ERIA Discussion Paper Series

No. 342

The Effects of Financial Inclusion on Development Outcomes: New Insights from ASEAN and East Asian Countries

Rajabrata BANERJEE[1]

Ronald DONATO[2]

Admasu Afsaw MARUTA

University of South Australia, Australia

September 2020

Abstract: *This study empirically examines the effects of financial inclusion on economic development, – economic growth, education, health, and income inequality – in 20 Asian countries in the period 2004-2015. The financial inclusion index at an aggregate level is constructed using a hybrid methodology (reported in the previous paper) and we empirically examine its relationship with particular development outcomes. We then disaggregate the index into the three dimensions of financial inclusions – access, usage, and quality – and further into the top two indicators from each dimension based on principal component analysis scores (reported in the previous paper), to examine whether specific dimensions or indicators are more strongly associated with particular development outcomes than with others. Our results show that aggregate financial inclusion has a strong positive effect on all development outcomes and this effect improves for countries with lower political risk. At the dimension level, while usage is the only dimension impacting on economic growth, and access is the only dimension impacting on health outcomes, both usage and access influence education and income inequality. Moreover, the top ranked indicators in each dimension exert a far greater positive influence on development outcomes than the second highest ranked indicators. Our findings show that adopting a single blanket policy may not be appropriate to realise the full potential of financial inclusion in a less developed country. Policy prescriptions should therefore target specific dimension and indicators of financial inclusion to maximise the positive effect on development outcomes.*

Keywords: Financial inclusion, Asia, development outcomes
JEL Classifications: G20, O10, O57

[1] Corresponding author. GPO Box 2471, Adelaide 5000, SA. Email: Rajabrata.Banerjee@unisa.edu.au
[2] GPO Box 2471, Adelaide 5000, SA. Email: Ronal.Donato@unisa.edu.au
Acknowledgements: We sincerely thank Mr Admasu Maruta for providing excellent research assistance to this project. We would like to acknowledge the funding from the Economic Research Institute for ASEAN and East Asia for the successful completion of this project.

1. Introduction

Over the past decade, financial inclusion has received increasing attention amongst researchers and policymakers, and a growing body of empirical literature is emerging highlighting the potential benefits of increasing financial inclusion in developing countries (Demirgüç-Kunt et al., 2018; IEG, 2015; Allen et al., 2012). The Sustainable Development Goals (SDGs) proposed by the United Nations refer to financial inclusion as a mechanism for supporting inclusive economic growth (Jahan et al., 2019). In essence, financial inclusion is generally viewed as the extent of the population who have access to and use formal financial services. In this context, research and policy attention has focused on those people who are socially excluded from the financial system and how strategies can be devised to enable the 'unbanked' segments of the population to enhance their engagement with the financial system. Expanding financial inclusion has the potential to benefit the poor through various channels, including the ability to accumulate savings and access credit that enable them to smoothen consumption patterns, better manage financial risk to deal with uncertainties, and invest in productive assets (Demirgüç-Kunt et al., 2018; IEG, 2015).

The study reported here considers a comprehensive data set on financial inclusion and development outcomes from 20 Asian countries over the period 2004–2015. This paper builds on the previous paper and contributes to the research enquiry on financial inclusion by filling several important research gaps in the literature. Specifically, they are (i) extending the array of development outcomes being analysed, (ii) using both aggregated and disaggregated measures of financial inclusion when determining its impact on development outcomes, (iii) giving greater attention to the role of political risk factors and its interaction effect when examining the impact of financial inclusion on development outcomes, and (iv) determining the broader policy implications that come with such closer examination. We briefly elaborate on these contributions below.

First, much of the empirical literature exploring the potential benefits of financial inclusion on development outcomes have focused on economic growth, poverty, and income inequality where research findings generally reveal the positive effects of financial inclusion on these outcomes (e.g. see paper 2).

However, there is a dearth of empirical literature examining the effect of financial inclusion on other important development outcomes listed under the United Nations' Sustainable Development Goals and forming part of overall human development – specifically, health and education outcomes. This is surprising given the already-established positive nexus in the empirical literature between financial development and human capital and its impact on education and health outcomes. Accordingly, a key focus of this paper is to extend the range of development outcomes under analysis by examining the impact of financial inclusion on economic growth, education, health, and income inequality. The aim is to offer greater insight and understanding into the extent to which financial inclusion impacts on particular development outcomes relative to others. This is particularly important from a policy perspective as the effect of financial inclusion on certain economic development outcomes may be stronger than others (e.g. health versus education versus poverty, etc.), which may vary across regions based on their demographic and institutional characteristics.

The second contribution of this paper is that both aggregated and disaggregated measures of financial inclusion are incorporated into the analysis to discern a more nuanced understanding of how financial inclusion at a broader level and an individual level impacts on development outcomes. Thus far, all empirical research on financial inclusion have either adopted an aggregate measure of financial inclusion by way of developing composite index measures (e.g. see Sarma, 2008; Park and Mercado, 2015, 2018) to analyse its impact, or studies have selected specific financial indicators (for example, number of bank branches, number of automatic teller machines, deposit accounts), drawn from either an access or a usage component of the financial system, as a proxy measure of financial inclusion (e.g. Neaime and Gaysett, 2018; Demirgüç-Kunt and Klapper, 2012; Honohan, 2008). It is generally understood both in the construction of a composite financial index measure and in utilising individual indicators that financial inclusion, as noted in paper 2, is generally referred to as comprising three major dimensions or components – namely, usage, access, and quality (see Jahan et al., 2019). To date, the empirical literature has given very limited attention to the nexus between these three levels of aggregation, that is, composite index measure,

dimensions, and indicators. Accordingly, and in contrast to other studies, this study uses both an aggregated and a disaggregated approach to measure and analyse financial inclusion. Specifically, we first consider financial inclusion at an aggregate level by using a hybrid methodology to establish a financial inclusion index (reported in paper 2) and to empirically examine its relationship with development outcomes. We then disaggregate the index into the three dimensions of financial inclusions, specifically access, usage, and quality, to examine whether specific dimensions are more strongly associated with particular development outcomes than others. Finally, we disaggregate further to the individual indicator level of financial inclusion and examine the effect of the top two most influential indicators from each dimension, based on principal component analysis scores reported in the previous paper, on the various development outcomes to see whether the impact of financial inclusion is sensitive to specific indicators. It is important to note here that we do not claim to establish all possible channels through which these indicators influence economic development, which would require a more rigorous empirical investigation at the country level and beyond the scope of this study. However, we show that the effect of financial inclusion is sensitive to the type of indicator chosen.

Related to the above, as a third contribution, this study refers to the growing body of literature on institutional quality and examines how political factors mediate the effect of financial inclusion on economic growth, education, health, and income inequality. The importance of institutional quality for economic development is well established in the literature (see, for example, Rodrik et al. 2004; Shleifer and Vishny, 1993; Gupta et al., 2001; Justino et al., 2013; Akresh et al., 2012). Also, a growing body of literature argues that if a country has lower political risk factors, the effect of financial inclusion is more immediate, such as ownership and usage of bank accounts and financial literacy (Allen et al., 2016; Grohmann et al., 2018). However, very little attention has been paid to how political factors moderate the effect of financial inclusion on various economic development outcomes.

The remainder of this paper is structured as follows: section 2 provides a brief overview of the literature on development outcomes. Section 3 describes the data, whilst section 4 outlines the empirical methodology used in the analysis. Section 5 reports on the empirical findings and section 3.6 concludes with discussion and policy implications.

2. Overview of the Literature on Development Outcomes

The effect of financial inclusion on economic growth relates closely to the widely accepted evidence of the significant positive effect of financial development on long-run economic growth through the channel of more efficient use of capital stock (Goldsmith, 1969), and greater savings and thus higher volume of investment (McKinnon, 2010; Shaw, 1973). Financial inclusion itself connects people with banks; thus, access to a well-functioning financial system enables economically and socially excluded people to integrate better into the economy and actively contribute to its development. Financial inclusion plays a key role in building a strong foundation of a country's financial infrastructure and more effectively and extensively facilitates a more efficient flow of funds channelling savings to investment activities, thus, promoting economic growth (Sharma, 2016). Several studies found empirical support to financial inclusion on economic growth. For example, Andrianaivo and Kpodar (2011) and Inoue and Hamouri (2016) showed the positive effects of financial inclusion on economic growth in African countries. Kim et al. (2017) demonstrated the same amongst countries of the Organisation of Islamic Cooperation and Rasheed et al. (2016) and Demirgüç-Kunt and Kappler (2012) for a large sample of developing countries. Sarma (2008) reported similar findings for financial inclusion in India.

Several studies also demonstrated empirically how financial inclusion contributes significantly to reducing income inequality and poverty. As noted, expanding financial inclusion to those previously excluded from the financial system enhances the ability to access credit and accumulate savings, thus enabling individuals and households to smoothen consumption patterns, better manage financial risk to deal with uncertainties, and invest in productive assets (Demirgüç-Kunt et al., 2018; IEG, 2015). Agyemang-Badu et al. (2018) found that financial

inclusion is inversely related to both poverty and income inequality in a study of Africa countries, whilst Park and Mercado (2015, 2018) demonstrated similar findings in developing Asian countries. Further, Neaime and Gaysset (2018) found that financial inclusion decreases income inequality in Middle Eastern and North African countries, and Honohan (2008) reported that financial access significantly reduced income inequality for 160 countries. Also, country-level studies showed that financial inclusion significantly reduces income inequality and poverty. For example, Huang and Zhang (2019), using Chinese provincial data, showed a gap reduction between urban and rural income. Burgess and Pande (2005) demonstrated the effects of state-led credit and savings facilities expansion on poverty reduction in India. Brune et al. (2011) and Allen et al. (2012) showed that greater access to savings/financial accounts can improve the well-being of poor households in Malawi and Kenya, respectively.

As highlighted before, there is very limited empirical literature exploring the nexus between financial inclusion and other development outcomes, specifically health and education. This is surprising given the already-established positive nexus in the empirical literature between financial development and human capital and its impact on education and health outcomes, and the high positive correlation between financial development with financial inclusion (Mor and Ananth, 2014; Ang, 2008; Mishkin, 2007). Dwyfor Evans et al. (2002) found evidence of complementarity between financial development and human capital. Cheston and Kuhn (2002) argued that financial inclusion offers the opportunity to potentially help women overcome exploitation, create confidence for economic reliance, and help carry out income-generating activities and thus invest more in children's schooling, nutrition, and health. Financial inclusion can ostensibly play an important role in expanding access of low-income households to education finance and lower barriers to accessing education. Similarly, financial inclusion can make important contributions to health outcomes, such as reduced child and infant mortality rates. This is through providing credit, savings, and insurance and thus assisting the financing of healthcare by smoothing income and consumption in the face of health shocks. Further, both education and health outcomes can be mediated through the higher wealth effects stemming from higher returns on savings and investment

balances due to lower costs of accessing financial services through formal channels and the higher economic growth fostered by financial inclusion through the enhanced use of capital stock (Hakeem, 2010; Pritchett and Summers, 1996).[3]

As noted, much of the empirical literature on the impact of financial inclusion on development outcomes have focused mostly on economic growth and the related development outcomes of poverty and income inequality. Little to no attention has been given to other development outcomes that focus on social well-being. Accordingly, this study fills an important research gap by extending the range of development outcomes under investigation to encompass the effects of financial inclusion not only on economic growth and income inequality but also on education and health outcomes.

