalisation	Bank Lending - Deposit Spread	Stock Market Turnover Ratio	Bank χ -score	Stock Price Volatility	Bank Concentration
Absolute Poverty	Poverty Headcount (\$3.1)	Poverty Headcount (\$1.9)	Poverty Gap (\$1.9)	Income Share (lowest 20%)					
	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate
Relative Poverty	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate	Alleviate

FI - Financial Institutions, FM - Financial Markets.

'.' denotes estimated coefficient is not significant at any statistical level.

F. Summary of Findings

CHAPTER 3

A. Results of the First stage – System GMM and Diagnostic tests

		Dependent Variable - Financial Development	
		Coef.	Std.Errr
GDP per capita		.2864878***	.0563039
Openness		.0550068	.0815874
Inflation		-.5834475***	.1077334
Government Expenditure		.1732335*	.1008885
Human Capital		.3613273**	.1214715
Constant		1.215936*	.6394602
Arellano-Bond Test	AR(1) <i>p</i> -value	0.000	
	AR(2) <i>p</i> -value	0.944	
Hansen Test of Overidentification	<i>p</i> -value	0.160	
Number of Observations		3743	
Number of Groups		135	
Number of Instruments		116	

Notes: ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

AR(1) is the test for first order serial correlation and AR(2) is the test for second order serial correlation.

The Hansen test examines the validity of the instruments, where a non-rejection indicates valid instruments.

Source: Author's calculation.

B. Definitions and Sources of Variables Used in Regression Analysis

Variable	Definition and Construction	Source
Household final consumption expenditure per capita (constant 2010 US\$)	Household final consumption expenditure per capita is calculated using private consumption in constant 2010 prices and World Bank population estimates. Logged.	Author's calculation using World Development Indicators (2018)
Private deposit money bank assets (% of GDP)	The financial resources provided to the private sector by domestic money banks as a share of GDP. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Logged.	Author's calculation using Global Financial Development Database (GFDD), The World Bank (2018)
GDP per capita growth (annual %)	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. Logged.	Author's calculation using World Development Indicators (2018)
Financial Crisis	It is a dummy variable based on the dates of system banking crises, takes value of one if there is a crisis for country i , in year t . And zero otherwise.	Laeven and Valencia (2018)
GDP per capita (constant 2010 US\$)	It is gross domestic product divided by midyear population. Logged.	Author's calculation using World Development Indicators (2018)
Trade (% of GDP)	It is the sum of exports and imports of goods and services measured as a share of gross domestic product. Logged.	Author's calculation using World Development Indicators (2018)
Inflation, consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services. Logged.	Author's calculation using World Development Indicators (2018)
General government final consumption expenditure (% of GDP)	It includes all government current expenditures for purchases of goods and services (including compensation of employees). Logged.	Author's calculation using World Development Indicators (2018)
School enrollment, secondary (% gross)	Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers. Logged.	Author's calculation using World Development Indicators (2018)
GINI index	It measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution.	Author's calculation using World Development Indicators (2018)
Mobile cellular subscriptions (per 100 people)	It measures subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. Logged and lagged for one period.	Author's calculation using World Development Indicators (2018)
Latitude of capital	The absolute value of the latitude of the country, scaled to take values between 0 and 1.	La Porta et al (1999)
Bank Z-score	It captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns. Logged.	Author's calculation using Global Financial Development Database (GFDD), The World Bank (2018)
Bank return on assets (% , before tax)	Commercial banks' pre-tax income to yearly averaged total assets. Logged and lagged for two periods.	Author's calculation using Global Financial Development Database (GFDD), The World Bank (2018)
Bureaucracy quality	It refers to the quality of the bureaucracy that tends to minimise revisions of policy when governments change. It ranges from 0 to 4. A lower score indicates high level and vice versa.	ICRG political risk index.
Law and order	Measure for the country's judicial system level. It ranges from 0 to 6. A lower score indicates high level and vice versa.	ICRG political risk index.

