

Park, Cyn-Young; Mercado, Rogelio

## Working Paper

# Understanding financial inclusion: What matters and how it matters

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**ADB Working Paper Series**

**UNDERSTANDING FINANCIAL INCLUSION:  
WHAT MATTERS AND HOW IT MATTERS**

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Cyn-Young Park and  
Rogelio Mercado, Jr.

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Cyn-Young Park is director, and Rogelio Mercado, Jr. is an economist, both at the Economic Research and Regional Cooperation Department of the Asian Development Bank.

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Please contact the authors for information about this paper.

Email: [cypark@adb.org](mailto:cypark@adb.org), [rmercado@adb.org](mailto:rmercado@adb.org)

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

Tel: +81-3-3593-5500  
Fax: +81-3-3593-5571  
URL: [www.adbi.org](http://www.adbi.org)  
E-mail: [info@adbi.org](mailto:info@adbi.org)

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**Abstract**

This paper introduces a new index of financial inclusion for 153 advanced, emerging, and developing economies using a comprehensive set of new indicators, grouped into four different dimensions: financial access, usage, financial development, and fintech infrastructure. The fintech infrastructure dimension in particular captures electronic and digital payments and their enabling infrastructure. In the two-step regression, we first estimated effective financial inclusion using the linear predicted values of financial inclusion based on the economic factors that are known to be the main determinants of financial inclusion. Second, we estimated the impact of effective financial inclusion on various development outcomes. The empirical results indicate that effective financial inclusion and all four related dimensions lower poverty. Improved access and fintech infrastructure reduce income inequality, and these two dimensions complement usage in increasing entrepreneurship. However, the dimensions do not have a uniform effect across different income groups. Moreover, an increase in effective financial inclusion is stronger for middle-income economies than for low-income economies. This suggests that the level of economic development, which can provide a better enabling environment for business and economic opportunities, matters for the effectiveness of financial inclusion in achieving poverty reduction.

**Keywords:** financial inclusion, poverty, income inequality

**JEL Classification:** G18, O11, I13, L26

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## 1. INTRODUCTION

This paper aims to assess the significance of financial inclusion for achieving socioeconomic development goals such as reducing poverty and income inequality, empowering women, and enabling entrepreneurship. The recent policy focus on financial inclusion is rooted in the political conviction that it is possible to reduce poverty by allowing the poor to access formal financial services. Economic theory and empirical evidence support this. Having a bank account increases savings, helps women to create opportunities, boosts household consumption, and raises productive investment (Beck, Levine, and Loayza 2000; Beck, Demirgüç-Kunt, and Honohan 2007; Honohan 2008; Beck, Demirgüç-Kunt, and Honohan 2009; Ashraf, Karlan, and Yin 2010; Park and Mercado 2016, 2018, and 2021; Popov 2018; and Barajas, Beck, Belhi, Naceur 2020). Policy recognition of this dates back to the G20 Seoul Summit in 2010, where leaders agreed to adopt financial inclusion as one of the pillars of the global development agenda.

Nevertheless, the concept and measures of financial inclusion seem elusive. It is possible to view financial inclusion from a multidimensional approach through the prism of different dimensions or aspects that contribute to overall inclusion. Earlier work has focused on a narrow scope of financial inclusion. For instance, Honohan (2007, 2008) considered financial access—defining and estimating it as the share of people within a population who have accounts with formal or semi-formal financial intermediaries, while Leyshon and Thrift (1995) and Sinclair (2001) focused on the exclusion of some groups and individuals from formal financial systems. In contrast, Sarma (2008) considered a multidimensional approach that viewed financial inclusion as a function of the ease of access, availability, and usage of financial services for all members of society. Recent studies have considered the importance of new aspects of financial inclusion. Khera et al. (2020) highlighted the digital dimension to account for the growing use of digital financial services, particularly during the COVID-19 pandemic. Given the varying nature of financial inclusion, which financial sector developments and technological advances often influence, a multidimensional approach to understanding financial inclusion offers significant benefits. Banerjee, Donato, and Maruta (2020) studied the impact of financial inclusion across different dimensions, such as access, usage, and quality, on diverse socioeconomic outcomes, like income and health. They found that only usage is relevant to income growth while access alone is significant for health outcomes.

Another consideration is that the effect of financial inclusion may be neither uniform nor universal. For instance, the growth effect of financial inclusion may depend on certain economic conditions and development characteristics.<sup>1</sup> Beck (2016) also focused on the role of financial deepening (beyond financial inclusion) in reducing poverty and income inequality by facilitating the structural transformation of an economy and boosting employment. Beck, Demirgüç-Kunt, and Honohan (2009) argued that easing financial access may be more effective for middle-income economies that have attained a certain level of development—in which case, low-income workers would benefit not only through the direct provision of financial services but also indirectly through higher wage savings and greater participation in the formal economy. In

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<sup>1</sup> See Section 2 for a discussion of country structural conditions and the level of financial inclusion, following Barajas et al. (2013, 2020). The authors proposed that economies with conducive domestic conditions for financial inclusion will attain higher levels of financial inclusion and that economies can deviate from their financial inclusion structural benchmark, which depends on their structural characteristics.

contrast, for high-income economies that have achieved significant financial development, the marginal benefit of additional financial inclusion may not be so large<sup>2</sup> or, in low-income economies that may not have attained a certain threshold of financial development, the indirect effects through economic transformation and job creation may be muted. Indeed, Park and Mercado (2021) found differences in the significance and quantitative values of the impacts of a financial inclusion index on poverty, income inequality, the empowerment of women, and entrepreneurship across country income groups. Should there be a relationship between the effect of financial inclusion and the level of financial development and certain economic conditions, its relevance and impact could also vary as economies reach higher stages of development. This may also depend on the aspects of financial inclusion that are in focus. For instance, ease of financial access and usage may be vital to households and enterprises at earlier stages of development, but financial development may have greater relevance and impact at later stages. Taken together, these points underscore the importance of considering different aspects of financial inclusion combined with development characteristics across country income groups when assessing the impact of financial inclusion on poverty reduction and inclusive economic growth.

This paper ties together the distinct concepts of financial inclusion and the economic conditions that influence its progress by constructing a new composite index of effective financial inclusion. The index draws on new dimensions of financial development and fintech infrastructure in the context of country-specific economic conditions and development characteristics.

To achieve this, we followed a two-step approach. The first step was to construct a new measure of financial inclusion by augmenting the previous financial inclusion index with more indicators on two fronts: advances in financial development and the growing importance of digital financial services. First, financial development complements financial access and usage, which financial inclusion measures more commonly use. A lack of financial resources and inefficient credit provision may impede households' and firms' access to financial services and thus hamper financial inclusion. In addition, the index accounts for fintech infrastructure as a vital element of financial inclusion given that it enables and broadens financial access and usage. The COVID-19 pandemic demonstrates the advantages of digital financial services in contactless payments, which helped to accelerate the digitalization trend in developing economies. The second step was to regress the financial inclusion index on the key economic determinants of financial inclusion. The linear predicted values based on these economic determinants constituted the measure of effective financial inclusion, accounting for the country-specific economic conditions that directly and indirectly affect financial inclusion.

Using the new composite index of effective financial inclusion, we asked two questions in this study. Answering these in a cross-country setting will help policy makers to make informed decisions on the reforms necessary to improve economy-wide conditions and financial inclusion.

*First, do different dimensions of financial inclusion—access, usage, financial development, and fintech infrastructure—show distinct impacts on the achievement of key international development goals, such as poverty reduction, income inequality, women's empowerment, and entrepreneurship, either separately or together?* This question involved not only assessing the impact of financial inclusion on socioeconomic

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<sup>2</sup> For high-income economies, further easing of financial access may lead to risky borrowers attaining more credit, as was the case in the US subprime mortgage crisis of 2007–2008.

outcomes but also determining which dimensions drive the relationship between financial inclusion and socioeconomic outcomes.

Second, *does the impact of financial inclusion (and its subcomponents) change systemically depending on the country income group, which is a proxy for the unique development characteristics of a country?* This question allowed us to investigate the importance of economies' unique enabling conditions for the effectiveness of financial inclusion.

This paper also introduces several innovations that we used in constructing the index for financial inclusion and assessing the impact. First, the new financial inclusion measure captures the depth and efficiency of domestic financial systems for financial development and the growing use of electronic and digital payments as well as their enabling infrastructure for fintech. These add to the traditional supply (access) and demand (usage) dimensions of financial inclusion. Second, the new index is a hybrid measure using the unweighted average of the percentile ranking of dimension indicators in the first step and principal component analysis weights to aggregate dimensions into a single measure in the second step. This approach resolves the issue of arbitrarily assigning dimension weights in the overall index and offers more flexibility by adding new indicators per dimension while avoiding the biases associated with highly correlated indicators in a dimension. Third, instead of employing the newly constructed financial inclusion measure, this research used linear predicted values of the financial inclusion index and its dimension indexes. We based the values on selected determinants of financial inclusion, such as the level of economic development, educational attainment, demographics, and financial constraints, to assess the impact of financial inclusion. Consequently, the linear predicted values that we used in our new index capture the effectiveness of financial inclusion. This approach improves the assessment of financial inclusion's impact on socioeconomic outcomes as it draws the effective financial inclusion and dimension indexes from country-specific socioeconomic structural conditions rather than "actual" measures of financial inclusion.

Using the linear fitted values and dimension indexes, we assessed the impacts of effective financial inclusion and its subcomponents on poverty, income inequality, women's empowerment, and entrepreneurship across country income groups for 153 economies from 2011 to 2019. Previous studies have shown that economies with higher levels of financial inclusion have lower levels of poverty and income inequality (Park and Mercado 2018, 2021; Banerjee, Donato, and Maruta 2020; Čihák and Sahay 2020) and higher measures of women's empowerment and entrepreneurship (Dupas and Robinson 2009; Ashraf, Karlan, and Yin 2010; Čihák and Sahay 2020; Park and Mercado 2021). This answered the first question in this paper. Next, we examined the effects on socioeconomic outcomes of interaction terms between financial inclusion and country income groups. The estimated coefficients would inform us whether and to what extent an increase in financial inclusion for a given country income group marginally affects socioeconomic outcomes such as reducing poverty and income inequality or improving women's empowerment and entrepreneurship.

Several of the research findings are prominent. First, the impact of effective financial inclusion on socioeconomic outcomes can differ appreciably across country income groups. For instance, a higher degree of financial access significantly lowers poverty for middle-income economies but not for high-income and low-income economies. Second, within the same country income group, some aspects of financial inclusion are more important than others. For example, for low-middle-income economies, improvements to financial access, financial development, and fintech infrastructure significantly reduce poverty, but the usage dimension of financial inclusion does not.



Finally, the marginal effects of effective financial inclusion on socioeconomic outcomes show that the level of economic development plays an important role in determining the effectiveness of financial inclusion in the achievement of development goals. For example, an increase in financial inclusion for middle-income economies brings about the biggest decline in poverty among the income groups. However, an increase in financial inclusion raises poverty in high-income economies while reducing it for other income groups.

The next section discusses the conceptual framework on financial inclusion. Section 3 explains the methodology that we used to construct a new financial inclusion index and provides stylized facts. Section 4 presents the empirical approach, while Section 5 discusses the results. Section 6 provides concluding remarks.

## 2. CONCEPTUAL FRAMEWORK

There is not yet a universally accepted definition of financial inclusion. Some studies have defined the concept of financial inclusion within the context of social exclusion. For example, Leyshon and Thrift (1995), Sinclair (2001), Amidžić, Massara, and Mialou (2014), and Camara and Tuesta (2014) underscored the exclusion of some groups and individuals from access to the formal financial system. Camara and Tuesta (2014) defined an inclusive financial system as one that maximizes usage and access while minimizing involuntary exclusion. Sarma (2008) viewed financial inclusion as a combination of multiple factors, such as the ease of access, availability, and usage of financial services for all members of society. Other papers have considered financial inclusion in the context of the efficient provision of financial services, which fosters growth, productivity, and capital accumulation and reduces poverty and income inequality (Beck, Levine, and Loayza 2000; Levine 2005; Beck, Demirgüç-Kunt, and Levine 2007; Barajas et al. 2020).

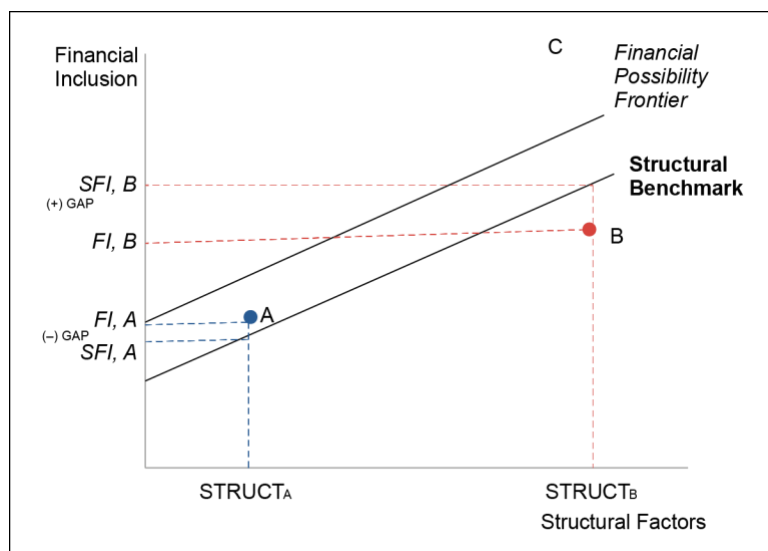
Just as no single conceptual *definition* of financial inclusion exists, no standard *measure* has achieved universal acceptance. Honohan (2007, 2008) constructed a financial access indicator defined by the fraction of the adult population with access to formal financial intermediaries. Sarma (2008) adopted a multidimensional approach to account for those multiple factors by constructing subindexes for each dimension (access, availability, and usage) before deriving an aggregated index using the normalized inverse of the Euclidean distance. Camara and Tuesta (2014) used the two-stage principal component analysis (PCA). In the first stage, they estimated three subindexes for usage, access, and barriers using PCA. In the second, they estimated the dimension weights for the overall financial inclusion index. In effect, their financial inclusion measure is a weighted average of three dimensions, the weights of which they derived through PCA.

Aside from varying definitions and measures of financial inclusion, the recent literature has provided the analytical framework for assessing how economies differ in their financial inclusion. For instance, Barajas et al. (2020) highlighted how domestic structural characteristics lead to economies having different levels of financial inclusion. Adapting the analytical framework of Barajas et al. (2013), Figure 1 illustrates how such cross-country differences arise.

Figure 1 shows an economy's structural conditions on the horizontal axis. The more conducive it is to financial inclusion, the further to the right of the axis the economy appears. For example, the figure compares a relatively rich economy with a large and densely distributed population, B, with a poor economy with a small and dispersed population, A. In this case, the structural conditions in B are more conducive to

financial inclusion than those in A; hence, the expectation is that B will have greater financial inclusion. The structural benchmark (SB) line shows the anticipated levels of financial inclusion for each level of structural conditions. An economy's actual level of financial inclusion may differ from its structural benchmark due to non-structural factors, such as financial policies. For instance, B lies below the SB line, hence underperforming its structural benchmark, possibly due to policies that hinder financial inclusion relative to other economies with similar structural characteristics.

**Figure 1: Financial Possibility Frontier**

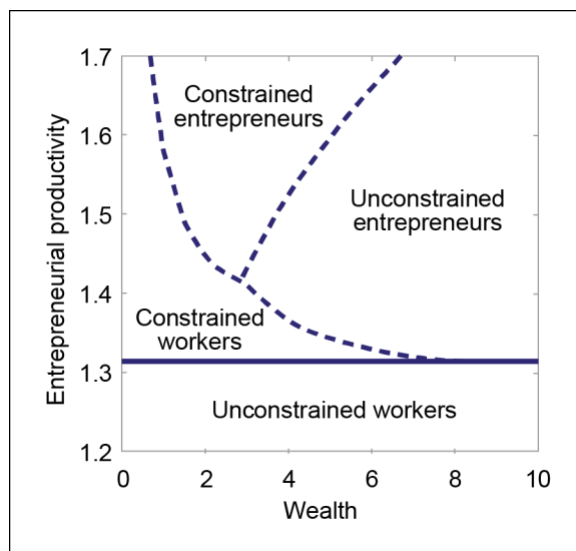


Source: Adapted from Barajas et al. (2013).

In contrast, A overperforms its benchmark, maybe because of financial inclusion policies that are more successful than those in other economies with similar structural conditions. The optimal level of financial inclusion reflects success in extending formal financial services to a broad segment of the population. The financial possibility frontier (FPF) line shows this level. As such, A can still promote financial inclusion to reach its FPF. However, there may be cases in which financial inclusion becomes excessive. An economy, like C, may have financial inclusion beyond its frontier, but this level is neither desirable nor sustainable as it is beyond its FPF.<sup>3</sup>

From the policy perspective, understanding the determinants of financial inclusion, which will eventually lead to desirable socioeconomic outcomes, is important. After all, financial inclusion is a policy objective with the aim of providing households and firms with efficient financial services and saving and investment vehicles. In this context, Dabla-Norris et al. (2021) developed a theoretical model that traces how financial activity and financial inclusion can affect economic outcomes. In their stylized economy, the agents differ in their initial wealth and managerial skills or productivity. They decide whether to become a worker or an entrepreneur by comparing the payoffs that they will earn from these activities. Entrepreneurship can be profitable but only after upfront expenditures, and the profitability will depend on the individual's talent.

<sup>3</sup> This model discussion closely follows Barajas et al. (2020).

**Figure 2: Occupational Choice with Financial Frictions**

Source: Adapted from Dabla-Norris et al. (2021).

