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Article

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Financial literacy promotes financial inclusion in both poor and rich countries

By Antonia Grohmann and Lukas Menkhoff

For social and economic reasons, national economies benefit from the inclusion of as many people as possible in financial services. In a cross country study, the present study shows that financial literacy for the general population promotes financial inclusion. This relationship goes beyond the effect of higher economic or financial development. And the effect of higher levels of financial literacy is greatest on the "use of financial products" in financial systems that are more developed. On the contrary, the educational effect on "access to finance" is greatest for countries that are financially less developed. Economic policy that targets financial inclusion should therefore not only concentrate on financial infrastructure, but also on improving financial literacy.

The inclusion of all people in financial services, wherever possible, is a universal goal in many countries.¹ The most basic indicator for financial inclusion is having a bank account. Considering this indicator only, approximately 45 percent of the world's population is excluded. Taking as an indicator for inclusion the actual use of the existing bank account the proportion of those excluded rises to around 77 percent.² This problem exists around the world, although it is more pronounced in poorer countries (see Figure 1).

Lack of financial inclusion is not only a social issue; it is also an economic one. A functioning financial system accessible to the entire national economy and all its groups is an important precondition for economic development.³ For example, there is a relationship between access to financial services in a country and that country's economic growth. As a result, economic policy in many countries systematically targets the development of financial infrastructure by creating financial institutions with the greatest possible amount of coverage. However, the existence of these types of institutions is only one of the prerequisites for financial inclusion; after all, people must take advantage of the spectrum of services offered. In order for extensive, complex financial services to be completely accepted and used, the entire population must have an adequate level of financial literacy.

1 Financial inclusion is considered an important step toward achieving the 17 sustainable development goals. See Leora Klapper, Mayada El-Zoghbi, and Jake Hess, "Achieving the sustainable development goals: The role of financial inclusion," *CGAP Working Paper* (2016).

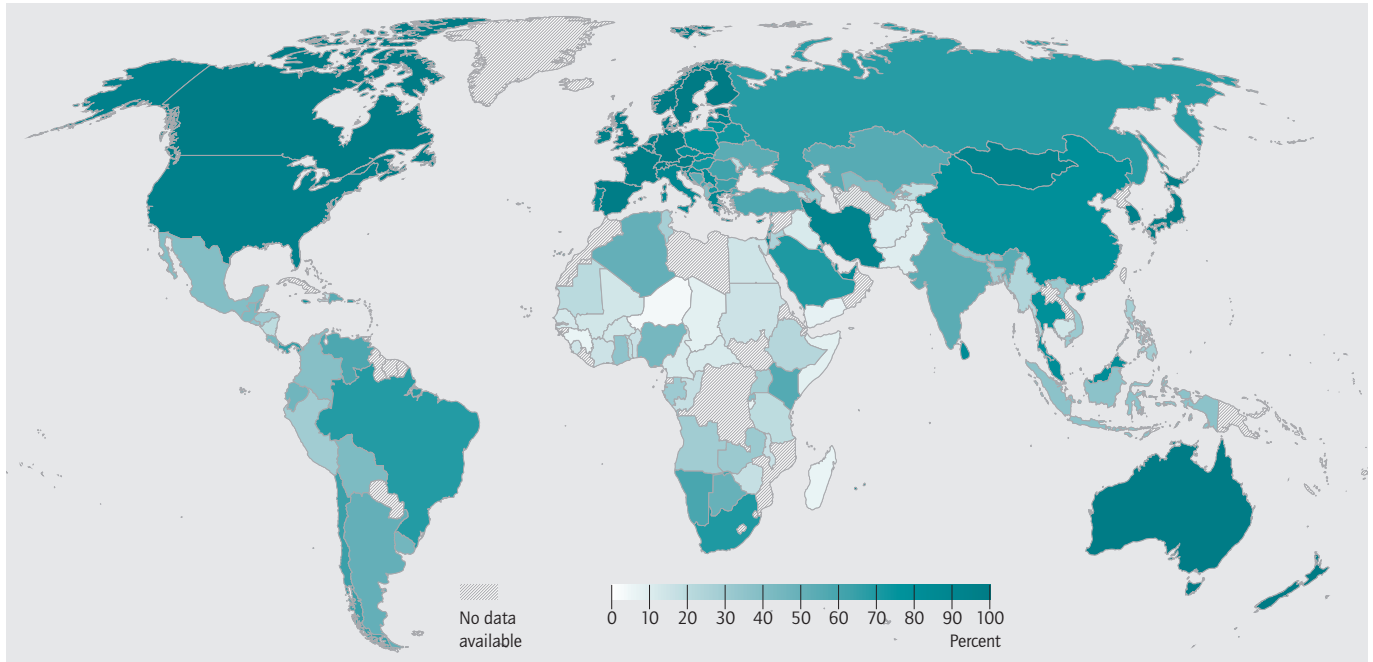
2 Here, "use" means that at least one transaction has been completed with the account in one year.