3. Data

The following section overviews the development outcomes, the key independent variables, and other control variables used in each model. A summary of the description and the data sources of the outcome variables and all independent variables are presented in the appendix.

Development outcomes

In this study, we consider four development outcomes: economic growth, education, health, and income inequality. Following the standard literature, economic growth is measured by the annual percentage change in the real gross domestic product (GDP) per capita in $US PPP. Education outcome is measured by expected years of schooling. Several studies have argued that expected years of schooling is a better measure of educational attainment of children than other education indicators, such as literacy rates and enrolment rates (see Behrman and Deolalikar, 1991; Gylfason, 2001; Gakidou et al., 2010). As per the United Nations Development Programme (UNDP)[4], expected years of schooling show the number

[3] Lee and Kim (2009) also show that education plays important role in promoting long-run economic growth in developing countries. Barrientos and Hulme (2009) state that education is increasingly important in ensuring employment and asset accumulation particularly in developing countries.
[4] http://hdr.undp.org/en/content/expected-years-schooling-children-years

of years of schooling that a school-aged child can expect to experience if prevailing patterns of age-specific enrolment rates remain throughout the child's life. Higher financial inclusion is expected to generate higher expected years of schooling through credit, savings, and insurance.

Similarly, health outcome is proxied by child mortality rates (Gakidou et al., 2010). Child mortality rate shows the death rate of children under the age of 5. Since financial constraints are more prevalent in less-developed countries, better financial inclusion is expected to have a positive effect on maternal health through credit and insurance, thereby reducing child mortality rates. Finally, following the standard literature, we measure income inequality by the Gini index of income inequality (Beck et al., 2007; Sarma and Pais, 2011; Park and Mercado, 2018). As noted, all definitions and corresponding data sources are provided in the appendix.

Financial inclusion index and disaggregated measures

The financial inclusion index is constructed using a hybrid index of aggregate financial inclusion by combining two existing methodologies: (i) the Euclidean distance–based method of Sarma (2008) and (ii) the double principal component analysis method of Camara and Tuesta (2014) and Park and Mercado (2018). As noted, the hybrid index comprises three dimensions, namely, usage, access, and quality of financial services, which we analyse separately. Further, each dimension has its indicators, which we derived from principal component analysis scores, and we examined the effect of the top two most influential indicators from each dimension. Paper 2 provides a detailed discussion on the construction of the financial inclusion index, the three dimensions comprising the index, and the top two most important indicators associated with each dimension. A unique feature of this study is that financial inclusion is analysed both at the aggregate level, using the hybrid index measure, as well as at the disaggregated level where the effects of financial inclusion are examined at the dimension and indicator level(s) for each development outcome. Specific details of the data set and the 20 Asian countries used in the analysis are elaborated in paper 2.

Political risk

Political risk is a measure of institutional quality, which can have a direct impact on development outcomes, as well as an indirect impact by enhancing the effectiveness of financial inclusion on development outcomes. The importance of institutional quality on economic growth and development is well established (Scully, 1982; LaPorta et al., 1998; Acemoglu et al., 2005). Weak institutional quality, particularly political factors that lead to higher levels of corruption, internal conflicts, and insecure property rights (Levin and Satarov, 2000), negatively impacts investment in productive activities (Chong and Calderon, 2000). Chong and Calderon (2000) presented cross-country evidence linking higher institutional quality with improved income inequality over time. In addition, lower political risks encourage investments in the education and health sectors (Glaeser et al., 2004). For instance, Justino et al. (2013) showed that civil conflict deteriorates educational systems by reducing government expenditures in the education sector. Corruption can also significantly reduce government revenue through tax evasion and drive up the price and reduce the level of human capital investment and government services in health (Shleifer and Vishny, 1993; Gupta et al., 2001).

Empirical studies had highlighted the importance of political risk factors, such as strengths of legal rights (Grohmann et al., 2018); efficient enforcement of rule of law (Park and Mercado, 2015, 2018); government stability (Claessens and Leaven, 2003); and lower corruption in supporting financial inclusion and financial development (Rojas-Suarez and Amado, 2014; Allen et al., 2016). Accordingly, this study incorporates political risk not only as a separate control variable but also as an interaction term to ascertain whether the effects of financial inclusion is enhanced in the presence of lower political risk. We use political risk ratings taken from the Political Risk Services group data set.[5] Here, political risk captures uncertainties related to government stability, internal conflict, corruption, religious tensions, law and order, as well as several other social and political attributes. Given the level of financial inclusion in a country, all these risk variables could, directly

[5] See https://www.prsgroup.com/

and indirectly, impact the level of economic development. The measurement unit takes a value between zero (highest risk) and 12 (lowest risk).

Other control variables

The set of control variables used for each development outcome is drawn from the empirical development literature, and a summary description of each control variable is provided in the appendix.

Concerning economic growth (i.e. per capita real GDP growth) as the dependent variable in the regression model(s), we include initial per capita income, trade openness, life expectancy, inflation, domestic credit to the private sector (percent of GDP), growth of population, average years of schooling, and female labour force participation (percentage of the total labour force) as additional controls. It is standard in the empirical growth literature that the convergence effect is captured by including the real per capita GDP at the beginning of the period. Following Fischer (1993), we include inflation to measure the effect of monetary policies. Trade openness facilitates the use of advanced technologies and promotes investments in new inputs thereby increasing economic growth (Banerjee and Roy, 2014; Yanikkaya, 2003). Our models, therefore, include trade openness as measured by the ratio of the sum of exports and imports to the value of GDP (in US dollars). Life expectancy has a positive effect on economic growth by increasing the number of the working-age population (De la Croix and Licandro, 1999). Financial sector development can also increase the pool of savings and in turn greater investment in productive activities (Ang, 2008). We use domestic credit to the private sector (percent of GDP) as a proxy for financial development. Becker et al. (1999) stated that in poorer, mainly agricultural, economies with limited human capital and rudimentary technology, a higher population significantly reduces economic growth. Accordingly, we include the growth of the population of the sampled countries. Krueger and Lindahl (2001) argued that the education sector positively contributes to economic growth through various mechanisms including the skills to adopt new technologies, and greater investment in human capital. Accordingly, we include average years of schooling in the growth regressions. Finally, a growing body of literature suggests that increasing women's participation in development can improve economic growth by improving overall family health

and, thus, increase household productivity (World Bank, 1994). To capture this relationship, our growth models include female labour participation as a percentage of the total labour force.

In the regressions with education as the outcome variable, we include population under age 15, growth of per capita GDP, government expenditure on education, life expectancy at birth years, and pupil–teacher ratio at primary schools as control variables. Simon and Pilarski (1979) argued that an increasing population size reduces the amount of education that children receive. Hence, to capture this relationship, we include the population under age 15 in the education regressions. Public education expenditure provides an assessment of a government's priorities in education and a commitment to invest in human capital (Jung and Thorbecke, 2003) and, thus, government expenditure on education captures this effect in our models. The links between health and education are well established in the literature. For example, healthy children can learn better and thus positively contribute to long-run economic growth. To capture this effect, we include life expectancy in the education regression. Finally, following Dearden et al. (2002), we include pupil–teacher ratio at primary schools to capture the effect of better learning and teaching environments on educational attainment.

In the regressions with health as the outcome variable, we include growth of per capita GDP, adult female literacy rate, the prevalence of undernourishment, births attended by skilled health staff, government expenditure on the health sector, and expected years of schooling as control variables – as all these variables have significant effects on child mortality rate (Galiani et al., 2005). For example, adult female literacy reduces child mortality rates because literate women can seek information for the betterment of health, nutrition, and education of their household members than illiterate women. In other words, higher levels of female illiteracy might be associated with poor levels of child health. Well-nourished children grow into healthy adults and, in turn, give their children a better start in life. Further, well-nourished women face fewer risks during pregnancy and childbirth, and their children set off on a firmer developmental path, both physically and mentally (Feeny and Ouattara, 2013).

Finally, in the regressions with income inequality as the dependent variable, we include growth of per capita GDP, trade openness, inflation, female labour force participation (percent of the total labour force), growth of population, life expectancy at birth, total and average years of schooling as additional controls. The extant literature suggests that these variables have a significant effect on income inequality. Hence, following Bjørnskov (2010), we include per capita income to test the Kuznets curve, which shows an inverted U-shape relationship between per capita income and income inequality. We also include population growth, following Ram (1984) who argued that population growth has a significantly negative effect on income distribution, as poor households could be affected by high fertility rates and temporary economic declines. Lin and Fu (2016) suggested that trade liberalisation promotes smooth distribution of income in developing countries as trade may increase the real return to the factor that is relatively abundant, including low-skilled workers. Trade openness is therefore included in the income inequality regressions.

4. Empirical Methodology

This study considers a system of moment equations using the generalized method of moments (GMM) proposed by Blundell and Bond (1998) to tackle the possible issue of reverse causality that may exist between financial inclusion and economic development.[6] For example, countries with increasing economic growth may experience increasing financial inclusion. Higher economic growth leads to a higher standard of living, lower poverty, greater access and usage of financial products and, thus, may significantly determine the level of financial inclusion. Also, other development outcomes, for example, education, can impact the level of financial inclusion of an economy. Educated people can understand the various financial products in the market, make informed decisions, and hence can improve their access to these products. Pena et al. (2014) stated that education is a way of measuring knowledge, skill sets, and the capacity to make decisions in formal

[6] In unreported results, we have also run fixed effect ordinary least squares (panel OLS model) regressions as a robustness check, and we find results are qualitatively similar.

financial markets. This indicates a positive association between financial inclusion and education. Similarly, better health outcomes can influence financial inclusion positively. A healthy economy signals more productive workers, better access to health-related financial products, such as credit and health insurance. This may in turn influence higher financial inclusion. Finally, income inequality can also influence financial inclusion in a less-developed country. Lower income inequality implies a higher standard of living. This could lead to higher financial development and a greater proportion of the population being able to access banking services, secure credit, insurance, and other financial products.

To address the reverse causality issues, the following equation is estimated in a system-GMM specification (Blundell and Bond, 2000):

$$DO_{it} = \mathsf{C}_0 + \mathsf{C}_1 DO_{it-1} + \mathsf{C}_2 FI_{it-1} + \mathsf{C}_3 (FI_{it-1} * PR_{it-1}) + \mathsf{C}_4\, PR_{it-1} + \mathsf{C}_5 X_{it-1} + \lambda_t + \mu_i + \varepsilon_{it}$$

where i denotes the country ($i = 1, \ldots, 22$) and t denotes the time ($t = 2004, \ldots, 2015$). DO_{it} shows development outcomes, which take the following measures: economic growth, education (expected years of schooling), health (under-5 child mortality rate), and income inequality (Gini coefficient), respectively. DO_{it-1} captures the previous year's realisations of a particular development outcome. Similarly, FI_{it-1} denotes the level of financial inclusion, PR_{it-1} refers to political risk rating, and X_{it-1} is a vector of control variables specific to a development outcome. [7] Also, λ_t denotes the time-fixed effect and ε_{it} shows the idiosyncratic error term. In addition, all variables including the outcomes variables are transformed into their logarithmic form. The main reason is that the log–log specification smooths the data and allows for the interpretation of the coefficients as elasticities (Mishra and Newhouse, 2009). The most important coefficient of interest of this study is C_2. If C_2 is statistically significant and positive, financial

[7] We use one period lagged values of all explanatory variables to consider the timing issues that these variables may take a certain time to influence the development outcomes. The lagged independent variables also eliminate reverse causality concerns with the development outcome. Additionally, we have checked that there is no endogeneity issue between the control variables and financial inclusion by regressing financial inclusion on all the other control variables.

inclusion, therefore, makes an important contribution to promoting development outcomes in Asian countries.