Figure 2, from Dabla-Norris et al. (2021), summarizes the impact of financial inclusion on economic outcomes. The figure represents a situation in which no credit exists and financial frictions abound.<sup>4</sup> Four types of agents emerge. First, “unconstrained workers” have very limited managerial ability and will opt to be workers regardless of their initial wealth. Second, “constrained workers” are those who have sufficient talent to become entrepreneurs but who remain workers because of their limited wealth. Third, “constrained entrepreneurs” have sufficient talent and initial wealth to become entrepreneurs but insufficient wealth to operate their firm at the optimal level. Fourth, “unconstrained entrepreneurs” have managerial talent and sufficient wealth to operate their firm at the optimal level. With the introduction of credit (financial access), talented individuals can invest in the required capital and become entrepreneurs, thereby shrinking the share of workers and increasing the share of entrepreneurs. Credit, likewise, enables entrepreneurs to raise their production to the optimal level. These mechanics lead to greater economic output and lower poverty and income inequality due to redistribution effects.<sup>5</sup>

In this study, we considered both analytical frameworks in assessing the impact of financial inclusion on socioeconomic outcomes. First, we considered the determinants of financial inclusion to reflect structural characteristics such as the level of development, demographics, educational attainment, and degree of financial frictions, in line with Barajas et al. (2013). These factors explain why economies have high or low levels of financial inclusion. We used these structural characteristics to derive the predicted linear values of the financial inclusion index; Section 4 discusses the details.

Second, we adapted Dabla-Norris et al.’s (2021) model to frame the analysis of financial inclusion impacts. Credit provision may depend on the conditions in the financial access or financial development dimensions. Consequently, greater financial inclusion will ease financial constraints, helping constrained workers and entrepreneurs

<sup>4</sup> Financial frictions include costly access to credit, collateral constraints, and inefficient financial systems. These financial frictions lead to financial exclusion, which exacerbates poverty traps and income inequality (Galor and Zeira 1993).

<sup>5</sup> This discussion follows Barajas et al. (2020).

to gain easier access to financial services. This leads to an overall increase in economic activity, which lowers poverty. In our empirical specification in Section 4, we considered different country income groups, using the per capita GDP as a proxy, because the conditions shape the ability to create credit provision and reduce financial constraints.

### 3. INDEX OF FINANCIAL INCLUSION

#### 3.1 Constructing the Index of Financial Inclusion

To assess the impact of financial inclusion and its dimensions on poverty, income inequality, women's empowerment, and entrepreneurship, we constructed a new index of financial inclusion (IFI) for 153 economies from 2011 to 2019. Unlike previous measures of financial inclusion, our new financial inclusion index includes new dimensions of financial development and fintech infrastructure, aside from the traditional access and usage dimensions, to incorporate the development of financial institutions and markets as well as advances in technology. The inclusion of financial development captures the depth and efficiency of financial services, while the inclusion of fintech infrastructure accounts for the growing use of digital payments and the need for their enabling physical infrastructures.

To compute our IFI, we followed a two-step approach. In the first step, we combined indicators of access, financial development, usage, and infrastructure into four dimension indexes that capture both traditional and non-traditional financial inclusion measures. Specifically, we combined various measures into a single dimension by taking the average of an economy's percentile ranking across indicators for each year from 2011 to 2019. Using average values mitigates the concern that some indicators are available only for some economies and for some years. For instance, mobile money accounts are mostly available for emerging and developing economies from 2014 onward. Using principal component analysis will yield inconsistent values as the weights may significantly change over the years. That is, they may show sharp rises and falls, thereby altering the dimension indexes.<sup>6</sup> Furthermore, the use of a percentile ranking allows for the equal distribution of values, which preserves the relative ordering of the economies in a sample. For these reasons, we derived the dimension indexes by taking the average values of the percentile ranking.

In the second step, we combined the four dimension indexes into an aggregate index of financial inclusion by forming a weighted linear combination of the dimension indexes that we computed in the first stage. We derived the weights using PCA, which is a commonly used method for combining a set of variables to extract the maximum common information from individual indicators.<sup>7</sup> The use of PCA to derive the weights provides several advantages. First, in their application to the IFI, the weights of each dimension are now data driven (parametric) as opposed to exogenously determined (nonparametric). Second, unlike common factor analysis, PCA does not make any assumptions about the number of common factors, enhancing its feature as a data-driven parametric approach to indexing. For these reasons, we used the dimension

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<sup>6</sup> See Park and Mercado (2021) on how weights could change when an additional indicator is added to a dimension.

<sup>7</sup> The financial inclusion literature, including Camara and Tuesta (2014), Sahay et al. (2015), Banerjee, Donato, and Maruta (2020) and Park and Mercado (2021), has commonly used principal component analysis. The use of PCA is more applicable in the second stage as each economy will have values for each of the four dimensions, whereas, in the first stage, some economies may have no available data for some indicators.

weights that we derived through PCA to produce our aggregate index of financial inclusion.

In the second step, we ran a PCA to derive the dimension weights for the overall financial inclusion index.

$$IFI_i = \frac{\sum_{j=1}^p \lambda_j P_{ki}}{\sum_{j=1}^p \lambda_j} \quad (\text{Equation 1})$$

where  $IFI_i$  is the aggregate financial inclusion index for country  $i$  and  $P_k = X\lambda_j$ .  $\lambda_j$  represents the variance of the  $k$ -th principal component (weights of each dimension) and  $X$  is the dimensions matrix. The weights given to each component are decreasing and account for 100% of the total variation in our IFI. We can also represent Equation 1 as follows:

$$IFI_i = \omega_1 d_{1,i} + \omega_2 d_{2,i} + \omega_3 d_{3,i} + \omega_4 d_{4,i} \quad (\text{Equation 2})$$

where  $\omega$  are the weights derived from PCA and  $d_i$  are the dimensions. Equation 2 states that our IFI measure is a weighted average of individual dimensions.

In summary, our financial inclusion index is a hybrid measure using the unweighted average of the percentile ranking of indicators for the subindexes and PCA weights for aggregating the dimensions into a single measure. This hybrid approach prevents the arbitrary application of the dimension weights for the overall index of financial inclusion, offers the flexibility to add more indicators per dimension, and reduces the biases associated with highly correlated indicators having greater weights.

We use several data sets to construct the dimensions of our new IFI. We use the World Bank's Global Financial Inclusion Database, the Global Financial Development Indicators, the G20 Financial Inclusion Database, the World Development Indicators, and the Doing Business Report, which we accessed through World Bank Open Data. We also used the IMF's Financial Access Survey and the United Nations' International Telecommunication Union dataset.<sup>8</sup> The *access* dimension includes the number of ATMs and bank branches per 100,000 adults and the proportion of the population aged 15 and above with bank accounts, credit cards, debit cards, and mobile money accounts. The *financial development* dimension consists of the ease of obtaining credit, bank concentration, financial system deposits to GDP, and depth of credit information. For *usage*, the dimension contains the proportion of the population aged 15 and above that has borrowed from and saved with a financial institution and the depositors in commercial banks per 1,000 adults. The *fintech infrastructure* dimension includes the share of the population aged 15 and above that makes electronic and digital payments, the number of fixed broadband and mobile cellular subscriptions per 100 persons, the number of secure internet servers per 1 million people, the share of the population aged 15 and above that uses the internet to pay bills or buy products online, and the internet bandwidth per internet user.

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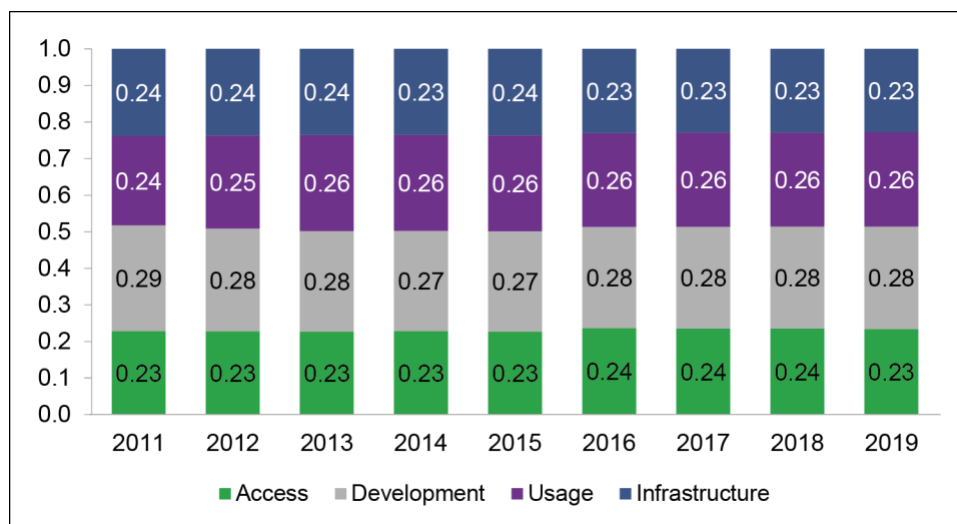
<sup>8</sup> See Appendix 1 for detailed data definition, notes, and sources.

We collected data for 153 advanced, emerging, and developing economies from 2011 to 2019. For years with unavailable data, we used the first (last) available data to extend the series to the start (end) of the sample period. If the missing data were between years of available data, we performed linear interpolation to estimate the missing values. We used the percentile ranking across economies for each year to derive the dimension indexes.

### 3.2 Trends and Patterns of Financial Inclusion and Dimensions

Figure 3 presents the normalized weights that we computed for each dimension. Two observations are notable. First, the figure shows that each dimension has roughly equal weights, suggesting that all the dimensions are equally important. However, financial development tends to have a greater weight than access, usage, and infrastructure. Second, the weights have remained roughly stable over the past decade. Table 1 shows the unconditional correlations of financial inclusion and the dimension indexes by income groups.<sup>9</sup> The key emerging pattern implies that the pairwise unconditional correlations between the IFI and the dimension indexes for high-income and high-middle-income economies are slightly weaker than those for low-middle-income and low-income economies. This suggests that the comovement between the IFI and the dimension indexes and among the dimension indexes is weaker for high-income groups. In other words, the financial inclusion dimensions are more differentiated for higher-income economies, providing a rationale for assessing the relevance of each dimension alongside the aggregate IFI.

**Figure 3: Dimension Weights: Principal Component Analysis**



Notes: We normalized the weights that we derived from the principal component analysis. Refer to Appendix 1 for the dimension variables' definition and sources.

Source: Authors' estimates.

<sup>9</sup> High-income economies are those with real per capita income (2011 USD prices) above \$18,000; high-middle-income economies are those with real per capita income between \$6,000 and \$17,999; low-middle-income economies are those with real per capita income between \$2,000 and \$5,999; and low-income economies are those with real per capita income below \$2,000. We used the above income group classification to achieve a rough balance in the number of economies per country income group.

**Table 1: Unconditional Correlations of Financial Inclusion and the Dimension Indexes**

	IFI	Access	Dev	Usage	Infra
<b>FULL SAMPLE</b>					
IFI	1.0000	0.9468*	0.8454*	0.9086*	0.9480*
Access	0.9468*	1.0000	0.7033*	0.8237*	0.9431*
Development	0.8454*	0.7033*	1.0000	0.6640*	0.7031*
Usage	0.9086*	0.8237*	0.6640*	1.0000	0.8224*
Infrastructure	0.9480*	0.9431*	0.7031*	0.8224*	1.0000
<b>HIGH INCOME ECONOMIES</b>					
IFI	1.0000	0.6625*	0.6339*	0.7842*	0.6467*
Access	0.6625*	1.0000	0.3130*	0.3799*	0.3688*
Development	0.6339*	0.3130*	1.0000	0.1538*	0.102
Usage	0.7842*	0.3799*	0.1538*	1.0000	0.5302*
Infrastructure	0.6467*	0.3688*	0.102	0.5302*	1.0000
<b>HIGH MIDDLE INCOME ECONOMIES</b>					
IFI	1.0000	0.8328*	0.6750*	0.7356*	0.8069*
Access	0.8328*	1.0000	0.4149*	0.4774*	0.7629*
Development	0.6750*	0.4149*	1.0000	0.2382*	0.3324*
Usage	0.7356*	0.4774*	0.2382*	1.0000	0.4591*
Infrastructure	0.8069*	0.7629*	0.3324*	0.4591*	1.0000
<b>LOW MIDDLE INCOME ECONOMIES</b>					
IFI	1.0000	0.8648*	0.7774*	0.8398*	0.8240*
Access	0.8648*	1.0000	0.4797*	0.7161*	0.7842*
Development	0.7774*	0.4797*	1.0000	0.4594*	0.5128*
Usage	0.8398*	0.7161*	0.4594*	1.0000	0.5607*
Infrastructure	0.8240*	0.7842*	0.5128*	0.5607*	1.0000
<b>LOW INCOME ECONOMIES</b>					
IFI	1.0000	0.8086*	0.9061*	0.8172*	0.8779*
Access	0.8086*	1.0000	0.6276*	0.5034*	0.8273*
Development	0.9061*	0.6276*	1.0000	0.6285*	0.7019*
Usage	0.8172*	0.5034*	0.6285*	1.0000	0.6080*
Infrastructure	0.8779*	0.8273*	0.7019*	0.6080*	1.0000

Notes: Unconditional correlations refer to pairwise correlations. (\*) indicates a significant correlation. Refer to Table 1 for a list of economies by income group.

Source: Authors' estimates.

Table 2 presents our cross-country IFI, ordered from highest to lowest, in 2019. In principle, the IFI index could reach 100, suggesting a very high level of financial inclusion. The computed index that Table 2 presents reaches only 93.1 for the United States in 2019. Compared with other measures, the ordering of economies based on the IFI appears to be consistent with the ordering that Park and Mercado (2018 and 2021) reported, as the United States, Australia, Canada, and Luxembourg appear consistently at the top of the rankings.

**Table 2: Index of Financial Inclusion Ranking, 2019**

Rank	Economy	Code	Income Group	Region	IFI_2017	IFI_2019
1	United States	USA	HIE	AMR	93.7	93.1
2	New Zealand	NZL	HIE	AP	92.7	91.9
3	United Kingdom	GBR	HIE	EUR	91.0	89.9
4	Australia	AUS	HIE	AP	87.8	87.9
5	Korea, Rep. of	KOR	HIE	AP	85.9	85.8
6	Canada	CAN	HIE	AMR	85.6	85.2
7	Germany	DEU	HIE	EUR	85.7	84.5
8	Luxembourg	LUX	HIE	EUR	83.0	82.0
9	Poland	POL	HMIE	EUR	82.3	82.0
10	Israel	ISR	HIE	MENA	81.5	81.6
11	Ireland	IRL	HIE	EUR	82.2	81.4
12	Belgium	BEL	HIE	EUR	80.2	81.3
13	Switzerland	CHE	HIE	EUR	82.2	81.1
14	Singapore	SGP	HIE	AP	81.8	81.1
15	Spain	ESP	HIE	EUR	81.5	81.0
16	Denmark	DNK	HIE	EUR	81.9	80.9
17	France	FRA	HIE	EUR	81.4	80.6
18	United Arab Emirates	ARE	HIE	MENA	78.2	80.1
19	Hong Kong, China	HKG	HIE	AP	80.4	80.0
20	Austria	AUT	HIE	EUR	79.9	79.0
21	Sweden	SWE	HIE	EUR	79.4	78.8
22	Norway	NOR	HIE	EUR	79.4	78.5
23	Iran, Islamic Rep.	IRN	HMIE	MENA	76.5	78.3
24	Thailand	THA	LMIE	AP	76.4	78.2
25	Slovak Republic	SVK	HMIE	EUR	78.3	78.2
26	Estonia	EST	HIE	EUR	78.7	77.9
27	Japan	JPN	HIE	AP	78.4	77.8
28	Czech Republic	CZE	HIE	EUR	78.1	77.7
29	Slovenia	SVN	HIE	EUR	76.6	76.8
30	Finland	FIN	HIE	EUR	76.2	76.2
31	Turkey	TUR	HMIE	MENA	72.8	76.2
32	Italy	ITA	HIE	EUR	76.7	76.1
33	Latvia	LVA	HMIE	EUR	78.5	76.0
34	Netherlands	NLD	HIE	EUR	75.6	74.9
35	Croatia	HRV	HMIE	EUR	76.2	74.8
36	Malaysia	MYS	HMIE	AP	75.1	74.7
37	Mauritius	MUS	HMIE	SSA	74.8	74.2
38	Kuwait	KWT	HIE	MENA	70.7	73.3
39	Malta	MLT	HIE	EUR	72.8	72.8
40	Bulgaria	BGR	HMIE	EUR	73.2	72.6
41	Mongolia	MNG	LMIE	AP	70.8	72.5
42	Costa Rica	CRI	HMIE	AMR	71.4	71.7
43	Russian Federation	RUS	HMIE	EUR	71.5	71.6
44	Kenya	KEN	LIE	SSA	68.9	70.9
45	Belarus	BLR	HMIE	EUR	70.3	70.8
46	Chile	CHL	HMIE	AMR	71.3	70.7
47	Portugal	PRT	HIE	EUR	71.1	70.6
48	Lithuania	LTU	HMIE	EUR	71.4	70.1
49	Montenegro	MNE	HMIE	EUR	69.7	69.8
50	Trinidad and Tobago	TTO	HMIE	AMR	70.3	69.8
51	Cyprus	CYP	HIE	EUR	70.3	69.1