3 For example, see Ross Levine, Norman Loayza, and Thorsten Beck, "Financial intermediation and growth," *Journal of Monetary Economics* 46(1) (2000): 205-224.

Figure 1

Financial inclusion worldwide

Percentage of people owning a bank account in each country



Sources: World Bank; FINDEX Data.

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The level of financial inclusion is related to the level of economic development.

Indeed, the present report shows that higher financial literacy has as much of a positive influence on financial inclusion as a developed financial infrastructure.⁴ In countries with low financial development, financial literacy can replace the effect of financial infrastructure on access to finance. When financial institutions are more developed, financial literacy can complement existing financial institutions and ensure that people use more financial services. Many countries could leverage these relationships in their economic policy, targeting improvements in financial literacy more actively in addition to developing financial institutions.

⁴ For more detailed information, see Antonia Grohmann, Theres Klühs, and Lukas Menkhoff, "Does financial literacy improve financial inclusion? Cross country evidence," *DIW Discussion Paper* 1682 (2017) (available online, accessed September 26, 2017. This also applies to all other online sources in this study, if not stated otherwise).

Which measure of financial inclusion is most suitable depends on the developmental stage of an economy

To conduct empirical studies on financial inclusion, quantifiable indicators that show the level of financial inclusion in a given economy are required. The literature on the subject contains a number of proposed indicators.⁵ "Availability of a bank account," as mentioned above, is the most widely used indicator. As a rule, all types of accounts are included. The indicator includes both savings accounts and checking accounts because in some parts of the world, cashless transactions are still unusual or even impossible. Mobile money accounts are also included in the definition.⁶ They offer the opportunity to save or transfer money using a mobile phone.

⁵ Asli Demircuc-Kunt and Leora Klapper, "Measuring financial inclusion: Explaining use of financial services across and within countries," *Brookings Paper on Economic Activity* (2013): 279-321.

⁶ Jenny Aker and L. M. Mbiti, "Mobile phones and economic development in Africa," *Journal of Economic Perspectives* 24 (2010): 207-232.

This case already shows that financial inclusion means something different at each stage of an economy's development. The possession of a bank account could surely be considered a lowest common denominator for all countries. It would be a decisive step for many people, providing them with a secure deposit for their money or the opportunity to receive interest for the first time. These two benefits make it easier to save and, in turn, to invest money.⁷

In a country such as Germany, on the other hand, the type of account does make a difference. Some people encounter difficulty in gaining access to a checking account, whereas it is rather easy to get a savings account. And since most people have access to financial services in multiple forms, their appropriate use is a much more important consideration than it is in developing countries. After all, it is difficult to speak of true participation in financial services with households that are burdened with too much debt or invest their savings poorly.

Because the present empirical study addresses the situation of the global economy, it is subject to two restrictions regarding indicators of financial inclusion. First, issues of inclusion in rich economies are not typical for the world, and secondly, comparative data on different countries are available on a limited basis only. Consequently, we worked with four different indicators in this empirical study (see Box 1), including possession of a bank account as the most basic indicator.⁸

Financial literacy and financial infrastructure indicators

In order to study the influence of financial literacy and financial infrastructure on inclusion, indicators that measure the two factors on the national level are required. Until recently, the only national studies that existed used a common core of simple questions to determine financial literacy but vary a lot in detail.⁹ Since 2014, a data set resulting from identical questions on financial literacy in representative surveys in 143 countries has been available. It is a major step forward for empirical analyses that compare countries.¹⁰

⁷ Pascaline Dupas et al., "Banking the unbanked? Evidence from three countries," *NBER Working Paper* 22463 (2016).