The GMM approach allows estimating a regression equation in differences and a regression equation in levels simultaneously, with each equation using its own set of instrumental variables (i.e. see Block, 2002; Narayan et al., 2011; Hasan et al., 2009). The plausibility of the instruments potentially depends on the consistency of the lagged values of the independent variables. Arellano and Bond (1991) and Arellano and Bover (1995) proposed two tests of specifications to verify the consistency of the instruments. The first one is the Sargan test of overidentifying restrictions which tests the overall validity of the instruments by analysing the sample analogue of the moment conditions used in the estimation process. Failure to reject the null hypothesis (which states overidentifying restrictions are valid) gives support to the model. The second test examines the presence of autocorrelation in the error process. Our findings from the study pass both the overidentifying restrictions and autocorrelation in the error process. Moreover, one major drawback of system-GMM estimation is the inclusion of too many instruments, which may introduce a bias in the coefficient estimates. Following Roodman (2009), we also control for this by using the collapse option in all system-GMM specifications. Thus, our empirical specification shows that the basic identification assumptions of the system-GMM are robust.

5. Empirical Results

This section reports on the empirical results for each of the development outcome specifications, namely, economic growth, education, health, and inequality.[8] The results for each development outcome are first reported at the aggregate level using the hybrid FI index and at the dimension level of financial inclusion, specifically usage, access, and quality, and presented in a single table (i.e. Tables 3.1, 3.3, 3.5, and 3.7). Consequently, we present the results for each

[8] As noted, we also use a fixed-effects ordinary least squares (OLS) model as a robust check. Although we do not report the fixed effects results here, we find a high degree of concordance between GMM and fixed effects OLS model approaches suggesting the results presented here are quite robust.

development outcome showing the impact for the highest and second-highest ranked indicators for each dimension of financial inclusion (i.e. Tables 3.2, 3.4, 3.6, and 3.8). At each level of analysis (i.e. aggregate index, dimension, and indicators), particular attention is given to the effect of political risks, not only in terms of its direct effect on development outcomes but also indirectly through its interaction effect with financial inclusion. Further, a particular set of control variables are included for each development outcome based on our discussion in the previous section. We discuss the results below based on each development outcome.

Economic growth and financial inclusion

Table 1 presents the results at the index level (specifications 1 and 2) and the dimension level (specifications 3 to 6) concerning per capita economic growth. All model specifications incorporate political risk ratings, whilst an interaction term between political risk and financial inclusion is added in specification 2 at the index level, and in specifications 4–6 at the dimension level. At the index level, specifications 1 and 2 (before and after interaction, respectively) in Table 3.1 reveal that the financial inclusion index has a strong positive and significant relationship with economic growth, as do several other covariates including initial income per capita, life expectancy, financial deepening (i.e. domestic private credit as a percentage of GDP), and population growth. Further, the signs for all the coefficients for all the parameter estimates are in the expected directions. Political risk as a stand-alone control variable exerts a statistically significant positive relationship with economic growth across both specifications. However, we do not find statistical significance as an interaction term.

Table 1: Economic Growth and Financial Inclusion at Index and Dimension(s) Levels

Variables	[1] Index No Interaction	[2] Index With Interaction	[3] Dimension No Interaction	[4] Dimension With Interaction (U)	[5] Dimension With Interaction (A)	[6] Dimension With Interaction (Q)
Financial inclusion - index	0.023***	0.030**				
	(4.72)	(2.04)				
(Financial inclusion) x (Political risk rating)		-0.001				
		(-0.57)				
Political risk rating	0.171***	0.190***	0.128*	0.325	0.256	0.117*
	(3.44)	(2.89)	(1.98)	(0.90)	(1.42)	(1.81)
Financial inclusion dimension – Usage (U)			0.038*	0.123**	0.080**	0.042***
			(1.97)	(2.25)	(2.30)	(2.73)
Financial inclusion dimension – Access (A)			0.034	0.011	0.054	0.025
			(1.56)	(0.33)	(1.00)	(0.93)
Financial inclusion dimension – Quality (Q)			0.014	0.107	0.032	0.031
			(0.36)	(1.57)	(0.69)	(0.45)
(U) x (Political risk ratings)				0.049*		
				(1.65)		
(A) x (Political risk ratings)					0.028	
					(1.19)	
(Q) x (Political risk ratings)						0.001
						(1.12)
Initial per capita income	-0.051***	-0.050***	-0.070*	-0.136**	-0.063	-0.072*
	(-5.22)	(-5.13)	(-1.70)	(-2.09)	(-0.89)	(-1.93)
Trade openness	0.003	0.002	0.039	0.141	0.032	0.036
	(0.12)	(0.11)	(0.95)	(1.58)	(0.79)	(0.88)
Life expectancy	0.342**	0.406**	0.583***	0.358**	0.546	0.559***
	(2.51)	(2.06)	(5.53)	(2.47)	(1.46)	(4.82)

Inflation	-0.007 (-0.89)	-0.007 (-0.81)	-0.009 (-1.48)	-0.027* (-1.94)	0.006 (0.41)	-0.007 (-0.98)
Domestic credit to private sector (% of GDP)	0.071*** (6.01)	0.076*** (4.40)	0.107*** (3.92)	0.062** (2.38)	0.187** (2.41)	0.099*** (3.30)
Growth of population	-0.020** (-2.35)	-0.021** (-2.21)	-0.031* (-1.86)	-0.032 (-1.01)	-0.091* (-1.82)	-0.039** (-2.36)
Average years of schooling	0.005 (0.07)	0.005 (0.08)	0.242 (1.46)	0.371 (1.14)	0.462 (1.22)	-0.232 (-1.45)
Labour force, female (% of total labour force)	0.048 (0.86)	0.048 (0.87)	0.055 (0.59)	0.007*** (2.90)	0.010*** (4.16)	0.001 (0.54)

Notes: The dependent variable is growth of per capita income. The key independent variable is the financial inclusion index derived from the hybrid method and the dimensions of financial inclusion. All variables are expressed in logarithmic form. An unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 178 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

Unpacking financial inclusion to its individual dimensions, results for specification 3 (without political risk interaction) and specifications 4 to 6 (with interaction) reveal that usage represents the only financial inclusion dimension that has a positive relationship with economic growth under all four specifications (i.e. specifications 3 to 6).[9] Results reveal that neither access nor quality dimension of financial inclusion has a statistically significant relationship with economic growth across any of the model specifications. Political risk as a stand-alone variable is statistically significant at 10% (i.e. specification 3 and 6). We also find a positive interaction effect when interacted with usage (i.e. specification 4) at 10%, implying the effect of usage is enhanced in the presence of lower political risks. The statistical significance of control variables remains consistent across all model specifications. The important observation made here is that whilst financial inclusion represents an important variable at the aggregate level, when disaggregated, however, the extent of its influence is not uniform across the three separate dimensions. In the case of economic growth, the 'driver' of financial inclusion is confined to the usage dimension only. We return to the issue of the relative importance of dimensions when reviewing other development outcomes.

Focusing on the indicators level in Table 3.2, specifications 1–4 contain the highest-ranked indicator(s) identified for each dimension, whilst specifications 5–8 represent results for the second-highest-ranked indicators of each dimension. Results are both before and after the inclusion of the political risk interaction term for each set of indicators. A notable observation from Table 3.2 is the far stronger relationship of the first-ranked indicators with respect to economic growth compared to the second-ranked indicators. In particular, the first ranked indicators for both the usage indicator – the percentage of adults who receive wages into an account – and the quality indicator – the strength of the credit reporting system – yielded a strong positive relationship with economic growth across nearly all model specifications (1–4) whilst access indicator percentage of adults with access to mobile banking at home was significant (at 10%) under only one model specification (specification 1). In contrast, amongst the second-ranked indicators, only the usage indicator revealed a positive statistically significant relationship with

[9] In specification 3, usage is statistically significant at 10%.

per capita economic growth (specifications 5–8). Political risk as a stand-alone variable generated a statistically significant relationship with economic growth across the majority of model specifications. However, as an interaction effect, we find that only the quality indicator interaction term was statistically significant (i.e. specification 4). This implies that the impact of the particular financial indicator is enhanced in the presence of lower political risk factors. The statistical significance of the particular control variables is consistent with Table 3.1. The results at the indicator level are consistent with those presented in Table 3.1 at the dimension level, where usage tends to be the most relevant financial inclusion dimension impacting on economic growth. Importantly also, results from Table 3.2 demonstrate that indicators themselves matter, and the influence and importance of financial inclusion on a development outcome can pivot on specific indicators.

Table 3.2: Economic Growth and Indicators of Financial Inclusion

Dimension	Variables	Top Indicators for Each Dimension (With Interaction - Specifications 2–4)				Second-Ranked Indicators for Each Dimension (With Interaction – Specification 6–8)			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Usage (U)	Percentage of adults who receive wages into an account	0.439*** (3.54)	0.315 (1.50)	0.430*** (4.20)	0.446*** (3.88)				
Access (A)	Percentage of adults with access to mobile banking at home	0.654* (1.75)	0.665 (1.57)	0.436 (1.07)	0.524 (1.35)				
Quality (Q)	The strength of credit reporting systems	0.592*** (3.32)	0.648*** (3.27)	0.565*** (3.58)	0.711 (1.35)				
Interaction: U	(Percentage of adults who receive wages into an account) * Political risk rating	0.064** (2.01)							
Interaction: A	(Percentage of adults with access to mobile banking at home) * Political risk ratings			0.147 (1.15)					
Interaction: Q	(The strength of credit reporting systems) * Political risk ratings				0.510*** (2.61)				
Usage (U)	Percentage of adults using the Internet to payments					0.046*** (3.82)	0.042*** (3.28)	0.049*** (3.81)	0.047*** (3.74)
Access (A)	Number of debit cards per 1,000 adults					0.008 (0.37)	0.002 (0.10)	0.044 (1.23)	0.016 (0.65)
Quality (Q)	Financial knowledge					0.001 (0.01)	0.001 (0.12)	0.001 (0.11)	0.001 (0.22)
Interaction: U	(Percentage of adults using the Internet to make payments) * Political risk ratings						0.021* (1.72)		
Interaction: A	(Number of debit cards per 1,000 adults) * Political risk ratings							0.021 (0.69)	
Interaction: Q	(Financial knowledge) * Political risk ratings								0.002 (1.16)
	Political risk ratings	0.064** (2.01)	0.135 (0.94)	0.177*** (3.01)	0.515*** (3.02)	0.176* (1.68)	0.130 (1.20)	0.148* (1.77)	0.025 (0.14)