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Table 2 *continued*

Rank	Economy	Code	Income Group	Region	IFI_2017	IFI_2019
52	Hungary	HUN	HMIE	EUR	67.7	68.8
53	Kazakhstan	KAZ	HMIE	AP	66.8	67.9
54	North Macedonia	MKD	LMIE	EUR	68.5	67.8
55	Uruguay	URY	HMIE	AMR	67.5	67.5
56	Ukraine	UKR	LMIE	EUR	67.8	67.4
57	Georgia	GEO	LMIE	AP	66.6	66.7
58	Armenia	ARM	LMIE	AP	65.9	65.9
59	China, People's Rep. of	CHN	HMIE	AP	64.8	65.6
60	Serbia	SRB	HMIE	EUR	65.8	65.6
61	Saudi Arabia	SAU	HIE	MENA	66.1	65.4
62	Qatar	QAT	HIE	MENA	63.0	65.1
63	Namibia	NAM	LMIE	SSA	64.9	65.0
64	Indonesia	IDN	LMIE	AP	63.8	64.8
65	Romania	ROU	HMIE	EUR	64.6	64.0
66	Brazil	BRA	HMIE	AMR	62.5	63.0
67	Colombia	COL	HMIE	AMR	62.7	62.3
68	Bolivia	BOL	LMIE	AMR	61.8	61.7
69	Viet Nam	VNM	LIE	AP	60.3	61.5
70	Venezuela, RB	VEN	HMIE	AMR	62.1	60.9
71	Jamaica	JAM	LMIE	AMR	59.7	60.7
72	Bosnia and Herzegovina	BIH	LMIE	EUR	60.5	60.6
73	Sri Lanka	LKA	LMIE	AP	60.7	60.5
74	South Africa	ZAF	HMIE	SSA	60.6	60.0
75	Lebanon	LBN	HMIE	MENA	60.7	59.9
76	Panama	PAN	HMIE	AMR	59.8	59.8
77	Dominican Republic	DOM	HMIE	AMR	58.9	58.8
78	Tunisia	TUN	LMIE	MENA	58.4	58.8
79	Honduras	HND	LMIE	AMR	59.2	58.6
80	Argentina	ARG	HMIE	AMR	58.7	58.6
81	Moldova	MDA	LMIE	EUR	58.8	58.5
82	Peru	PER	HMIE	AMR	57.4	57.8
83	Greece	GRC	HIE	EUR	58.2	57.1
84	El Salvador	SLV	LMIE	AMR	56.2	55.8
85	Ghana	GHA	LIE	SSA	55.3	55.8
86	India	IND	LIE	AP	54.1	55.3
87	Botswana	BWA	HMIE	SSA	54.4	55.3
88	Albania	ALB	LMIE	EUR	55.4	54.8
89	Cambodia	KHM	LIE	AP	52.3	53.5
90	Mexico	MEX	HMIE	AMR	53.0	53.0
91	Guatemala	GTM	LMIE	AMR	53.2	52.4
92	Ecuador	ECU	LMIE	AMR	52.2	52.4
93	Nepal	NPL	LIE	AP	45.0	51.9
94	Jordan	JOR	LMIE	MENA	49.3	51.9
95	Azerbaijan	AZE	LMIE	AP	45.9	51.7
96	Zambia	ZMB	LIE	SSA	50.1	51.5
97	Philippines	PHL	LMIE	AP	49.8	51.3
98	Paraguay	PRY	LMIE	AMR	50.2	50.6
99	Kyrgyz Republic	KGZ	LIE	AP	48.2	50.3
100	Nigeria	NGA	LMIE	SSA	47.8	49.8
101	Uzbekistan	UZB	LMIE	AP	47.5	49.6
102	Belize	BLZ	LMIE	AMR	48.6	48.3

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Table 2 *continued*

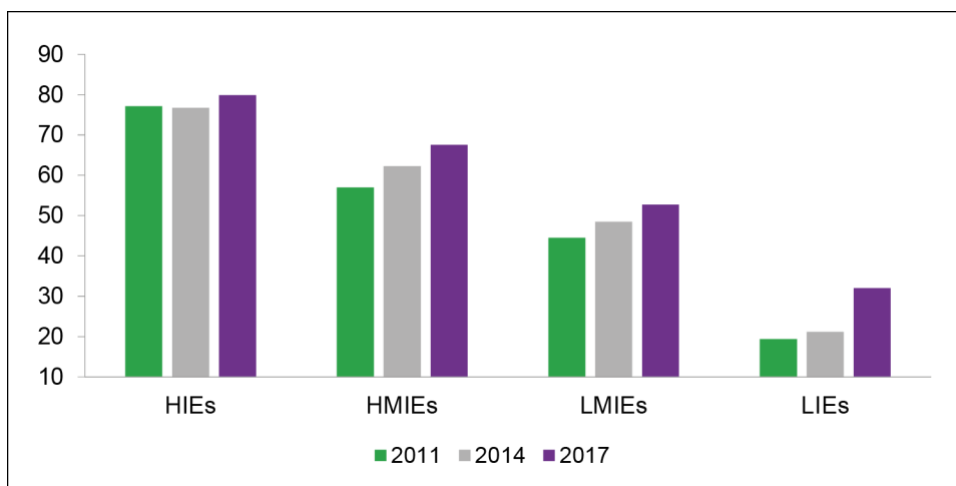
Rank	Economy	Code	Income Group	Region	IFI_2017	IFI_2019
103	Uganda	UGA	LIE	SSA	48.3	47.5
104	Rwanda	RWA	LIE	SSA	46.2	46.7
105	Bangladesh	BGD	LIE	AP	42.3	46.2
106	Egypt, Arab Rep.	EGY	LMIE	MENA	43.3	45.2
107	West Bank and Gaza	PSE	LMIE	MENA	40.5	44.5
108	Eswatini	SWZ	LMIE	SSA	44.2	44.2
109	Cote d'Ivoire	CIV	LIE	SSA	32.5	44.1
110	Zimbabwe	ZWE	LIE	SSA	40.4	43.2
111	Togo	TGO	LIE	SSA	35.7	42.9
112	Tajikistan	TJK	LIE	AP	42.6	42.6
113	Nicaragua	NIC	LIE	AMR	44.6	42.6
114	Bhutan	BTN	LMIE	AP	41.8	42.3
115	Tanzania	TZA	LIE	SSA	42.1	42.1
116	Libya	LBY	HMIE	MENA	42.6	42.1
117	Senegal	SEN	LIE	SSA	34.9	41.3
118	Lao PDR	LAO	LIE	AP	39.5	40.2
119	Lesotho	LSO	LIE	SSA	39.5	40.0
120	Gabon	GAB	HMIE	SSA	39.0	38.9
121	Morocco	MAR	LMIE	MENA	38.3	38.5
122	Pakistan	PAK	LIE	AP	38.4	38.1
123	Cameroon	CMR	LIE	SSA	32.0	36.6
124	Mozambique	MOZ	LIE	SSA	35.9	35.7
125	Malawi	MWI	LIE	SSA	31.5	35.5
126	Haiti	HTI	LIE	AMR	31.0	34.9
127	Burkina Faso	BFA	LIE	MENA	34.7	34.7
128	Syrian Arab Republic	SYR	LIE	MENA	30.3	31.9
129	Benin	BEN	LIE	SSA	31.3	31.5
130	Mali	MLI	LIE	MENA	31.5	31.5
131	Algeria	DZA	LMIE	MENA	31.4	30.7
132	Mauritania	MRT	LIE	MENA	27.0	30.6
133	Angola	AGO	LMIE	SSA	28.9	28.5
134	Liberia	LBR	LIE	SSA	26.9	27.6
135	Myanmar	MMR	LIE	AP	24.2	26.2
136	Comoros	COM	LIE	SSA	25.2	25.6
137	Djibouti	DJI	LMIE	MENA	24.1	25.4
138	Congo, Rep.	COG	LMIE	SSA	23.4	23.6
139	Madagascar	MDG	LIE	SSA	20.4	22.5
140	Niger	NER	LIE	MENA	15.3	22.1
141	Guinea	GIN	LIE	SSA	19.7	20.0
142	Ethiopia	ETH	LIE	MENA	19.9	20.0
143	Iraq	IRQ	LMIE	MENA	19.7	19.5
144	Afghanistan	AFG	LIE	AP	18.3	18.9
145	Congo, Dem. Rep.	COD	LIE	SSA	16.8	16.6
146	Somalia	SOM	LIE	MENA	16.9	16.2
147	Sierra Leone	SLE	LIE	SSA	15.9	16.0
148	Sudan	SDN	LIE	MENA	13.3	14.0
149	Central African Republic	CAF	LIE	SSA	10.8	12.0
150	Chad	TCD	LIE	MENA	11.7	11.6
151	Burundi	BDI	LIE	SSA	8.3	9.4
152	Yemen, Rep.	YEM	LIE	MENA	9.0	9.0
153	South Sudan	SSD	LIE	MENA	6.4	7.0

IFI = index of financial inclusion, HIE = high-income economy, HMIE = high-middle-income economy, LMIE = low-middle-income economy, LIE = low-income economy, AMR = Americas, AP = Asia and the Pacific, EUR = Europe, MENA = Middle East and North Africa, SSA = Sub-Saharan Africa.

Source: Authors' calculations.

Figure 4 illustrates the IFI median values by country income groups for 2011, 2014, and 2017. As expected, high-income economies score highly on our IFI measure, while low-income economies score the lowest. The figure also shows that financial inclusion has increased moderately across income groups between sample periods, but the increase is most notable for low-income economies in 2017, which is consistent with Sahay et al. (2015). Figure 5 presents the IFI median values by geographic regions for 2011, 2014, and 2017. Among the regions, Europe has the highest level of financial inclusion, followed by the Americas and then Asia and the Pacific. Both the Middle East and North Africa and Sub-Saharan Africa have lower degrees of financial inclusion. Among the regions, Asia and the Pacific and Sub-Saharan Africa show the greatest increases in financial inclusion in 2017.

**Figure 4: Financial Inclusion Index by Income Group**

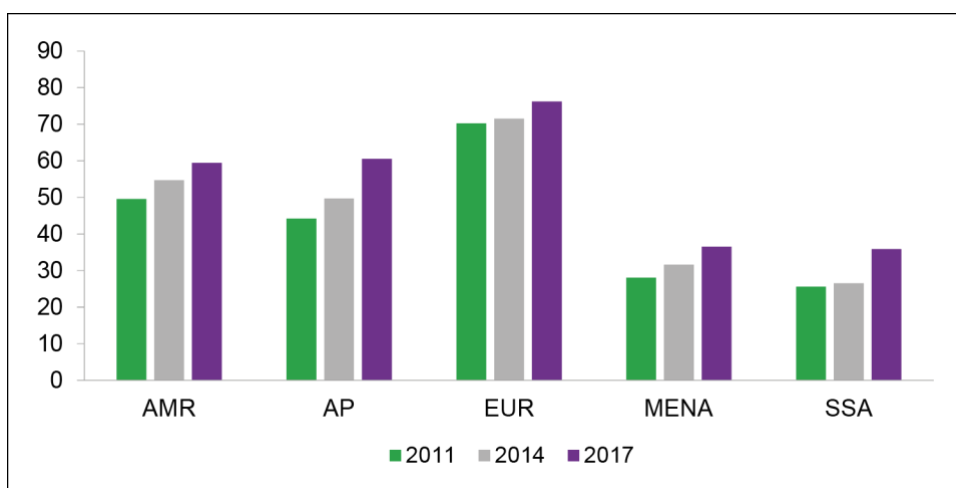


HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: Values refer to the median value for each income group.

Source: Authors' calculations.

**Figure 5: Financial Inclusion Index by Geographic Region (Median)**



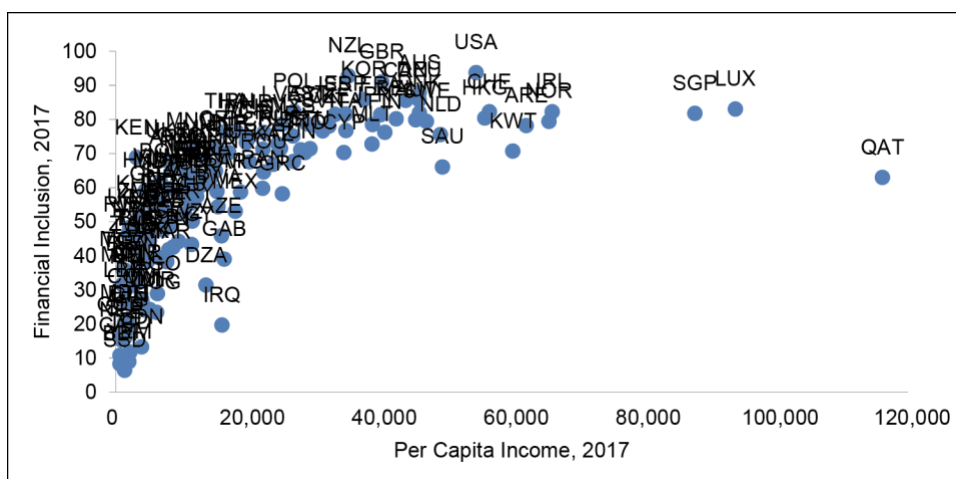
Notes: Values refer to the median value for each geographic regional group; AMR = Americas, AP = Asia and the Pacific, EUR = Europe, MENA = Middle East and North Africa, SSA = Sub-Saharan Africa.

Source: Authors' calculations.

### 4. EMPIRICAL METHODOLOGY

To answer this paper’s first question on *the socioeconomic impact of financial inclusion*, we tested the significance of effective financial inclusion and its dimension indexes on measures of poverty, income inequality, women’s empowerment, and entrepreneurship across a sample of 153 economies from 2011 to 2019. Using the IFI that we computed in the previous section, Figure 6 suggests that economies with a higher level of economic development tend to have higher levels of financial inclusion, in line with Barajas et al. (2013, 2020). Figures 7, 9, and 10 show a negative relationship between financial inclusion and poverty and a positive relationship between financial inclusion and measures of women’s empowerment and entrepreneurship. However, the scatter plot for income inequality in Figure 8 implies an inconclusive relationship.

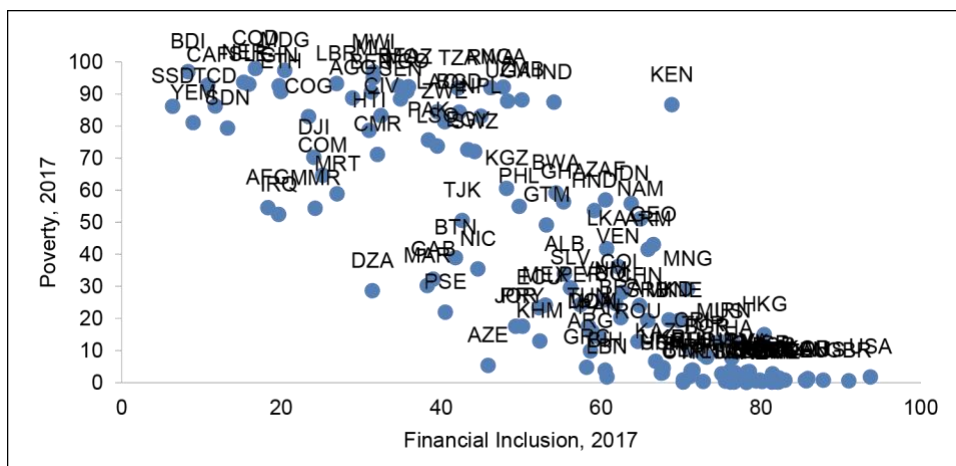
**Figure 6: Financial Inclusion and Per Capita Income**



Notes: Per capita income refers to the real GDP per capita in \$ 2011 PPP. Refer to Appendix 1 for variable notes and sources. Table 2 contains the financial inclusion 2017 values.

Source: Authors’ calculations.

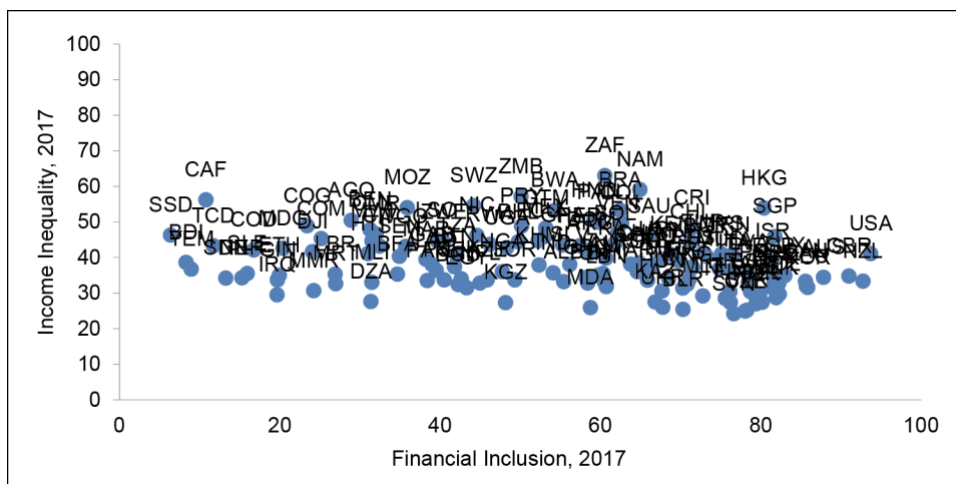
**Figure 7: Poverty and Financial Inclusion**



Notes: Poverty refers to the poverty headcount ratio at \$5.50 per day. Refer to Appendix 1 for variable notes and sources. Table 2 contains the financial inclusion 2017 values.

Source: Authors’ calculations.