⁸ See Grohmann et al., "Financial literacy and financial inclusion."

⁹ For an overview, see Annamaria Lusardi and Olivia S. Mitchell, "The economic importance of financial literacy: Theory and evidence," *Journal of Economic Literature* 52(1) (2014): 5–44.

¹⁰ Leora Klapper, Annamaria Lusardi, and Peter van Oudheusden, "Financial literacy around the world: Insights from the Standard & Poor's Ratings Service Global Financial Literacy Survey," (PDF, McGraw Hill Financial, New York, 2015) (available online).

Box 1

Measures of financial inclusion

There are many indicators for measuring access to financial institutions. This study is limited to access to financial products that clearly offer benefits to most people: bank accounts and debit cards. The benefits are less obvious for loans, for example. We measure both access to these products and their use, always with reference to a country's adult population.

Access to financial services:

1. Access to a bank account: the proportion of the population that possesses a bank account. This includes savings accounts and mobile money accounts.
2. Access to a debit card: the proportion of the population that possesses a debit card.

Use of financial services:

3. Use of a bank account: the proportion of the population that has used an account for savings in the past year.
4. Use of a debit card: the proportion of the population that used its debit card in the past year.

The questions probe respondents' understanding of four financial concepts: numeracy, inflation, compound interest (two questions), and risk diversification (see Box 2). The proportion of questions answered correctly varies with the question's degree of difficulty and the developmental stage of the country as measured by its income level (see Table 1). The values for Germany are listed for comparison. As anticipated, they are relatively high.

To be able to assess this individual information better, the questions are summarized to gain an index. The present study uses the data from a study in which "financially literate" describes someone who has understood three of four concepts correctly.¹¹ In the next step, the proportion of respondents who were financially literate according to the above definition are determined. For rich countries, the proportion is systematically higher than for poorer national economies (see Figure 2). For example, Germany achieves a value of 66 percent, while the value in Egypt is 27 percent.

¹¹ See Klapper et al., "Financial literacy."

Box 2

Five questions on financial literacy

The S&P Global Financial Literacy Survey surveyed a sample of around 1,000 adults in 143 countries. It asked a total of five questions on four different financial concepts: numeracy, interest compounding (two questions), inflation, and risk diversification. Respondents who indicated they understood three of the four concepts correctly are considered financially literate. For each question, respondents had the option to answer "I don't know" or "I refuse to answer" in addition to the answers listed below.

1. Numeracy

Suppose you need to borrow 100 US dollars. Which is the lower repayment amount: 105 US dollars or 100 US dollars plus three percent?

- a) 105 US dollars
- b) 100 US dollars plus interest

2. Compound interest

Suppose you put money in the bank for two years. The bank agrees to add 15 percent per year to your account. Will the bank add more money to your account the second year than it did the first year, or will it add the same amount of money both years?

- a) More in the second year
- b) The same in both years

Suppose you have 100 US dollars in a savings account and the bank adds ten percent per year to the account. How much money would you have in the account after five years if you did not remove any money from the account?

- a) More than 150 US dollars
- b) Exactly 150 US dollars
- c) Less than 150 US dollars

3. Inflation

Suppose over the next ten years the prices of the things you buy double. If your income also doubles, will you be able to buy less than you can buy today, the same as you can buy today, or more than you can buy today?

- a) Less than today
- b) The same as today
- c) More than today

4. Risk diversification

Suppose you want to invest money. Is it safer to put your money into one business or investment option, or to put your money into multiple businesses or investment options?

- a) One business or investment option
- b) Multiple businesses or investment options

Table 1

Financial literacy by income groups

	Question on numeracy	Questions on interest rates	Question on inflation	Question on risk diversification
Low income countries	41	47.1	38.4	45.6
Low middle income countries	45	42.6	50.4	31.8
High middle income countries	48.4	43.5	52.7	33.9
High income countries	50.7	50.6	61.3	52.9
Germany	66.1	64.3	61.6	73.6

Source: S&P Global Financial Literacy Data. Income groups are those used by the World Bank.

Even high and middle income countries have low levels of financial literacy.

There are many indicators for measuring the developmental stage of a country's financial infrastructure (similar to financial inclusion or financial literacy), but the ratio of the volume of outstanding private credit to GDP—the private credit-to-GDP ratio—is the most conventional measure in the literature. Of course the credit-to-GDP ratio has a positive correlation to economic development (see Figure 3).