C. System Banking Crisis Dates for Sampled Countries

Country	Start	End	Country	Start	End	Country	Start	End
Argentina	1980	1982	Guinea	1985	1985	Russia	1998	1998
Argentina	1989	1991	Guinea	1993	1993	Russia	2008	2009
Argentina	1995	1995	Guinea-Biss: 1995	1995	1998	São Tomé & Príncipe	1992	1992
Argentina	2001	2003	Guinea-Biss: 2014	ongoing		Senegal	1988	1991
Armenia	1994	1994	Guyana	1993	1993	Sierra Leone	1990	1994
Austria	2008	2012	Haiti	1994	1998	Slovak Rep	1998	2002
Azerbaijan	1995	1995	Hungary	1991	1995	Slovenia	1992	1992
Bangladesh	1987	1987	Hungary	2008	2012	Slovenia	2008	2012
Belarus	1995	1995	Iceland	2008	2012	Spain	1977	1981
Belgium	2008	2012	India	1993	1993	Spain	2008	2012
Benin	1988	1992	Indonesia	1997	2001	Sri Lanka	1989	1991
Bolivia	1986	1986	Ireland	2008	2012	Sweden	1991	1995
Bolivia	1994	1994	Israel	1983	1986	Sweden	2008	2009
Bosnia and Herzegov	1992	1996	Italy	2008	2009	Switzerland	2008	2009
Brazil	1990	1994	Jamaica	1996	1998	Tanzania	1987	1988
Brazil	1994	1998	Japan	1997	2001	Thailand	1983	1983
Bulgaria	1996	1997	Jordan	1989	1991	Thailand	1997	2000
Burkina Faso	1990	1994	Kazakhstan	2008	2008	Togo	1993	1994
Burundi	1994	1998	Kenya	1985	1985	Tunisia	1991	1991
Cameroon	1987	1991	Kenya	1992	1994	Turkey	1982	1984
Cameroon	1995	1997	Korea	1997	1998	Turkey	2000	2001
Central African Rep	1976	1976	Kuwait	1982	1985	Uganda	1994	1994
Central African Rep	1995	1996	Kyrgyz Rep	1995	1999	Ukraine	1998	1999
Chad	1983	1983	Latvia	1995	1996	Ukraine	2008	2010
Chad	1992	1996	Latvia	2008	2012	Ukraine	2014	ongoing
Chile	1976	1976	Lebanon	1990	1993	United Kingdom	2007	2011
Chile	1981	1985	Liberia	1991	1995	United States	1988	1988
China, Mainland	1998	1998	Lithuania	1995	1996	United States	2007	2011
Colombia	1982	1982	Luxembourg	2008	2012	Uruguay	1981	1985
Colombia	1998	2000	Madagascar	1988	1988	Uruguay	2002	2005
Congo, Dem Rep	1983	1983	Malaysia	1997	1999	Venezuela	1994	1998
Congo, Dem Rep	1991	1994	Mali	1987	1991	Vietnam	1997	1997
Congo, Dem Rep	1994	1998	Mauritania	1984	1984	Yemen	1996	1996
Congo, Rep	1992	1994	Mexico	1981	1985	Zambia	1995	1998
Costa Rica	1987	1991	Mexico	1994	1996			
Costa Rica	1994	1995	Moldova	2014	ongoing			
Croatia	1998	1999	Mongolia	2008	2009			
Czech Republic	1996	2000	Morocco	1980	1984			
Cyprus	2011	2015	Mozambique	1987	1991			
Denmark	2008	2009	Nepal	1988	1988			
Djibouti	1991	1995	Netherlands	2008	2009			
Dominican Rep	2003	2004	Nicaragua	1990	1993			
Ecuador	1982	1986	Nicaragua	2000	2001			
Ecuador	1998	2002	Niger	1983	1985			
Egypt	1980	1980	Nigeria	1991	1995			
El Salvador	1989	1990	Nigeria	2009	2012			
Equatorial Guinea	1983	1983	Norway	1991	1993			
Eritrea	1993	1993	Panama	1988	1989			
Estonia	1992	1994	Paraguay	1995	1995			
Finland	1991	1995	Peru	1983	1983			
France	2008	2009	Philippines	1983	1986			
Georgia	1991	1995	Philippines	1997	2001			
Germany	2008	2009	Poland	1992	1994			
Ghana	1982	1983	Portugal	2008	2012			
Greece	2008	2012	Romania	1998	1999			

Sources: Laeven and Valencia (2018)

D. Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Household Final Consumption Expenditure per capita (constant 2010 US\$)	1.000															
(2) Private Credit by Deposit Money Banks (% of GDP)	0.704	1.000														
(3) Economics Growth (annual %)	-0.060	-0.035	1.000													
(4) Financial Crisis	0.112	0.100	-0.208	1.000												
(5) GDP per capita	0.813	0.564	-0.103	0.100	1.000											
(6) Openness	0.221	0.269	0.076	0.063	0.285	1.000										
(7) Inflation, Consumer Prices (annual %)	-0.076	-0.179	-0.197	0.041	-0.060	0.005	1.000									
(8) Government Expenditure (% of GDP)	0.442	0.354	-0.100	0.084	0.373	0.182	-0.004	1.000								
(9) School Enrollment, Secondary (% gross)	0.830	0.621	0.007	0.071	0.615	0.247	0.009	0.441	1.000							
(10) Gini Index	-0.338	-0.264	-0.049	-0.095	-0.415	-0.178	-0.021	-0.242	-0.400	1.000						
(11) Mobile Cellular Subscriptions (per 100 people)	0.541	0.513	-0.057	0.018	0.427	0.275	-0.110	0.250	0.530	-0.252	1.000					
(12) Latitude of Capital/90 (Absolute Value)	0.638	0.423	0.034	0.117	0.554	0.224	0.059	0.491	0.666	-0.639	0.306	1.000				
(13) Bank Z-score	0.095	0.241	-0.009	-0.115	0.084	0.093	-0.071	0.073	0.004	0.151	0.050	-0.064	1.000			
(14) Bank Return on Assets (% of GDP)	-0.255	-0.280	0.111	-0.186	-0.179	-0.039	0.063	-0.070	-0.218	0.158	-0.154	-0.146	0.038	1.000		
(15) Bureaucracy Quality	0.780	0.641	-0.063	0.110	0.737	0.174	-0.088	0.384	0.647	-0.345	0.335	0.505	0.127	-0.156	1.000	
(16) Law and Order	0.600	0.502	0.027	0.119	0.649	0.222	-0.021	0.444	0.518	-0.504	0.182	0.668	0.083	-0.100	0.630	1.000