	Initial per capita income	-0.099*** (-4.25)	-0.109*** (-4.03)	-0.102*** (-4.89)	-0.100*** (-4.00)	- 0.083*** (-5.53)	-0.093*** (-7.57)	- 0.080*** (-5.59)	-0.097*** (-4.11)
	Trade openness	0.018 (0.51)	0.030 (0.85)	-0.004 (-0.09)	-0.018 (-0.60)	0.038 (1.48)	0.034 (1.27)	0.047* (1.66)	0.035 (1.40)
	Life expectancy	0.278 (1.22)	0.258 (1.12)	0.392 (1.29)	0.401* (1.75)	0.275 (0.80)	0.327 (0.98)	0.204 (0.63)	0.243 (0.78)
	Inflation	0.001 (0.04)	0.001 (0.09)	-0.001 (-0.08)	-0.001 (-0.01)	-0.003 (-0.23)	-0.001 (-0.09)	-0.004 (-0.29)	-0.005 (-0.36)
	Domestic credit to private sector (% of GDP)	0.106*** (3.49)	0.099*** (3.48)	0.140*** (4.32)	0.106*** (3.55)	0.085*** (3.34)	0.074*** (2.52)	0.090*** (3.21)	0.091*** (3.22)
	Growth of population	-0.027* (-1.92)	-0.017 (-1.04)	-0.033* (-1.87)	-0.024 (-1.23)	-0.036* (-1.95)	-0.031 (-1.33)	-0.045** (-2.12)	-0.027* (-1.75)
	Average years of schooling	-0.071 (-0.55)	0.030 (0.21)	0.056 (0.40)	0.067 (0.55)	0.029 (0.37)	0.051 (0.70)	0.024 (0.28)	0.078 (0.71)
	Labour force, female (% of total labour force)	0.003 (1.32)	0.004* (1.79)	0.002 (0.93)	0.002 (1.28)	-0.001 (-0.20)	0.001 (0.12)	0.001 (0.31)	0.016 (0.23)

Notes: The dependent variable is growth of per capita income. The key independent variables are the top two indicators from each dimension of financial inclusion. All variables are expressed in logarithmic form. Unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 178 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

Education and financial inclusion

Table 3 presents the results at the index level (specifications 1 and 2) and the dimension level (specifications 3 to 6) concerning education outcomes (as measured by average years of schooling) after controlling for an array of control variables, including political risk. At the index level, Table 3 reveals that financial inclusion yields a statistically significant and positive relationship on education outcomes both before and after interaction effects (i.e. specifications 1 and 2).[10] Political risk rating yields a positive relationship in educational outcomes. Also, when interacted with financial inclusion, political risk exerts a statistically significant positive relationship (at 10%), implying that the influence of financial inclusion on educational outcomes is enhanced in the presence of lower political risks. The results for the array of statistically significant control variables, such as population under 15 years, per capita GDP growth, and government health expenditure as a percentage of GDP, have coefficient signs that are in concord with a priori expectations.

When disaggregating to the dimension level, specifications 3 to 6 in Table 3 reveal that usage is the dominant financial inclusion dimension influencing educational outcomes across all four specifications whilst, to a lesser extent, access also some positive influence on educational outcomes of which two specifications were statistically significant at 10% (i.e. specifications 3 and 4). Results show no positive association for the quality indicator. We find political risk as a stand-alone variable to be significant (at 10%) for three out of the four specifications (i.e. specifications 3 to 5) whilst the influence of the usage dimension is enhanced in the presence of lower political risk factors (i.e. specification 4) as reflected in the strong statistically significant association of the interaction effect of political risk (i.e. specification 4). The statistical significance for the control variables used in the analysis remains mostly consistent across model specifications and the respective signs of the coefficients are in accordance with expectations.

[10] The financial inclusion index is significant at 10% when interacting with political risk rating (i.e. specification 2).

Table 3: Education (Average Years of Schooling) and Financial Inclusion at Index and Dimension(s) Levels

Variables	[1] Index No Interaction	[2] Index With Interaction	[3] Dimension No Interaction	[4] Dimension With Interaction (U)	[5] Dimension With Interaction (A)	[6] Dimension With Interaction (Q)
Financial inclusion	0.003**	0.004*				
	(2.08)	(1.82)				
(Financial inclusion) x (Political risk ratings)		0.001*				
		(1.80)				
Political risk ratings	0.045**	0.044**	0.024*	0.031*	0.038*	0.035
	(2.34)	(2.30)	(1.71)	(1.70)	(1.88)	(1.51)
Financial inclusion dimension – Usage (U)			0.013***	0.011**	0.023**	0.012**
			(2.97)	(2.31)	(2.45)	(2.53)
Financial Inclusion Dimension – Access (A)			0.001**	0.001*	0.009*	0.002
			(2.00)	(1.68)	(1.70)	(0.34)
Financial Inclusion Dimension- Quality (Q)			0.011	0.011	0.011	0.031
			(1.22)	(1.24)	(1.10)	(1.56)
(Usage) x (Political risk ratings)				0.004**		
				(2.22)		
(Access) x (Political risk ratings)					0.003	
					(0.77)	
(Quality) x (Political risk ratings)						0.001
						(1.11)
Population under 15 years	-0.007**	-0.002**	-0.004**	-0.004**	-0.017***	-0.004*
	(-2.12)	(-2.26)	(-2.12)	(-2.25)	(-4.64)	(-1.93)
Growth, per capita GDP	0.002**	0.006*	0.004	0.003	0.011	0.005
	(2.27)	(1.76)	(0.82)	(0.47)	(0.87)	(1.03)
Government expenditure on education expenditure (% of GDP)	0.005**	0.004	-0.001	-0.002	0.029***	0.004
	(2.00)	(0.77)	(-0.11)	(-0.35)	(2.81)	(0.59)
Life expectancy at birth years	0.010	0.005	0.115*	0.104*	0.140	0.111*
	(0.28)	(0.14)	(1.90)	(1.69)	(1.20)	(1.85)

Pupil–teacher ratio, primary	-0.004 (-0.62)	-0.003 (-0.43)	-0.034*** (-3.60)	-0.030*** (-2.88)	-0.016 (-0.88)	-0.026* (-1.99)

Notes: The dependent variable is average years of schooling. The key independent variable is the financial inclusion index derived from the hybrid method and the dimensions of financial inclusion. All variables are expressed in logarithmic form. Unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10%, levels respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 101 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

When financial inclusion is disaggregated to the indicator level, Table 4 reveals that only the first-ranked indicators are statistically relevant, whilst no second-ranked indicators under any model specifications yield a positive relationship to education outcomes. Amongst the first-ranked indicators, we find that the financial inclusion indicator relating to usage represents the most important indicator influencing educational outcomes across all four specifications (three of these specifications were significant at 10%) whilst the quality indicator was significant for three of the four specifications (specifications 1–4). We do not find any statistical significance for the access indicator. In terms of institutional quality, we find that political risk yields a positive relationship across all model specifications. As an interaction effect, the influence of the usage indicator on educational outcomes is enhanced when interacted with political risk (i.e. specification 2). Again, the results reveal the sensitivity of the influence of financial inclusion on specific indicators that are dependent on the particular development outcomes.

Health and financial inclusion

Turning to health outcomes as measured by under-5 child mortality rates, results in specifications 1 and 2 in Table 5 reveal that financial inclusion as an index measure has a statistically significant positive effect on health outcomes.[11] Results also show that political risk is significant both before interaction (specification 1) and when interacted with the financial inclusion index (specification 2). This implies that the influence of financial inclusion is enhanced in the presence of lower political risk factors. The statistical significance and the sign of parameter coefficients for the array of other control variables – such as economic growth, literacy rates, the prevalence of undernourishment, government expenditure as a percentage of GDP, and expected years of schooling – appear to be consistent with a priori expectations under both model specifications.

[11] Note that as health outcomes is measured as childhood mortality, a negative coefficient implies a positive effect on health outcomes.

Table 4. Education (Average Years of Schooling) and Indicators of Financial Inclusion

Dimension	Variables	Top Indicators for Each Dimension (With Interaction - Specifications 2–4)				Second-Ranked Indicators for Each Dimension (With Interaction – Specifications 6–8)			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Usage (U)	Percentage of adults who receive wages into an account	0.079** (2.03)	0.159* (1.72)	0.075* (1.75)	0.071* (1.67)				
Access (A)	Percentage of adults with access to mobile banking at home	0.034 (0.55)	0.001 (0.01)	-0.012 (-0.10)	0.042 (0.65)				
Quality (Q)	The strength of credit reporting systems	0.123** (2.21)	0.118** (2.09)	0.120** (2.10)	0.051 (0.32)				
Interaction: U	(Percentage of adults who receive wages into an account) * Political risk rating		0.001** (2.00)						
Interaction: A	(Percentage of adults with access to mobile banking at home) * Political risk ratings			0.011 (0.21)					
Interaction: Q	(The strength of credit reporting systems) * Political risk ratings				0.027 (0.48)				
Usage (U)	Percentage of adults using the internet to payments					0.001 (0.46)	0.001 (0.28)	-0.001 (-0.20)	0.001 (0.26)
Access (A)	Number of debit cards per 1,000 adults					0.001 (0.16)	0.002 (0.39)	-0.005 (-0.67)	0.001 (0.04)
Quality (Q)	Financial knowledge					0.002 (0.41)	0.003 (0.21)	0.004 (0.44)	0.005 (0.40)
Interaction: U	(Percentage of adults using the Internet to make payments) * Political risk ratings						0.005 (0.59)		
Interaction: A	(Number of debit cards per 1,000 adults) * Political risk ratings							0.017 (1.06)	

Interaction: Q	(Financial knowledge) * Political risk ratings								0.019 (0.92)
	Political risk ratings	0.115*** (3.05)	0.099** (2.39)	0.122** (2.38)	0.132** (2.56)	0.039** (2.05)	0.054** (2.06)	0.039** (2.06)	0.059** (2.06)
	Growth per capita GDP	0.007 (1.15)	0.004 (0.60)	0.006 (1.03)	0.006 (0.92)	0.005* (1.98)	0.003 (0.06)	0.005* (1.77)	0.004** (2.04)
	Population under 15 years	-0.005*** (-2.64)	-0.005*** (-2.62)	-0.005** (-2.56)	-0.005** (-2.50)	-0.003* (-1.74)	-0.004* (-1.93)	-0.003* (-1.85)	-0.002** (-2.58)
	Government expenditure on education expenditure (% of GDP)	0.003 (0.38)	0.005 (0.64)	0.003 (0.38)	0.004 (0.47)	0.006 (0.74)	0.009 (0.96)	0.007 (0.85)	0.002 (0.28)
	Life expectancy at birth years	0.007 (0.13)	-0.037 (-0.54)	0.008 (0.16)	0.009 (0.18)	-0.006 (-0.14)	-0.030 (-0.52)	-0.011 (-0.24)	0.005 (0.11)
	Pupil–teacher ratio, primary	-0.022** (-2.30)	-0.029** (-2.20)	-0.022* (-1.94)	-0.021* (-1.88)	-0.005** (-2.00)	-0.003* (-1.68)	-0.009* (-1.91)	-0.012* (-1.98)

Notes: The dependent variable is the average years of schooling. The key independent variables are the top two indicators from each dimension of financial inclusion. All variables are expressed in logarithmic form. An unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time fixed effects, which are not reported in the table, are included. The regressions include 128 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

Table 5: Health (Child Mortality Rate) and Financial Inclusion at the index and Dimension(s) Levels