Financial inclusion rises with the development of economies

Current regression analyses show that the measure of financial inclusion in a national economy rises with its development stage. This finding is indeed highly robust (see Figure 4). For a causal analysis of the effect of financial literacy on financial inclusion, it is therefore important to consider the relevant developmental stage of the countries in any calculations.¹²

Financial literacy is positively correlated with financial inclusion

Both financial literacy and financial inclusion are positively correlated with per capita income because these variables measure different aspects of development. Therefore, it is not surprising that these two financial variables also show a highly significant positive correlation (see Table 2). Due to their mutual correlation on general development, it is useful to include the common determinants in the calculations. We did this in two phases.

In an expanded regression analysis, we included additional general characteristics of the countries (see Table 2). This applies particularly to per capita income, as mentioned above. In addition, the proportion of the population that is able to work (which also has a positive effect on financial literacy when considered alone) and educational level are included in the analysis. The latter is measured by the proportions of the population with secondary and tertiary education. We expanded the analysis by two additional measures of financial infrastructure and two institutional measures that represent useful control variables for financial development.¹³ The results are plausible and show the importance of the controls for various statistically significant factors. Above all, all the regressions confirm that financial literacy makes a standalone contribution that surpasses that of the other known determinants.

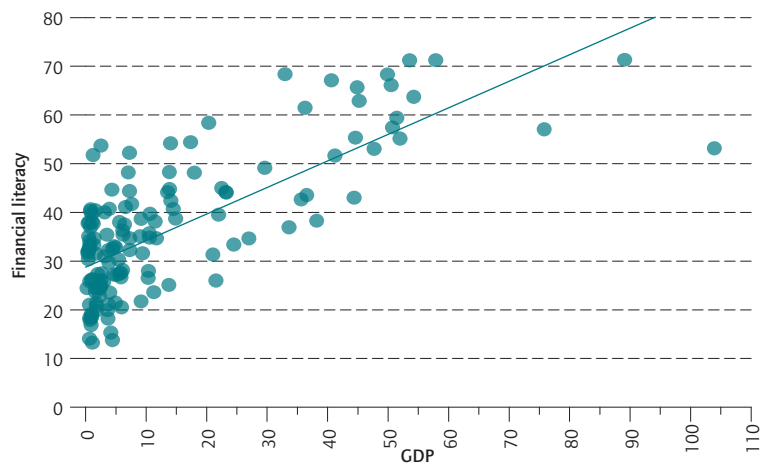
¹² See Thorsten Beck, Asli Demirguc-Kunt, and Maria Soledad Martinez Peria, "Reaching out: Access to and use of banking services across countries," *Journal of Financial Economics* 85 (2007): 234-266.

¹³ See Franklin Allen et al., "The foundations of financial inclusion: Understanding ownership and use of formal accounts," *Journal of Financial Intermediation* 27 (2016): 1-30.

Figure 2

Relationship between financial literacy and GDP per capita

Financial literacy measured by the share of adults who replied correctly to three out of four questions, in percent; gross domestic product per capita and year in thousand US-dollars



Sources: World Bank; S&P Global Financial Literacy Data.

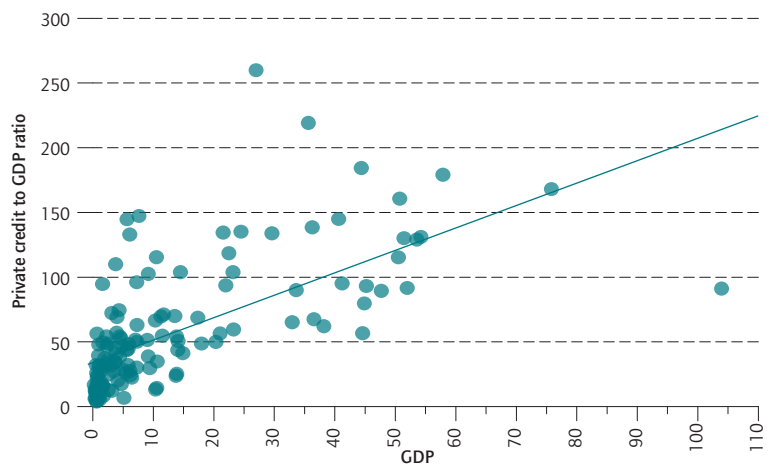
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There is a positive correlation between financial literacy and the level of economic development.