Source: Author's own calculations

E. Sampled Countries

Advanced Countries

Australia	Finland	Italy	Norway	United Kingdom
Austria	France	Japan	Portugal	United States
Belgium	Germany	Korea, Rep.	Singapore	
Canada	Greece	Latvia	Slovak Republic	
Cyprus	Hong Kong SAR, China	Lithuania	Slovenia	
Czech Republic	Iceland	Luxembourg	Spain	
Denmark	Ireland	Netherlands	Sweden	
Estonia	Israel	New Zealand	Switzerland	

Emerging and Developing Countries

Angola	China	India	Namibia	Suriname
Argentina	Colombia	Indonesia	Nigeria	Syrian Arab Republic
Armenia	Costa Rica	Iran, Islamic Rep.	Pakistan	Thailand
Azerbaijan	Croatia	Jamaica	Panama	Trinidad and Tobago
Barbados	Dominican Republic	Jordan	Paraguay	Tunisia
Belarus	Ecuador	Kazakhstan	Peru	Turkey
Belize	Egypt, Arab Rep.	Kuwait	Philippines	Turkmenistan
Bolivia	El Salvador	Lebanon	Poland	Ukraine
Bosnia and Herzegovina	Equatorial Guinea	Libya	Romania	Uruguay
Botswana	Fiji	Malaysia	Russian Federation	Venezuela, RB
Brazil	Gabon	Mauritius	Serbia	Vietnam
Brunei Darussalam	Georgia	Mexico	Seychelles	
Bulgaria	Guatemala	Mongolia	South Africa	
Chile	Hungary	Morocco	Sri Lanka	

Low Income Countries

Bangladesh	Djibouti	Kenya	Myanmar	Tanzania
Benin	Dominica	Kyrgyz Republic	Nepal	Togo
Bhutan	Eritrea	Lao PDR	Nicaragua	Uganda
Burkina Faso	Ethiopia	Lesotho	Niger	Uzbekistan
Burundi	Gambia, The	Liberia	Papua New Guinea	Yemen, Rep.
Cambodia	Ghana	Madagascar	Rwanda	Zambia
Cameroon	Grenada	Malawi	Sao Tome and Principe	
Central African Republic	Guinea	Maldives	Senegal	
Chad	Guinea-Bissau	Mali	Sierra Leone	
Comoros	Guyana	Mauritania	South Sudan	
Congo, Dem. Rep.	Haiti	Moldova	Sudan	
Congo, Rep.	Honduras	Mozambique	Tajikistan	

CHAPTER 4

A. CHFS 2017 Provinces (including municipalities) Coverage

North-East Region	Eastern Region	Central Region	Western Region
Liaoning	Beijing	Shanxi	Neimenggu
Jilin	Tianjin	Anhui	Guangxi
Heilongjiang	Hebei	Jiangxi	Chongqing
	Shanghai	Henan	Sichuan
	Jiangsu	Hubei	Guizhou
	Zhejiang	Hunan	Yunnan
	Fujian		Shanxi
	Shandong		Gansu
	Guangdong		Qinghai
	Hainan		Ningxia

Note. The survey has covered in total, 29 Provinces (incl. municipalities)

