

Chuc Anh Tu et al.

Working Paper

Remittance inflows, financial inclusion, and economic development: An empirical analysis of the world sample

ADB Working Paper Series, No. 1000

Provided in Cooperation with:

Asian Development Bank Institute (ADBI), Tokyo

Suggested Citation: Chuc Anh Tu et al. (2019) : Remittance inflows, financial inclusion, and economic development: An empirical analysis of the world sample, ADB Working Paper Series, No. 1000, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:

<https://hdl.handle.net/10419/222767>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by-nc-nd/3.0/igo/>



ADB Working Paper Series

**REMITTANCE INFLOWS, FINANCIAL
INCLUSION, AND ECONOMIC
DEVELOPMENT: AN EMPIRICAL
ANALYSIS OF THE WORLD SAMPLE**

Chuc Anh Tu, Nguyet Thi Minh Phi,
Le Quoc Tuan, Naoyuki Yoshino,
Tapan Sarker, and Farhad Taghizadeh-Hesary

No. 1000
September 2019

Asian Development Bank Institute

Chuc Anh Tu is an associate professor at the Academy of Finance in Ha Noi. Nguyet Thi Minh Phi is a lecturer at the Academy of Finance and a researcher at the Center for Applied Economics and Business Research in Ha Noi. Le Quoc Tuan is a lecturer at the Banking Academy of Viet Nam and a researcher at the Center for Applied Economics and Business Research in Ha Noi. Naoyuki Yoshino is dean and chief executive officer of the Asian Development Bank Institute in Tokyo. Tapan Sarker is a senior lecturer at the Griffith Business School of Griffith University in Brisbane. Farhad Taghizadeh-Hesary is an assistant professor at the Faculty of Political Science and Economics of Waseda University in Tokyo.

The views expressed in this paper are the views of the author and do not necessarily reflect the views or policies of ADBI, ADB, its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

Working papers are subject to formal revision and correction before they are finalized and considered published.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. Some working papers may develop into other forms of publication.

Suggested citation:

Tu, C. A., N. T. M. Phi, L. Q. Tuan, N. Yoshino, T. Sarker, and F. Taghizadeh-Hesary. 2019. Remittance Inflows, Financial Inclusion, and Economic Development: An Empirical Analysis of the World Sample. ADBI Working Paper 1000. Tokyo: Asian Development Bank Institute. Available: <https://www.adb.org/publications/remittance-inflows-financial-inclusion-economic-development>

Please contact the authors for information about this paper.

Email: farhad@aoni.waseda.jp

Asian Development Bank Institute
Kasumigaseki Building, 8th Floor
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

© 2019 Asian Development Bank Institute

Abstract

The main purpose of this paper is to empirically investigate the impacts of remittance inflows, financial inclusion, and economic development and whether inward remittances may help to construct an inclusive financial system. Using both endogeneity-robust generalized method of moments and a structural equation model, our results show that remittances and financial inclusions are engines of growth in countries of different income groups. This implies that the policies to attract extra inward remittances and improve financial inclusion status are of great importance and could pull middle-income countries out of middle-income traps. To this end, our empirical study helps to shed light on the development dilemma of remittance inflows and financial inclusion and to explain both direct and indirect mechanisms through which these effects may happen.

Keywords: remittance, financial inclusion, economic development, structural equation model, middle-income countries

JEL Classification: G00, F24, F63

Contents

1.	INTRODUCTION	1
2.	LITERATURE REVIEW	2
2.1	Remittance and Financial Inclusion Nexus.....	2
2.2	Financial Inclusion and Economic Development Nexus	3
2.3	Remittance and Economic Development Nexus	4
3.	METHODOLOGY	5
3.1	Data and Sample	5
3.2	Methodology	8
4.	EMPIRICAL RESULTS.....	9
4.1	Remittance Inflows, Financial Inclusion, and Economic Development: A Preliminary Analysis	9
4.2	Remittance and Financial Inclusion Nexus.....	10
4.3	Financial Inclusion and Economic Development	11
4.4	Remittance and Its Joint Effects with Financial Inclusion on Economic Development	13
4.5	Robustness Check.....	16
5.	ADDITIONAL ANALYSES: REMITTANCES, FINANCIAL INCLUSION, AND ECONOMIC DEVELOPMENT: THE ROLE OF INCOME LEVEL AND FINANCIAL CRISES	16
6.	CONCLUSION AND DISCUSSION	19
	REFERENCES	20

1. INTRODUCTION

In the last 15 years, migrants' remittances have emerged as one of the largest sources of financial flows, often overshadowing and growing more steadily than traditional sources, such as official aid and foreign direct investment (FDI) flows. Particularly, in developing countries, the inward remittances account for 74% of the world remittances and take up about 27% of their GDP (World Bank 2014). Academics and policy-makers have paid special attention to these international money flows, since they could be an important source of development financing.

Furthermore, there has also been growing interest in financial inclusion (World Bank 2014). At the G20 Summit in Seoul in 2010, financial inclusion was firmly placed as one of the main pillars of the global development agenda. In its most basic definition, financial inclusion refers to the process that ensures the ease of access, availability, and usage of the formal financial system for all members of an economy (Sarma and Pais 2011). The increased emphasis on financial inclusion reflects a growing realization of its potential development-pushing effects (Sharma 2016). An efficient flow of funds channeled by a sound financial system helps in accelerating the growth of an economy (McKinnon 1973).

Thus, it is plausible to hypothesize that inward remittances and financial inclusions might be an important driving force of economic development. Particularly in the case of less developed countries where a large proportion of the population is financially excluded (Sharma 2016), remittances and financial inclusion could help them deal with their poverty trap. Hence, the ultimate goal of this research is to investigate the interlinked relationships among remittance inflow, financial inclusion, and economic development. From that basis, the study additionally tries to partly answer the question of how a middle-income country (MIC) could shift to a high-income level.

Prior literature has attempted to associate those indicators together; however, these effects seem not to be straightforward. Literature on this issue has four main constraints. First, most studies have either investigated those nexuses separately (i.e., Sarma and Pais 2011; Ambrosius and Cuenca 2013; Akobeng 2016; Yoshino, Taghizadeh-Hesary and Otsuka, 2019) or examined the impact of remittance on development mediated via financial development (Nyamongo et al. 2012; Sobiech 2019). Given the fact that the interlinked relationship among remittance inflows, financial inclusion, and development is relatively complicated, those studies could hardly provide insight into the investigated nexus. This may drive practitioners to misinterpret economic phenomena. Second, rather than examining the potential impact of remittances on an aggregate financial inclusion index, those studies (i.e., Gupta, Pattillo, and Wagh 2009; Demircuc-Kunt et al. 2011) mostly look at this effect on different aspects of financial inclusion. A more comprehensive research investigating both a financial inclusion index and its components is expected to produce a more explicit understanding of the association of those finance–economic phenomena. Third, literature on financial inclusion and its links to remittances and development, albeit limited in number, either focus on constructing a financial inclusion index or fail to reach a consensus. Thus, more attempts are required to cast further light on this issue. Finally, most research has attempted to examine those relationships in a single country (i.e., Anzoategui, Demircuc-Kunt, and Peria 2014; Ajefu and Ogebe 2019) or a group of regional countries (Kpodar and Andrianaivo 2011; Kim, Yub, and Hassan 2018). Although this genre of research could provide a closer look at a nation or region, it fails to produce a panoramic view of the investigated issue on a global basis.

In this paper, we aim to fill in these gaps and report further empirical evidence on how remittance inflows, financial inclusion, and economic development may be related with each other. Our study is built on the studies by Sobiech (2019), Wang and Guan (2017), and Sarma and Pais (2011) and extends them in a number of ways. First, we contribute to remittance–financial inclusion by investigating the direct channel linking remittance inflows and financial inclusion. Instead of putting emphasis on financial assessment or separate components of financial inclusion, we comprehensively investigate the impact of inward remittances on the aggregate inclusion index and its constructs independently. Second, to the best of our knowledge, we are the first to examine the interlinked nexuses among remittance inflows, financial inclusion, and economic development. For the robustness of our study, we employed multiple econometrics methods. In order to investigate those relationship separately, we employed endogeneity-robust generalized method of moments (GMM) developed by Arellano and Bond (1991). In addition, a structural equation model (SEM) (Anderson and Gerbing 1988) was adopted as our main empirical methodology to examine the concurrent relationship among those investigated variables. Therefore, our study investigates the issue from various aspects. Third, by employing a broad data sample covering virtually all countries in the world, we are among few studies providing a look into remittances–financial inclusion–development linkages. Additionally, we focus on MICs. While comparing how these linkages operate in country groups of different development levels, we aim to answer the initially proposed questions regarding whether remittances and financial inclusion are engines of growth in MICs. Last but not least, we also try to revisit this issue and attempt to provide more robust analyses than the existing finance–development literature.