Figure 3

Relationship between financial literacy and GDP per capita

Financial development measured as private credit to GDP ratio; GDP per capita and year in thousand US-dollars



World Bank; S&P Global Financial Literacy Data.

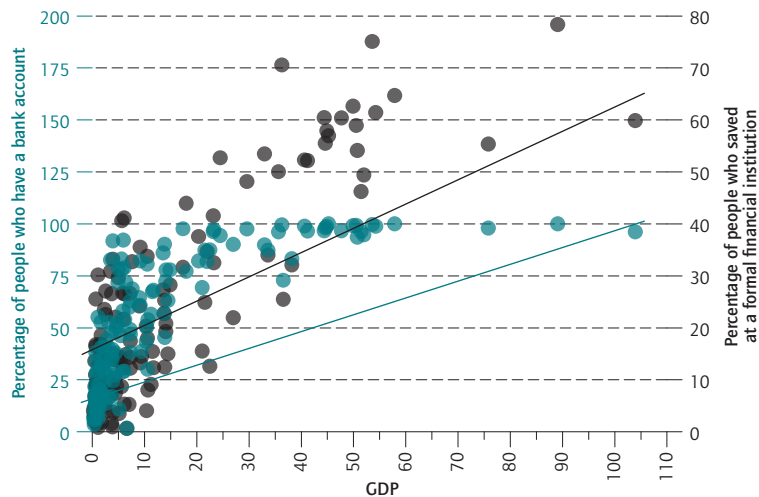
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There is a positive correlation between financial sector development and the level of economic development.

Figure 4

Relationship between financial inclusion and economic development

GDP per capita and year in thousand US Dollars



Source: World Bank.

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Financial inclusion is higher in richer countries.

The basic relationships shown also apply to other measures of financial inclusion. We used the proportion of persons who possess a debit card as another measure of access to finance (see Table 2). As measures of use of financial services, we took the proportion of those who actually deposited savings at a formal financial institution and the proportion of those who used their debit card in the past year.

In all regressions, per capita income remains a significant determinant. Financial infrastructure continued to play a distinct role, since the estimated effect of the credit-to-GDP ratio was positive in most cases, and the density of bank branches (a further measure of financial infrastructure) also showed this relationship. Ultimately, access to financial services is significantly easier in countries where it is easier to do business.¹⁴ So far, our calculations have confirmed that three variables known in the literature and one new variable positively affect financial inclusion: first, the relationship to per capita income is important; second, suitable general conditions play a helpful role (business conditions); third, financial infrastructure and fourth, financial literacy also show a positive relationship. The fourth point is new in comparative analyses of countries.

¹⁴ The "ease of doing business" index improves for smaller values, i.e., a negative effect in the estimate shows that greater ease of doing business is connected to higher inclusion.

Financial literacy and financial infrastructure can act as compliments

From the perspective of economic policy, the findings presented above raise the question as to how the policy of developing financial infrastructure preferred thus far interrelates with that of promoting financial literacy. Perhaps financial literacy is a luxury that countries can choose to afford but only promotes financial inclusion if a solid infrastructure already exists. Alternatively, literacy may be essential for financial and economic development. For an analysis of these issues, we added an interaction term between the credit-to-GDP ratio and the index of financial literacy (see Table 2). Since we did this for all four measures of financial inclusion, the result is four terms. Interestingly enough, their estimated effects are not identical. Therefore, there are various interactions between infrastructure and literacy, and each depends on the measure of financial inclusion observed.

For the simplest measure of financial inclusion, access to a bank account, the coefficient in question is negative and statistically significant. This indicates that the influence of financial literacy decreases with improved infrastructure. In line with this, from the viewpoint of policy makers it would make sense to substitute investment in financial literacy with investment in infrastructure. It also demonstrates the estimated effect of additional financial literacy on inclusion, depending on the level of the credit-to-GDP ratio as a measure of financial infrastructure (see Figure 5). Based on the confidence range showing the uncertainty of the estimate, it is obvious that given a much higher than average credit-to-GDP ratio, financial literacy no longer has a significant influence.