B. Matrix of Correlations – All Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
(1) H. Income	1.000																							
(2) Fin. Incl. Score	0.319	1.000																						
(3) Fin. Incl. Dummy	0.268	0.792	1.000																					
(4) Account	0.139	0.572	0.219	1.000																				
(5) Debt	0.209	0.368	0.291	0.095	1.000																			
(6) Equity	0.276	0.487	0.463	0.080	0.181	1.000																		
(7) Loan	0.072	0.422	0.328	0.059	-0.046	0.088	1.000																	
(8) Credit	0.245	0.555	0.543	0.094	0.081	0.322	0.219	1.000																
(9) Insurance	0.146	0.648	0.661	0.078	0.080	0.206	0.129	0.251	1.000															
(10) Gender	-0.057	0.008	-0.009	0.031	-0.004	-0.045	0.042	-0.016	-0.007	1.000														
(11) Age	-0.041	-0.274	-0.249	-0.102	0.050	-0.088	-0.224	-0.306	-0.184	-0.062	1.000													
(12) <i>Hikein</i>	-0.401	-0.227	-0.205	-0.076	-0.160	-0.298	0.010	-0.203	-0.094	0.181	-0.047	1.000												
(13) Marital Status	0.003	0.094	0.068	0.051	0.036	0.035	0.088	0.036	0.047	0.355	-0.082	0.056	1.000											
(14) Education	0.395	0.394	0.344	0.147	0.158	0.340	0.147	0.368	0.189	0.024	-0.360	-0.455	0.076	1.000										
(15) Communist	0.157	0.096	0.082	0.038	0.067	0.101	0.026	0.083	0.029	0.034	0.044	-0.171	0.039	0.235	1.000									
(16) Public Official	0.148	0.152	0.135	0.045	0.039	0.107	0.094	0.170	0.069	-0.013	-0.161	-0.182	0.036	0.288	0.150	1.000								
(17) Business	0.038	0.132	0.130	0.025	-0.013	0.027	0.137	0.127	0.108	0.042	-0.207	0.033	0.072	0.060	-0.030	-0.044	1.000							
(18) Agricultural	-0.275	-0.115	-0.134	0.027	-0.091	-0.191	0.008	-0.153	-0.064	0.164	0.008	0.464	0.097	-0.274	-0.090	-0.106	-0.071	1.000						
(19) Family Size	-0.115	0.058	0.055	-0.006	-0.054	-0.056	0.126	0.062	0.077	0.180	-0.239	0.205	0.322	-0.047	-0.066	-0.006	0.164	0.222	1.000					
(20) Prop. Children	-0.076	0.131	0.129	0.029	-0.051	-0.005	0.133	0.139	0.133	0.064	-0.383	0.115	0.142	0.056	-0.029	0.029	0.140	0.077	0.561	1.000				
(21) Prop. the Elderly	0.029	-0.204	-0.187	-0.074	0.060	-0.054	-0.185	-0.212	-0.154	-0.087	0.679	-0.066	-0.147	-0.212	0.071	-0.131	-0.180	-0.069	-0.342	-0.320	1.000			
(22) No. of Houses	0.171	0.213	0.198	0.028	0.071	0.166	0.169	0.170	0.131	0.023	-0.082	-0.077	0.073	0.149	0.034	0.077	0.113	-0.041	0.132	0.058	-0.105	1.000		
(23) No. of Cars	0.218	0.327	0.310	0.042	0.060	0.209	0.248	0.339	0.212	0.029	-0.284	-0.117	0.118	0.280	0.072	0.150	0.247	-0.109	0.230	0.198	-0.247	0.267	1.000	

Source: Author's own calculations

C. Multicollinearity Test

Variable	VIF	1/VIF
Age	2.350	0.426
Proportion of The Elderly	2.020	0.496
Family Size	1.840	0.543
Education	1.820	0.551
<i>Hukou</i>	1.660	0.602
Proportion of Children	1.640	0.610
Agricultural	1.350	0.738
No. of Cars Owned	1.340	0.745
Marital Status	1.320	0.759
Financial Inclusion Dummy	1.270	0.790
Gender	1.200	0.832
Public Official	1.130	0.886
Business	1.130	0.887
No. of Houses Owned	1.120	0.896
Communist Party	1.100	0.908
Mean VIF	1.480	

D. Heteroskedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lnpinc

chi2(1) = 878.89

Prob > chi2 = 0.0000

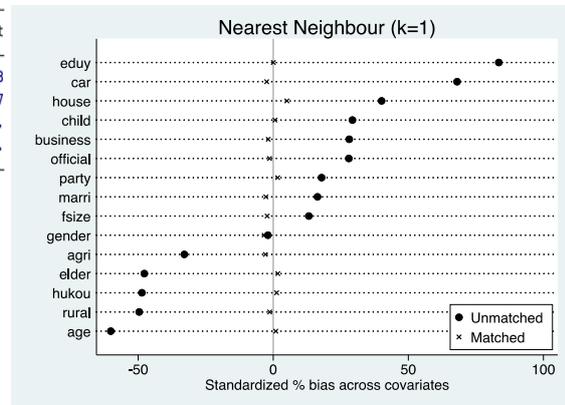
E. PSM

Nearest Neighbour (k=1)

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
lnpinc	Unmatched	10.3393396	9.40811505	.931224583	.016890019	55.13
	ATT	10.3386121	9.95964787	.378964181	.026553392	14.27
	ATU	9.41371439	9.86201785	.44830346	.	.
	ATE			.430724287	.	.

Note: S.E. does not take into account that the propensity score is estimated.

psmatch2: Treatment assignment	psmatch2: Common support			Total
	Off suppo	On suppor		
Untreated	147	29,126		29,273
Treated	5	9,892		9,897
Total	152	39,018		39,170

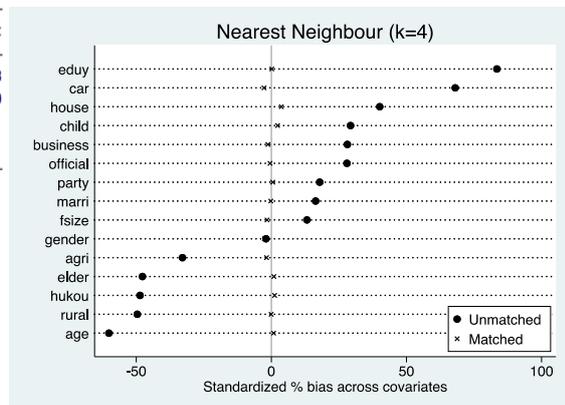


Nearest Neighbour (k=4)

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
lnpinc	Unmatched	10.3393396	9.40811505	.931224583	.016890019	55.13
	ATT	10.3386121	9.95936752	.379244537	.022066236	17.19
	ATU	9.41371439	9.86329935	.449584956	.	.
	ATE			.431751971	.	.