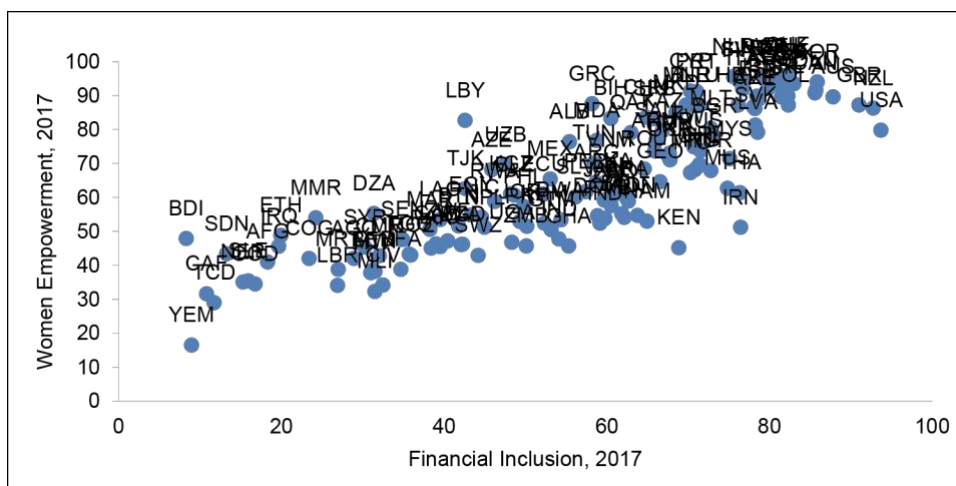
**Figure 8: Income Inequality and Financial Inclusion**



Notes: Income inequality refers to the Gini index. Refer to Appendix 1 for variable notes and sources. Table 2 contains the financial inclusion 2017 values.

Source: Authors' calculations.

**Figure 9: Women's Empowerment and Financial Inclusion**



Notes: We recomputed the women's empowerment index from the gender inequality index. Refer to Appendix 1 for variable notes and sources. Table 2 contains the financial inclusion 2017 values.

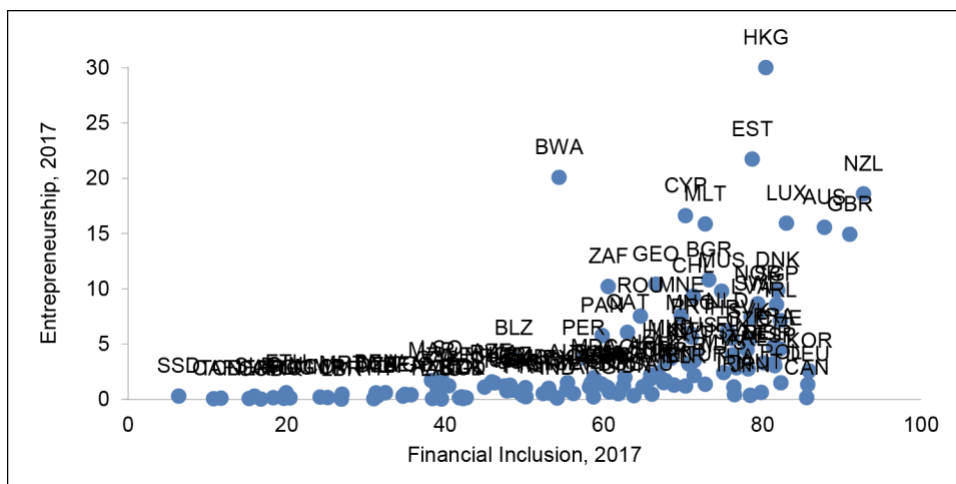
Source: Authors' calculations.

To test these relationships formally, we followed a two-step approach. In the first step, we derived the measures of effective financial inclusion and its indexes of the four dimensions to account for varying levels of economic development and financial constraints. This step addressed cases in which developing economies have significant computed financial inclusion but are relatively less developed or may have greater financial constraints.<sup>10</sup> Accordingly, we regressed the financial inclusion and dimension indexes on several covariates using the following equation:

$$IFI_{t,i} = \theta'X_{t-1,i} + \varepsilon_{t,i} \tag{Equation 3}$$

<sup>10</sup> For instance, Kenya has a computed IFI of about 71 in 2019. However, considering its level of development and financial constraints, its predicted *effective* IFI measure is only 39 in 2019.

**Figure 10: Entrepreneurship and Financial Inclusion**



Notes: Entrepreneurship ratio refers to the new business density, which is the number of new business registrations per 1,000 people aged 15 to 64. Refer to Appendix 1 for variable notes and sources. Table 2 contains the financial inclusion 2017 values.

Source: Authors' calculations.

where IFI refers to measures of financial inclusion or its dimensions (as Table 2 shows).  $X$  is a row vector of regressors including per capita income, education completion, age dependency, collateral constraints, access constraints, and the interest rate differential.<sup>11</sup>  $\varepsilon$  is the error term. We used clustered standard errors at the economy level and lagged the regressors by 1 year to address endogeneity further. We derived the effective financial inclusion and dimension indexes using linear predicted values of the IFI and its dimensions from the estimation of Equation (3) and subsequently used them as regressors in the second step, given the following equation:<sup>12</sup>

$$Y_{t,i} = \alpha_i + \beta_1 \widehat{IFI}_{t-1,i} + \theta' X_{t-1,i} + \varepsilon_{t,i} \tag{Equation 4}$$

where  $Y$  pertains to the outcome variables, namely poverty, income inequality, women's empowerment, and entrepreneurship.  $\widehat{IFI}$  refers to effective financial inclusion and the dimension indexes—access, financial development, usage, and fintech infrastructure—that we derived in the first step.  $X$  is a row vector of regressors for each outcome variable. We included economy fixed effects and used clustered standard errors at the economy level. We lagged the regressors by 1 year. Consequently, the use of lagged regressors, inclusion of fixed effects, and use of clustered standard errors reduced the endogeneity problems. We estimated Equation (4) for the full sample and four economic income groups—high-, high-middle, low-middle, and low-income economies—as Table 2 shows.

<sup>11</sup> Refer to Honohan (2008), Park and Mercado (2018), and Zins and Weill (2016) on the cross-country determinants of financial inclusion and Barajas et al. (2020) on the three main frictions or constraints (collateral, access, and efficiency) that inhibit an economy from increasing the availability and scale of finance. As data on financial constraints are mostly available for emerging and developing economies, we regressed the IFI on per capita income, educational attainment, and age dependency for advanced economies. Refer to Appendix 1 for the data definition, notes, and sources for the first-step regression.

<sup>12</sup> See Appendix 2 for the results and comparison between actual and linear predicted (fitted) values of the IFI and its dimensions in the first-step regression.

For the socioeconomic outcome variables, poverty refers to the headcount ratio at \$5.50 a day. We used the Gini index as the income inequality measure. Women's empowerment is a composite index reflecting inequality between men and women in health, political empowerment, and labor market participation. Entrepreneurship refers to new business registrations per 1,000 persons aged 15 to 64. Appendix 1 shows the detailed definition, notes, and sources of each variable.

For the regressors in Equation 4, we adopted variables drawing on the past empirical literature. We limited the number of regressors to avoid multicollinearity. In addition, we selected the determinants based on the available country-level data. For poverty, the regressors included educational attainment, health quality, age dependency, and labor force participation. We expected poverty to decline with better education and health care, a lower age dependency ratio, and greater labor force participation (Peng et al. 2018; Park and Mercado 2021). For income inequality, the covariates included educational attainment, trade openness, age dependency, and labor force participation. The level of development and demographics, as well as unemployment and globalization, were among the key determinants of income inequality (Paweenawat and McNown 2014; Furceri and Ostry 2019; Čihák and Sahay 2020; Park and Mercado 2021). For the women's empowerment dimension, the regressors were educational attainment, median age, and rural population (Habibov, Barrett, and Chernyak 2017; Cinar and Kose 2018; Park and Mercado 2021), while, for entrepreneurship, we considered education completion, trade openness, and domestic credit (Ahmad and Hoffman 2007). Appendix 1 presents detailed definitions, notes, and sources for each variable.

To assess the varying socioeconomic impacts of effective financial inclusion and its four dimensions across different income groups, we included a dummy variable for economic income groups and its interaction term with the financial inclusion and dimension variables. The difference between the estimated coefficients of financial inclusion and the interaction term will indicate the quantitative differences in impacts between specific and other income groups. We used:

$$Y_{t,i} = \alpha_i + \beta_1 \widehat{IFI}_{t-1,i} + \theta' X_{t-1,i} + \gamma D_i + \delta \widehat{IFI}_{t-1,i} * D_i + \varepsilon_{t,i} \quad (\text{Equation 5})$$

where  $Y$ ,  $\widehat{IFI}$ , and  $X$  are the same as in Equation (4).  $D$  is the dummy variable, taking the value of 1 if an economy belongs to a particular income group and 0 otherwise.  $D*IFI$  is the interaction term between a country income group and the effective financial inclusion and dimension indexes. The coefficient of the interaction term is the parameter of interest. We included economy fixed effects and used clustered standard errors at the economy level. To address endogeneity further, we lagged the regressors by 1 year. We estimated Equation (5) across income groups, namely high, high-middle, low-middle, and low-income economies.

## 5. RESULTS AND ANALYSIS

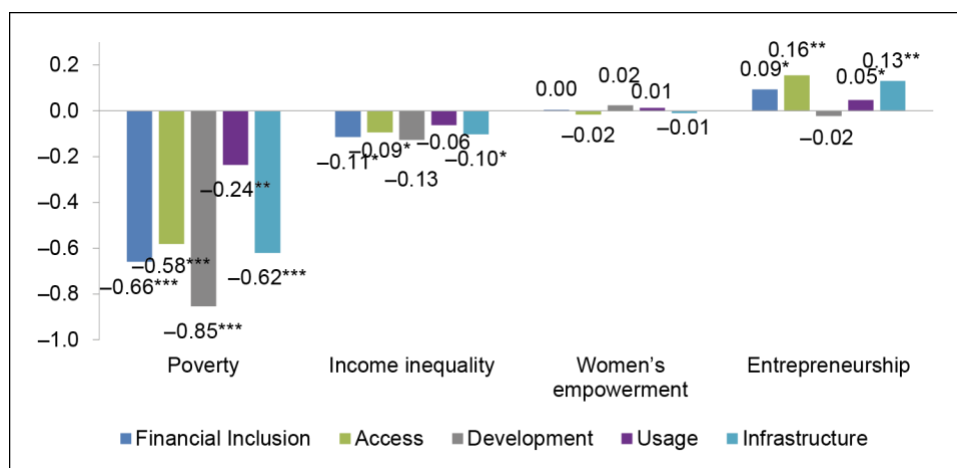
Figure 11 presents the full-sample estimated coefficients for poverty, income inequality, women's empowerment, and entrepreneurship on effective financial inclusion and its dimensions.<sup>13</sup> The results indicate that effective financial inclusion and its dimensions have a significant association with lower poverty levels, consistent with the previous findings of Park and Mercado (2018, 2021). Specifically, a 1 unit increase in the index

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<sup>13</sup> Table S2 in Appendix 3 reports the complete regression results.

of financial inclusion lowers poverty by 0.7 percentage points, while a 1 unit increase in financial development reduces poverty by 0.8 percentage points.

**Figure 11: Financial Inclusion and Economic Outcomes**



Notes: The values refer to the estimated coefficients of the poverty, income inequality, women’s empowerment, and entrepreneurship regressions on effective financial inclusion/dimensions and determinants with economy fixed effects and clustered standard errors at the economy level, as Table S2 in Appendix 3 shows. The figure does not include insignificant results. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors’ calculations.

In addition, the results show that more effective financial inclusion, access, and fintech infrastructure significantly lower income inequality, whereas more effective financial inclusion, access, usage, and fintech infrastructure significantly increase entrepreneurship. In contrast, the estimates reveal that effective financial inclusion and its dimensions are insignificant for women’s empowerment. These results highlight that (i) the impact of effective financial inclusion and its dimensions is most relevant to poverty but is also important for income inequality and entrepreneurship; and (ii) not all financial inclusion dimensions are significant for specific socioeconomic outcomes, as is the case for income inequality and entrepreneurship.

Figures 12 to 16 present the estimated coefficients of socioeconomic outcomes on effective financial inclusion and its dimensions by income groups. Figure 12 shows the results for aggregate financial inclusion across income groups, while Figures 13, 14, 15, and 16 present the results across each dimension.<sup>14</sup>

Figure 12 reveals that effective financial inclusion significantly lowers poverty for high-middle-income and low-middle-income economies but more so for low-middle-income economies, such that a 1 unit increase in effective financial inclusion reduces poverty by about 1.9 percentage points for low-middle-income economies and by only 1.1 percentage points for high-middle-income economies. Effective financial inclusion also lowers income inequality for both categories of middle-income economies but increases it for high-income economies. This provides evidence on the extensive versus intensive impact of effective financial inclusion on income inequality whereby effective financial inclusion may lower income inequality in low-income economies but increase it in high-income economies as high-income households may benefit more from greater access to financial services than low-income households (Čihák and Sahay 2020). The results, likewise, constitute evidence that effective financial inclusion

<sup>14</sup> Tables S3 to S6 in Appendix 3 present the full regression results.



significantly increases women’s empowerment and entrepreneurship for low-income economies. This finding offers new evidence on the varying significance and impacts of effective financial inclusion on socioeconomic outcomes across economic income groups.

**Figure 12: Financial Inclusion Outcomes by Income Group**



HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The values refer to the estimated coefficients of the poverty, income inequality, women’s empowerment, and entrepreneurship regressions on the index of effective financial inclusion and determinants with economy fixed effects and clustered standard errors at the economy level, as Tables S3 to S6 in Appendix 3 show. The figure does not include insignificant results. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors’ calculations.

**Figure 13: Access Dimension Outcomes by Income Group**

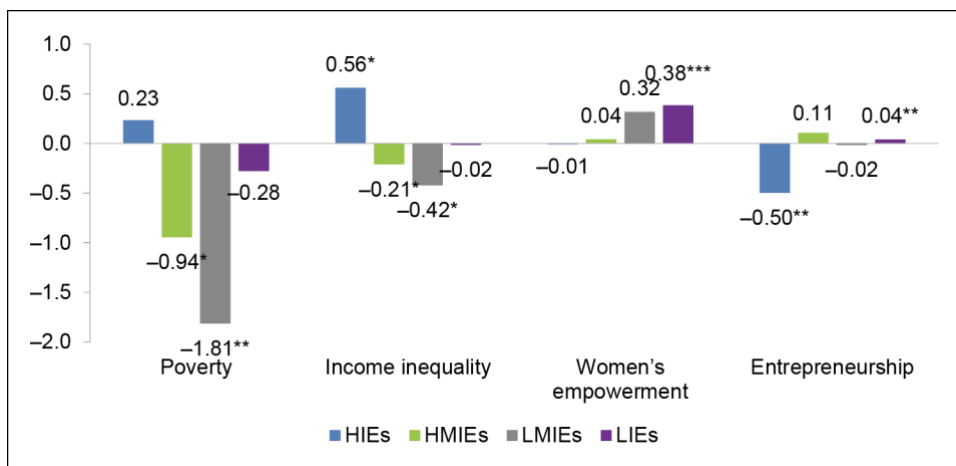


HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The values refer to the estimated coefficients of the poverty, income inequality, women’s empowerment, and entrepreneurship regressions on the effective access dimension and determinants with economy fixed effects and clustered standard errors at the economy level, as Tables S3 to S6 in Appendix 3 show. The figure does not include insignificant results. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors’ calculations.

**Figure 14: Financial Development Outcomes by Income Group**



HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The values refer to the estimated coefficients of the poverty, income inequality, women's empowerment, and entrepreneurship regressions on the effective financial development dimension and determinants with economy fixed effects and clustered standard errors at the economy level, as Tables S3 to S6 in Appendix 3 show. The figure does not show insignificant results. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' calculations.

**Figure 15: Usage Dimension Outcomes by Income Group**



HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The values refer to the estimated coefficients of the poverty, income inequality, women's empowerment, and entrepreneurship regressions on the effective usage dimension and determinants with country fixed effects and clustered standard errors at the economy level, as Tables S3 to S6 in Appendix 3 show. The figure does not include insignificant results. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' calculations.

**Figure 16: Infrastructure Dimension Outcomes by Income Group**



HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The values refer to the estimated coefficients of poverty, income inequality, women's empowerment, and entrepreneurship regressions on the effective infrastructure dimension and determinants with country fixed effects and clustered standard errors at the economy level, as Tables S3 to S6 in Appendix 3 show. The figure does not include insignificant results. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: Authors' calculations.

For the access dimension, as Figure 13 shows, the results indicate that greater effective access reduces poverty for middle-income economies, with high- and low-middle-income economies having roughly similar magnitudes. Greater effective financial access also significantly reduces income inequality for low-middle-income economies. This result is consistent with Banerjee, Donato, and Maruta (2020), who found an inverse relationship between financial access and income inequality but not across income groups. Greater financial access also significantly increases women's empowerment for low-income economies and entrepreneurship for high-income economies.

Figure 14 shows the estimated coefficients of the effective financial development dimension for socioeconomic outcomes by income groups. The results indicate that more effective financial development lowers poverty for middle-income economies, with the estimated impact being higher for low-middle-income economies than for high-middle-income economies. The effective financial development dimension also reduces income inequality in middle-income economies but significantly increases inequality in high-income economies. In addition, greater financial development increases women's empowerment and the level of entrepreneurship in low-income economies, while it reduces entrepreneurship in high-income economies. A possible explanation is that more developed financial systems could have better credit information, which could discourage risky entrepreneurs from borrowing.