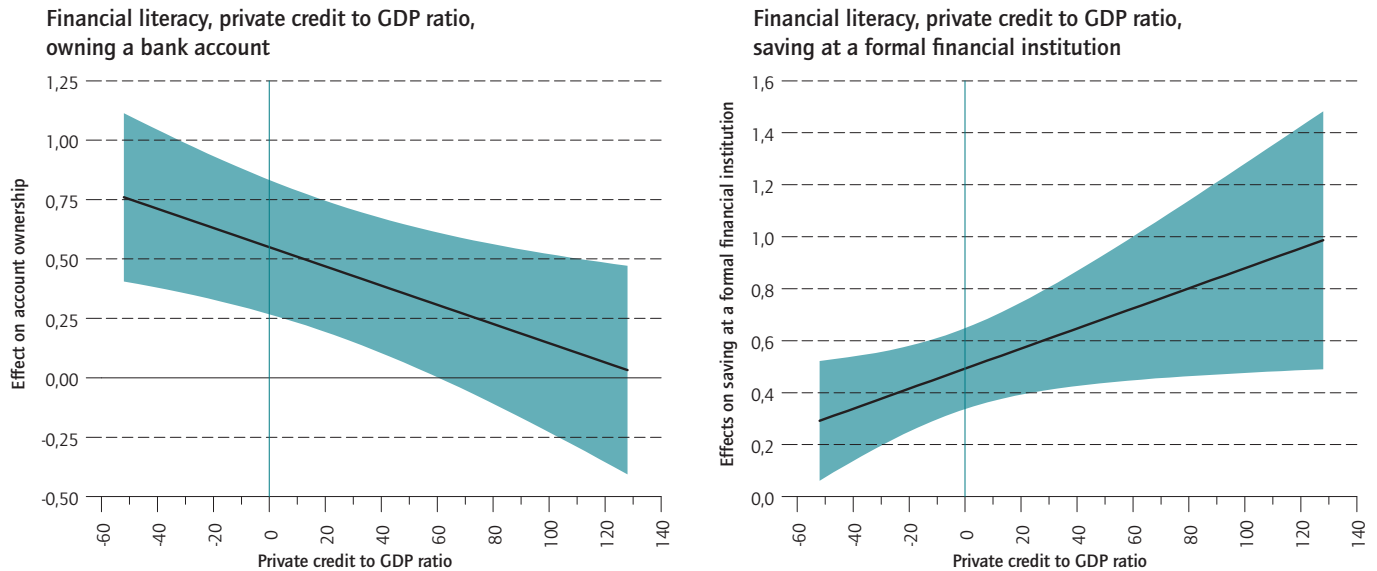
The interaction between financial literacy and infrastructure is the exact opposite when it comes to the use of savings accounts. The effect of the interaction term in the regression is positive, meaning that the influence of financial literacy rises with the credit-to-GDP ratio (see Figure 5). Further, the relationship is significant across all levels of financial infrastructure. This means that higher financial literacy actually reinforces the desired effects of the infrastructure. To put it more concisely, we can presume that financial literacy is necessary if people are to actually use financial infrastructure.

This assessment is extended by further estimates that will not be described in detail here.¹⁵ The effect of the interaction term is positive but insignificant for debit cards, a more sophisticated financial product, and positive and significant for the use of debit cards. Repeating this type of analysis using per capita income as a measure of finan-

¹⁵ See Grohmann et al., "Financial literacy and financial inclusion."

Figure 5

Financial literacy at different private credit to GDP ratios



Source: Authors' own calculations.

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The effect of financial literacy is different for different levels of financial education.

cial development instead of credit-to-GDP ratio provides qualitative confirmation of the findings. If bank branch penetration is used as the measure of financial infrastructure and not credit-to-GDP ratio, the interaction terms are not significant. All of these findings support the assertion that financial literacy has an effect that is independent of infrastructure in the case of a lower economic and financial level of development. However, when a country is more developed, it represents a critical variable for tapping the full potential of the available infrastructure with regard to the goal of inclusion.

Financial literacy has a causal, positive influence on financial inclusion

Although we have focused on presenting the effect of financial literacy and the control variables on financial inclusion as statistical correlations, we like to know if this relationship is causal. There are three approaches to examining it:

- Including the relevant control variables
- Evidence from experiments
- Generating estimates using random variation

First, it is possible to argue that if the relevant competing determinants are considered, the influence of financial literacy is causal and does not originate in other channels (see Table 2). However, there can also be a reverse effect on the development of both financial inclusion and financial literacy. This possibility may seem less plausible or relevant but cannot be ignored. In this respect other arguments may be useful.