Note: S.E. does not take into account that the propensity score is estimated.

psmatch2: Treatment assignment	psmatch2: Common support			Total
	Off suppo	On suppor		
Untreated	147	29,126		29,273
Treated	5	9,892		9,897
Total	152	39,018		39,170

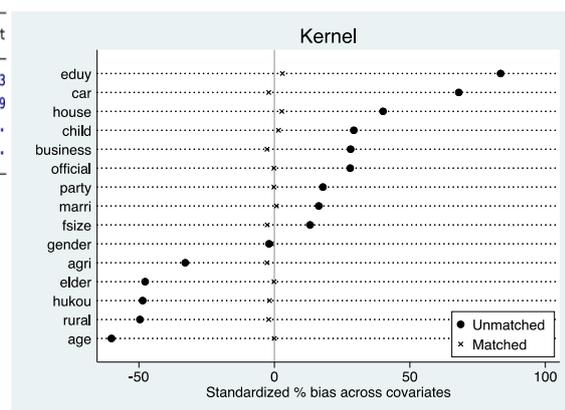


Kernel

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
lnpinc	Unmatched	10.3393396	9.40811505	.931224583	.016890019	55.13
	ATT	10.3386121	9.93376813	.404843924	.020155997	20.09
	ATU	9.41371439	9.86950363	.45578924	.	.
	ATE			.442873379	.	.

Note: S.E. does not take into account that the propensity score is estimated.

psmatch2: Treatment assignment	psmatch2: Common support			Total
	Off suppo	On suppor		
Untreated	147	29,126		29,273
Treated	5	9,892		9,897
Total	152	39,018		39,170

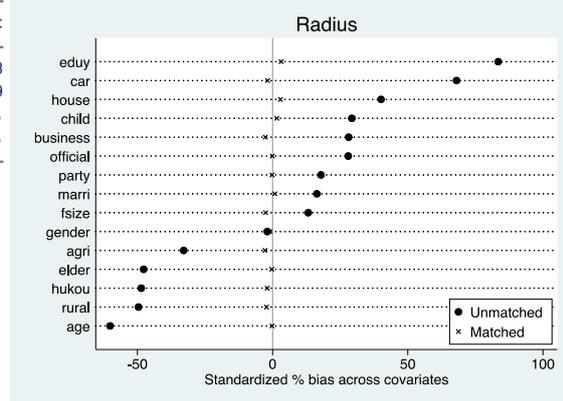


Radius

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
lnpinc	Unmatched	10.3393396	9.40811505	.931224583	.016890019	55.13
	ATT	10.3386121	9.93220232	.40640973	.020132991	20.19
	ATU	9.41371439	9.8719303	.458215905	.	.
	ATE			.445081795	.	.

Note: S.E. does not take into account that the propensity score is estimated.

psmatch2: Treatment assignment	psmatch2: Common support			Total
	Off suppo	On suppor		
Untreated	147	29,126	29,273	
Treated	5	9,892	9,897	
Total	152	39,018	39,170	

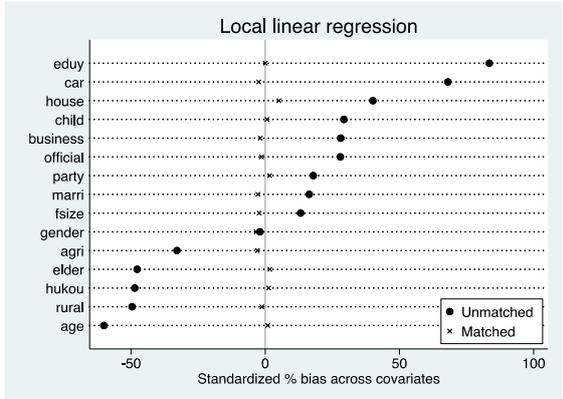


Local linear regression

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
lnpinc	Unmatched	10.3393396	9.40811505	.931224583	.016890019	55.13
	ATT	10.3386121	9.93269852	.405913538	.026553392	15.29
	ATU	9.41371439	9.83206626	.418351865	.	.
	ATE			.415198451	.	.

Note: S.E. does not take into account that the propensity score is estimated.

psmatch2: Treatment assignment	psmatch2: Common support			Total
	Off suppo	On suppor		
Untreated	147	29,126	29,273	
Treated	5	9,892	9,897	
Total	152	39,018	39,170	

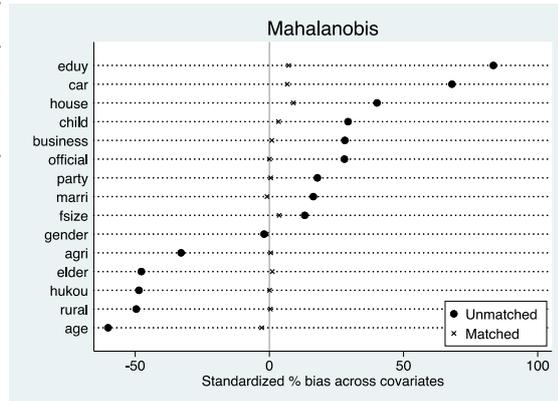


Mahalanobis

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
lnpinc	Unmatched	10.3393396	9.40811505	.931224583	.016890019	55.13
	ATT	10.3393396	9.94281291	.39652673	.018136708	21.86
	ATU	9.40811505	9.90640315	.498288093	.022705878	21.95
	ATE			.472576267	.01936173	24.41

Note: Sample S.E.

psmatch2: Treatment assignment	psmatch2: Common support		Total
	On suppor		
Untreated	29,273	29,273	
Treated	9,897	9,897	
Total	39,170	39,170	



F. Counterfactual Decomposition

Conditional model linear quantile regression
 Number of regressions estimated 100

The variance has not been computed.
 Do not turn the option boot off if you want to compute it.