Variables	[1] Index No Interaction	[2] Index With Interaction	[3] Dimension No Interaction	[4] Dimension With Interaction (U)	[5] Dimension With Interaction (A)	[6] Dimension With Interaction (Q)
Financial inclusion	-0.315*** (-2.68)	-0.132*** (-3.84)				
(Financial inclusion) x (Political risk ratings)		-0.187*** (-6.12)				
Political risk ratings	-0.056** (-2.30)	-0.046*** (-6.84)	-0.047* (-1.71)	-0.056** (-2.06)	-0.026* (-1.78)	-0.049* (-1.73)
Financial inclusion dimension – Usage (U)			0.090 (0.40)	0.323 (1.29)	0.183 (0.83)	0.108 (0.47)
Financial inclusion dimension – Access (A)			-0.784*** (-2.64)	-0.591* (-1.93)	-0.132** (-2.04)	-0.761** (-2.48)
Financial inclusion dimension- Quality (Q)			0.010 (0.02)	0.061 (0.10)	0.242 (0.39)	0.924 (0.28)
(Usage) x (Political risk ratings)				-0.008* (-1.88)		
(Access) x (Political risk ratings)					-0.019** (-2.39)	
(Quality) x (Political risk ratings)						-0.014 (-0.28)

Growth, per capita GDP	-0.212*** (-5.30)	-0.139*** (-12.60)	-0.235*** (-5.08)	-0.205*** (-4.31)	-0.255*** (-5.57)	-0.225*** (3.78)
Literacy rate, adult female (% of females 15 years and above)	0.004 (0.32)	-0.034*** (-10.63)	-0.010 (-0.66)	-0.001 (-0.06)	-0.025 (-1.56)	-0.008 (-0.51)
Prevalence of undernourishment (% of population)	0.088* (1.68)	0.082*** (5.60)	0.141** (2.38)	0.112* (1.87)	0.127** (2.18)	0.142** (2.39)
Births attended by skilled health staff (% of total)	-0.010 (-0.81)	0.001 (0.18)	-0.017 (-1.12)	-0.011 (-0.73)	-0.020* (-1.73)	-0.017 (-1.08)
Government expenditure on health expenditure (% of GDP)	-0.107*** (-5.49)	-0.218*** (-12.10)	-0.393*** (-4.60)	-0.339*** (-3.86)	-0.396*** (-4.75)	-0.393*** (-4.59)
Expected years of schooling	-0.593*** (-2.77)	-0.722*** (-12.66)	-0.603*** (-2.82)	-0.533** (-2.53)	-0.716*** (-3.36)	-0.624*** (-2.75)

Notes: The dependent variable is child mortality rate, under-5 (per 1,000 live births). The key independent variable is the financial inclusion index derived from the hybrid method and the dimensions of financial inclusion. All variables are expressed in logarithmic form. Unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 132 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

At the dimension level (i.e. specifications 3 to 6), Table 5 results reveal that access represents the only financial inclusion dimension that has a statistically positive influence on health outcomes. Neither usage nor quality dimensions had any statistical association with the dependent variable. Political risk yields a significant relationship with health outcomes across all the model specifications; and as an interaction term, the effectiveness of access dimension was enhanced in the presence of lower political risk factors (i.e. specification 5). As with other development outcomes, whilst higher financial inclusion reduces child mortality, this did not translate into a uniform influence at the dimension level, as results show that only access represented the only dimension that exerted a statistically significant influence on health outcomes.

Disaggregating at the indicator level, Table 6 shows that, after allowing for control variables, both first- and second-ranked financial inclusion indicators yielded statistically significant positive relationships on health outcomes across most model specifications (i.e. specifications 1 to 8). Specifically, across both sets of indicators, both usage and quality represented the two most influential dimensions on health outcomes. Political risk also exerted a statistically significant influence on health outcomes across all model specifications. In the case of the highest-ranked indicators, the political interaction effects were significant for all three indicators, suggesting that the influence of these indicators on health outcomes was enhanced in the presence of lower political risk factors (i.e. specifications 2 to 4). We do not find the political interaction effects to be statistically significant for second-ranked indicators. Again, all other control variables have coefficient signs that are consistent with expectations.

Income inequality and financial inclusion

Finally, turning to income inequality, as measured by the Gini coefficient, results presented in Table 7 reveal that at the aggregate level, financial inclusion exerts a positive influence in improving income inequality (i.e. specification 1). However, when introducing the interaction effect (specification 2), the financial inclusion index is statistically significant only as an interaction term and not as a stand-alone variable, implying that financial inclusion becomes relevant only in the presence of institutional quality. The signs for the coefficient estimate for the other control variables – specifically per capita growth, female labour force participation, life expectancy, and average years of schooling – are consistent with expectations.

Table 6: Health (Child Mortality Rate) and Indicators of Financial Inclusion

Dimension	Variables	Top Indicators for Each Dimension (With Interaction - Specifications 2–4)				Second-Ranked Indicators for Each Dimension (With Interaction – Specifications 6–8)			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Usage (U)	Percentage of adults who receive wages into an account	-0.242*** (-2.93)	-0.958*** (-5.12)	-0.270*** (-3.63)	-0.251*** (-3.43)				
Access (A)	Percentage of adults with access to mobile banking at home	-0.024 (-0.23)	-0.039 (-0.41)	-0.490*** (-3.38)	-0.016 (-0.17)				
Quality (Q)	The strength of credit reporting systems	-0.172 (-1.36)	-0.324*** (-2.75)	-0.200 (-0.11)	-0.684*** (-4.13)				
Interaction: U	(Percentage of adults who receive wages into an account) * Political risk rating		-0.182*** (-4.15)						
Interaction: A	(Percentage of adults with access to mobile banking at home) * Political risk ratings			-0.219*** (-4.27)					
Interaction: Q	(The strength of credit reporting systems) * Political risk ratings				-0.209*** (-4.20)				
Usage (U)	Percentage of adults using the Internet to payments					-0.016*** (-5.05)	-0.017*** (-5.20)	-0.016*** (-5.06)	-0.016*** (-5.12)
Access (A)	Number of debit cards per 1,000 adults					-0.013*** (-2.75)	-0.009 (-1.57)	-0.010 (-1.05)	-0.012*** (-2.60)

Quality (Q)	Financial knowledge					-0.483*** (-3.19)	-0.540*** (-3.46)	-0.462*** (-2.86)	-0.388** (-2.09)
Interaction: U	(Percentage of adults using the internet to make payments) * Political risk ratings						-0.016 (-1.42)		
Interaction: A	(Number of debit cards per 1,000 adults) * Political risk ratings							-0.001 (-0.35)	
Interaction: Q	(Financial knowledge) * Political risk ratings								0.001 (0.86)
	Political risk ratings	-0.111** (-2.03)	-0.100 (-1.43)	-0.040** (-2.01)	-0.043** (-2.01)	-0.146*** (-3.38)	-0.127*** (-2.81)	-0.136*** (-2.64)	-0.106* (-1.68)
	Growth, per capita GDP	-0.033** (-2.13)	-0.024* (-1.77)	-0.038*** (-2.70)	-0.037*** (-2.68)	-0.027** (-2.22)	-0.040*** (-2.63)	-0.028** (-2.19)	-0.026** (-2.21)
	Literacy rate, adult female (% of females aged 15 and above)	-0.022 (-0.86)	-0.016 (-0.65)	-0.042* (-1.78)	-0.040* (-1.72)	-0.071*** (-4.27)	-0.062*** (-3.45)	-0.067*** (-3.30)	-0.075 (-4.41)
	Prevalence of undernourishment (% of population)	-0.001 (-0.05)	0.022 (1.08)	0.011 (0.56)	0.012 (0.58)	-0.011 (-0.82)	0.014 (0.63)	0.006 (0.29)	-0.001 (-0.07)
	Births attended by skilled health staff (% of total)	0.026 (0.96)	0.015 (0.63)	0.027 (1.15)	0.020 (0.84)	0.010 (0.72)	0.009 (0.67)	-0.009 (-0.68)	0.000 (0.02)
	Government expenditure on health expenditure (% of GDP)	-0.065*** (-3.05)	0.016 (0.74)	-0.037* (-1.85)	-0.035* (-1.72)	-0.008 (-0.41)	0.001 (0.05)	-0.005 (-0.26)	-0.003 (-0.14)
	Expected years of schooling	-0.206*** (-4.02)	-0.279*** (-5.73)	-0.267*** (-5.54)	-0.255*** (-5.43)	-0.273*** (-6.93)	-0.261*** (-6.54)	-0.265*** (-5.88)	-0.257*** (-6.04)

Notes: The dependent variable is child mortality rate, under-5 (per 1,000 live births). The key independent variables are the top two indicators from each dimension of financial inclusion. All variables are expressed in logarithmic form. Unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 133 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

Table 7: Income Inequality and Financial Inclusion: At Index and Dimension(s) Levels

Variables	[1] Index No Interaction	[2] Index With Interaction	[3] Dimension No Interaction	[4] Dimension With Interaction (U)	[5] Dimension With Interaction (A)	[6] Dimension With Interaction (Q)
Financial inclusion	-0.033*** (-2.72)	-0.016 (-0.49)				
(Financial inclusion) x (Political risk ratings)		-0.018*** (3.38)				
Political risk ratings	-0.010 (-0.56)	-0.002 (-0.05)	0.118 (0.95)	0.237 (1.33)	0.097 (0.41)	0.492 (0.40)
Financial inclusion dimension – Usage			-0.105*** (-6.06)	-0.088*** (-3.52)	-0.021*** (-2.75)	-0.083*** (-4.74)
Financial inclusion dimension - Access			-0.076*** (-3.69)	-0.022 (-0.67)	0.016 (0.77)	-0.061*** (-3.13)
Financial inclusion dimension - Quality			-0.003 (-0.06)	0.012 (0.17)	-0.075*** (-3.71)	0.052 (0.97)
(Usage) x (Political risk ratings)				-0.001*** (-3.90)		
(Access) x (Political risk ratings)					-0.001* (-1.83)	
(Quality) x (Political risk ratings)						-0.003*** (-4.80)
Growth, per capita GDP	0.018*** (3.92)	0.060*** (6.17)	0.269*** (6.80)	0.301*** (5.34)	0.087*** (4.44)	0.229*** (5.78)
Trade openness	0.000 (-0.57)	-0.005*** (-2.94)	-0.001*** (-2.78)	-0.001** (-2.01)	-0.001 (-0.88)	-0.001 (-0.89)
Inflation	-0.001 (-1.31)	0.001* (1.67)	-0.002 (-1.04)	0.006** (2.43)	0.001** (2.51)	-0.001 (-0.87)

Labour force, female (% of total labour force)	-0.047*** (-4.07)	-0.076*** (-3.04)	-0.688*** (-7.04)	-0.564*** (-3.99)	-0.147*** (-4.35)	-0.352*** (-5.50)
Growth of population	0.151** (2.50)	0.168 (1.32)	0.051** (2.57)	0.050* (1.77)	-0.001 (-0.04)	-0.022 (-1.11)
Life expectancy at birth, total (years)	0.001 (0.48)	-0.004*** (-2.61)	-0.021*** (-3.69)	-0.022*** (-2.75)	-0.001 (-0.60)	-0.008* (-1.87)
Average years of schooling	-0.010*** (-6.51)	-0.023*** (-6.95)	-0.083*** (-7.99)	-0.059*** (-3.64)	-0.034*** (-5.67)	-0.086*** (-7.24)

Notes: The dependent variable is income inequality measured by Gini coefficient. The key independent variable is the financial inclusion index derived from the hybrid method and the dimensions of financial inclusion. To minimise the issue of multi-collinearity, all regressions consider rural population (% of total population) and population growth interchangeably, and the qualitative nature of the results remains intact. Moreover, ethnic fractionalisation, literacy rate, and adult female (% of females aged 15 and above) are included. However, they are not reported as their coefficients are insignificant. All variables are expressed in logarithmic form. Unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 147 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

When disaggregating financial inclusion into its dimension components, results in Table 7 show that usage represents the most dominant financial inclusion dimension that has a statistically significant influence on income inequality across all four model specifications (i.e. specifications 3 to 6). Its effectiveness is enhanced when interacted with political risk. Results show that the access dimension is significant under two specifications (i.e. specifications 3 and 6) whilst the quality dimension is statistically significant under one specification (i.e. specification 5). Again, we find that political risk is not statistically significant as a stand-alone variable. However, its effectiveness becomes statistically significant as an interaction effect for each of the three dimensions (i.e. specifications 4 to 6), thereby enhancing the influence of each dimension on inequality outcomes.