Second, the literature contains evidence that higher financial literacy leads to improved access to and use of financial services. Various studies have shown that training courses designed to increase financial literacy can lead to more people having a bank account¹⁶ or saving more.¹⁷ This indicates that the relationship between financial literacy and financial inclusion is causal and takes the anticipated direction.

¹⁶ See Shawn Cole, Thomas Sampson, and Bilal Zia, "Price or knowledge? What drives demand for bank accounts in emerging markets?" *Journal of Finance* 66 (2011): 1933-1967.

¹⁷ See Doi Yoko, David McKenzie, and Bilal Zia, "Who you train matters: Identifying combined effects of financial education on migrant households," *Journal of Development Economics* 109 (2014): 39-55.

Table 2

Financial inclusion and financial inclusion

	1	2	3	4	5	6
	Own account	Own account	Own account	Owns a bank card	Saves at formal financial institution	Used bank card during the last year
	OLS	OLS	OLS	OLS	OLS	OLS
Financial literacy	1.444*** (0.101)	0.712*** (0.143)	0.511*** (0.140)	0.518*** (0.154)	0.529*** (0.086)	0.687*** (0.155)
GDP per capita		15.418*** (2.414)	13.223*** (2.798)	13.943*** (2.550)	6.238*** (1.518)	12.207*** (2.391)
Population between 15 and 64		0.277 (0.389)	-0.239 (0.342)	-0.482 (0.305)	-0.616*** (0.217)	-0.719** (0.301)
Proportion with secondary education		-0.007 (0.108)	0.018 (0.106)	0.028 (0.102)	-0.053 (0.068)	-0.031 (0.094)
Proportion tertiary education		0.050 (0.145)	-0.151 (0.137)	0.031 (0.150)	0.026 (0.107)	0.241* (0.142)
Private credit to GDP ratio			0.130*** (0.031)	0.093** (0.044)	0.114** (0.045)	0.046 (0.041)
Bank branch penetration 1,000 km ²			0.058*** (0.017)	0.034** (0.017)	0.033* (0.018)	0.029 (0.018)
Strength of law index			0.309 (0.542)	-0.002 (0.509)	0.146 (0.410)	0.332 (0.498)
Ease of doing business index			-0.102** (0.049)	-0.105* (0.053)	-0.030 (0.040)	-0.074 (0.059)
Constant	1.38 (4.318)	-132.72*** (16.349)	-71.89*** (25.653)	-77.52*** (24.802)	-18.961 (19.067)	-65.957** (29.774)
R ²	0.424	0.741	0.803	0.816	0.737	0.779
Observations	140	136	119	119	119	119

Note: The stars indicate a statistically significant relationship.

Source: Authors' own calculations.

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Countries with higher financial literacy also have a higher degree of financial inclusion.

Third, it is possible to include random variation in an estimate in order to rule out the possibility that the findings described above are the result of unobserved factors (such as socio-economic background), measurement errors in the financial literacy variables or reverse causality (i.e., from financial inclusion's effect on financial literacy). In the case at hand, the quality of a country's primary education in numeracy is a plausible random variation.¹⁸ This makes sense because financial literacy requires high levels of numeracy. At the same time, we can assume that high quality mathematics lessons do not

directly influence financial inclusion. The results of this study confirm the findings described above.

Conclusions

The present study shows that a high level of financial literacy in a country's population promotes financial inclusion. This effect is statistically robust and exceeds the effect that a well-developed financial infrastructure would have. Further, we show that financial literacy reinforces the effect of a solid financial infrastructure if the use of financial products is considered. In countries with less well-developed financial infrastructures, financial literacy can reinforce access to financial products.

¹⁸ See Noam Angrist, Harry Anthony Patrinos, and Martin Schlotter, "An expansion of a global data set on educational quality," *World Bank Policy Research Paper* no. 6536 (2013).

For this reason, economic policy targeted to financial inclusion should increase the level of financial literacy in the country in question and not only focus on expanding

financial infrastructure. Beneficial effects result in various ways for both poorer and richer countries.

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