No. of obs. in the reference group 29273
 No. of obs. in the counterfactual group 9897

Differences between the observable distributions (based on the conditional model)

Quantile	Quantile effect	Pointwise Std. Err.	Pointwise [95% Conf. Interval]	Functional [95% Conf. Interval]
.1	-1.50128	.	.	.
.2	-1.25595	.	.	.
.3	-1.07822	.	.	.
.4	-.950154	.	.	.
.5	-.853735	.	.	.
.6	-.778636	.	.	.
.7	-.723108	.	.	.
.8	-.679434	.	.	.
.9	-.634361	.	.	.

Effects of characteristics

Quantile	Quantile effect	Pointwise Std. Err.	Pointwise [95% Conf. Interval]	Functional [95% Conf. Interval]
.1	-.630862	.	.	.
.2	-.696559	.	.	.
.3	-.677344	.	.	.
.4	-.641925	.	.	.
.5	-.600918	.	.	.
.6	-.557532	.	.	.
.7	-.516661	.	.	.
.8	-.47569	.	.	.
.9	-.441452	.	.	.

Effects of coefficients

Quantile	Quantile effect	Pointwise Std. Err.	Pointwise [95% Conf. Interval]	Functional [95% Conf. Interval]
.1	-.870422	.	.	.
.2	-.559389	.	.	.
.3	-.400874	.	.	.
.4	-.308229	.	.	.
.5	-.252818	.	.	.
.6	-.221104	.	.	.
.7	-.206447	.	.	.
.8	-.203743	.	.	.
.9	-.192909	.	.	.

G. Two-Stage Least Squares and Relevant Tests

First-stage regressions

Number of obs = 39,170
 F(20, 39149) = 639.50
 Prob > F = 0.0000
 R-squared = 0.2757
 Adj R-squared = 0.2753
 Root MSE = 16.7434

fincls	Robust		t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.				
gender	.0508512	.2377706	0.21	0.831	-.415185	.5168874
age	-.1162325	.0094123	-12.35	0.000	-.1346809	-.0977842
hukou	-2.459596	.2366482	-10.39	0.000	-2.923432	-1.99576
rural	2.61719	.2586375	10.12	0.000	2.110254	3.124126
marri	2.527959	.2670841	9.47	0.000	2.004468	3.051451
eduy	.9418022	.0295276	31.90	0.000	.8839273	.9996771
party	.5907271	.2854177	2.07	0.038	.0313013	1.150153
official	1.71813	.3993303	4.30	0.000	.9354328	2.500827
business	2.361001	.2809438	8.40	0.000	1.810344	2.911658
agri	1.967501	.2231847	8.82	0.000	1.530053	2.404948
fsize	-.4463198	.0757859	-5.89	0.000	-.594862	-.2977777
child	6.788025	.6809574	9.97	0.000	5.453331	8.122718
elder	-1.638249	.3114044	-5.26	0.000	-2.24861	-1.027889
house	3.874935	.2411621	16.07	0.000	3.402251	4.347618
car	5.631145	.2152233	26.16	0.000	5.209302	6.052988
region						
2	.1242294	.2780694	0.45	0.655	-.4207935	.6692524
3	.533591	.2913045	1.83	0.067	-.037373	1.104555
4	.7058723	.2911127	2.42	0.015	.1352841	1.27646
mfincls1	62.60418	2.600922	24.07	0.000	57.50631	67.70206
mfincls2	6.041822	3.082047	1.96	0.050	.0009339	12.08271
_cons	-.0785756	.9913049	-0.08	0.937	-2.021558	1.864406

Instrumental variables (2SLS) regression

Number of obs = 39,170
 Wald chi2(19) = 13552.80
 Prob > chi2 = 0.0000
 R-squared = 0.1472
 Root MSE = 1.3924