For the usage dimension, which Figure 15 presents, the estimates show that more effective financial usage reduces poverty significantly in high-middle-income economies, while it lowers income inequality in middle-income economies and increases it in high-income economies. Moreover, the results indicate that more effective financial usage increases women's empowerment and entrepreneurship significantly. Figure 16 shows that better fintech infrastructure reduces poverty and income inequality significantly for middle-income economies, both high-middle-income and low-middle-income economies. However, the estimated impacts appear to be

greater for low-middle-income economies. The results also indicate that better fintech infrastructure improves women's empowerment significantly in low-income economies.

In summary, the results that Figures 13 to 16 present underscore two key findings. First, the impact of effective financial inclusion and its dimensions on socioeconomic outcomes could differ in sign and significance across income groups. For instance, a higher access dimension significantly lowers poverty in middle-income economies but not in high- and low-income economies, while financial development significantly reduces income inequality in middle-income economies and increases it in high-income economies (Figures 13 and 14). Financial development and usage have considerable positive effects on entrepreneurship in low-income economies but not for other income groups, while effective financial inclusion and its dimensions are relevant to empowering women in low-income economies but not in other income groups. Second, even within the same economic income group, the impacts of effective financial inclusion and its dimensions on socioeconomic outcomes could have varying significance. For example, in low-middle-income economies, higher levels of financial inclusion, access, financial development, and fintech infrastructure significantly lower poverty, but the effect of increased usage is insignificant. Taken together, these results show that the impacts of different dimensions of effective financial inclusion vary in size and significance across income groups. This finding is new to the financial inclusion empirical literature as it highlights the importance of the level of economic development across income groups in understanding the varying impacts of financial inclusion.

Tables 3 to 6 present findings about the interaction effects between effective financial inclusion in its dimensions and economic income groups. The most significant interaction effects are for poverty, followed by income inequality (Tables 3 and 4). The interaction effects for women's empowerment and entrepreneurship are not significant (Tables 5 and 6). This is unsurprising given that financial inclusion and its dimensions are mostly immaterial for women's empowerment and marginally significant for low-income economies for entrepreneurship.

Table 3 validates the suggestion that more effective financial inclusion, access, financial development, and fintech infrastructure tends to lower poverty in middle-income and low-income economies. However, the reduction in poverty is greater in both high- and low-middle-income economies than it is in low-income economies. Specifically, a 1 unit increase in effective financial inclusion reduces poverty for middle-income economies by 1.4 percentage points compared with 0.5 percentage points for other income groups. In contrast, a 1 unit increase in effective financial inclusion lowers poverty in low-income economies by only 0.2 percentage points compared with 1.2 percentage points for other income groups. Interestingly, a 1 unit increase in effective financial inclusion raises poverty in high-income economies by 0.4 percentage points, whereas it lowers poverty by 0.8 percentage points for other income groups; this result is similar to the findings of Park and Mercado (2021). A possible explanation for this is that financial inclusion increases poverty in high-income economies due to financial crises and economic downturns in advanced economies, driving households into poverty despite increased financial inclusiveness.

**Table 3: Effective Financial Inclusion and Poverty: Interaction Effects**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Financial Inclusion			Access						Development		
L.IFI/ Dimension	-0.782*** (0.247)	-0.460** (0.208)	-0.526*** (0.196)	-1.197*** (0.323)	-0.682*** (0.218)	-0.460*** (0.168)	-0.492*** (0.181)	-0.973*** (0.318)	-0.882*** (0.303)	-0.652** (0.316)	-0.659** (0.290)	-1.290*** (0.356)
L.Education	-0.139 (0.125)	0.004 (0.115)	0.011 (0.121)	0.147 (0.139)	-0.080 (0.128)	0.082 (0.121)	0.023 (0.122)	0.184 (0.160)	-0.114 (0.117)	-0.097 (0.116)	-0.067 (0.114)	-0.026 (0.116)
L.Health	0.011 (0.065)	0.063 (0.060)	0.044 (0.061)	0.044 (0.066)	0.015 (0.070)	0.026 (0.061)	0.028 (0.065)	0.039 (0.062)	0.042 (0.062)	0.089 (0.061)	0.082 (0.057)	0.158** (0.071)
L.Age	-0.052 (0.107)	-0.003 (0.097)	-0.064 (0.116)	-0.023 (0.103)	0.093 (0.095)	0.151* (0.084)	0.128 (0.097)	0.182** (0.091)	-0.223 (0.167)	-0.214 (0.162)	-0.278* (0.158)	-0.289* (0.157)
L.Labor	-0.160 (0.112)	-0.062 (0.113)	-0.136 (0.117)	-0.038 (0.118)	-0.199* (0.112)	-0.035 (0.111)	-0.180 (0.117)	-0.042 (0.129)	-0.138 (0.115)	-0.147 (0.110)	-0.119 (0.117)	-0.137 (0.107)
HIEs	-88.920*** (18.744)			-57.784*** (15.117)			-41.854* (22.837)					
L.HIE*IFI/ Dimension	<b>1.141*** (0.278)</b>			<b>0.723*** (0.218)</b>			<b>0.536* (0.317)</b>					
HMIes	64.812** (32.066)			55.973** (24.281)			54.189* (32.411)					
L.HMIE*IFI/ Dimension	<b>-0.973* (0.494)</b>			<b>-0.826** (0.366)</b>			-0.769 (0.509)					
LMIEs	30.939 (30.202)			7.367 (29.255)			32.530 (26.436)					
L.LMIE*IFI/ Dimension	<b>-0.884* (0.489)</b>			-0.514 (0.489)			<b>-0.809** (0.402)</b>					
LIEs	-42.154* (23.608)			-27.026 (23.848)			-39.142* (21.023)					
L.LIE*IFI/ Dimension	<b>1.002*** (0.371)</b>			<b>0.727* (0.395)</b>			<b>0.984*** (0.313)</b>					
Observations	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056
R-squared	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.998
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Usage				Infrastructure			
L.IFI/ Dimension	-0.312** (0.149)	-0.086 (0.157)	-0.161* (0.096)	-0.430** (0.194)	-0.702*** (0.210)	-0.491*** (0.171)	-0.523*** (0.183)	-1.055*** (0.296)
L.Education	-0.265** (0.117)	-0.208* (0.113)	-0.163 (0.115)	-0.144 (0.113)	-0.039 (0.135)	0.131 (0.127)	0.082 (0.126)	0.275* (0.165)
L.Health	0.106 (0.065)	0.149** (0.068)	0.131* (0.067)	0.174** (0.076)	-0.004 (0.072)	0.018 (0.063)	0.012 (0.066)	0.034 (0.062)
L.Age	-0.013 (0.107)	0.038 (0.106)	-0.043 (0.120)	0.018 (0.105)	0.054 (0.094)	0.108 (0.084)	0.081 (0.098)	0.132 (0.089)
L.Labor	-0.206* (0.119)	-0.204* (0.120)	-0.174 (0.125)	-0.177 (0.120)	-0.185* (0.110)	-0.035 (0.109)	-0.168 (0.115)	-0.019 (0.123)
HIEs	-63.670*** (18.103)			-60.883*** (14.442)				
L.HIE*IFI/ Dimension	<b>0.791*** (0.257)</b>			<b>0.743*** (0.209)</b>				
HMIes	26.716 (19.306)			51.929** (23.022)				
L.HMIE*IFI/Di mension	-0.380 (0.311)			-0.749** (0.343)				
LMIEs	18.284 (25.605)			9.569 (25.494)				
L.LMIE*IFI/Di mension	-0.607 (0.430)			-0.553 (0.419)				
LIEs	-7.217 (16.377)			-29.999 (21.422)				
L.LIE*IFI/ Dimension	<b>0.504** (0.232)</b>			<b>0.801** (0.364)</b>				
Observations	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056
R-squared	0.997	0.997	0.997	0.997	0.997	0.998	0.997	0.998
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

HIEs = high-income economies, HMIes = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is poverty. The estimated coefficients for the L.IFI/dimension in columns (5) to (8) correspond to the access dimension, those in columns (9) to (12) correspond to the development dimension, those in columns (13) to (16) correspond to the usage dimension, and those in columns (17) to (20) correspond to the infrastructure dimension. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.

**Table 4: Effective Financial Inclusion and Income Inequality: Interaction Effects**

	(1)	(2) Financial Inclusion			(4)	(5)	(6) Access			(8)	(9) Development			(12)
L.IFI/ Dimension	-0.141** (0.069)	-0.068 (0.069)	-0.077 (0.068)	-0.248*** (0.091)	-0.110* (0.061)	-0.067 (0.057)	-0.077 (0.065)	-0.181** (0.083)	-0.134 (0.082)	-0.082 (0.095)	-0.070 (0.084)	-0.226** (0.096)		
L.Education	-0.096 (0.067)	-0.054 (0.062)	-0.049 (0.062)	-0.023 (0.074)	-0.075 (0.066)	-0.043 (0.063)	-0.054 (0.062)	-0.020 (0.077)	-0.099 (0.061)	-0.082 (0.062)	-0.073 (0.061)	-0.070 (0.065)		
L.Trade	-0.003 (0.007)	-0.005 (0.008)	-0.006 (0.008)	-0.007 (0.008)	-0.004 (0.008)	-0.006 (0.008)	-0.006 (0.008)	-0.007 (0.007)	-0.005 (0.007)	-0.005 (0.008)	-0.006 (0.008)	-0.006 (0.008)		
L.Age	-0.003 (0.036)	0.017 (0.035)	-0.003 (0.035)	0.013 (0.034)	0.026 (0.038)	0.041 (0.036)	0.036 (0.036)	0.050 (0.035)	0.007 (0.043)	-0.009 (0.045)	-0.032 (0.044)	-0.029 (0.041)		
L.Labor	-0.074 (0.063)	-0.044 (0.062)	-0.061 (0.065)	-0.037 (0.061)	-0.077 (0.064)	-0.043 (0.060)	-0.072 (0.065)	-0.044 (0.060)	-0.055 (0.064)	-0.064 (0.065)	-0.051 (0.065)	-0.059 (0.064)		
HIEs	-17.722** (7.998)				-0.941 (7.043)				-21.808* (11.666)					
L.HIE*IFI/ Dimension	<b>0.360**</b> (0.119)				0.143 (0.095)				0.442** (0.170)					
HMIes		5.637 (8.776)				1.519 (8.096)				2.913 (11.617)				
L.HMIE*IFI/ Dimension		-0.245** (0.119)				-0.178 (0.110)				-0.199 (0.164)				
LMIEs			0.570 (10.044)				-9.557 (8.784)				3.557 (9.324)			
LLMIE*IFI/ Dimension			-0.261 (0.161)				-0.095 (0.141)				-0.286** (0.142)			
LIEs				-30.027*** (7.195)				-25.870*** (6.635)				-26.771*** (7.080)		
LLIE*IFI/ Dimension				<b>0.225*</b> (0.133)				0.155 (0.127)				0.177 (0.123)		
Observations	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072		
R-squared	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989		
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

	(13)	(14) Usage			(16)	(17)	(18) Infrastructure		(19)	(20)
L.IFI/ Dimension	-0.097** (0.043)	-0.021 (0.052)	-0.033 (0.041)	-0.121** (0.055)	-0.114* (0.060)	-0.072 (0.059)	-0.082 (0.064)	-0.200** (0.083)		
L.Education	-0.123* (0.070)	-0.094 (0.067)	-0.078 (0.066)	-0.079 (0.071)	-0.070 (0.066)	-0.033 (0.062)	-0.043 (0.061)	-0.002 (0.078)		
L.Trade	-0.001 (0.007)	-0.004 (0.008)	-0.005 (0.008)	-0.005 (0.008)	-0.004 (0.008)	-0.006 (0.008)	-0.006 (0.008)	-0.007 (0.007)		
L.Age	-0.001 (0.034)	0.026 (0.036)	-0.009 (0.036)	0.021 (0.035)	0.018 (0.037)	0.033 (0.035)	0.026 (0.036)	0.040 (0.034)		
L.Labor	-0.075 (0.061)	-0.068 (0.062)	-0.055 (0.062)	-0.059 (0.061)	-0.076 (0.064)	-0.042 (0.060)	-0.070 (0.065)	-0.038 (0.060)		
HIEs	-21.529*** (7.718)				-2.557 (6.829)					
L.HIE*IFI/ Dimension	<b>0.410***</b> (0.112)				<b>0.159*</b> (0.092)					
HMIes		-3.417 (6.729)				1.382 (7.606)				
L.HMIE*IFI/ Dimension		-0.115 (0.088)				-0.172* (0.099)				
LMIEs			0.828 (8.790)				-8.758 (8.573)			
LLMIE*IFI/ Dimension			-0.266* (0.144)				-0.109 (0.139)			
LIEs				-23.980*** (5.073)				-26.649*** (6.531)		
LLIE*IFI/ Dimension				0.132 (0.085)				0.173 (0.129)		
Observations	1,072	1,072	1,072	1,072	1,072	1,072	1,072	1,072		
R-squared	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989		
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

HIEs = high-income economies, HMIes = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is income inequality. The estimated coefficients for the L.IFI/dimension in columns (5) to (8) correspond to the access dimension, those in columns (9) to (12) correspond to the development dimension, those in columns (13) to (16) correspond to the usage dimension, and those in columns (17) to (20) correspond to the infrastructure dimension. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.

**Table 5: Effective Financial Inclusion and Women’s Empowerment: Interaction Effects**

	(1)	(2) Financial Inclusion			(4)	(5)	(6) Access			(8)	(9) Development			(12)
L.IFI/ Dimension	0.053 (0.095)	-0.004 (0.261)	0.018 (0.184)	-0.107 (0.254)	0.015 (0.092)	-0.032 (0.214)	-0.003 (0.156)	-0.095 (0.202)	0.100 (0.109)	0.030 (0.203)	0.038 (0.177)	-0.063 (0.206)		
L.Education	0.030 (0.171)	-0.041 (0.129)	-0.043 (0.133)	-0.018 (0.127)	0.006 (0.119)	-0.035 (0.111)	-0.036 (0.114)	-0.005 (0.110)	-0.003 (0.164)	-0.039 (0.149)	-0.039 (0.151)	-0.036 (0.150)		
L.Median Age	1.314*** (0.501)	1.288*** (0.488)	1.313*** (0.493)	1.322*** (0.490)	1.325** (0.518)	1.305** (0.503)	1.319*** (0.497)	1.332*** (0.505)	1.243** (0.500)	1.279*** (0.439)	1.289*** (0.453)	1.289*** (0.442)		
L.Rural	-0.114 (0.143)	-0.169 (0.160)	-0.173 (0.153)	-0.139 (0.148)	-0.143 (0.150)	-0.171 (0.146)	-0.172 (0.146)	-0.151 (0.144)	-0.103 (0.118)	-0.158 (0.181)	-0.160 (0.173)	-0.124 (0.161)		
HIEs	57.068 (98.679)				35.343 (54.326)				55.109 (98.564)					
L.HIE*IFI/ Dimension	-0.531 (1.170)				-0.248 (0.566)				-0.565 (1.384)					
HMIes		-15.377 (23.393)				-17.146 (22.421)				-12.813 (15.857)				
L.HMIE*IFI/ Dimension		0.018 (0.225)				0.036 (0.187)				-0.020 (0.186)				
LMIEs			11.802 (16.580)				9.125 (17.678)				7.895 (15.210)			
LLMIE*IFI/ Dimension			-0.149 (0.222)				-0.113 (0.208)				-0.073 (0.212)			
LIEs				-4.110 (18.428)				-0.595 (16.512)				-3.500 (14.561)		
LLIE*IFI/ Dimension				0.271 (0.214)				0.224 (0.180)				0.245 (0.195)		
Observations	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121		
R-squared	0.989	0.988	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989	0.989		
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

	(13)	(14)	(15) Usage		(16)	(17)	(18) Infrastructure		(19)	(20)
L.IFI/ Dimension	0.056 (0.067)	0.013 (0.194)	0.031 (0.136)	-0.075 (0.179)	0.019 (0.089)	-0.024 (0.216)	0.002 (0.148)	-0.084 (0.192)		
L.Education	0.020 (0.158)	-0.041 (0.141)	-0.045 (0.145)	-0.028 (0.140)	0.015 (0.137)	-0.037 (0.113)	-0.038 (0.116)	-0.008 (0.114)		
L.Median Age	1.299*** (0.478)	1.281*** (0.470)	1.301*** (0.474)	1.302*** (0.470)	1.327** (0.519)	1.301** (0.502)	1.316*** (0.496)	1.326*** (0.499)		
L.Rural	-0.119 (0.139)	-0.166 (0.159)	-0.172 (0.151)	-0.136 (0.147)	-0.135 (0.149)	-0.172 (0.149)	-0.173 (0.147)	-0.147 (0.145)		
HIEs	52.499 (92.707)				39.359 (62.432)					
L.HIE*IFI/ Dimension	-0.480 (1.101)				-0.292 (0.660)					
HMIes		-13.889 (19.830)				-16.694 (22.304)				
L.HMIE*IFI/ Dimension		-0.001 (0.175)				0.032 (0.188)				
LMIEs			11.915 (15.524)				8.579 (16.459)			
LLMIE*IFI/ Dimension			-0.145 (0.170)				-0.102 (0.198)			
LIEs				-2.260 (15.122)				0.371 (15.391)		
LLIE*IFI/ Dimension				0.231 (0.160)				0.211 (0.167)		
Observations	1,121	1,121	1,121	1,121	1,121	1,121	1,121	1,121		
R-squared	0.989	0.988	0.989	0.989	0.989	0.989	0.989	0.989		
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

HIEs = high-income economies, HMIes = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is women’s empowerment. The estimated coefficients for the L.IFI/dimension in columns (5) to (8) correspond to the access dimension, those in columns (9) to (12) correspond to the development dimension, those in columns (13) to (16) correspond to the usage dimension, and those in columns (17) to (20) correspond to the infrastructure dimension. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors’ estimates.