At the indicator level, results in Table 8 reveal that the first-ranked indicators are much more dominant than second-ranked indicators in terms of exerting a statistically significant relationship on reducing income inequality. The usage indicator yields a statistically significant influence on inequality outcome across all model specifications which included the second-ranked indicators (i.e. specifications 1 to 8). Interestingly, we find political risk has a statistically significant positive impact on income inequality as a stand-alone variable across all model specifications (but mostly at the 10% significance level) and is statistically significant as an interaction term across each of the three indicators. This implies that the influence of financial inclusion is enhanced in the presence of higher institutional risk ratings (specifications 2 to 4 and 6 to 7). Again, the sign of the coefficients for the statistically significant control variables was in accordance with expectations and consistent with results presented at the index and dimension levels (Table 7).

Table 8: Income Inequality and Indicators of Financial Inclusion

Dimension	Variables	Top Indicators from Each Dimension (With Interaction - Specifications 2–4)				Second-Ranked Indicators for Each Dimension (With Interaction – Specifications 6–8)			
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Usage (U)	Percentage of adults who receive wages into an account	-0.284*** (-4.96)	-0.281*** (-3.53)	-0.206*** (-3.54)	-0.222*** (-4.48)				
Access (A)	Percentage of adults with access to mobile banking at home	-0.392*** (-5.18)	-0.003 (-0.03)	-0.118 (-0.35)	-0.496*** (-5.54)				
Quality (Q)	The strength of credit reporting systems	-0.142 (-1.30)	-0.061 (-0.78)	-0.086 (-0.85)	-0.568*** (-1.00)				
Interaction: U	(Percentage of adults who receive wages into an account) * Political risk ratings		-0.053*** (-2.86)						
Interaction: A	(Percentage of adults with access to mobile banking at home) * Political risk ratings			-0.006* (-1.69)					
Interaction: Q	(The strength of credit reporting systems) * Political risk ratings				-0.006*** (-2.79)				
Usage (U)	Percentage of adults using the Internet to payments					-0.028*** (-7.13)	-0.028*** (-7.56)	-0.028*** (-7.77)	-0.027*** (-6.55)
Access (A)	Number of debit cards per 1,000 adults					-0.001 (-0.22)	-0.001 (-0.01)	-0.010 (-1.46)	-0.002 (-0.32)
Quality (Q)	Financial knowledge					-0.001 (-0.15)	-0.001 (-0.55)	-0.002 (-0.58)	-0.001 (-0.55)
Interaction: U	(Percentage of adults using the Internet to make payments) * Political risk ratings						-0.023*** (-2.82)		

Interaction: A	(Number of debit cards per 1,000 adults) * Political risk ratings							-0.001*** (-2.94)	
Interaction: Q	(Financial knowledge) * Political risk ratings								-0.001 (-0.74)
	Political risk ratings	-0.103*** (-2.62)	-0.003* (-1.70)	-0.212* (-1.68)	-0.183* (-1.79)	-0.011* (-1.85)	-0.032* (-1.72)	-0.001* (-1.65)	-0.001** (-2.01)
	Growth, per capita GDP	0.102*** (6.01)	0.052*** (5.35)	0.065*** (6.99)	0.065*** (6.92)	0.058*** (4.65)	0.073*** (5.76)	0.067*** (5.51)	0.058*** (4.45)
	Trade openness	-0.001 (-1.12)	0.001 (0.56)	-0.001* (-1.84)	-0.001** (-2.30)	-0.001* (-1.82)	-0.001* (-1.66)	-0.001 (-1.12)	-0.001* (-1.97)
	Inflation	0.001 (1.01)	0.001 (1.06)	0.001 (0.45)	0.001 (0.62)	0.001* (1.80)	0.001 (1.49)	0.001* (1.85)	0.001* (1.77)
	Labour force, female (% of total labour force)	-0.168*** (-5.28)	-0.061** (-2.14)	-0.151*** (-5.43)	-0.197*** (-5.82)	-0.075*** (-3.22)	-0.065*** (-2.95)	-0.076*** (-3.52)	-0.082*** (-3.37)
	Growth of population	0.023** (2.47)	0.012* (1.65)	0.015* (1.99)	0.020*** (2.60)	0.016* (1.89)	0.016** (2.02)	0.013* (1.65)	0.015* (1.73)
	Life expectancy at birth, total (years)	-0.005** (-2.12)	-0.002 (-1.12)	-0.005** (-2.24)	-0.006*** (-2.68)	-0.002 (-0.70)	-0.003 (-1.46)	-0.004* (-1.69)	-0.003 (-1.06)
	Average years of schooling	-0.031*** (-6.05)	-0.027*** (-6.98)	-0.029*** (-6.26)	-0.028*** (-5.96)	-0.017*** (-5.91)	-0.018*** (-6.89)	-0.018*** (-6.82)	-0.017*** (-5.90)

Notes: The dependent variable is income inequality measured by Gini coefficient. The key independent variables are the top two indicators from each dimension of financial inclusion. To minimise the issue of multi-collinearity, all regressions consider rural population (% of total population) and population growth interchangeably, and the qualitative nature of the results remains intact. Moreover, ethnic fractionalisation, literacy rate, and adult female (% of females aged 15 and above) are included. However, they are not reported as their coefficients are insignificant. All variables are expressed in logarithmic form. Unrestricted number of lags of endogenous variables is used. We, however, checked the consistency of the results by taking different lags of the endogenous variables and the qualitative nature of the results remains intact. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Heteroscedasticity and autocorrelation robust t-statistics are in parentheses. Constant and country and time-fixed effects, which are not reported in the table, are included. The regressions include 147 observations and 20 Asian countries. Both Hansen test of overidentification restrictions and AR (2) test for serial correlation align with the conventional levels.

In sum, this study reveals that at an aggregate level, financial inclusion has a positive effect across all major development outcomes, namely, economic growth, education, health, and income inequality. Although the positive effect of an index measure is robust across different specifications, results reveal that at a dimension level, different financial inclusion dimensions matter more for particular development outcomes than others. More specifically, usage and, to a lesser extent, access are the dominant dimensions impacting across virtually the development outcomes whilst the quality dimension yield very limited influence on any of the development outcomes.

At the indicator level, results reveal that the top-ranked indicators identified in this study exert a far greater positive influence on development outcomes than second-ranked indicators demonstrating the importance of select indicators. These indicators are the percentage of adults who receive wages into an account (usage), percentage of adults with access to mobile banking at home (access), and the strength of credit reporting systems (quality). Possible reasons as to why these indicators are more relevant than others are (i) increase of usage of the formal banking system as a medium to receive wages and salaries in most developing countries and (ii) advancement of digital technology in the banking industry. With the recent tightening of credit reporting laws and to curb corruption, many countries, such as India,[12] have introduced ownership and use of formal accounts as the main medium of receiving wages and salaries. Whilst a larger proportion of the population receives wages through formal accounts, the process of receiving money in this way makes it easier for the government to collect higher income tax and provides better insurance and credit availability. This, in turn, increases consumption, government expenditure, and investment in the economy, which has direct money multiplier effects on national income. The higher the marginal propensity to consume and the propensity to invest, the higher is the multiplier effect in the economy, which increases economic growth and lowers income inequality. Similarly, formal ownership of accounts in relation to wages and salaries also helps the government collect more taxes that influence better health and education outcomes. The effect on economic growth and development has been

[12] See https://www.bbc.com/news/world-asia-india-28962762

further enhanced by the advancement of banking technologies, particularly the use of mobile phones to transfer money and apply for credit. This provides easier access to money, credit, and insurance and increases financial inclusion in the economy.

Interestingly, whilst quality is not influential at the dimension level, at the indicator level, the quality indicator – i.e. stronger credit reporting system – influences some development outcomes. This reveals that a stronger legal system and respect for creditors' and debtors' rights, which are all part of lower political risk factors, not only influence development outcomes but also enhance the impact of financial inclusion. Political risk thus represents an important parameter not just as a control variable but also as a policy-relevant parameter in the context of implementing financial inclusion in developing countries.

6. Conclusion and Policy Perspectives

This study contributes to the financial inclusion literature by broadening the array of development outcomes under analysis, and in utilising both aggregated and disaggregated measures of financial inclusion. Further, we pay particular attention to the role of political risk rating and its interaction with financial inclusion in determining its effect on development outcomes. By drawing upon a comprehensive data set compiled from various sources in 20 Asian countries, this study finds that financial inclusion not only contributes to enhancing the domains of economic growth and reducing inequality; its reach also extends to improving other development outcomes, specifically education and health. In this context, financial inclusion represents a fundamental mechanism for enhancing human development and is, therefore, of key importance to policymakers.

The 'fibrous' nature of financial inclusion means it can be constructed at various levels of aggregation. Thus, whilst at the most aggregated level financial inclusion can be analysed using a composite index to establish possible linkages with development outcomes, a finer-grained conceptual lens is required for understanding which particular components of financial inclusion are more important for certain development outcomes. For instance, our results show that using an index measure, financial inclusion is positively associated with all development outcomes. Yet, when analysed at a dimensional level, we find that

usage is the only dimension impacting economic growth, and access is the only dimension impacting health outcomes. However, both usage and, to a lesser extent, access influence the other two development outcomes, specifically education and income inequality. The corollary to this is that we do not find any circumstance where all three dimensions of financial inclusion are simultaneously relevant for any one particular development outcome. The implication here is that when policymakers select particular development outcomes, they need to be cognisant of supporting particular, and not necessarily all, elements of financial inclusion to enhance and support their development policy objective(s) most effectively.

Most telling regarding the fibrous nature of financial inclusion is when analysing at the indicator level. Notably, our results show a considerable difference amongst indicators where the first-order indicators, generated using the principal component analysis method, exerted a far greater positive influence on development outcomes than the second highest-ranked indicators. As a stand-alone measure, the percentage of adults who receive wages into an account (usage indicator) represents the most influential indicator as it exerted a statistically significant positive effect across all development outcomes and under most model specifications. In contrast, the percentage of adults with access to mobile banking at home (access indicator) is less influential, being important for particular development outcomes. Interestingly, we find that (first-ranked) quality indicator exerts a positive influence on particular outcomes for specifications which showed no influence at the dimensional level. Although outside the scope of this study, an in-depth analysis on why each indicator is more influential in each country is warranted in the future. Some possible explanations as to why the percentage of adults who receive wages into an account is highly significant are that greater ownership and use of formal bank accounts to receive salaries and wages have a direct implication on economic growth through the channels of higher consumption, government expenditure, and investment. The higher the propensity to consume and propensity to invest, the higher is the multiplier effect on national income. Higher use of bank accounts for wages and salaries also helps the government collect higher income tax, which can be better used for health and education outcomes. Similarly, recent developments in banking technologies, including greater access to

mobile phone banking at home (access indicator), has made it easier for everyone to access financial knowledge, transfer money to others, and apply for credit and insurance. Together all these factors influence economic development positively. Finally, a better credit reporting system (quality indicator) is a measure of lower political risk and higher institutional quality, which directly influences economic development. Thus, the influence of financial inclusion can hinge on very specific indicators, and policymakers need to understand and identify these critical indicators which impact most on the development outcome that is under policy focus.