As such, our study reveals some important findings. Results from both GMM and SEM methods show that remittance and financial inclusion are positively linked to economic development. Thus, attracting additional remittances could fuel the inclusion of a financial system, which, in turn, is important for economic development. The GMM methodology also shows that accessibility to financial services hardly fuels development, while actual usage of them could robustly exert developmental impacts on economies. When we break our full sample into subgroups according to income level, our findings reveal that these effects are evident in countries with a lower income level, implying that remittances and financial inclusion might help MICs out of their income trap.

The remainder of the paper is structured as follows. Section 2 reviews the related literature. Section 3 discusses the methodology concerning the description of data and construction of empirical models. Section 4 reports and discusses our findings. Section 5 provides additional analyses and section 6 concludes.

2. LITERATURE REVIEW

2.1 Remittance and Financial Inclusion Nexus

In recent years, studies on the remittance–financial inclusion linkage have captured attention from researchers and policy-makers. The growing interest in financial inclusion is linked to its potential effects on financial development (i.e., Dupas and Robinson 2013), and thus economic growth. In general, existing evidence provides opposing views on the relationship between remittances and financial inclusion.

First, one strand of literature is of the view that the inflows of remittance might not result in a more inclusive financial system. Calderon, Fajnzylber, and Lopez (2008) indicate that remittances could reduce demands for credit and even have a dampening effect on

the credit markets. Brown, Carmignani, and Fayad (2013), after controlling for per capita GDP and other macroeconomics factors, also show that remittances do not increase domestic credit to the private sector. Similarly, Ambrosius and Cuecuecha (2013), while employing Mexican household panel data, conclude that remittances can serve as a substitute for credits and thus are not linked to financial inclusion. The explanation could be that remittances help to relax receiving households' financial constraints (Giuliano and Ruiz-Arranz 2009; Chami and Fullenkamp 2012) and allow them to invest in human capital and mitigate the impact of health shock without depending on debts (Ambrosius and Cuecuecha 2013).

Second, a number of studies (i.e., Gupta, Pattillo, and Wagh 2009; Aggarwal et al. 2011; Demirguc-Kunt et al. 2011; Ambrosius and Cuecuecha 2013; Anzoategui, Demirguc-Kunt, and Peria 2014; Ajefu and Ogebe 2019) support the positive effects of remittance inflows on financial inclusion at both country and household levels. Specifically, using a panel model of 99 countries, Aggarwal et al. (2011) find empirical evidence that remittances increase the aggregate level of deposits and credits. Their findings are also confirmed by Gupta, Pattillo, and Wagh (2009); Demirguc-Kunt et al. (2011); and Anzoategui et al. (2014). Furthermore, a smaller group of literature has focused on the access side of financial inclusion and homogeneously reports on the potentially positive association between remittance inflows and the access of financial services in Sub-Saharan Africa (Inoue, Takeshi, and Hamori 2016), Latin America (Ambrosius, Fritz, and Stiegler 2014), and Asian and Pacific developing countries (Inoue and Hamori 2016). Some of the reasons for the positive impact of remittances on financial inclusion include the lumpiness of remittances, which may translate into a demand for deposit accounts (Ambrosius and Cuecuecha 2016); a reduction in the risks of asymmetric information and adverse selection from potential clients (Roa 2015), which encourages lenders to enhance the creditworthiness of their clients through the receipt of remittances (Orozco and Fedewa 2006); and the transmission of financial knowledge, as well as the promotion of financial literacy, which could eventually lead to financial inclusion (Yoshino, Morgan, and Trinh 2017). To this end, despite different methods and samples, prior studies have provided no consensus about the general effects that remittances might have on financial inclusion.

2.2 Financial Inclusion and Economic Development Nexus

The finance–growth nexus has been the topic of great interest and debate among academics. However, little seems to be known about the direct relationship between financial inclusion and economic development and growth. Literature on this linkage, albeit limited in volume, tends to reveal mixed results.

On the one hand, financial inclusion, while entailing access to financial services at an affordable cost, could act as an important driver for development. An early study by Demetriades and Hussein (1996) suggests that a flourishing economy creates the need for sustainable financial infrastructure as a result of a strong and inclusive financial system. Subsequently, the financial inclusion–economic development has been studied in various dimensions. The deepening of financial inclusion has been shown to lead to an improvement in human development (Sarma and Pais 2011), reduce poverty and inequality (Bruhn and Love 2014), encourage household investment (Dupas and Robinson 2013), and fuel financial development (Mohan 2006), eventually producing economic development. Interestingly, Bhattacharya and Wolde (2010) identify the lack of access to credit as one of the important factors driving growth differentials between MENA and other regions. Similarly, Kpodar and Andrianaivo (2011) and Kim, Yub, and

Hassan (2018) also observe the positive impact of financial inclusion on economic development in the African area and OIC countries, respectively.

On the other hand, another body of research supports the view that financial inclusion is not necessarily conducive to economic growth. There is a major concern that financial inclusion achieved through rapid and unregulated credit growth can negatively affect financial stability (Mehrotra and Yetman 2015) and thus economic development. Over-financing and the 2008 crisis have slowed down the growth in such advanced economies as Germany, France, and the UK; meanwhile, in emerging countries with a lower financial inclusion level like India and the People's Republic of China, there has been sustainable high growth (Bhattarai 2015). Furthermore, in bank-based economies, in the long run, the association between the deepening of the banking system and economic development may weaken contingent upon inflationary pressures (Rousseau and Wachtel 2002) and the level of economic development (Rioja and Valev 2004). Later studies by Masoud and Hardaker (2012) and Barajas, Chami, and Yousefi (2012) are of the view that financial deepening is indirectly associated with economic growth.

2.3 Remittance and Economic Development Nexus

Given the surge in the value and importance of remittances, many studies have aimed to examine the developmental impacts of these transfers on receiving countries. Studies focusing on this nexus, albeit limited in number, also suggest rather mixed outcomes.

The first stand of literature has generally supported the view that remittances are a catalyst for development through various channels. These studies have addressed the effects of remittances on a variety of subjects that could eventually contribute to economic development, such as lower poverty and inequality (Jones 1998; Acosta et al. 2008; Akobeng 2016; Yoshino, Taghizadeh-Hesary and Otsuka 2017; 2018), financial development (Aggarwal et al. 2011; Brown, Carmignani, and Fayad 2013), spending behavior (Cox Edwards and Ureta 2003; Adams and Cuenca 2010), labor productivity (Azizi 2018), investment (Le 2011), and macroeconomic effects (Buch and Kuckulenz 2010).

However, there are also concerns of the growth-detering impacts of remittances, since an increase in the inflow of remittances can lead to the deterioration of institutional quality (Abdih et al. 2012), exacerbate corruption (Berdiev, Kimb, and Chang 2013), fuel inflation (Ball, Lopez, and Reyes 2013), and reduce labor force participation as receiving households may choose to live on migrants' transfer instead of working (Cox Edwards and Oreggia 2009). Several other studies (i.e., Rao and Hassan 2012; Senbeta 2013; Clemens and McKenzie 2014) document a negative or at best an insignificant relationship between remittances and development. Specifically, Rao and Hassan (2012) show that these transfers could affect GDP per capita in different channels: investment, financial development, productivity, and output volatility; however, on an aggregate level, these effects can cancel out. A recent study by Hajer and Kaouthar (2016) empirically argues that remittances have a negative effect on growth in the short run and a positive effect in the long run.

Interestingly, another group of literature (Giuliano and Ruiz-Arranz 2009; Benmamoun and Lehnert 2013; Ramirez 2013; Sobiech 2019) shows that the impact of remittances on economic development depends on the level of financial development. Specifically, Giuliano and Ruiz-Arranz (2009) and Sobiech (2019) argue that remittance inflows could significantly benefit development in developing countries where a financial market is not yet developed. According to these authors, in a country with a less developed financial system and greater credit constraints, remittances could act as an important source of

financing growth-enhancing activities and be used in a more productive way. Benmamoun and Lehnert (2013), while comparing the effects of ODA, FDI, and international remittances on receiving countries, conclude that remittance inflow is a great contributor of economic growth, especially in countries with a lower income level. On the contrary, studies by Bettin and Zazzaro (2008) and Nyamongo et al. (2012) provide evidence of the opposite findings by reporting a positive sign on the coefficient of the interaction term between remittances and financial depth. According to them, a more deepening financial system helps to strengthen the growth-enhancing impacts of remittances.