lnpinc	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
fincls	.0468055	.0020687	22.63	0.000	.042751	.05086
gender	.0147911	.0191045	0.77	0.439	-.022653	.0522353
age	.0066954	.0008153	8.21	0.000	.0050975	.0082933
hukou	-.3457917	.0216134	-16.00	0.000	-.3881533	-.3034302
rural	-.2970983	.0213234	-13.93	0.000	-.3380914	-.2553051
marri	-.0947402	.0231557	-4.09	0.000	-.1401246	-.0493559
eduy	.027688	.003323	8.33	0.000	.021175	.034201
party	.1344857	.021487	6.26	0.000	.0923719	.1765994
official	.0763516	.0247097	3.09	0.002	.0279214	.1247817
business	-.0786612	.0256591	-3.07	0.002	-.1289521	-.0283703
agri	-.1638784	.0218314	-7.51	0.000	-.2066671	-.1210897
fsize	.009036	.0066055	1.37	0.171	-.0039105	.0219825
child	-.7464021	.0596274	-12.52	0.000	-.8632696	-.6295347
elder	.3650039	.0258452	14.12	0.000	.3143482	.4156596
house	.075412	.018536	4.07	0.000	.0390822	.1117419
car	.0178282	.02089	0.85	0.393	-.0231154	.0587718
region						
2	.2014483	.0232641	8.66	0.000	.1558516	.247045
3	-.1045338	.0249726	-4.19	0.000	-.1534792	-.0555885
4	-.2083482	.0254678	-8.18	0.000	-.2582642	-.1584322
_cons	7.64704	.0805411	94.95	0.000	7.489182	7.804898

Instrumented: fincls
 Instruments: gender age hukou rural marri eduy party official business
 agri fsize child elder house car 2.region 3.region 4.region
 mfincls1 mfincls2

Test of overidentifying restrictions:

Score chi2(1) = 1.25699 (p = 0.2622)

First-stage regression summary statistics

Variable	R-sq.	Adjusted R-sq.	Partial R-sq.	Robust F(2,39149)	Prob > F
fincls	0.2757	0.2753	0.0424	855.543	0.0000

Shea's partial R-squared

Variable	Shea's Partial R-sq.	Shea's Adj. Partial R-sq.
fincls	0.0424	0.0419

Minimum eigenvalue statistic = 866.079

Critical Values # of endogenous regressors: 1
 Ho: Instruments are weak # of excluded instruments: 2

2SLS relative bias	5%	10%	20%	30%
	(not available)			
2SLS Size of nominal 5% Wald test	10%	15%	20%	25%
LIML Size of nominal 5% Wald test	19.93	11.59	8.75	7.25
	8.68	5.33	4.42	3.92

Tests of endogeneity

Ho: variables are exogenous

Robust score chi2(1) = 340.069 (p = 0.0000)
 Robust regression F(1,39149) = 348.673 (p = 0.0000)