The significance of political risk factors extends beyond that as a control variable, as it is typically used in the empirical literature, but as an interaction effect where it represents an important mechanism for enhancing the effects of financial inclusion on particular development outcomes. We find that its influence on financial inclusion occurs at all levels of aggregation – at the index, dimension, and indicator levels. Importantly also, institutional quality can extend the range of financial inclusion components that can exert a positive influence on outcomes. For instance, whilst the quality dimension appears to have no influence on any of the development outcomes, when interacted with political risk, it has a positive effect on income inequality. Similarly, at the indicator level, the access indicator now exerts a positive influence on health outcomes when interacted with political risk, where hitherto had no influence on the particular outcome. Again, for policymakers wishing to extend financial inclusion to the 'unbanked' population, the effectiveness of the policy approach will depend on the extent of the political risk factors that prevail in that country.

Ultimately policymakers need to refrain from adopting a broad blanket policy approach to maximise the full potential of expanding financial inclusion. Rather, there is the need to be cognisant of the particular development outcome under focus and the need to select the most effective channel of financial inclusion. Moreover, consideration needs to be given to the state of its political risk factors and how they can be strategically incorporated into the overall financial inclusion policy framework.

Finally, this study provides a basis for future research by recognising the importance of understanding financial inclusion both at the aggregate and disaggregate levels and the role of political risk factors in effecting financial inclusion across different development outcomes. To this end, countries are at different stages of human development and have varying levels of political risk factors. Therefore, the interaction of these two can lead to differences in the impact of financial inclusion. Thus, future research to inform policy development needs to be tailored to the specific circumstances of a country at a particular time to identify the critical components and channels by which the effectiveness of financial inclusion can be optimised across development outcomes. This includes finding the channels through which each indicator influences development outcomes and why some indicators are more influential than others. Another future research direction is to examine closely the relationship between access, usage, and quality in these countries. Since our findings suggest that usage is the most dominant dimension, there could exist a hierarchical relationship between the dimensions where usage becomes more important when the economy has reached a certain threshold level of access and, similarly, quality becomes more dominant when the economy has reached a certain threshold level of usage. However, given that every country is at a different transitional phase of development, a closer examination is required at the country level to establish this threshold relationship amongst dimensions.

References

Acemoglu, D., S. Johnson, and J. Robinson (2005), 'Institutions as a Fundamental Cause of Long-Run Growth', *Handbook of Economic Growth*, 1, pp.385–472.

Agyemang-Badu, A., K. Agyei, and E. Kwaku Duah (2018), 'Financial Inclusion, Poverty and Income Inequality: Evidence from Africa', *Spiritan International Journal of Poverty Studies*, 2(2).

Akresh, R., L. Lucchetti, and H. Thirumurthy (2012), 'Wars and Child Health: Evidence from the Eritrean–Ethiopian Conflict', *Journal of Development Economics*, 99(2), pp.330–40.

Allen, F., Demirguc-Kunt, L. Klapper, and M. Peria (2012), 'The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts', *The World Bank Policy Research Working Paper* No. 6290, Washington, DC: World Bank.

Allen, F., E, Carletti, R. Cull, J. Qian, L. Senbet, and P. Valenzuela (2013), 'Resolving the African Financial Development Gap: Cross-Country Comparisons and a Within-Country Study of Kenya', *World Bank Policy Working Paper* No. 6592, Washington, DC: World Bank.

Allen, F., A. Demirguc-Kunt, L. Klapper, and M. Peria (2016), 'The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts', *Journal of Financial Intermediation*, 27, pp.1–30.

Ang, J. (2008) 'What Are the Mechanisms Linking Financial Development and Economic Growth in Malaysia?', *Economic Modelling*, 25(1), pp.38–53.

Arellano, M. and S. Bond (1991), 'Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations', *The Review of Economic Studies*, 58(2), pp.277–97.

Arellano, M. and O. Bover (1995), 'Another Look at the Instrumental Variable Estimation of Error-Components Models', *Journal of Econometrics*, 68(1), pp.29–51.

Banerjee, R. and S. Roy (2014), 'Human Capital, Technological Progress and Trade: What Explains India's Long-Run Growth?', *Journal of Asian Economics*, 30, pp.15–31.

Barrientos, A. and D. Hulme (2009), 'Social Protection for the Poor and Poorest in Developing Countries: Reflections on a Quiet Revolution: Commentary', *Oxford Development Studies*, 37(4), pp.439–56.

Beck, T., A. Demirgüç-Kunt, and R. Levine (2007), 'Finance, Inequality and the Poor', *Journal of Economic Growth*, 12(1), pp.27–49.

Becker, G., E. Glaeser, and K. Murphy (1999), 'Population and Economic Growth', *American Economic Review*, 89(2), pp.145–49.

Behrman, J. and A. Deolalikar (1991), 'School Repetition, Dropouts, and the Rates of Return to Schooling: The Case of Indonesia', *Oxford Bulletin of Economics and Statistics*, 53(4), pp.467–80.

Bjørnskov, C. (2010), 'Do Elites Benefit from Democracy and Foreign Aid in Developing Countries?', *Journal of Development Economics*, 92(2), pp.115–24.

Block, S. (2002), 'Political Business Cycles, Democratization, and Economic Reform: The Case of Africa', *Journal of Development Economics*, 67(1), pp.205–28.

Blundell, R. and S. Bond (1998), 'Initial Conditions and Moment Restrictions in Dynamic Panel Data Models', *Journal of Econometrics*, 87(1), pp.115–43.

Blundell, R. and S. Bond (2000), 'GMM Estimation with Persistent Panel Data: An Application to Production Functions', *Econometric Reviews*, 19(3), pp.321–40.

Brune, L., X. Giné, J. Goldberg, and D. Yang (2011), 'Commitments to Save: A Field Experiment in Rural Malawi', *World Bank Policy Research Working Paper* No. 5748, Washington, DC: World Bank.

Burgess, R. and R. Pande (2005), 'Do Rural Banks Matter? Evidence from the Indian Social Banking Experiment', *American Economic Review,* 95(3), pp.780–95.

Camara, N. and D. Tuesta (2014), 'Measuring Financial Inclusion: A Multidimensional Index', *BBVA Research Paper* number 14/26.

Cheston, S. and L. Kuhn (2002), Empowering Women through Microfinance. Draft, Opportunity International, 64. http://www.chs.ubc.ca/srilanka/PDFs/Empowering%20women%20through%20microfinance.pdf (accessed 10 September 2019).

Chong, A. and C. Calderon (2000), 'Institutional Quality and Income Inequality', *Economic Development and Cultural Change*, 48(4), pp.761–86.

Claessens, S. and L. Leaven (2003), 'Financial Development, Property Rights, and Growth', *Journal of Finance*, 58(6), pp.2401–36.

Dearden, L., J. Ferri, and C. Meghir (2002), 'The Effect of School Quality on Educational Attainment and Wages', *Review of Economics and Statistics*, 84(1), pp.1–20.

De la Croix, D. and O. Licandro (1999), 'Life Expectancy and Endogenous Growth', *Economics Letters*, 65(2), pp.255–63.

Demirgüç-Kunt, A. and L. Klapper (2012), Measuring Financial Inclusion: The Global Findex Database. Washington, DC: The World Bank.

Demirgüç-Kunt, A., L. Klapper, D. Singer, S. Ansar, and J. Hess (2018), The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. Washington, DC: The World Bank.

Dwyfor Evans, A., C. Green, and V. Murinde (2002), 'Human Capital and Financial Development in Economic Growth: New Evidence Using the Translog Production Function', *International Journal of Finance & Economics*, 7(2), pp.123–40.

Feeny, S. and B. Ouattara (2013), 'The Effects of Health Aid on Child Health Promotion in Developing Countries: Cross-Country Evidence', *Applied Economics*, 45(7), pp.911–19.

Fischer, S. (1993), 'The Role of Macroeconomic Factors in Growth', *Journal of Monetary Economics*, 32(3), pp.485–512.

Gakidou, E., K. Cowling, R. Lozano, and C. Murray (2010), 'Increased Educational Attainment and its Effect on Child Mortality in 175 Countries between 1970 and 2009: A Systematic Analysis', *The Lancet*, 376(9745), pp.959–74.

Galiani, S., P. Gertler, and E. Schargrodsky (2005), 'Water for Life: The Impact of the Privatization of Water Services on Child Mortality', *Journal of Political Economy*, 113(1), pp.83–120.

Glaeser, E.L., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer (2004),. 'Do Institutions Cause Growth?', *Journal of Economic Growth*, 9(3), pp.271–303.

Goldsmith, R. (1969), *Financial Structure and Development*. New Haven, CT: Yale University Press.

Grohmann, A., T. Klühs, and L. Menkhoff (2018). 'Does Financial Literacy Improve Financial Inclusion? Cross-Country Evidence', *World Development*, 111, pp.84–96.

Gupta, S., H. Davoodi, and E. Tiongson (2001), 'Corruption and the Provision of Health Care and Education Services, in A.K. Jain (ed.), *The Political Economy of Corruption*. London: Routledge. pp.123–53.

Gylfason, T. (2001), 'Natural Resources, Education, and Economic Development', *European Economic Review*, 45(4-6), pp.847–59.

Hakeem I. (2010), 'Banking Development, Human Capital and Economic Growth in Sub-Saharan Africa (SSA)', *Journal of Economic Studies*, 37(5), pp.557–77.

Hasan, I., P. Wachtel, and M. Zhou (2009), 'Institutional Development, Financial Deepening and Economic Growth: Evidence from China', *Journal of Banking & Finance*, 33(1), pp.157–70.

Honohan, P. (2008). 'Cross-Country Variation in Household Access to Financial Services', *Journal of Banking & Finance*, 32(11), pp.2493–500.

Huang, Y. and Y. Zhang (2019), 'Financial Inclusion and Urban–Rural Income Inequality: Long-Run and Short-Run Relationships', *Emerging Markets Finance and Trade*, pp.1–15.

IEG (2015), *Financial Inclusion: A Foothold on the Latter toward Prosperity? An Evaluation of the World Bank Group Support for Financial Inclusion for Low-Income Households and Microenterprises*. Washington, DC: IBRD and World Bank. http://ieg.worldbankgroup.org/sites/default/files/Data/Evaluation/files/financialinclusion.pdf (accessed 8 September 2019).

Inoue, T. and S. Hamori (2016), 'Financial Access and Economic Growth: Evidence from Sub-Saharan Africa', *Emerging Markets Finance and Trade*, 52(3), pp.743–53.

Jahan, S., J. De, F. Jamaludin, P. Sodsriwiboon, and C. Sullivan (2019), 'The Financial Inclusion Landscape in the Asia-Pacific Region: A Dozen Key Findings', *IMF Working Paper*, https://www.imf.org/en/Publications/WP/Issues/2019/04/19/The-Financial-Inclusion-Landscape-in-the-Asia-Pacific-Region-A-Dozen-Key-Findings-46713 (accessed 30 September 2019).