3. METHODOLOGY

3.1 Data and Sample

Before embarking upon the empirical analyses, it is worthwhile to analyze the data used in this research. Our panel dataset covers virtually all countries and territories around the world. The data span the years from 2004 to 2017 due to the ready availability of financial inclusion index data. For the purpose of insight analysis, we additionally split our world sample dataset to investigate how the linkages among remittances, financial inclusion, and economic development may vary among countries of different income levels. All of the variables, unless otherwise stated, are collected from the World Development Indicators database provided by the World Bank.

3.1.1 Measuring Financial Inclusion

Studies have attempted to figure out how to measure financial inclusion. In a broad sense, it is a measure of inclusiveness of the financial sector of a country. Beck, Demirguc-Kunt, and Martinez Peria (2007) constructed eight indicators to measure the outreach of finance. These indicators seem to be complete, but they yield the correct information if and only if they are used together. Later, Sarma (2008) developed a method of computing the Index of Financial Inclusion for several dimensions of financial inclusion, including accessibility, availability, and usage of banking services. However, in this construct, the dimension “accessibility” is similar to “availability,” which possibly results in multi-collinearity in the calculations.

Therefore, in this study, we follow Wang and Guan (2017) and measure financial inclusion in two broad dimensions: access and usage. We then employ the factor analysis technique, which is widely used in finance literature, to create a financial inclusion index (*FII2*). Since commercial banks play a leading role in providing financial services, we depend mostly on the penetration of the banking system for our calculations.

Access measures the outreach of financial services. This dimension is constructed via two indicators: the number of commercial bank branches and the number of ATMs per 100,000 adults. Usage reflects the regularity and frequency with which customers use financial services. Consistently with the literature, we look at two key banking services — savings and borrowings — and develop this dimension from the number of borrowers from commercial banks and the number of depositors from commercial banks per 1,000 adults.

Furthermore, for the robustness test, we construct another set of financial inclusion index using the Global Findex Database provided by the World Bank. The index is constructed in line with Wang and Guan (2017).

3.1.2 Measuring Remittance Inflow

Remittances (*REMITTANCE*) refer to the natural logarithm of personal remittances received in current USD.

3.1.3 Measuring Economic Development

Consistent with the literature on development, in this study, economic development is measured via GDP in logarithm form (*LnGDP*).

3.1.4 Other Control Variables

For the purpose of this study, we follow Kim, Yub, and Hassan (2018) and Sobiech (2019) and incorporate a set of control variables that may exhibit some influence on our investigated nexuses. The change in population over years in each country is illustrated via *POP_GROWTH* (*population growth*). *POP_DENSITY* (*population density*) depicts the population density of a country, measured by dividing the total population to the total area. These indicators capture region-wise demographics and understand the role of population concentration on the penetration of the banking system. *Unemployment rate* (*UNEM*) is measured as a share of unemployed adults to total labor force and represents the employment status of a region. Those of more secure status economically are less likely to be financially excluded. *Industrialization* (*INStoGDP*), revealing the level of industry development, is the contribution of industry to GDP in total GDP. As a matter of fact, advanced economies with greater industrialization are expected to have a greater role for banking and financial activities. *Human capital* (*LITERACY*) indicates the awareness of financial services and technology and is proxied by literacy rate. *GDPPC*, indicating the level of a country's income, is GDP per capita. Infrastructure and communication technology, through their network externalities, could lower transaction costs and speed up the diffusion of information and technology spillover (Datta and Aggarwal 2004), thus playing an increasingly important role in spreading out financial services. Therefore, telecommunication can be assumed as an important indicator of infrastructure advancement. As such, in this study, the number of mobile phone subscriptions per 100 people is employed as a proxy for *Infrastructure* (*INFRAS*). *Government investment* (*GOVEXP*) is general government final consumption expenditure as a share to GDP. *Inflation* (*INFLATION*) is measured by the consumer price index. It influences the senders' decisions to transfer money to their home countries. *Institutional quality* (*IQ*) is a simple average of six aspects of institutional quality: voice and accountability, political instability and violence, government effectiveness, regulatory quality, rule of law, and control of corruption. These indices are derived from the World Bank Governance Indicators.

Descriptive statistics for our main variables are reported in Table 1. A correlation matrix is provided in Table 2.

Table 1: Descriptive Statistics

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
<i>GDP</i>	23.627	23.427	2.421	16.328	30.596
<i>FII2</i>	8.008	8.414	2.040	-1.968	12.612
<i>REMITTANCE</i>	19.484	19.778	2.357	8.706	24.977
<i>INFRAS</i>	58.295	49.961	52.010	0.000	328.800
<i>INFLATION</i>	8.008	8.414	72.912	-18.109	4145.106
<i>INStoGDP</i>	26.724	24.818	12.858	0.003	87.797
<i>LITERACY</i>	82.057	91.333	20.014	12.848	99.998
<i>GOVEXP</i>	16.388	15.772	7.421	0.911	135.794
<i>GDPPC</i>	15,508.73 0	8,262.32 3	18,586.350	341.083	140,037.10 0
<i>POP_GROWTH</i>	1.457	1.305	1.490	-10.955	16.332
<i>POP_DENSITY</i>	387.249	79.360	1,888.001	0.000	21,398.950
<i>UNEM</i>	8.254	6.717	6.251	0.140	37.940
<i>IQ</i>	0.014	-0.113	0.916	-2.449	1.970

Table 2: Pearson Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) LnGDP	1						
(2) FII2	0.17***	1					
(3) REMITTANCE	0.69***	0.15***	1				
(4) INFLATION	-0.03	-0.06***	-0.05**	1			
(5) INFRAS	0.40***	0.26***	0.31***	-0.07***	1		
(6) INStoGDP	0.31***	-0.01	0.09***	0.07***	0.02	1	
(7) LITERACY	0.34***	0.52***	0.14***	-0.01	0.47***	0.17***	1
(8) GOVEXP	-0.10***	0.13***	-0.14***	-0.09***	0.11***	-0.07***	0.06
(9) GDPPC	0.42***	0.35***	0.19***	-0.05***	0.54***	0.16***	0.36***
(10) POP_GROWTH	-0.11***	-0.21***	-0.23***	0.02	-0.16***	0.15***	-0.31***
(11) POP_DENSITY	0.00	0.10***	-0.04**	-0.01	0.16***	-0.14***	0.09**
(12) UNEM	-0.12***	0.07***	-0.03**	0.04**	-0.02	0.06***	0.24***
(13) IQ	0.26***	0.33***	0.09***	-0.08***	0.39***	-0.19***	0.42***
	(8)	(9)	(10)	(11)	(12)	(13)	
(1) LnGDP							
(2) FII2							
(3) REMITTANCE							
(4) INFLATION							
(5) INFRAS							
(6) INStoGDP							
(7) LITERACY							
(8) GOVEXP	1						
(9) GDPPC	0.13***	1					
(10) POP_GROWTH	-0.18***	0.06***	1				
(11) POP_DENSITY	-0.11***	0.31***	0.01	1			
(12) UNEM	0.22***	-0.14***	-0.25***	-0.09***	1		
(13) IQ	0.28***	0.61***	-0.32***	0.16***	0.00	1	

3.2 Methodology

This section specifies the methodology in this study to investigate the linkages among remittance inflows, financial inclusion, and economic development. In order to investigate those relationships separately, we employ endogeneity-robust GMM developed by Arellano and Bond (1991). In addition, an SEM (Anderson and Gerbing 1988) is adopted as our main empirical methodology to examine the concurrent relationship among those investigated variables.

3.2.1 Dynamic GMM

The well-known GMM method has been widely used in finance-development literature due to its ability to control for potential endogeneity in all regressions. We apply the GMM approach for dynamic panel estimation. Thus, our equations have the following form:

$$FII_{it} = \delta_0 + \delta_1 FII_{i,t-1} + \delta_2 REMITTANCE_{i,t} + \delta_3^j X_{i,t}^j + \varepsilon_{it} \quad (1)$$

Where FII_{it} is the measure of financial inclusion index of country i in year t of the period from 2004 to 2017. $REMITTANCE$ is the variable capturing remittance inflows. X_{it}^j = set of control variables that may influence financial inclusion, including INFRASTRUCTURE, INDUSTRIALIZATION, HUMAN CAPITAL, GOVERNMENT INVESTMENT, GDPPC, POP_GROWTH, POP_DENSITY, UNEMPLOYMENT, and INSTITUTIONAL QUALITY. ε_{it} is the error term.