H. OLS and Quantile Regressions – Financial Inclusion Cut-off Score of 75

	Dependent Variable: Household Income per Equivalent Person (Log)									
	(1) OLS	(2) Q10	(3) Q20	(4) Q30	(5) Q40	(6) Q50	(7) Q60	(8) Q70	(9) Q80	(10) Q90
Fin. Incl. D.	0.320*** (12.416)	0.382*** (8.402)	0.286*** (10.300)	0.264*** (11.642)	0.259*** (13.933)	0.270*** (15.400)	0.276*** (15.625)	0.283*** (17.380)	0.272*** (12.981)	0.265*** (12.007)
Gender	-0.001 (-0.036)	-0.005 (-0.125)	-0.013 (-0.531)	-0.014 (-0.782)	-0.021 (-1.423)	-0.017 (-1.383)	-0.022* (-1.755)	-0.012 (-1.031)	-0.017 (-1.423)	-0.000 (-0.007)
Age	0.001 (0.860)	0.012*** (6.889)	0.005*** (5.409)	0.002*** (2.646)	0.001** (2.073)	0.000 (0.421)	-0.001* (-1.712)	-0.001*** (-2.868)	-0.003*** (-5.210)	-0.004*** (-6.903)
<i>Hukou</i>	-0.516*** (-27.743)	-1.164*** (-20.728)	-0.809*** (-25.605)	-0.614*** (-27.197)	-0.514*** (-30.746)	-0.441*** (-29.051)	-0.379*** (-27.794)	-0.332*** (-24.522)	-0.289*** (-20.510)	-0.259*** (-16.679)
Rural	-0.366*** (-18.384)	-0.463*** (-8.974)	-0.523*** (-14.257)	-0.504*** (-19.737)	-0.479*** (-22.829)	-0.409*** (-21.476)	-0.334*** (-20.352)	-0.279*** (-17.072)	-0.236*** (-14.696)	-0.173*** (-9.605)
Marital Status	0.026 (1.226)	0.179*** (2.901)	0.105*** (3.226)	0.090*** (3.676)	0.068*** (3.665)	0.051*** (3.002)	0.036** (2.160)	0.011 (0.729)	-0.004 (-0.288)	-0.069*** (-3.862)
Education	0.079*** (34.197)	0.125*** (22.940)	0.103*** (31.112)	0.090*** (37.009)	0.080*** (38.873)	0.071*** (41.713)	0.066*** (39.426)	0.063*** (39.460)	0.059*** (37.410)	0.056*** (34.625)
Communist Party	0.167*** (8.824)	0.173*** (4.300)	0.170*** (7.408)	0.171*** (10.425)	0.145*** (9.627)	0.137*** (10.436)	0.120*** (9.604)	0.114*** (8.800)	0.108*** (7.713)	0.118*** (7.538)
Public Official	0.119*** (6.226)	0.308*** (8.362)	0.038 (1.639)	-0.019 (-0.934)	-0.016 (-0.969)	-0.034* (-1.949)	-0.013 (-0.760)	-0.014 (-0.946)	-0.026 (-1.461)	-0.049** (-2.508)
Business	0.026 (1.095)	-0.415*** (-5.167)	-0.076** (-2.549)	0.036* (1.698)	0.075*** (3.970)	0.130*** (7.435)	0.187*** (11.888)	0.239*** (13.506)	0.305*** (17.341)	0.395*** (18.634)
Agricultural	-0.067*** (-3.292)	0.034 (0.710)	-0.055* (-1.750)	-0.112*** (-4.596)	-0.107*** (-5.176)	-0.119*** (-6.013)	-0.099*** (-5.423)	-0.078*** (-4.391)	-0.050*** (-2.952)	-0.018 (-0.903)
Family Size	-0.023*** (-3.883)	0.057*** (4.036)	-0.008 (-0.976)	-0.032*** (-5.055)	-0.047*** (-9.431)	-0.061*** (-13.064)	-0.074*** (-16.160)	-0.083*** (-17.770)	-0.091*** (-20.559)	-0.103*** (-18.161)
Proportion of Children	-0.435*** (-8.205)	-0.656*** (-5.498)	-0.415*** (-5.677)	-0.312*** (-5.804)	-0.216*** (-4.934)	-0.228*** (-5.794)	-0.226*** (-5.792)	-0.197*** (-5.210)	-0.205*** (-5.152)	-0.203*** (-3.980)
Proportion of the Elderly	0.301*** (12.740)	0.474*** (7.605)	0.301*** (8.126)	0.305*** (11.434)	0.309*** (14.721)	0.313*** (16.664)	0.340*** (20.939)	0.340*** (20.822)	0.339*** (20.653)	0.301*** (14.176)
No. of Houses	0.256*** (13.192)	0.260*** (14.280)	0.238*** (12.348)	0.237*** (16.046)	0.225*** (20.394)	0.223*** (23.328)	0.216*** (22.387)	0.222*** (24.650)	0.215*** (20.576)	0.215*** (15.188)
No. of Cars	0.291*** (19.313)	0.268*** (9.854)	0.271*** (14.631)	0.257*** (17.898)	0.257*** (22.926)	0.260*** (26.126)	0.258*** (26.898)	0.262*** (23.268)	0.268*** (25.146)	0.266*** (20.534)
1.region	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
2.region	0.313*** (15.136)	0.277*** (5.473)	0.329*** (11.831)	0.316*** (15.478)	0.333*** (20.711)	0.338*** (21.522)	0.345*** (25.852)	0.349*** (26.658)	0.346*** (21.609)	0.343*** (18.967)
3.region	-0.022 (-0.985)	-0.076 (-1.310)	-0.041 (-1.251)	-0.048** (-2.081)	-0.020 (-1.053)	0.000 (0.005)	0.004 (0.235)	0.019 (1.247)	0.015 (0.889)	0.012 (0.600)
4.region	-0.093*** (-4.052)	-0.147*** (-2.615)	-0.110*** (-3.417)	-0.114*** (-4.687)	-0.075*** (-4.069)	-0.046** (-2.505)	-0.032** (-2.042)	-0.008 (-0.550)	0.002 (0.119)	0.010 (0.507)
_cons	8.750*** (145.207)	6.277*** (46.997)	7.739*** (100.566)	8.421*** (135.875)	8.835*** (180.701)	9.196*** (203.884)	9.500*** (219.633)	9.732*** (237.012)	10.054*** (239.832)	10.496*** (219.127)
N	39170	39170	39170	39170	39170	39170	39170	39170	39170	39170
r2	0.283	0.259	0.277	0.280	0.280	0.279	0.276	0.272	0.264	0.250

Notes: Robust *t* statistics in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

Source: Author's own calculations.

I. IV-2SLS Regressions with *Fin.Incl.S.* * *Gender*

	Dependent Variable: Household Income per Equivalent Person (Log)
	IV-2SLS
Fin. Incl. S.	0.143*** (0.010)
Gender	4.250*** (0.318)
Age	0.008*** (0.001)
<i>Hukou</i>	-0.366*** (0.025)
Marital Status	-0.379*** (0.043)
Rural	-0.351*** (0.024)
Education	0.006 (0.005)
Communist Party	0.149*** (0.027)
Public Official	0.057 (0.037)
Business	-0.042 (0.029)
Agricultural	-0.197*** (0.025)
Family Size	-0.008 (0.008)
Proportion of Children	-0.560*** (0.072)
Proportion of the Elderly	0.426*** (0.034)
No. of Houses	0.071*** (0.021)
No. of Cars	0.069*** (0.024)
1.region	0.000 (.)
2.region	0.146*** (0.030)
3.region	-0.137*** (0.031)
4.region	-0.233*** (0.032)
Fin. Incl. S.*Gender	-0.121*** (0.009)
_cons	4.769*** (0.288)
N	39,170
F	450.85

Notes: Robust *t* statistics in parentheses; * $p < .1$, ** $p < .05$, *** $p < .01$.

Source: Author's own calculation.