**Table 6: Effective Financial Inclusion and Entrepreneurship: Interaction Effects**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
		Financial Inclusion				Access				Development			
L.IFI/ Dimension	0.075 (0.048)	0.106** (0.049)	0.091 (0.057)	0.128 (0.094)	0.106* (0.064)	0.176*** (0.062)	0.154** (0.077)	0.220** (0.104)	0.033 (0.033)	-0.035 (0.052)	-0.029 (0.060)	-0.088 (0.080)	
L.Education	-0.033 (0.051)	-0.005 (0.041)	-0.009 (0.040)	-0.021 (0.046)	-0.098 (0.060)	-0.049 (0.057)	-0.063 (0.051)	-0.098 (0.065)	0.037 (0.043)	0.027 (0.041)	0.026 (0.041)	0.032 (0.041)	
L.Trade	-0.005 (0.012)	-0.006 (0.012)	-0.007 (0.012)	-0.006 (0.012)	-0.003 (0.012)	-0.005 (0.011)	-0.005 (0.011)	-0.005 (0.012)	-0.009 (0.012)	-0.009 (0.013)	-0.009 (0.013)	-0.010 (0.013)	
L.Credit	-0.010 (0.008)	-0.012 (0.009)	-0.012 (0.009)	-0.011 (0.009)	-0.006 (0.008)	-0.011 (0.008)	-0.011 (0.008)	-0.010 (0.008)	-0.008 (0.008)	-0.010 (0.009)	-0.010 (0.009)	-0.010 (0.009)	
HIEs	-5.708 (13.621)				-11.738 (10.617)				41.194*** (14.352)				
L.HIE*IFI/ Dimension	0.204 (0.200)				<b>0.267*</b> (0.149)				-0.502** (0.220)				
HMIes		-3.838 (14.543)				0.533 (12.800)				-14.514 (12.476)			
L.HMIE*IFI/ Dimension		-0.077 (0.237)				-0.133 (0.208)				0.086 (0.199)			
LMIEs			-13.022** (5.462)				-11.444* (5.888)				-14.956*** (4.615)		
LLMIE*IFI/ Dimension			0.011 (0.087)				0.003 (0.096)				0.029 (0.066)		
LIEs				-8.713 (6.187)				-2.377 (6.924)				-22.191*** (5.397)	
LLIE*IFI/ Dimension				-0.065 (0.097)				-0.157 (0.110)				0.139* (0.080)	
Observations	984	984	984	984	984	984	984	984	984	984	984	984	
R-squared	0.970	0.970	0.970	0.970	0.972	0.971	0.971	0.971	0.971	0.970	0.970	0.970	
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
		Usage				Infrastructure			
L.IFI/ Dimension	0.034 (0.028)	0.058 (0.041)	0.057* (0.031)	0.044 (0.043)	0.098* (0.057)	0.149*** (0.054)	0.125* (0.069)	0.191* (0.101)	
L.Education	-0.005 (0.048)	0.013 (0.041)	0.014 (0.041)	0.014 (0.041)	-0.093 (0.061)	-0.040 (0.056)	-0.053 (0.049)	-0.087 (0.066)	
L.Median Age	-0.006 (0.013)	-0.007 (0.013)	-0.008 (0.012)	-0.008 (0.012)	-0.003 (0.012)	-0.005 (0.012)	-0.005 (0.011)	-0.005 (0.012)	
L.Rural	-0.010 (0.008)	-0.011 (0.009)	-0.011 (0.009)	-0.011 (0.009)	-0.007 (0.008)	-0.012 (0.009)	-0.012 (0.008)	-0.010 (0.008)	
HIEs	-3.002 (12.926)				-10.225 (10.675)				
L.HIE*IFI/ Dimension	0.165 (0.189)				<b>0.250*</b> (0.150)				
HMIes		-6.664 (6.084)				-0.924 (11.816)			
L.HMIE*IFI/ Dimension		-0.033 (0.107)				-0.116 (0.192)			
LMIEs			-9.035*** (3.269)				-12.816** (5.332)		
LLMIE*IFI/ Dimension			-0.062 (0.043)				0.020 (0.087)		
LIEs				-13.654*** (2.996)				-4.256 (6.545)	
LLIE*IFI/ Dimension				0.007 (0.045)				-0.132 (0.104)	
Observations	984	984	984	984	984	984	984	984	
R-squared	0.970	0.970	0.970	0.970	0.971	0.971	0.971	0.971	
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

HIEs = high-income economies, HMIes = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is entrepreneurship. The estimated coefficients for the L.IFI/dimension in columns (5) to (8) correspond to the access dimension, those in columns (9) to (12) correspond to the development dimension, those in columns (13) to (16) correspond to the usage dimension, and those in columns (17) to (20) correspond to the infrastructure dimension. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.



Across dimensions, the results for interaction effects hold for access and fintech infrastructure but not for financial development and usage. Nonetheless, the findings indicate that greater financial development and usage reduce poverty, though belonging to a specific income group does not significantly increase or decrease the negative impact compared with other income groups.

For income inequality, which Table 4 shows, the estimates indicate that more effective financial inclusion, usage, and fintech infrastructure significantly increase income inequality for high-income economies yet reduce it for other income groups. This finding might explain why the impact of financial inclusion on income inequality has been inconclusive in previous studies (Honohan 2008; Park and Mercado 2021), and it concurs with Čihák and Sahay (2020) on the positive (negative) impact of financial inclusion on income inequality in less developed (more developed) economies. The results that this paper presents imply that the impact might depend on specific income group(s) and specific dimension(s) as it is possible to attribute the increase in income inequality among high-income economies to financial usage and fintech infrastructure.

These findings suggest that the impact of effective financial inclusion and its dimensions on the magnitude of socioeconomic outcomes, particularly for poverty and income inequality, varies significantly across income groups. In the case of poverty, the decline is greatest in middle-income economies. In contrast, an increase in effective financial inclusion raises poverty in high-income economies and reduces it in other income groups. For income inequality, an increase in access and fintech infrastructure raises it in high-income economies and decreases it in other groups.

## 6. CONCLUDING REMARKS

In this paper, we assessed the impacts of effective financial inclusion on socioeconomic outcomes, specifically poverty, income inequality, women's empowerment, and entrepreneurship. However, unlike previous studies, this paper highlighted the importance of considering financial inclusion from multiple dimensions and in multiple country income groups. This helped to assess the policy effectiveness of financial inclusion across diverse economic income groups. The paper also introduced several innovations to the construction of financial inclusion. First, it added financial development and fintech infrastructure as new dimensions. Second, it used linear predicted values of the financial inclusion index and its dimension indexes in empirical specifications to consider the impact of financial inclusion by directly employing its policy determinants to assess their effects on socioeconomic outcomes.

The empirical findings indicate that all four dimensions of effective financial inclusion—access, usage, financial development, and fintech infrastructure—lower poverty. Access and fintech infrastructure reduce income inequality, while access, usage, and fintech infrastructure increase entrepreneurship. However, the relevance of each dimension varies among the country income groups. The interaction effects further show that the effect on poverty reduction of any given increase in effective financial inclusion is stronger for middle-income economies than for low-income economies. This suggests that its impact may depend on the level of economic development, higher levels being able to provide a better enabling environment for business and more economic opportunities. In summary, these findings underscore the importance of considering both specific dimensions of financial inclusion and the level of economic development in designing policies that will reap the largest benefits.

## REFERENCES

- Ahmad, Nadim, and Andres Hoffman. 2007. *A Framework for Addressing and Measuring Entrepreneurship*. Paris: Organisation for Economic Cooperation and Development.
- Amidžić, Goran, Alexander Massara, and Andre Mialou. 2014. *Assessing Countries' Financial Inclusion Standing—A New Composite Index*. IMF Working Paper No. 14/36. Washington, DC: International Monetary Fund.
- Ashraf, Nava, Dean Karlan, and Wesley Yin. 2010. "Female Empowerment: Further Evidence from a Commitment Savings Product in the Philippines." *World Development* 28 (3): 333–44.
- Banerjee, Rajabrata, Ronald Donato, and Admasu Afsaw Maruta. 2020. *The Effects of Financial Inclusion on Development Outcomes: New Insights from ASEAN and East Asian Countries*. ERIA Discussion Paper Series No. 342. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Barajas, Adolfo, Thorsten Beck, Era Dabla-Norris, and Seyed Reza Yousefi. 2013. *Too Cold, Too Hot, or Just Right? Assessing Financial Sector Development across the Globe*. IMF Working Paper No. 13/81. Washington, DC: International Monetary Fund.
- Barajas, Adolfo, Thorsten Beck, Mohamed Belhaj, and Sami Ben Naceur. 2020. *Financial Inclusion: What Have We Learned So Far? What Do We Have to Learn?* IMF Working Paper No. 20/157. Washington, DC: International Monetary Fund.
- Beck, Thorsten. 2016. Financial Inclusion—Measuring Progress and Progress in Measuring. In *The Fourth IMF Statistical Forum* (17–18 November 2016). Washington, DC: International Monetary Fund.
- Beck, Thorsten, Asli Demirgüç-Kunt, and Patrick Honohan. 2009. "Access to Financial Services: Measurement, Impact, and Policies." *The World Bank Research Observer* 24 (1): 119–45.
- Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine. 2007. "Finance, Inequality and the Poor." *Journal of Economic Growth* 12 (1): 27–49.
- Beck, Thorsten, Ross Levine, and Norman Loayza. 2000. "Finance and the Sources of Growth." *Journal of Financial Economics* 58: 261–300.
- Camara, Noelia, and David Tuesta. 2014. *Measuring Financial Inclusion: A Multidimensional Index*. BBVA Research Working Paper 14/26. Madrid: BBVA.
- Čihák, Martin, and Ratna Sahay. 2020. *Finance and Inequality*. IMF Staff Discussion Note SDN/20/01. Washington, DC: International Monetary Fund.
- Cinar, Kursat, and Tekin Kose. 2018. "The Determinants of Women's Empowerment in Turkey: A Multilevel Analysis." *South European Society and Politics* 23 (3): 365–86.
- Dabla-Norris, Era, Yan Ji, Robert M. Townsend, and D. Filiz Unsal. 2021. "Distinguishing Constraints on Financial Inclusion and their Impact on GDP, TFP, and the Distribution of Income." *Journal of Monetary Economics* 117 (c): 1–18.

- Dupas, Pascaline, and Jonathan Robinson. 2009. *Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya*. NBER Working Paper No. 14693. Cambridge, MA: National Bureau of Economic Research.
- Furceri, Davide, and Jonathan Ostry. 2019. "Robust Determinants of Income Inequality." *Oxford Review of Economic Policy* 35 (3): 490–517.
- Galor, Oded, and Joseph Zeira. 1993. "Income Distribution and Macroeconomics." *Review of Economic Studies* 60: 35–52.
- Habibov, Nazim, Betty Jo Barrett, and Elena Chernyak. 2017. "Understanding Women's Empowerment and Its Determinants in Post-Communist Countries: Results of Azerbaijan National Survey." *Women's Studies International Forum* 62: 125–35.
- Honohan, Patrick. 2004. *Financial Development, Growth, and Poverty: How Close Are the Links?* World Bank Policy Research Working Paper No. 3203. Washington, DC: World Bank.
- . 2007. "Cross-Country Variation in Household Access to Financial Services." World Bank paper prepared for the conference *Access to Finance*, 15–16 March, Washington, DC.
- . 2008. "Cross-Country Variation in Household Access to Financial Services." *Journal of Banking and Finance* 32 (11): 2493–500.
- Khera, Purva, Stephanie Ng, Sumiko Ogawa, and Ratna Sahay. 2021. *Measuring Digital Financial Inclusion in Emerging Market and Developing Economies: A New Index*. IMF Working Paper No. 21/90. Washington, DC: International Monetary Fund.
- Levine, Ross. 2005. "Finance and Growth: Theory and Evidence." In *Handbook of Economic Growth, Volume 1*, chap. 12, edited by Philippe Aghion and Steven Durlauf, 865–934. The Netherlands: North-Holland Publishing Company.
- Leyshon, Andrew, and Nigel Thrift. 1995. "Geographies of Financial Exclusion: Financial Abandonment in Britain and the United States." *Transactions of the Institute of British Geographers* 20 (3): 312–41.
- Park, Cyn-Young, and Rogelio Mercado Jr. 2016. "Does Financial Inclusion Reduce Poverty and Income Inequality in Developing Asia?" In *Financial Inclusion in Asia: Issues and Policy Concerns*, edited by Sasidaran Gopalan and Tomoo Kikuchi, 61–92. London: Palgrave Macmillan UK.
- . 2018. "Financial Inclusion, Poverty, and Income Inequality." *Singapore Economic Review* 63 (1): 1–22.
- . 2021. "Financial Inclusion: New Measurement and Cross-Country Impact Assessment." In *Financial Inclusion in Asia and Beyond: Measurement, Development Gaps, and Economic Consequences*, edited by Tony Cavoli and Rashesh Shrestha, 98–128. London: Routledge.
- Peng, Chenhong, Lue Fang, Julia Shu-Huah Wang, Yik Wa Law, Yi Zhang, and Paul S. F. Yip. 2018. "Determinants of Poverty and their Variation across the Poverty Spectrum: Evidence from Hong Kong, a High-Income Society with High Poverty Level." *Social Indicators Research* 144: 219–50.

- Paweenawat, Sasimon Warunsiri, and Robert McNown. 2014. "The Determinants of Income Inequality in Thailand: A Synthetic Cohort Analysis." *Journal of Asian Economics* 31–32: 10–21.
- Popov, Alexander. 2018. "Evidence on Finance and Economic Growth." In *Handbook of Finance and Development*, edited by Thorsten Beck and Ross Levine, 63–94. Cheltenham, UK: Edward Elgar.
- Sarma, Mandira. 2008. *Index of Financial Inclusion*. Working Paper No. 215. New Delhi: Indian Council for Research on International Economic Relations.
- Sinclair, Stephanie P. 2001. *Financial Exclusion: An Introductory Survey*. Report from the Centre for Research in Socially Inclusive Services. Edinburgh: Heriot-Watt University.
- Sahay, Ratna, Martin Čihák, Papa N'Diaye, Adolfo Barajas, Srobona Mitra, Annette Kyobe, Yen Nian Mooi, and Seyed Reza Yousefi. 2015. *Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?* IMF Staff Discussion Note SDN/15/17. Washington, DC: International Monetary Fund.
- Zins, Alexander, and Laurent Weill. 2016. "The Determinants of Financial Inclusion in Africa." *Review of Development Finance* 6: 46–57.

## APPENDIX 1: VARIABLES, DEFINITION, SOURCES, AND NOTES

Variable	Definition	Sources	Notes
<i>Financial Inclusion Dimension: Financial Access</i>			
ATM (percentile rank)	The number of ATMs per 100,000 adults.	International Monetary Fund Financial Access Survey (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. We converted the ratios into a percentile ranking of economies per year.
Bank Branches (percentile rank)	The number of commercial bank branches per 100,000 adults.	International Monetary Fund Financial Access Survey (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. We converted the ratios into a percentile ranking of economies per year.
Account (percentile rank)	The percentage of respondents, aged 15 and over, who reported having an account at a bank or another type of financial institution or reported personally using a mobile money service in the past 12 months.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Credit Card Ownership (percentile rank)	The percentage of respondents, aged 15 and over, who reported having a credit card.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Debit Card Ownership (percentile rank)	The percentage of respondents, aged 15 and over, who reported having a debit card.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.

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**Appendix 1** *table continued*

<b>Variable</b>	<b>Definition</b>	<b>Sources</b>	<b>Notes</b>
Mobile Money Account (percentile rank)	The percentage of respondents, aged 15 and over, who reported personally using a mobile money service in the past 12 months.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
<b><i>Financial Inclusion Dimension: Financial Development</i></b>			
Obtaining Credit (percentile rank)	The score for obtaining credit benchmarks economies with respect to the regulatory best practice in the indicator set. A scale from 0 (worst) to 100 (best) indicates the score.	World Bank Doing Business Report (accessed September 2020).	For years with unavailable data, we used the first available value to extend the series at the start of the sample period. We converted the scores into a percentile ranking of economies per year.
Bank Concentration (percentile rank)	The percentage share of the three largest banks to all banks according to Bankscope.	World Bank Global Financial Development Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage shares into a percentile ranking of economies per year.
Financial System Deposit (percentile rank)	Demand, time, and saving deposits in deposit money banks and other financial institutions as a share of the GDP.	World Bank Global Financial Development Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Credit Information (index)	The depth of credit information index measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries. The index ranges from 0 to 8, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions.	World Bank World Development Indicators (accessed September 2020).	We used data for 2013 to extend the series to 2011 and 2012. We rescaled the index from 0 to 100.

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**Appendix 1** *table continued*

<b>Variable</b>	<b>Definition</b>	<b>Sources</b>	<b>Notes</b>
<b><i>Financial Inclusion Dimension: Financial Usage</i></b>			
Borrowed (percentile rank)	The percentage of respondents, aged 15 and over, who reported borrowing any money from a bank or another type of financial institution in the past 12 months.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Saved (percentile rank)	The percentage of respondents, aged 15 and over, who reported saving or setting aside any money at a bank or another type of financial institution in the past 12 months.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Deposited (percentile rank)	The number of deposit account holders at commercial banks and other resident banks functioning as commercial banks that are resident nonfinancial corporations and households.	World Bank World Development Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. We converted the ratios into a percentile ranking of economies per year.
<b><i>Financial Inclusion Dimension: Fintech Infrastructure</i></b>			
Electronic Payments (percentile rank)	The percentage of respondents, aged 15 and over, who have used electronic payments in the past 12 months to make payments on bills or to buy things using money from their accounts.	World Bank Global Financial Development Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Digital Payments (percentile rank)	The percentage of respondents, aged 15 and over, who reported using mobile money, a debit or credit card, or a mobile phone to receive a payment through an account in the past 12 months.	World Bank G20 Financial Inclusion Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.