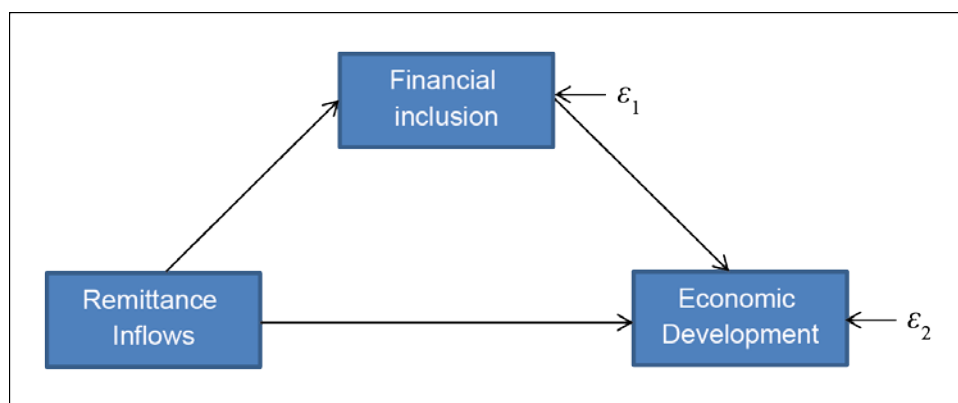
$$\ln y_{it} = \delta_0 + \delta_1 \ln y_{i,t-1} + \delta_2 REMITTANCE_{i,t} + \delta_3 FII_{i,t} + \delta_4^j X_{i,t}^j + \varepsilon_{it} \quad (2)$$

Where $\ln y_{it}$ is the measure of economic development and is proxied as the natural logarithm of GDP of country i in year t of the period from 2004 to 2017. $REMITTANCE$ is the variable capturing remittance inflows. FII_{it} is the measure of financial inclusion index. X_{it}^j = set of control variables that may influence economic development: INFRASTRUCTURE, INDUSTRIALIZATION, HUMAN CAPITAL, GOVERNMENT INVESTMENT, GDPPC, POP_GROWTH, POP_DENSITY, INFLATION and UNEMPLOYMENT. ε_{it} is the error term.

3.2.2 Structural Equation Model (SEM)

As discussed earlier, the associations among remittance inflows, financial inclusion, and economic development are complicated. Sobiech (2019) even argues that the impact of remittances on development turns positive and significant on condition of financial development. Therefore, an examination of the concurrent linkages among those indicators is necessary to have an insight into the investigated topic. For that purpose, we apply the SEM method. The SEM can be used to analyze connections among multiple causes and results and relationships among latent variables. It can also be used to simulate the internal logical relationships among multiple factors (Anderson and Gerbing 1988). In light of the literature, we propose the model structure in Figure 1.

Figure 1: Model Structure



Source: Authors' compilation.

4. EMPIRICAL RESULTS

4.1 Remittance Inflows, Financial Inclusion, and Economic Development: A Preliminary Analysis

To obtain a preliminary analysis of the investigated linkages, we first plot a scatterplot along with a linear prediction line showing the association between our main dependents and explanatory variables. Figure 2 reports the relationship between remittances and financial inclusion, with the main dependent variable being financial inclusion. Figure 3 depicts the association between financial inclusion and economic development. The sample period is from 2004 to 2017.

As can be seen from Figure 2, remittance inflows appear to be positively associated with financial inclusion, indicating that an increase in these transfers is considered to improve financial inclusion. Similarly, Figure 3 reveals a positive relationship between financial inclusion and development, implying that financial inclusion might fuel economic enhancement.

Figure 2: Scatterplot of Remittances – Financial Inclusion

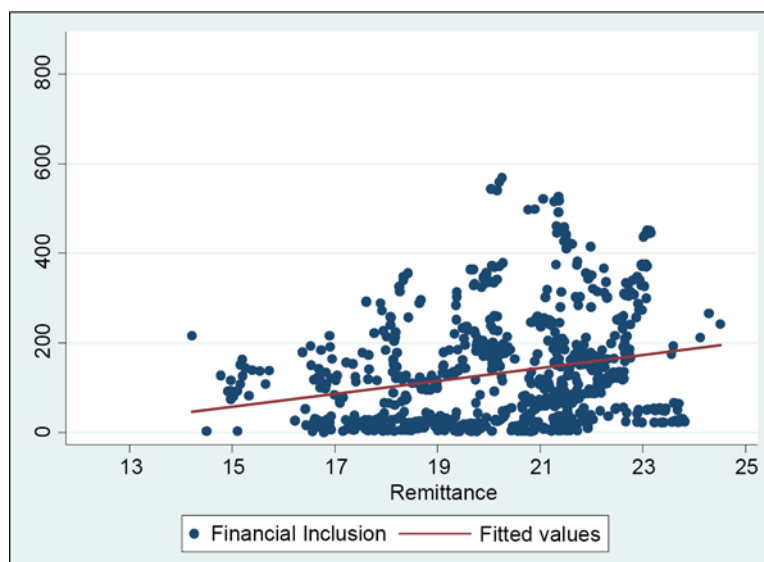
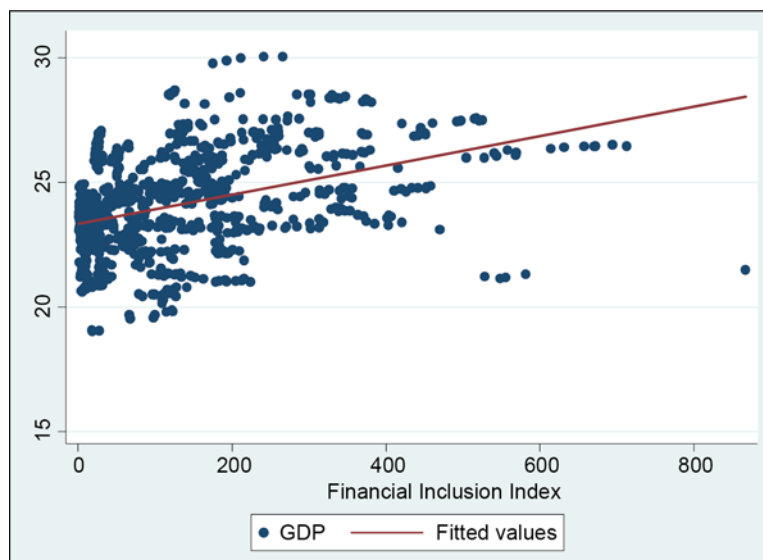


Figure 3: Scatterplot of Financial Inclusion and Economic Development

4.2 Remittance and Financial Inclusion Nexus

Table 3 presents the estimation results of our GMM estimations to examine the impact of remittances, with controls, on financial inclusion. In model (1), the estimated coefficients on remittances are positive and statistically significant, revealing that remittance inflows could promote financial inclusion in the countries adopting this policy. Nonetheless, remittances tend to have opposite effects on the two constructs of financial inclusion. In model (2), it is clear that remittance inflows are inclined to help receiving countries to have better accessibility to financial services, as evidenced by a robustly positive coefficient on remittances. By contrast, the significantly negative sign of correlation between remittances and usage as can be seen in model (3) implies that this type of transfer fails to enhance the possibility to use financial products.

Overall, our findings from the GMM method are consistent with previous studies (i.e., Ambrosius and Cuecuecha 2013; Ambrosius, Fritz, and Stiegler 2014; Inoue and Hamori 2016). The plausible explanation might be that remittances allow the recipients to save on cash, which translates into the demand for deposit accounts. This also paves a way for them to access other potential products like payment or even credit (Ambrosius and Cuecuecha 2016). These demands, in turn, could be accommodated via an increase in the provision of financial services. Thus, remittances could enhance their recipients' accessibility to financial services. However, while this additional source of income could lead to the usage of savings accounts (Demirguc-Kunt et al. 2011), it also substitutes for credits in countries with larger credit constraints (Giuliano and Ruiz-Arranz 2009), which eventually results in a fall in the demand for credits. Besides, according to Ambrosius and Cuecuecha (2016), the effect of remittances on borrowing is driven by informal finance rather than by traditional bank loans, explaining that an increase in remittances is unlikely to encourage the usage of formal financial services. Although remittances could induce negative impacts on the actual usage of financial products, these effects are weaker than the positive impacts they have on the access side of financial inclusion. Thus, taking these effects all together, the beneficial impacts of remittances on financial inclusion are still witnessed.