Jung, H.S. and E. Thorbecke (2003), 'The Impact of Public Education Expenditure on Human Capital, Growth, and Poverty in Tanzania and Zambia: A General Equilibrium Approach', *Journal of Policy Modeling*, 25(8), pp.701–25.

Justino, P., T. Brück, and P. Verwimp (eds.) (2013), *A Micro-level Perspective on the Dynamics of Conflict, Violence, and Development*. New York: Oxford University Press.

Kim, D., J. Yu, and M. Hassan (2018), 'Financial Inclusion and Economic Growth in OIC Countries', *Research in International Business and Finance*, 43, pp.1–14.

Andrianaivo, M. and K. Kpodar (2011), 'ICT, Financial Inclusion, and Growth Evidence from African Countries', *IMF Working Paper* No. 11-73, Washington, DC: International Monetary Fund.

Krueger, A. and M. Lindahl (2001), 'Education for Growth: Why and For Whom?', *Journal of Economic Literature*, 39(4), pp.1101–36.

LaPorta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny (1998), 'Law and Finance', *Journal of Political Economy*, 106(6), pp.1113–55.

Lee, K. and B. Kim (2009), 'Both Institutions and Policies Matter But Differently for Different Income Groups of Countries: Determinants of Long-Run Economic Growth Revisited', *World Development*, 37(3), pp.533–49.

Levin, M. and G. Satarov (2000), 'Corruption and Institutions in Russia', *European Journal of Political Economy*, 16(1), pp.113–32.

Lin, F. and D. Fu (2016), 'Trade, Institution Quality and Income Inequality', *World Development*, 77, pp.129–42.

McKinnon, R. (2010), *Money and Capital in Economic Development*. Washington, DC: Brookings Institution Press.

Mishkin, F. (2007), *The Economics of Money, Banking, and Financial Markets*. London: Pearson Education.

Mishra, P. and D. Newhouse (2009), 'Does Health Aid Matter?', *Journal of Health Economics*, 28(4), pp.855–72.

Mor, N. and B. Ananth (2014), Financial Development and Health. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2418861 (accessed 15 September 2019).

Narayan, P., S. Narayan, and S. Mishra (2011), 'Do Remittances Induce Inflation? Fresh Evidence from Developing Countries', *Southern Economic Journal*, 77(4), pp.914–33.

Neaime, S. and I. Gaysset (2018), 'Financial Inclusion and Stability in MENA: Evidence from Poverty and Inequality', *Finance Research Letters*, 24, pp.230–37.

Park, C. and R. Mercado (2015), 'Financial Inclusion, Poverty, and Income Inequality in Developing Asia', *ADB Economics Working Paper Series* No. 426, Mandaluyong: ADB.

Park, C. and R. Mercado (2018), Financial Inclusion, Poverty, and Income Inequality', *The Singapore Economic Review*, 63(01), pp.185–206.

Pena, X., C. Hoyo, and D. Tuesta (2014), 'Determinants of Financial Inclusion in Mexico based on the 2012 National Financial Inclusion Survey (ENIF)', *BBVA Research* No. 14/15.

Pritchett, L. and L. Summers (1996), 'Wealthier is Healthier', *The Journal of Human Resources*, 31(4), pp.841–68.

Ram, R. (1984), 'Population Increase, Economic Growth, Educational Inequality, and Income Distribution: Some Recent Evidence', *Journal of Development Economics*, 14(3), pp.419–28.

Rasheed, B., S. Law, L. Chin, and M. Habibullah (2016), 'The Role of Financial Inclusion in Financial Development: International Evidence. *Abasyn University Journal of Social Sciences*, 9(2), pp.330–48.

Rodrik, D., A. Subramanian, and F. Trebbi (2004), 'Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development', *Journal of Economic Growth*, 9(2), pp.131–65.

Rojas-Suarez, L. and M. Amado (2014), 'Understanding Latin America's Financial Inclusion Gap', *Working Paper*, 367, Washington, DC: Center for Global Development.

Roodman, D. (2009), 'How to Do xtabond2: An Introduction to Difference and System GMM in Stata', *The Stata Journal*, 9(1), pp.86–136.

Sarma, M. (2008), 'Index of Financial Inclusion', *ICRIER Working Paper* No. 215, http://icrier.org/pdf/Working_Paper_215.pdf (accessed 8 September 2019).

Sharma, D. (2016), 'Nexus between Financial Inclusion and Economic Growth: Evidence from the Emerging Indian Economy', *Journal of Financial Economic Policy*, 8(1), pp.13–36.

Sarma, M. and J. Pais (2011), 'Financial Inclusion and Development', *Journal of International Development*, 23(5), pp.613–28.

Shaw, E. (1973), *Financial Deepening in Economic Development*. New York: Oxford University Press.

Scully, G. (1982), 'The Institutional Framework and Economic Development', *Journal of Political Economy*, 96(3), pp.652–62.

Shleifer, A. and R. Vishny (1993), 'Corruption', *The Quarterly Journal of Economics*, 108(3), pp.599-617.

Simon, J. and A. Pilarski (1979), 'The Effect of Population Growth upon the Quantity of Education Children Receive', *The Review of Economics and Statistics*, pp.572–84.

Yanikkaya, H. (2003), 'Trade Openness and Economic Growth: A Cross-Country Empirical Investigation', *Journal of Development Economics*, 72(1), pp.57–89.

World Bank (1994), 'Enhancing Women's Participation in Economic Development', *Report* No. 12972, Washington, DC: World Bank.

Appendix: Data Description and Sources – Dependent and Independent Variables

	Description	Sources
Dependent Variables		
Economic growth	It indicates the annual percentage growth rate of GDP per capita based on constant $US 2010.	WDI
Education (expected years of schooling)	It denotes the number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life.	UNDP
Health (under-5 mortality rate)	It shows the probability of dying between birth and age 5, expressed per 1,000 live births.	UNDP
Income inequality (Gini coefficient)	It measures the deviation of the distribution of income amongst individuals or households within a country from a perfectly equal distribution. A value of 0 represents absolute equality, a value of 100, absolute inequality.	UNDP
Independent Variables		
Financial inclusion index	It shows a composite index of usage, access, and quality of financial services.	see Paper 2
Political risk ratings	It covers 12 weighted variables including both social and political attributes of a country, such as government stability, internal conflict, corruption, religious tensions, law and order, and other attributes. It takes a value between zero (highest risk) and 12 (lowest risk).	PRS group
Initial per capita income	It is per capita GDP measured based on the constant $US 2010 at the beginning of the relevant period.	WDI
Trade openness	It is calculated as the sum of merchandise exports and imports divided by the value of GDP, which is measured by constant $US 2010.	WDI
Life expectancy	It indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of his or her birth were to stay the same throughout his or her life.	WDI
Inflation	It is measured by the consumer price index which reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	WDI
Domestic credit to the private sector (% of GDP)	It refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	WDI
Population growth	It is the annual population growth rate for year t calculated as the exponential rate of growth of the midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	WDI

Labour force, female (% of total labour force)	It is the percentage of women who are in the total labour force. Labour force comprises people aged 15 years and older who supply labour for the production of goods and services during a specified period.	WDI
Population under 15 years	It is the total population between the ages of 15 to 64. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	WDI
Government expenditure on education expenditure (% of GDP)	It is the general government expenditure on education (current, capital, and transfers), expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to the government. General government usually refers to local, regional, and central governments.	WDI
Pupil–teacher ratio, primary	It is the average number of pupils per teacher in primary school.	WDI
Literacy rate, adult female (% of females aged 15 and above)	It is the percentage of people aged 15 years and above who can both read and write and understand a short simple statement about their everyday life.	WDI
Prevalence of undernourishment (% of population)	It is the percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously.	WDI
Births attended by skilled health staff (% of total)	It shows the percentage of deliveries attended by personnel trained to give the necessary supervision, care, and advice to women during pregnancy, labour, and the postpartum period; to conduct deliveries on their own; and to care for newborn babies.	WDI
Government expenditure on health expenditure (% of GDP)	It is the public expenditure on health from domestic sources as a share of the economy as measured by GDP.	WDI

GDP = gross domestic product, PRS = political risk service, UNDP = United Nations Development Programme, WDI = World Development Index.

ERIA Discussion Paper Series

No.	Author(s)	Title	Year
2020-14 (no. 341)	Rajabrata BANERJEE and Ronald DONATO	The Composition of Financial Inclusion in ASEAN and East Asia: A New Hybrid Index and Some Stylised Facts	September 2020
2020-13 (no. 340)	Tony CAVOLI and Rashesh SHRESTHA	The Nature and Landscape of Financial Inclusion in Asia	September 2020
2020-12 (no. 339)	Han PHOUMIN, TO Minh Tu, THIM Ly	Sustainable Water Resource Development Scenarios and Water Diplomacy in the Lower Mekong Basin: Policy Implications	September 2020
2020-11 (no. 338)	Kiki VERICO and Mari Elka PANGESTU	The Economic Impact of Globalisation in Indonesia	August 2020
2020-10 (no. 337)	Yuziang YANG and Hongyong ZHANG	The Value-Added Tax Reform and Labour Market Outcomes: Firm-Level Evidence from China	August 2020
2020-09 (no. 336)	Juthathip JONGWANICH, Archanun KOHPAIBOON, Ayako OBASHI	Technological Advancement, Import Penetration, and Labour Markets: Evidence from Thai Manufacturing	August 2020
2020-08 (no. 335)	Duc Anh DANG and Thu Thu VU	Technology Imports and Employment in Developing Countries: Evidence from Viet Nam	August 2020
2020-07 (no. 334)	Hiroaki ISHIWATA, Hiroyuki WADA, Koji SUZUKI, Makoto IKEDA, Naoto TADA	A Quantitative Analysis of Disaster Risk Reduction Investment Effects for Sustainable Development: Indonesia Case Study	June 2020
2020-06 (no. 333)	Dao Ngoc TIEN, Nguyen Quynh HUONG	Assessment of Industrial Cluster Policies in Viet Nam: The Role of Special Economic Zones in Attracting Foreign Direct Investment	June 2020
2020-05 (no. 332)	Ayako OBASHI and Fukunari KIMURA	New Developments in International Production Networks: Impact of Digital Technologies	June 2020
2020-04 (no. 331)	Upalat KORWATANASAKUL, Youngmin BAEK, Adam MAJOE	Analysis of Global Value Chain Participation and the Labour Market in Thailand: A Micro-level Analysis	May 2020

2020-03 (no. 330)	Ha Thi Thanh DOAN and Huong Quynh NGUYEN	Trade Reform and the Evolution of Agglomeration in Vietnamese Manufacturing	April 2020
2020-02 (no. 329)	Kazunobu HAYAKAWA, Tadashi ITO, Shujiro URATA	Labour Market Impacts of Import Penetration from China and Regional Trade Agreement Partners: The Case of Japan	April 2020
2020-01 (no. 328)	Fukunari KIMURA, Shandre Mugan THANGAVELU, Dionisius A. NARJOKO, Christopher FINDLAY	Pandemic (COVID-19) Policy, Regional Cooperation, and the Emerging Global Production Network	April 2020

ERIA discussion papers from the previous years can be found at:
http://www.eria.org/publications/category/discussion-papers