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**Appendix 1** *table continued*

<b>Variable</b>	<b>Definition</b>	<b>Sources</b>	<b>Notes</b>
Used Internet for Online Transactions (percentile rank)	The percentage of respondents who reported using the Internet to pay bills or buy something online in the past 12 months.	World Bank Global Findex Database (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the percentage values into a percentile ranking of economies per year.
Fixed Broadband Subscriptions (percentile rank)	Fixed broadband subscriptions per 100 people refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection) at downstream speeds equal to, or greater than, 256 kbit/s.	World Bank World Governance Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the ratios into a percentile ranking of economies per year.
Mobile Cellular Subscriptions (percentile rank)	Mobile cellular telephone subscriptions per 100 people are subscriptions to a public mobile telephone service that provides access to the Public Switched Telephone Network (PSTN) using cellular technology. The indicator includes the number of postpaid and active prepaid subscriptions.	World Bank World Governance Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the ratios into a percentile ranking of economies per year.
Secure Internet Servers (percentile rank)	The number of distinct, publicly trusted TLS/SSL certificates in the Netcraft Secure Server Survey per 1 million people.	World Bank World Governance Indicators (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the ratios into a percentile ranking of economies per year.
Internet Bandwidth (percentile rank)	International internet bandwidth per internet user refers to the total used capacity of international Internet bandwidth, in megabits per second (mbit/s). Used international Internet bandwidth refers to the average traffic load of international fiber-optic cables and radio links for carrying Internet traffic.	International Telecommunication Union (accessed September 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values. We converted the ratios into a percentile ranking of economies per year.

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Variable	Definition	Sources	Notes
<b>Dependent Variables</b>			
Poverty (%)	The poverty headcount ratio at \$5.50 a day is the percentage of the population living on less than \$5.50 a day at 2011 international prices.	World Bank World Development Indicators and PovcalNet (accessed October 2020).	For years with unavailable data, we used the last available value to extend the series to the end of the sample period. If the missing data were between years with available data starting from 2005 onwards, we used linear interpolation to estimate the missing values.
Income Inequality (index)	The Gini index (World Bank estimates) measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. An index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	World Bank World Development Indicators, Central Intelligence Agency The World Factbook, and national sources (accessed October 2020).	For years with unavailable data, we used the last available value to extend the series to the end of the sample period. If the missing data were between years with available data starting from 2005 onwards, we used linear interpolation to estimate the missing values.
Women's Empowerment (index)	A composite measure reflecting inequality in achievement between women and men in three dimensions: reproductive health, empowerment, and the labor market.	United Nations Development Programme, Human Development Reports (accessed October 2020).	As the measure captures gender inequality, that is, a higher number means more inequality, we recomputed the values as $100 - x$ , where $x$ is the measure of gender inequality. Higher recomputed values imply more gender equality, and lower recomputed values mean less gender equality. For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values.
Entrepreneurship (ratio)	New business density refers to new business registrations per 1,000 people aged 15 to 64. New businesses registered means the number of new limited liability corporations registered in the calendar year.	World Bank Entrepreneurship Survey (accessed October 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If the missing data were between years with available data, we used linear interpolation to estimate the missing values.
<b>Regressors</b>			
Education (educational attainment, %)	The percentage of the population, aged 25 and over, that has attained or completed a bachelor's degree or equivalent.	Barro and Lee Dataset, World Bank World Development Indicators, and UNESCO Institute of Statistics (accessed October 2020).	We estimated data for 2011–14 and 2016–19 through linear interpolation based on Barro and Lee's data for 2010, 2015, and 2020.

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<b>Variable</b>	<b>Definition</b>	<b>Sources</b>	<b>Notes</b>
Health (infant mortality rate)	The number of infants dying before reaching 1 year of age per 1,000 live births each year.	World Bank World Development Indicators (accessed October 2020).	
Age (age dependency ratio, %)	The ratio of dependents—people younger than 15 or older than 64—to the working-age population (those aged 15 to 64). The data indicate the proportion of dependents per 100 members of the working-age population.	World Bank World Development Indicators (accessed October 2020).	
Median Age (median age, in years)	The median age of the population each year.	United Nations Population Division (accessed October 2020).	We estimated data for 2011–14 and 2016–19 through linear interpolation based on the United Nations Population Division data for 2010, 2015, and 2020.
Rural (rural population, %)	People living in rural areas according to the national statistical offices. It is the difference between the total population and the urban population.	World Bank World Development Indicators (accessed October 2020).	
Labor (labor force participation, %)	The labor force participation rate is the proportion of the population aged 15 to 64 that is economically active: all the people who supply labor to produce goods and services during a specified period.	World Bank World Development Indicators (accessed October 2020).	Values based on International Labour Organization estimates.
Trade (trade openness, %)	Merchandise trade as a share of the GDP is the sum of merchandise exports and imports divided by the value of the GDP, all in current US dollars.	World Bank World Development Indicators (accessed October 2020).	
Credit (domestic credit, %)	Domestic credit to the private sector by banks as a percentage of the GDP.	World Bank World Development Indicators (accessed October 2020).	For years with unavailable data, we used the first (last) available value to extend the series to the start (end) of the sample period. If missing data were between years with available data, we used linear interpolation to estimate the missing values. We sourced data for Canada from the national central bank.
GDP Growth (domestic real GDP growth, %)	The annual percentage growth rate of the GDP at market prices based on constant local currency.	World Bank World Development Indicators and IMF World Economic Outlook Database (accessed November 2020).	We based aggregates on constant 2010 US dollars. We sourced the data from the World Development Indicators. For economies and years with unavailable data, we took the GDP growth from the IMF's World Economic Outlook Database.

*continued on next page*

**Appendix 1** *table continued*

<b>Variable</b>	<b>Definition</b>	<b>Sources</b>	<b>Notes</b>
<b><i>Determinants of Financial Inclusion</i></b>			
Collateral Constraint (%)	The average share of respondents who cited financial services as being too expensive and having insufficient funds as reasons for not having a financial account.	World Bank Global Findex Database (accessed January 2021).	The sample includes emerging and developing economies. The survey data are for 2017. We assumed that the data for 2011–16 and 2018–19 are the same as the 2017 data.
Access Constraint (%)	The average share of respondents who cited financial institutions as being too far away; lacking the necessary documentation; having no trust in financial institutions; and religious reasons for not having a financial account.	World Bank Global Findex Database (accessed January 2021).	The sample includes emerging and developing economies. The survey data are for 2017. We assumed that the data for 2011–16 and 2018–19 are the same as the 2017 data.
Interest Rate Differential (%)	The difference between the lending rate and the deposit rate.	World Bank World Development Indicators (accessed January 2021).	

Source: Authors' compilation.

## APPENDIX 2: TWO-STEP LEAST-SQUARES REGRESSIONS AND LINEAR PREDICTIONS

Table S1: Determinants of Financial Inclusion

Variables	(1) fin_pca	(2) access	(3) dev	(4) use	(5) infra
Lag Per Capita Income	10.490*** (1.278)	14.240*** (1.384)	3.430 (2.093)	11.300*** (1.809)	13.801*** (1.234)
Lag Education Completion	0.293*** (0.070)	0.326*** (0.065)	0.202* (0.112)	0.288*** (0.108)	0.362*** (0.066)
Lag Age Dependency	-0.172** (0.085)	0.083 (0.089)	-0.455*** (0.129)	-0.183 (0.117)	-0.072 (0.083)
Lag Collateral Constraint					
Lag Access Constraint					
Lag Interest Rate Differential					
Observations	142	142	142	142	142
R-squared	0.752	0.743	0.416	0.601	0.820

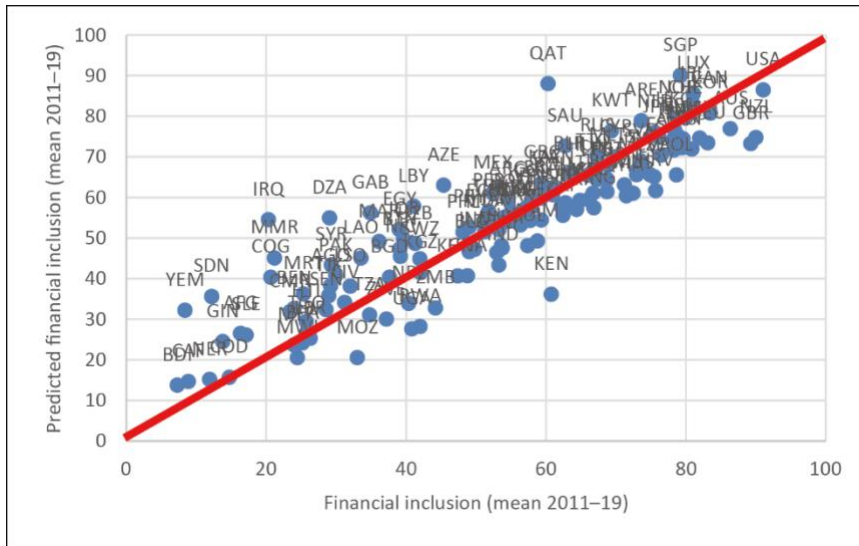
VARIABLES	(6) fin_pca	(7) access	(8) dev	(9) use	(10) infra
Lag Per Capita Income					
Lag Education Completion					
Lag Age Dependency					
Lag Collateral Constraint	-0.210 (0.178)	-0.267 (0.181)	-0.053 (0.211)	-0.191 (0.252)	-0.353* (0.208)
Lag Access Constraint	-0.137 (0.296)	-0.097 (0.315)	-0.165 (0.364)	-0.137 (0.401)	-0.136 (0.356)
Lag Interest Rate Differential	-0.495* (0.268)	-0.459 (0.305)	-0.451 (0.289)	-0.480* (0.258)	-0.583* (0.296)
Observations	94	94	94	94	94
R-squared	0.101	0.097	0.045	0.065	0.135

VARIABLES	(11) fin_pca	(12) access	(13) dev	(14) use	(15) infra
Lag Per Capita Income	8.216*** (2.395)	11.488*** (2.606)	4.840 (3.658)	5.218 (3.295)	11.943*** (2.006)
Lag Education Completion	0.116** (0.058)	0.230*** (0.070)	-0.009 (0.108)	-0.023 (0.106)	0.300*** (0.064)
Lag Age Dependency	-0.274* (0.146)	0.026 (0.156)	-0.463** (0.220)	-0.506** (0.195)	-0.084 (0.122)
Lag Collateral Constraint	0.001 (0.140)	-0.103 (0.139)	0.150 (0.214)	0.038 (0.228)	-0.115 (0.128)
Lag Access Constraint	0.182 (0.227)	0.069 (0.250)	0.289 (0.396)	0.305 (0.370)	0.022 (0.235)
Lag Interest Rate Differential	-0.052 (0.115)	0.071 (0.175)	-0.161 (0.204)	-0.086 (0.219)	-0.008 (0.121)
Observations	89	89	89	89	89
R-squared	0.634	0.598	0.369	0.399	0.738

Notes: The dependent variables are the financial inclusion index (fin\_pca), access dimension (access), financial development dimension (dev), usage dimension (use), and infrastructure dimension (infra). Cross-section OLS estimation with robust standard errors in parentheses. We lagged the regressors by 1 year. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

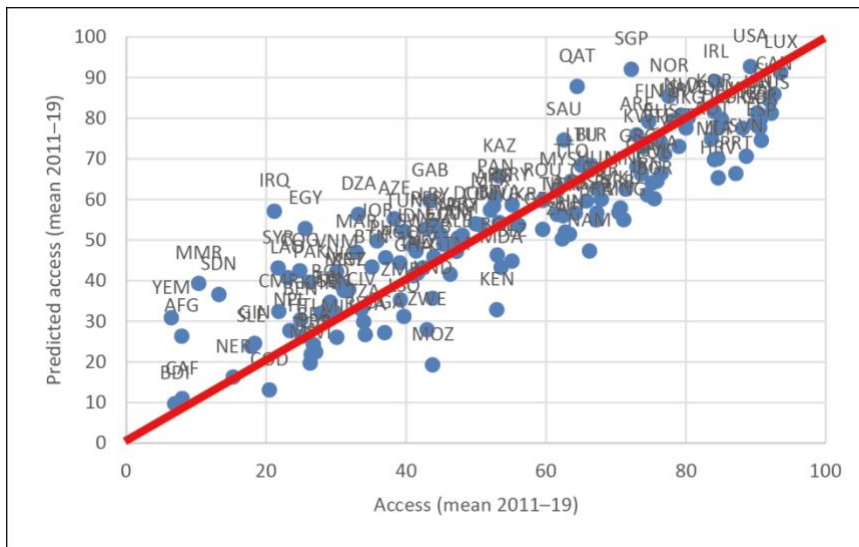
Source: Authors' calculations.

**Figure S1: Actual vs Effective (Fitted) Financial Inclusion**



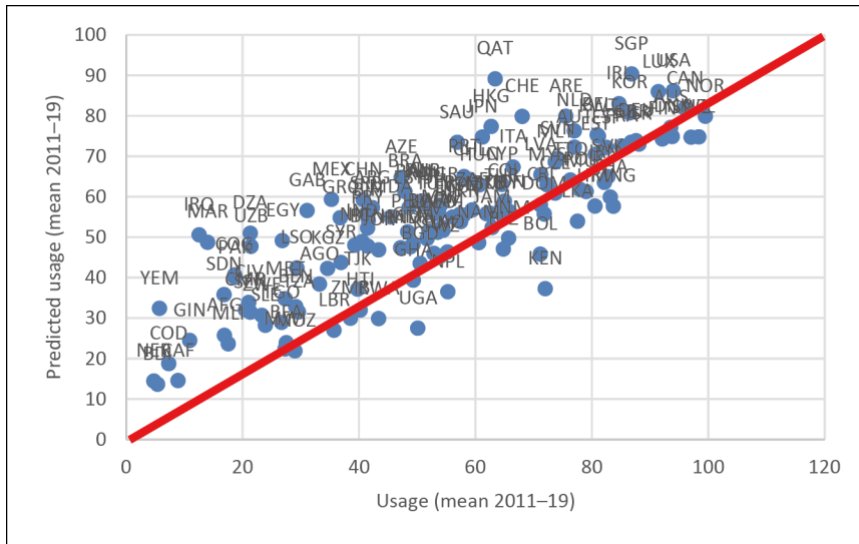
Source: Authors' calculations.

**Figure S2: Actual vs Effective (Fitted) Access Dimension**



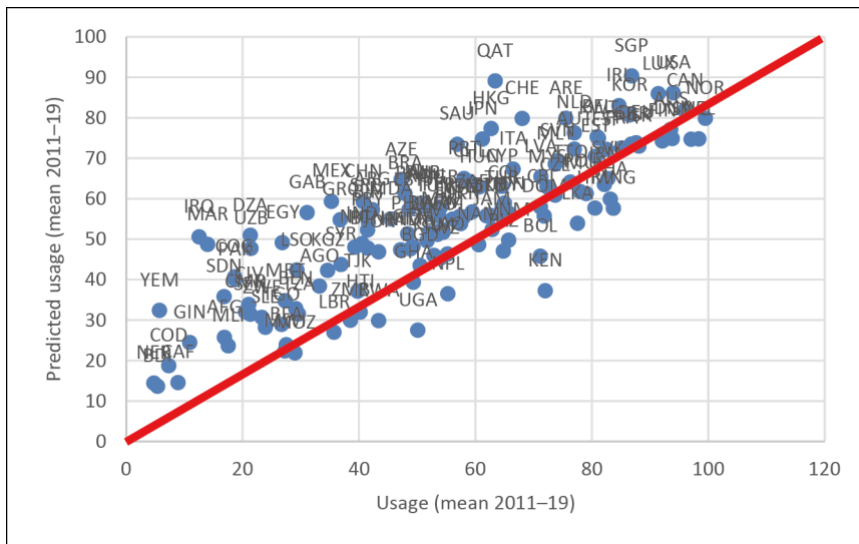
Source: Authors' calculations.

**Figure S3: Actual vs Effective (Fitted) Financial Development Dimension X**



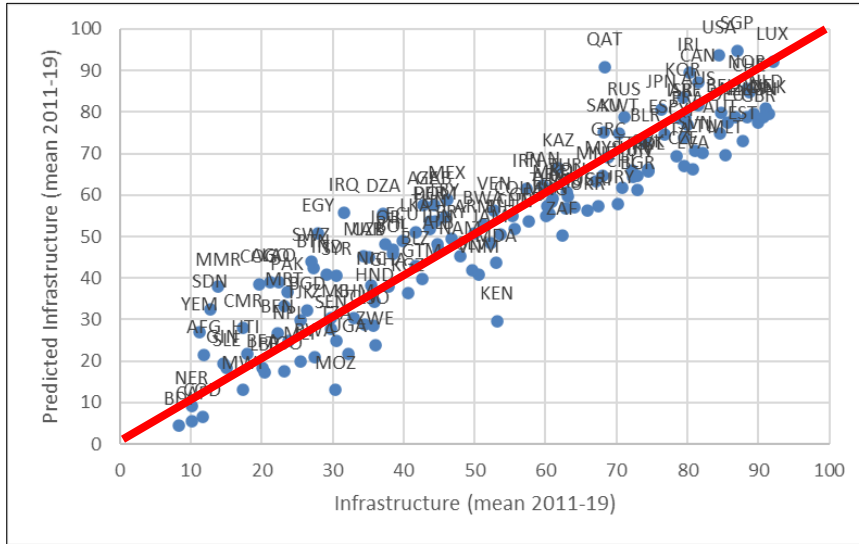
Source: Authors' calculations.