Table3: Remittance and Financial Inclusion: Dynamic System GMM

Dependent Variable	FII2	ACCESS	USAGE
	(1)	(2)	(3)
<i>L.FII2</i>	0.931*** (0.005)		
<i>L.ACCESS</i>		0.881*** (0.0077)	
<i>L.USAGE</i>			0.940*** (0.003)
REMITTANCE	0.010*** (0.003)	0.022*** (0.003)	-0.004** (0.002)
<i>INFRAS</i>	-0.000*** (0.000)	-0.001*** (0.000)	0.000*** (0.000)
<i>INStoGDP</i>	0.001*** (0.000)	-0.002*** (0.001)	0.004*** (0.000)
<i>LITERACY</i>	0.002*** (0.000)	0.004*** (0.001)	-0.000 (0.000)
<i>GOVEXP</i>	-0.004*** (0.001)	0.000 (0.001)	-0.003*** (0.001)
<i>GDPPC</i>	0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
<i>POP_GROWTH</i>	-0.010*** (0.003)	-0.002 (0.004)	-0.016*** (0.002)
<i>POP_DENSITY</i>	0.000*** (0.000)	-0.000 (0.000)	0.000*** (0.000)
<i>UNEM</i>	0.001 (0.001)	-0.000 (0.001)	0.002*** (0.001)
<i>IQ</i>	0.071*** (0.007)	0.087*** (0.009)	0.040*** (0.004)
<i>CONSTANT</i>	0.288*** (0.094)	-0.188** (0.085)	0.521*** (0.049)
<i>No. of Obs.</i>	493	493	493
Hansen's J test chi-squared	61.68	69.75	70.30
p-value	0.661	0.385	0.368

Note: *Remittance inflow in logarithm form (REMITTANCE)* is the main variable of interest. Column (1) reports the results of the aggregate financial inclusion index. Columns (2) and (3) show the results for two constructs of financial index: ACCESS and USAGE. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

4.3 Financial Inclusion and Economic Development

Table 4 reports our findings on the financial inclusion–economic development nexus from the GMM estimation. As can be seen from model (1), financial inclusion index is positively related to economic development, indicating that an inclusive financial system is an engine for growth. However, when different aspects of financial inclusion index are taken into consideration, opposing signs of impact are witnessed. While additional access to financial services has an insignificant developmental effect (model 2); the actual usage of them could be a robust contributor of economic growth (model 3). This reveals that getting more and more unbanked citizens to access financial products without actual usage is of no use.

In general, our findings are partly consistent with those of Kim, Yub, and Hassan (2018). As a matter of fact, the construction of additional bank branches and ATMs is inclined to be counter-productive and capital-consuming if it fails to attract more financially excluded people to use financial products. In comparison, an inclusive financial system with universal access and usage of both savings and borrowing services could promote economic growth (Sharma 2016). The use of deposit accounts helps people park their savings in the financial system, which, in turn, ensures efficient allocation of these funds into capital-scarce projects via the provision of credit services. In this way, the financial market secures liquidity risk and encourages more investment.

Table4: Financial Inclusion and Economic Development: Dynamic System GMM

	<i>Dependent Variable: LnGDP</i>		
	FII2	ACCESS	USAGE
	(1)	(2)	(3)
<i>L.LnGDP</i>	0.991*** (0.003)	0.995*** (0.002)	0.992*** (0.004)
FII2	0.022*** (0.008)		
ACCESS		-0.004 (0.008)	
USAGE			0.024** (0.011)
<i>INFLATION</i>	0.008*** (0.001)	0.002*** (0.000)	0.010*** (0.001)
<i>POP_GROWTH</i>	-0.003 (0.007)	-0.007* (0.000)	0.002 (0.007)
<i>LITERACY</i>	-0.002*** (0.000)	0.000 (0.000)	-0.002*** (0.001)
<i>UNEM</i>	-0.001 (0.001)	-0.001* (0.001)	-0.000 (0.001)
<i>INFRAS</i>	0.001*** (0.000)	0.000 (0.000)	0.001*** (0.000)
<i>INStoGDP</i>	0.000 (0.001)	0.001 (0.000)	0.000 (0.001)
<i>CONSTANT</i>	0.139** (0.061)	0.197*** (0.048)	0.063 (0.069)
<i>No. of Obs.</i>	530	530	533
Hansen's J test chi-squared	45.60	52.05	43.74
p-value	0.185	0.064	0.241

Note: *Dependent variable is natural logarithm of GDP.* Column (1) reports the results of the aggregate financial inclusion index. Columns (2) and (3) show the results for two constructs of financial index: ACCESS and USAGE. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

4.4 Remittance and Its Joint Effects with Financial Inclusion on Economic Development

The literature suggests that the economic-boosting effects of remittances may be conditional on the development of the financial market (Giuliano and Ruiz-Arranz 2009; Nyamongo et al. 2012; Benmamoun and Lehnert 2013; Ramirez 2013). However, studies report opposing views regarding the real developmental effects of remittance with the relevance of financial development. Despite mixed outcomes, these studies all show that the financial sector can be a channel through which remittances affect development.

Thus, to test this conjunction, we follow Nyamongo et al. (2012) and Sobiech (2019), and we incorporate the interaction terms of remittance and financial inclusion (*REMITTANCE*FII2*, *REMITTANCE*ACCESS*, *REMITTANCE*USAGE*) into the model specification (2) and estimate it both with and without interaction terms. The estimation results are reported in Table 5. Specification (1) presents the estimations for remittances and development. Meanwhile, columns (2), (3), and (4) report comparable estimates for equation (2), with remittance and its interaction terms with financial inclusion as regressors.

Our estimation outcomes reveal important findings. First, remittances have positive impacts on economic development. Second, the coefficients on interaction terms of remittances with financial inclusion index and both constructs of financial inclusion index are positive and statistically significant across almost all models, signaling that under the condition of a more financially inclusive financial system, the development benefits associated with remittances are inclined to increase. Therefore, our results corroborate findings of Bettin and Zazzaro (2008) and Nyamongo et al. (2012). These findings may be motivated because a more inclusive and effective financial system helps migrants to send more money home and also encourages recipients to save money in banks. As remittances can be deposited in banks, they bring a larger share of the population in contact with the financial sector, expanding the availability of credit and savings products (Aggarwal et al. 2011). At the same time, those funds could be more efficiently channeled towards productive investment projects (Terry and Wilson 2005), contributing to economic development.

The interlinked relationships among remittances, financial inclusion, and economic development are explicitly and additionally investigated through the SEM model. Table 6 reports our SEM results. Specification (1) presents estimation results of the aggregate financial inclusion index. Columns (2) and (3) provide estimates when we break financial inclusion index into two separate components.

From Table 7, it is clear that remittances tend to result in a higher level of financial inclusion, evidenced by significantly positive coefficients. Financial inclusion, in turn, could directly impose robustly positive impacts on economic development. With respect to the remittance–development linkage, we obtain homogeneous results across all models. The estimation coefficients on remittance are robustly positive in our world sample and show that remittances are necessary for development in all parts of the world. Given their prominence, in order to achieve the Millennium Development Goals, a policy to attract more international remittances could be an answer. Hence, these findings are generally in line with those of the GMM method and previous studies.

Table 5: Remittance and Economic Development: Dynamic System GMM

	<i>Dependent Variable: LnGDP</i>			
	No Interaction	Interacted with FII2	Interacted with ACCESS	Interacted with USAGE
	(1)	(2)	(3)	(4)
<i>L.LnGDP</i>	0.970*** (0.007)	0.979*** (0.001)	0.986*** (0.001)	0.986*** (0.001)
REMITTANCE	0.031*** (0.008)	0.005 (0.005)	-0.008*** (0.001)	0.010*** (0.003)
<i>FII2</i>		-0.024** (0.012)		
REMITTANCE*FII2		0.002*** (0.001)		
<i>ACCESS</i>			-0.088*** (0.005)	
REMITTANCE*ACCESS			0.005*** (0.000)	
<i>USAGE</i>				0.000 (0.007)
REMITTANCE*USAGE				0.000 (0.000)
<i>INFLATION</i>	0.004*** (0.002)	0.002*** (0.000)	0.000 (0.000)	0.001*** (0.000)
<i>POP_GROWTH</i>	0.002 (0.005)	-0.001 (0.002)	-0.003* (0.001)	-0.001 (0.002)
<i>LITERACY</i>	0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
<i>UNEM</i>	-0.001 (0.001)	-0.001* (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
<i>INFRAS</i>	0.000 (0.000)	-0.000** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)
<i>INStoGDP</i>	0.002*** (0.001)	0.002*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
<i>CONSTANT</i>	0.095 (0.078)	0.420*** (0.108)	0.570*** (0.023)	0.184*** (0.063)
<i>No. of Obs.</i>	502	500	500	502
Hansen's J test chi-squared	44.42	71.04	80.31	84.02
p-value	0.071	0.777	0.997	0.994