**Figure S4: Actual vs Effective (Fitted) Usage Dimension**



Source: Authors' calculations.

Figure S5: Actual vs Effective (Fitted) Infrastructure Dimension+



Source: Authors' calculations.

## APPENDIX 3: REGRESSION RESULTS

**Table S2: Effective Financial Inclusion and Socioeconomic Outcomes**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Poverty					Income Inequality				
L.IFI	-0.659*** (0.214)					-0.114* (0.065)				
L.Access		-0.581*** (0.187)					-0.094* (0.057)			
L.Development			-0.854*** (0.301)					-0.127 (0.082)		
L.Usage				-0.236** (0.118)					-0.063 (0.039)	
L.Infrastructure					-0.620*** (0.188)					-0.102* (0.057)
L.Education	-0.028 (0.124)	0.005 (0.125)	-0.087 (0.121)	-0.190 (0.115)	0.059 (0.130)	-0.060 (0.063)	-0.057 (0.062)	-0.077 (0.063)	-0.087 (0.067)	-0.047 (0.061)
L.Health	0.043 (0.062)	0.032 (0.066)	0.062 (0.059)	0.127* (0.066)	0.015 (0.068)					
L.Median Age										
L.Trade						-0.006 (0.008)	-0.006 (0.008)	-0.006 (0.008)	-0.005 (0.008)	-0.006 (0.008)
L.Age	-0.021 (0.103)	0.136 (0.090)	-0.251 (0.162)	0.010 (0.103)	0.095 (0.090)	0.011 (0.035)	0.038 (0.036)	-0.020 (0.043)	0.016 (0.035)	0.029 (0.035)
L.Labor	-0.142 (0.116)	-0.152 (0.116)	-0.164 (0.114)	-0.204* (0.121)	-0.141 (0.115)	-0.064 (0.064)	-0.067 (0.064)	-0.069 (0.064)	-0.069 (0.062)	-0.065 (0.064)
L.Rural										
L.Credit										
Observations	1,056	1,056	1,056	1,056	1,056	1,072	1,072	1,072	1,072	1,072
R-squared	0.997	0.997	0.997	0.997	0.997	0.989	0.989	0.989	0.989	0.989
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Women's Empowerment					Entrepreneurship				
L.IFI	0.003 (0.177)					0.093* (0.048)				
L.Access		-0.017 (0.148)					0.155** (0.065)			
L.Development			0.024 (0.153)					-0.022 (0.047)		
L.Usage				0.013 (0.128)					0.047* (0.028)	
L.Infrastructure					-0.010 (0.141)					0.130** (0.058)
L.Education	-0.042 (0.132)	-0.037 (0.114)	-0.038 (0.151)	-0.041 (0.144)	-0.039 (0.117)	-0.009 (0.040)	-0.063 (0.050)	0.027 (0.041)	0.013 (0.041)	-0.053 (0.049)
L.Health										
L.Median Age	1.287*** (0.481)	1.301*** (0.494)	1.279*** (0.440)	1.281*** (0.466)	1.296*** (0.489)					
L.Trade						-0.007 (0.012)	-0.005 (0.012)	-0.009 (0.013)	-0.008 (0.012)	-0.005 (0.012)
L.Age										
L.Labor										
L.Rural	-0.169 (0.156)	-0.172 (0.146)	-0.160 (0.174)	-0.166 (0.153)	-0.172 (0.148)					
L.Credit						-0.012 (0.009)	-0.011 (0.008)	-0.010 (0.009)	-0.011 (0.009)	-0.012 (0.009)
Observations	1,121	1,121	1,121	1,121	1,121	984	984	984	984	984
R-squared	0.988	0.988	0.988	0.988	0.988	0.970	0.971	0.970	0.970	0.971
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Fixed effects refer to economy fixed effects. The estimation includes economy dummy variables. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.



**Table S3: Effective Financial Inclusion and Poverty by Income Group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Financial Inclusion			Access						Development		
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
L.IFI/ Dimension	0.031 (0.097)	-1.064** (0.507)	-1.867** (0.829)	-0.293 (0.232)	-0.008 (0.059)	-1.243** (0.517)	-1.229* (0.673)	-0.294 (0.195)	0.233 (0.196)	-0.944* (0.507)	-1.814** (0.884)	-0.280 (0.360)
L.Education	0.017 (0.058)	0.004 (0.199)	0.307 (0.462)	-0.803* (0.438)	0.029 (0.052)	0.185 (0.259)	0.237 (0.464)	-0.793* (0.424)	-0.024 (0.064)	-0.159 (0.175)	-0.039 (0.297)	-0.784* (0.458)
L.Health	0.296 (0.443)	0.629** (0.294)	-0.107 (0.133)	0.026 (0.075)	0.270 (0.444)	0.514* (0.266)	-0.061 (0.157)	0.019 (0.080)	0.319 (0.451)	0.689** (0.301)	-0.003 (0.182)	0.038 (0.065)
L.Age	-0.065* (0.037)	0.181 (0.254)	-0.158 (0.375)	-0.128 (0.180)	-0.067 (0.045)	0.411* (0.208)	0.287 (0.239)	-0.065 (0.138)	0.028 (0.082)	0.020 (0.328)	-0.492 (0.409)	-0.171 (0.265)
L.Labor	-0.003 (0.049)	-0.112 (0.257)	-0.146 (0.174)	0.131 (0.247)	0.005 (0.049)	-0.013 (0.261)	-0.231 (0.178)	0.105 (0.248)	-0.022 (0.051)	-0.229 (0.245)	-0.131 (0.181)	0.150 (0.244)
Observations	240	256	240	320	240	256	240	320	240	256	240	320
R-squared	0.984	0.984	0.990	0.995	0.984	0.984	0.990	0.995	0.985	0.983	0.991	0.995
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Usage				Infrastructure			
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
L.IFI/ Dimension	0.048 (0.105)	-0.293* (0.162)	-0.866 (0.809)	-0.165 (0.180)	-0.011 (0.055)	-1.167** (0.483)	-1.383** (0.602)	-0.295 (0.193)
L.Education	0.013 (0.058)	-0.234 (0.176)	-0.243 (0.365)	-0.848* (0.470)	0.031 (0.052)	0.245 (0.278)	0.426 (0.484)	-0.765* (0.418)
L.Health	0.314 (0.441)	0.842** (0.346)	0.050 (0.184)	0.048 (0.076)	0.267 (0.446)	0.503* (0.264)	-0.103 (0.140)	0.016 (0.080)
L.Age	-0.062 (0.037)	0.299 (0.239)	-0.096 (0.459)	-0.126 (0.195)	-0.067 (0.042)	0.318 (0.213)	0.193 (0.254)	-0.085 (0.146)
L.Labor	-0.005 (0.049)	-0.303 (0.231)	-0.241 (0.190)	0.157 (0.241)	0.006 (0.049)	-0.020 (0.259)	-0.200 (0.175)	0.102 (0.248)
Observations	240	256	240	320	240	256	240	320
R-squared	0.985	0.982	0.989	0.995	0.984	0.985	0.990	0.995
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is poverty. The estimated coefficients for L.IFI (dimension) in columns (5) to (8) correspond to the access dimension index, those in columns (9) to (12) correspond to the development dimension index, those in columns (13) to (16) correspond to the usage dimension index, and those in columns (17) to (20) correspond to the infrastructure index. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.

**Table S4: Effective Financial Inclusion and Income Inequality by Income Group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Financial Inclusion			Access				Development				
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
L.IFI/ Dimension	0.258* (0.146)	-0.254** (0.119)	-0.486*** (0.132)	-0.025 (0.055)	0.150 (0.101)	-0.253 (0.151)	-0.324*** (0.112)	-0.025 (0.045)	0.559* (0.287)	-0.210* (0.123)	-0.421* (0.220)	-0.015 (0.079)
L.Education	-0.073 (0.103)	-0.144 (0.108)	0.239* (0.125)	-0.471 (0.421)	-0.048 (0.101)	-0.124 (0.120)	0.218 (0.133)	-0.470 (0.419)	-0.114 (0.099)	-0.188* (0.109)	0.111 (0.129)	-0.471 (0.420)
L.Trade	-0.003 (0.010)	-0.010 (0.016)	0.005 (0.020)	-0.011 (0.012)	-0.005 (0.010)	-0.015 (0.017)	0.007 (0.021)	-0.011 (0.012)	-0.001 (0.010)	-0.010 (0.017)	0.003 (0.020)	-0.011 (0.012)
L.Age	-0.072 (0.057)	0.088 (0.114)	0.002 (0.061)	-0.045 (0.040)	-0.120** (0.058)	0.149 (0.116)	0.119* (0.062)	-0.040 (0.036)	0.145 (0.119)	0.055 (0.117)	-0.053 (0.102)	-0.043 (0.055)
L.Labor	-0.095 (0.091)	-0.056 (0.093)	0.011 (0.057)	0.048 (0.169)	-0.084 (0.087)	-0.042 (0.096)	-0.012 (0.058)	0.044 (0.168)	-0.109 (0.103)	-0.089 (0.099)	0.009 (0.064)	0.052 (0.172)
Observations	256	256	248	312	256	256	248	312	256	256	248	312
R-squared	0.988	0.989	0.988	0.989	0.988	0.989	0.988	0.989	0.988	0.989	0.988	0.989
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Usage				Infrastructure			
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
L.IFI/ Dimension	0.299* (0.147)	-0.102* (0.056)	-0.356** (0.169)	-0.017 (0.044)	0.126 (0.093)	-0.246* (0.143)	-0.338*** (0.102)	-0.025 (0.045)
L.Education	-0.076 (0.099)	-0.196* (0.110)	0.111 (0.134)	-0.476 (0.430)	-0.044 (0.100)	-0.109 (0.125)	0.254* (0.128)	-0.468 (0.416)
L.Trade	0.000 (0.009)	-0.005 (0.016)	0.008 (0.021)	-0.010 (0.012)	-0.005 (0.011)	-0.015 (0.017)	0.006 (0.021)	-0.011 (0.012)
L.Age	-0.060 (0.060)	0.099 (0.114)	-0.029 (0.072)	-0.044 (0.042)	-0.104* (0.056)	0.131 (0.115)	0.095 (0.059)	-0.042 (0.036)
L.Labor	-0.092 (0.088)	-0.102 (0.091)	-0.004 (0.061)	0.052 (0.174)	-0.080 (0.087)	-0.040 (0.098)	-0.006 (0.057)	0.044 (0.167)
Observations	256	256	248	312	256	256	248	312
R-squared	0.989	0.989	0.988	0.989	0.988	0.989	0.988	0.989
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is income inequality. The estimated coefficients for L.IFI (dimension) in columns (5) to (8) correspond to the access dimension index, those in columns (9) to (12) correspond to the development dimension index, those in columns (13) to (16) correspond to the usage dimension index, and those in columns (17) to (20) correspond to the infrastructure index. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.

**Table S5: Effective Financial Inclusion and Women's Empowerment by Income Group**

	(1)	(2) Financial Inclusion			(4)	(5)	(6) Access			(8)	(9)	(10) Development			(12)	
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
LIFI/ Dimension	-0.775 (1.813)	0.056 (0.044)	0.320 (0.345)	0.264*** (0.067)	-0.655 (1.068)	0.052 (0.046)	-0.000 (0.158)	0.156* (0.077)	-0.009 (1.334)	0.041 (0.060)	0.318 (0.228)	0.383*** (0.073)				
L.Education	-0.125 (0.589)	0.011 (0.070)	0.390 (0.246)	0.272 (0.244)	-0.065 (0.427)	0.001 (0.069)	0.437* (0.250)	0.258 (0.255)	-0.376 (0.452)	0.019 (0.068)	0.472** (0.213)	0.257 (0.225)				
L.Median Age	2.128 (1.632)	1.041*** (0.250)	0.012 (0.510)	0.915* (0.517)	2.153 (1.683)	1.035*** (0.249)	0.323 (0.364)	1.163** (0.523)	1.949 (1.439)	1.056*** (0.251)	0.055 (0.431)	0.684 (0.500)				
L.Rural	-1.043 (0.919)	-0.146 (0.176)	-0.211 (0.224)	-0.059 (0.133)	-1.318 (1.064)	-0.149 (0.176)	-0.229 (0.232)	-0.092 (0.137)	-1.108 (0.962)	-0.149 (0.177)	-0.156 (0.231)	0.010 (0.133)				
Observations	272	272	264	313	272	272	264	313	272	272	264	313				
R-squared	0.836	0.994	0.987	0.985	0.837	0.994	0.987	0.985	0.834	0.994	0.987	0.986				
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

	(13)	(14) Usage			(16)	(17)	(18) Infrastructure			(20)		
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
LIFI/ Dimension	-0.515 (1.401)	0.035 (0.033)	0.166 (0.245)	0.236*** (0.062)	-0.701 (1.246)	0.049 (0.040)	0.083 (0.199)	0.167** (0.071)				
L.Education	-0.231 (0.478)	0.014 (0.070)	0.447** (0.218)	0.323 (0.244)	-0.040 (0.515)	0.002 (0.069)	0.402 (0.263)	0.245 (0.253)				
L.Median Age	2.056 (1.537)	1.049*** (0.252)	0.176 (0.446)	0.905* (0.507)	2.177 (1.717)	1.037*** (0.249)	0.227 (0.394)	1.102** (0.521)				
L.Rural	-1.052 (0.872)	-0.156 (0.172)	-0.200 (0.234)	-0.058 (0.134)	-1.237 (1.036)	-0.146 (0.177)	-0.236 (0.227)	-0.083 (0.136)				
Observations	272	272	264	313	272	272	264	313				
R-squared	0.835	0.994	0.987	0.985	0.837	0.994	0.987	0.985				
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is women's empowerment. The estimated coefficients for LIFI (dimension) in columns (5) to (8) correspond to the access dimension index, those in columns (9) to (12) correspond to the development dimension index, those in columns (13) to (16) correspond to the usage dimension index, and those in columns (17) to (20) correspond to the infrastructure index. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.

**Table S6: Effective Financial Inclusion and Entrepreneurship by Income Group**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Financial Inclusion				Access				Development			
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
L.IFI/ Dimension	0.099 (0.271)	0.138 (0.184)	-0.016 (0.060)	0.039** (0.018)	0.373* (0.211)	0.172 (0.233)	0.025 (0.045)	0.027 (0.019)	-0.499** (0.206)	0.105 (0.104)	-0.016 (0.038)	0.040** (0.017)
L.Education	-0.054 (0.109)	-0.060 (0.104)	0.145* (0.072)	0.019 (0.036)	-0.209 (0.129)	-0.108 (0.162)	0.123* (0.067)	0.019 (0.039)	0.016 (0.059)	-0.020 (0.070)	0.140** (0.064)	0.018 (0.035)
L.Trade	-0.036 (0.027)	0.022 (0.043)	0.017* (0.008)	-0.002 (0.002)	-0.027 (0.024)	0.023 (0.042)	0.017* (0.009)	-0.002 (0.002)	-0.041 (0.026)	0.022 (0.043)	0.016* (0.008)	-0.002 (0.002)
L.Credit	-0.024** (0.010)	0.008 (0.028)	0.020 (0.020)	0.003 (0.002)	-0.018** (0.008)	0.010 (0.028)	0.017 (0.019)	0.004 (0.003)	-0.021** (0.009)	0.006 (0.027)	0.020 (0.019)	0.003 (0.002)
Observations	272	240	216	256	272	240	216	256	272	240	216	256
R-squared	0.9771	0.9292	0.9712	0.9267	0.9741	0.9269	0.9694	0.9259	0.9750	0.9221	0.9685	0.9248
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
	Usage				Infrastructure			
	HIEs	HMIEs	LMIEs	LIEs	HIEs	HMIEs	LMIEs	LIEs
L.IFI/ Dimension	0.031 (0.233)	0.031 (0.083)	-0.060 (0.048)	0.037*** (0.012)	0.322 (0.232)	0.179 (0.211)	0.027 (0.043)	0.026 (0.017)
L.Education	-0.030 (0.091)	-0.021 (0.071)	0.149** (0.064)	0.027 (0.034)	-0.184 (0.137)	-0.120 (0.162)	0.121* (0.069)	0.017 (0.039)
L.Trade	-0.037 (0.028)	0.019 (0.045)	0.015* (0.008)	-0.002 (0.002)	-0.029 (0.025)	0.025 (0.042)	0.018* (0.009)	-0.002 (0.002)
L.Credit	-0.025** (0.010)	0.010 (0.027)	0.022 (0.019)	0.002 (0.002)	-0.019** (0.008)	0.008 (0.029)	0.017 (0.019)	0.004 (0.003)
Observations	272	240	216	256	272	240	216	256
R-squared	0.9749	0.9254	0.9718	0.9253	0.9767	0.9303	0.9721	0.9281
Notes	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.	Panel F.E.

HIEs = high-income economies, HMIEs = high-middle-income economies, LMIEs = low-middle-income economies, and LIEs = low-income economies.

Notes: The dependent variable is entrepreneurship. The estimated coefficients for L.IFI (dimension) in columns (5) to (8) correspond to the access dimension index, those in columns (9) to (12) correspond to the development dimension index, those in columns (13) to (16) correspond to the usage dimension index, and those in columns (17) to (20) correspond to the infrastructure index. The estimation includes economy fixed effects. Clustered standard errors at the economy level are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: Authors' estimates.