Note: *Dependent variable is natural logarithm of GDP.* Columns (1) and (2) report the impact of remittance on development without and with an interaction term with financial inclusion. Columns (2) and (3) show the interacted impact of remittance with two constructs of financial index — ACCESS and USAGE — on economic development. *REMITTANCE*FII2*, *REMITTANCE*ACCESS*, and *REMITTANCE*USAGE* are interaction terms between REMITTANCE and financial inclusion index, access, and usage, respectively. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Table 6: Remittance, Financial Inclusion, and Economic Development: Structural Equation Model (SEM)

	<i>Dependent Variable: LnGDP</i>		
	FII2	ACCESS	USAGE
	(1)	(2)	(3)
<i>LnGDP</i>			
FII2	0.204*** (0.041)		
ACCESS		0.343*** (0.053)	
USAGE			0.108** (0.047)
REMITTANCE	0.486*** (0.028)	0.503*** (0.028)	0.481*** (0.029)
<i>INFLATION</i>	0.003 (0.004)	0.004 (0.004)	0.003 (0.004)
<i>POP_GROWTH</i>	-0.006 (0.058)	0.008 (0.057)	-0.029 (0.058)
<i>LITERACY</i>	0.005 (0.004)	0.000 (0.005)	0.011** (0.004)
<i>UNEM</i>	-0.007 (0.010)	-0.009 (0.010)	-0.005 (0.010)
<i>INFRAS</i>	0.006*** (0.001)	0.005*** (0.001)	0.007*** (0.001)
<i>INStoGDP</i>	0.041*** (0.005)	0.044*** (0.005)	0.040*** (0.006)
<i>CONSTANT</i>	11.041*** (0.706)	11.370*** (0.673)	11.498*** (0.732)
<i>FII2</i>			
REMITTANCE	0.064** (0.031)	0.012 (0.023)	0.081*** (0.028)
<i>INFRAS</i>	-0.001 (0.002)	0.000 (0.001)	-0.001 (0.002)
<i>INStoGDP</i>	-0.008 (0.007)	-0.013*** (0.005)	0.003 (0.006)
<i>LITERACY</i>	0.022*** (0.004)	0.023*** (0.003)	0.007 (0.004)
<i>GOVEXP</i>	-0.004 (0.015)	0.001 (0.012)	-0.007 (0.014)
<i>GDPPC</i>	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
<i>POP_GROWTH</i>	-0.196*** (0.065)	-0.163*** (0.049)	-0.111* (0.060)
<i>POP_DENSITY</i>	-0.000 (0.000)	-0.000* (0.000)	-0.000 (0.000)
<i>UNEM</i>	0.008 (0.012)	0.007 (0.009)	0.004 (0.011)
<i>IQ</i>	0.629*** (0.143)	0.548*** (0.107)	0.334** (0.131)
<i>CONSTANT</i>	5.387*** (0.729)	2.157*** (0.547)	5.628*** (0.668)
<i>var(e.GDP)</i>			
<i>_cons</i>	1.702*** (0.109)	1.647*** (0.106)	1.770*** (0.114)
<i>var(e.FI)</i>			
<i>_cons</i>	1.840*** (0.115)	1.035*** (0.065)	1.542*** (0.097)
<i>No. of Obs.</i>	511	511	511

Note: *Dependent variable is natural logarithm of GDP.* Column (1) reports the results of aggregate financial inclusion index. Columns (2) and (3) show the results for two constructs of financial index: ACCESS and USAGE. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

4.5 Robustness Check

We test the robustness of our model by using an alternative financial inclusion index. As indicated, we construct another set of financial inclusion index using the Global Findex Database provided by the World Bank. The index is constructed in line with Wang and Guan (2017). We then rerun our models with both GMM and SEM estimations. For the sake of brevity, we do not report our estimation outcomes here. The outcomes are generally similar with those presented in our mainstream analyses. The effects of financial inclusion and remittances on growth remain robustly positive.

5. ADDITIONAL ANALYSES: REMITTANCES, FINANCIAL INCLUSION, AND ECONOMIC DEVELOPMENT: THE ROLE OF INCOME LEVEL AND FINANCIAL CRISES

After the Second World War, rapid growth allowed a significant number of countries to get out of poverty to achieve middle-income status. With 108 countries and accounting for one third of the global GDP, MICs can be thought of as major engines of global growth. However, rather than making an additional leap to the next step in the income ladder, they seem to get stuck in the well-known middle-income trap. As such, the MIC trap has been a serious problem facing developing countries.

Given the developmental benefit that remittances and financial inclusion may induce, it is plausible to hypothesize that they could help MICs deal with their income trap. In this section, we split our world sample into groups of different income levels (i.e., low, middle, and high income) and provide insight into the impact of remittance on financial inclusion and financial inclusion, in turn, on development in MICs. Besides, since the financial crisis in 2007–2008 had profound impacts on the global financial markets and economies, we also predict that the interlinked relationships among remittance, financial inclusion, and economic development may alter before, during, and after the crisis. The estimation outcomes are reported in Tables 7 and 8.

We firstly report the results of remittances and financial inclusion nexus in Table 7. It is clear that, before and during the financial crisis, remittances have insignificant impacts on financial inclusion in all income groups. However, after the crisis, while remittances are negatively related to financial inclusion, an opposing sign is seen in lower-income countries.

With regard to the financial inclusion–development linkage, when the full sample is split into subgroups, findings reveal important and interesting results. As can be seen from Table 8, the development-boosting effect of financial inclusion is evident solely in MICs during the post-crisis period. Most studies pay special attention to financial inclusion issues in MICs since the number of unbanked adults in those countries is larger than in high-income peers. In general, Kpodar and Andrianaivo (2011) and Kim, Yub, and Hassan (2018) also observe the positive impact of financial inclusion on economic development in the African area and OIC countries, respectively. Thus, our results imply that building an inclusive financial system is an important means for MICs to escape their middle-income trap.

Table 7: Remittance and Financial Inclusion: Country and Crisis Time: Dynamic System GMM

Country	Dependent Variable: <i>FII2</i>					
	Low Income		Middle Income		High Income	
	Before and During Crisis	Post Crisis	Before and During Crisis	Post Crisis	Before and During Crisis	Post Crisis
Time	(1)	(2)	(3)	(4)	(5)	(6)
<i>L.FII2</i>	0.935*** (0.012)	0.920*** (0.007)	0.935*** (0.015)	0.920*** (0.011)	0.926*** (0.011)	0.916*** (0.003)
<i>REMITTANCE</i>	-0.015* (0.009)	0.031*** (0.004)	0.023 (0.021)	-0.012 (0.008)	-0.010 (0.011)	0.039*** (0.004)
<i>LI</i>	-1.896 (1.667)	-0.873*** (0.269)				
<i>REMITTANCE*LI</i>	0.098 (0.084)	0.035*** (0.012)				
<i>MI</i>			0.724 (0.565)	-1.317*** (0.308)		
<i>REMITTANCE*MI</i>			-0.028 (0.027)	0.070*** (0.015)		
<i>HI</i>					-0.611 (0.418)	0.959*** (0.098)
<i>REMITTANCE_HI</i>					0.024 (0.020)	-0.046*** (0.005)
<i>INFRAS</i>	-0.001 (0.001)	0.000 (0.000)	-0.001 (0.001)	-0.000 (0.000)	-0.001 (0.001)	0.000*** (0.000)
<i>INStoGDP</i>	-0.001 (0.002)	0.003*** (0.001)	-0.002 (0.003)	0.002 (0.001)	-0.003 (0.002)	0.001* (0.000)
<i>LITERACY</i>	0.001 (0.001)	0.002*** (0.001)	-0.001 (0.001)	0.002* (0.001)	0.000 (0.001)	0.004*** (0.000)
<i>GOVEXP</i>	-0.006** (0.003)	0.002** (0.001)	-0.005 (0.004)	0.002 (0.002)	-0.007** (0.003)	-0.002*** (0.000)
<i>GDPPC</i>	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000 (0.000)
<i>POP_GROWTH</i>	-0.006 (0.012)	-0.021*** (0.003)	-0.001 (0.014)	-0.036*** (0.005)	-0.004 (0.013)	-0.021*** (0.002)
<i>POP_DENSITY</i>	-0.000*** (0.000)	0.000** (0.000)	-0.000*** (0.000)	0.000* (0.000)	-0.000*** (0.000)	0.000*** (0.000)
<i>UNEM</i>	-0.002 (0.003)	0.001 (0.001)	0.005 (0.004)	0.001 (0.002)	0.002 (0.003)	-0.001 (0.001)
<i>IQ</i>	0.0298 (0.027)	0.061*** (0.018)	-0.005 (0.033)	0.045 (0.032)	0.008 (0.025)	0.040*** (0.008)
<i>CONSTANT</i>	0.891*** (0.187)	-0.177 (0.123)	0.075 (0.425)	0.716*** (0.203)	0.954*** (0.258)	-0.345*** (0.091)
<i>N. of Obs.</i>	213	280	213	280	213	280
Hansen's J test chi-squared	36.58	40.16	34.12	25.47	36.73	57.29
p-value	0.306	0.863	0.413	0.702	0.300	0.354

Note: *Dependent variable is financial inclusion index.* Columns (1) and (2) report the impact of remittances on financial inclusion in low-income countries over two periods: before and during the 2007–2008 financial crisis, respectively. Columns (3) and (4) show the estimation results for middle-income countries. Meanwhile, results for high-income countries are reported in columns (5) and (6). Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

**Table 8: Financial Inclusion and Economic Development:
Country and Crisis Time: Dynamic System GMM**

		<i>Dependent Variable: LnGDP</i>					
Country	Low Income		Middle Income		High Income		
	Before and During Crisis	Post Crisis	Before and During Crisis	Post Crisis	Before and During Crisis	Post Crisis	
Time	(1)	(2)	(3)	(4)	(5)	(6)	
<i>L.GDP</i>	1.019*** (0.016)	0.970*** (0.011)	1.013*** (0.022)	0.975*** (0.012)	0.996*** (0.021)	0.971*** (0.010)	
<i>FII2</i>	-0.070 (0.057)	0.048 (0.044)	-0.125* (0.074)	0.022 (0.057)	-0.028 (0.037)	0.057 (0.051)	
<i>LI</i>	0.046 (1.255)	-0.838 (1.022)					
<i>FII2*LI</i>	-0.178 (0.159)	0.085 (0.115)					
<i>MI</i>			-0.183 (0.733)	-1.094*** (0.423)			
<i>FII2*MI</i>			0.139 (0.089)	0.158** (0.061)			
<i>HI</i>					-0.619 (0.561)	0.390 (0.284)	
<i>FII2*HI</i>					0.075 (0.081)	-0.044 (0.039)	
<i>INFLATION</i>	0.009*** (0.002)	0.031*** (0.007)	0.009*** (0.002)	0.033*** (0.006)	0.008*** (0.002)	0.028*** (0.007)	
<i>POP_GROWTH</i>	0.015 (0.040)	0.001 (0.010)	-0.048 (0.052)	0.007 (0.018)	-0.003 (0.048)	-0.007 (0.011)	
<i>LITERACY</i>	0.002 (0.002)	-0.002 (0.002)	-0.004 (0.002)	-0.004 (0.004)	-0.001 (0.002)	-0.001 (0.002)	
<i>UNEM</i>	-0.000 (0.005)	0.001 (0.002)	-0.002 (0.004)	-0.004 (0.003)	-0.002 (0.004)	-0.002 (0.002)	
<i>INFRAS</i>	0.002** (0.001)	0.000 (0.001)	0.002** (0.001)	-0.001 (0.001)	0.002*** (0.001)	0.000 (0.001)	
<i>INStoGDP</i>	-0.001 (0.003)	0.001 (0.001)	0.004 (0.003)	0.005** (0.002)	0.000 (0.003)	0.002 (0.001)	
<i>CONSTANT</i>	0.052 (0.378)	0.436* (0.233)	0.377 (0.546)	0.573** (0.263)	0.365 (0.477)	0.223 (0.247)	
<i>N. of Obs.</i>	244	286	244	286	244	286	
Hansen's J test chi-squared	13.21	21.59	14.50	22.27	17.54	24.96	
p-value	0.354	0.363	0.270	0.326	0.130	0.203	

Note: *Dependent variable is natural logarithm of GDP.* Columns (1) and (2) report the impact of financial inclusion on economic development in low-income countries over two periods: before and during the 2007–2008 financial crisis, respectively. Columns (3) and (4) show the estimation results for middle-income countries. Meanwhile, results for high-income countries are reported in columns (5) and (6). Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

6. CONCLUSION AND DISCUSSION

In this study, we examine the developmental influence of remittances and financial inclusion on economies and whether remittances could help to improve financial inclusion. Using a comparatively comprehensive dataset covering virtually all countries, we provide evidence that remittances and financial inclusions are positively linked to economic growth, especially in MICs. In addition, the developmental effect of remittances could become stronger in a country with a more inclusive financial system.

When we break our financial inclusion index, the GMM methodology shows that the accessibility to financial services hardly fuels developments, while actual usage of them could robustly have a developmental impact on economies. In the SEM, the outcomes show consistently positive effects of both ACCESS and USAGE on GDP. These findings are mostly consistent and robust over different empirical methodologies. This drives us to conclude that our initially proposed hypotheses are confirmed, and the policies to attract extra inward remittances and improve financial inclusion status are of great importance and could pull MICs out of the middle-income traps.

To this end, our findings suggest important considerations on a number of policies towards more sustainable development. Remittances and financial inclusion could be considered as drivers for development. Attracting additional remittances could fuel the inclusion of a financial system, which, in turn, is important for economic development. However, these effects are hardly evident in high-income economies, implying that remittances and financial inclusion are not important when a middle-income nation has gotten out of its trap and a non-linear relationship between remittances and financial inclusion and development may exist. Therefore, further research on a longer period is needed to provide more insights on this issue.

REFERENCES

- Abdih, Y., R. Chami, J. Dagher, and P. Montiel. 2012. Remittances and Institutions: Are Remittances a Curse? *World Development* 40(4): 657–666.
- Acosta, P., C. Calderon, P. Fajnzylber, and H. Lopez. 2008. What is the Impact of International Remittances on Poverty and Inequality in Latin America? *World Development* 36(1): 88–114.
- Adams, R., and A. Cuecuecha. 2010. Remittances, Household Expenditure and Investment in Guatemala. *World Development* 38(11): 1626–1641.
- Aggarwal, R., A. Demirguc-Kunt, M. Soledad, and M. Peria. 2011. Do Remittances Promote Financial Development? *Journal of Development Economics* 96: 255–264.
- Ajefu, J. B., and J. Ogebe. 2019. Migrant Remittances and Financial Inclusion among Households in Nigeria. *Oxford Development Studies* 47(3): 319–335.
- Akobeng, E. 2016. Out of Inequality and Poverty: Evidence for the Effectiveness of Remittances in Sub-Saharan Africa. *The Quarterly Review of Economics and Finance* 60: 207–223.
- Ambrosius, C., and A. Cuecuecha. 2013. Are Remittances a Substitute for Credit? Carrying the Financial Burden of Health Shocks in National and Transnational Households. *World Development* 46: 143–152.
- Ambrosius, C., and A. Cuecuecha. 2016. Remittances and the Use of Formal and Informal Financial Services. *World Development* 77: 80–98.
- Ambrosius, C., B. Fritz, and U. Stiegler. 2014. Remittances for Financial Access: Lessons from Latin American Microfinance. *Development Policy Review* 32(6): 733–753.
- Anderson, J. C., and D. W. Gerbing. 1988. Structural Equation Modeling in Practice: A Review and Recommended Two-step Approach. *Psychological Bulletin* 103(3): 411–423.
- Anzoategui, D., A. Demirguc-Kunt, and M. S. M. Peria. 2014. Remittances and Financial Inclusion: Evidence from El Salvador. *World Development* 54: 338–349.
- Arellano, M., and S. Bond. 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies* 58(2): 277–297.
- Azizi, S. 2018. The Impacts of Workers' Remittances on Human Capital and Labor Supply in Developing Countries. *Economic Modelling* 75: 377–396.
- Ball, C. P., C. Lopez, and J. Reyes. 2013. Remittances, Inflation and Exchange Rate Regimes in Small Open Economies. *World Economy* 36(4): 487–507.
- Barajas, A., R. Chami, and S. R. Yousefi. 2012. The Finance and Growth Nexus Re-examined: Do All Countries Benefit Equally? Working Paper IMF.
- Beck, T., Demirguc-Kunt, A. and Peria, M.S.M. 2007. Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics* 85(1): 234-266.

- Benmamoun, M., and K. Lehnert. 2013. Financing Growth: Comparing the Effects of FDI, ODA, and International Remittances. *Journal of Economic Development* 38(2): 43–65.
- Berdiev, A. N., Y. Kimb, and C. P. Chang. 2013. Remittances and Corruption. *Economics Letters* 118: 182–185.
- Bettin, G., and Zazzaro, A. 2012. Remittances and financial development: Substitutes or complements in economic growth? *Bulletin of Economic Research* 64: 509–536.
- Bhattacharya, R., and H. Wolde. 2010. Constraints on Growth in the MENA Region. (No w30), International Monetary Fund.
- Bhattarai, K. 2015. Financial Deepening and Economic Growth in Advanced and Emerging Economies. *Review of Development Economic*, 19(1): 178–195.
- Brown, R. P. C., F. Carmignani, and G. Fayad. 2013. Migrants' Remittances and Financial Development: Macro- and Micro-level Evidence of a Perverse Relationship. *The World Economy* 36(5): 636–660.
- Bruhn, M., and I. Love. 2014. The Real Impact of Improved Access to Finance: Evidence from Mexico. *The Journal of Finance*. 69(3): 1347–1376.
- Buch, C. M., and A. Kuckulenz. 2010. Worker Remittances and Capital Flows to Developing Countries. *International Migration* 48(5): 89–117.
- Calderon, C., P. Fajnzylber, and J. H. Lopez. 2008. Remittances and Growth: The Role of Complementary Policies. In *Remittances and Development: Lessons from Latin America*, edited by P. Fajnzylber and J. H. Lopez. Washington, DC: World Bank.
- Chami, R., and C. Fullenkamp. 2012. Workers' Remittances and Economic Development: Realities and Possibilities, in *Maximizing the Development Impact of Remittances*. New York: United Nations Conference on Trade and Development.
- Clemens, M. A., and D. McKenzie. 2014. Why Don't Remittances Appear to Affect Growth? Policy Research Working Paper 6856, Washington, DC: World Bank.
- Cox Edwards, A., and E. R. Oreggia. 2009. Remittances and Labor Force Participation in Mexico: An Analysis Using Propensity Score Matching. *World Development* 37(4): 1004–1014.
- Cox Edwards, A., and M. Ureta. 2003. International Migration, Remittances, and Schooling: Evidence from El Salvador. *Journal of Development Economics* 72: 429–461.
- Datta, A., and S. Aggarwal. 2004. Telecommunications and Economic Growth: A Panel Data Approach. *Applied Economics* 36(15): 1649–1655.
- Demetriades, P. O., and K. A. Hussein. 1996. Does Financial Development Cause Economic Growth? Time Series Evidence from Sixteen Countries. *Journal of Development Economics* 51(2): 387–411.
- Demirguc-Kunt, A., E. Lopez Cordova, M. S. Martinez Peria, and C. Woodruff. 2011. Remittances and Banking Sector Breadth and Depth: Evidence from Mexico. *Journal of Development Economics* 95(2): 229–241.

- Dupas, P., and J. Robinson. 2013. Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya. *American Economic Journal: Applied Economics* 5(1): 163–192.
- Giuliano, P., and M. Ruiz-Arranz. 2009. Remittances, Financial Development, and Growth. *Journal of Development Economics* 90: 144–152.
- Gupta, S., C. Pattillo, and S. Wagh. 2009. Effect of Remittances on Poverty and Financial Development in Sub-Saharan Africa. *World Development* 37(1): 104–115.
- Hajer, K., and G. Kaouthar. 2016. Addressing the Effect of Workers' Remittance on Economic Growth: Evidence from MENA Countries. *International Journal of Social Economics* 43(1): 51–70.
- Inoue, T., and S. Hamori. 2016. Do Workers' Remittances Promote Access to Finance? Evidence from Asia-Pacific Developing Countries. *Emerging Markets Finance and Trade* 52(3): 765–774.
- Inoue, T., I. Takeshi, and S. Hamori. 2016. Financial Access and Economic Growth: Evidence from Sub-Saharan Africa. *Emerging Markets Finance and Trade* 52(3): 743–753.
- Jones, R. C. 1998. Remittances and Inequality: A Question of Migration Stage and Geographic Scale. *Economic Geography* 74(1): 8–25.
- Kim, D. W., J. S. Yub, and M. K. Hassan. 2018. Financial Inclusion and Economic Growth in OIC Countries. *Research in International Business and Finance* 43: 1–14.
- Kpodar, K., and M. Andrianaivo. 2011. ICT, Financial Inclusion, and Growth Evidence from African Countries. IMF Working Paper/11/73.
- Le, T. 2011. Remittances for Economic Development: The Investment Perspective. *Economic Modelling* 28: 2409–2415.
- Masoud, N., and G. Hardaker. 2012. The Impact of Financial Development on Economic Growth: Empirical Analysis of Emerging Market Countries. *Studies in Economics and Finance* 29(3): 148–173.
- McKinnon, R. 1973. *Money and Capital in Economic Development*. Washington, DC: Brookings Institution.
- Mehrotra, A., and J. Yetman. 2015. Financial Inclusion: Issues for Central Banks. *BIS Quarterly Review*. www.bis.org/publ/qtrpdf/r_qt1503h.htm (accessed 13 July 2019).
- Mohan, R. 2006. Economic Growth, Financial Deepening, and Financial Inclusion. Annual Bankers' Conference, Hyderabad.
- Nyamongo, E. M., R. N. Misati, L. Kipyegon, and L. Ndirangu. 2012. Remittances, Financial Development and Economic Growth in Africa. *Journal of Economics and Business* 64: 240–260.
- Orozco, M., and R. Fedewa. 2006. Leveraging Efforts on Remittances and Financial Intermediation. INTAL-ITD: Inter-American Development Bank.
- Ramirez, M. 2013. Do Financial and Institutional Variables Enhance the Impact of Remittances on Economic Growth in Latin America and the Caribbean? A Panel Cointegration Analysis. *International Advances in Economic Research* 19(3): 273–288.

- Rao, B. B., and G. M. Hassan. 2012. Are the Direct and Indirect Growth Effects of Remittances Significant? *The World Economy* 35: 351–372.
- Rioja, F., and N. Valev. 2004. Does One Size Fit All? A Reexamination of the Finance and Growth Relationship. *Journal of Development Economics* 74(2): 429–447.
- Roa, M. J. 2015. Financial Inclusion in Latin America and the Caribbean: Access, Usage and Quality. Research Papers 19. CEMLA.
- Rousseau, P. L., and P. Wachtel. 2002. Inflation Thresholds and the Finance-Growth Nexus. *Journal of International Money and Finance* 21(1): 277–293.
- Sarma, M. 2008. Index of Financial Inclusion. ICRIER Working Paper 215.
- Sarma, M., and J. Pais. 2011. Financial Inclusion and Development. *Journal of International Development* 23(5): 613–628.
- Senbeta, A. 2013. Remittances and the Sources of Growth. *Applied Economics Letters* 20: 572–580.
- Sharma, D. 2016. Nexus Between Financial Inclusion and Economic Growth: Evidence from the Emerging Indian Economy. *Journal of Financial Economic Policy* 8(1): 13–36.
- Sobiech, I. 2019. Remittances, Finance and Growth: Does Financial Development Foster the Impact of Remittances on Growth? *World Development* 113: 44–59.
- Terry, D., and S. Wilson. 2005. *Beyond Small Change: Making Migrant Remittances Count*. Washington, DC: InterAmerican Development Bank.
- Yoshino, N., P. J. Morgan, and L. Q. Trinh. 2017. Financial Literacy in Japan: Determinants and Impacts. ADBI Working Paper 796.
- Yoshino, N., F. Taghizadeh-Hesary, and M. Otsuka. 2017. International Remittances and Poverty Reduction: Evidence from Asian Developing Countries. ADBI Working Paper 759. Tokyo: Asian Development Bank Institute.
- . 2018. Impact of International Remittances on Poverty Reduction: Case of Developing Asia. *Global Solutions Journal*. 1:1-90-96 May 2018.
- . 2019. Determinants of International Remittance Inflows in Middle-Income Countries in Asia and the Pacific. ADBI Working Paper 964.
- Wang, X. and Guan, J. 2017. Financial Inclusion: Measurement, spatial effects, and influencing factors. *Applied Economics* 49(18): 1751–1762.
- World Bank. 2018. *World Development Indicators*. Washington, DC: World Bank.
- . 2014. *Global Economic Prospectus*. Washington, DC.