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# **Female financial inclusion and its impacts on inclusive economic development**

## **Abstract**

This paper investigates the effects of female financial inclusion, on inclusive economic development. Financial inclusion, understood as the access to and usage of a diverse range of quality financial products and services, can have a positive effect on the reduction of income inequality. Specifically, when women participate in the financial system, the inequality gap decreases, enabling higher economic development, which also increases both physical and social wellbeing. An instrumental variable analysis is conducted on a sample of 91 countries, comprising both developed and emerging countries, using data from the Global Findex (2015) database and the World Bank DataBank. Our results effectively provide evidence attesting to the fact that greater financial inclusion of women, measured as access to a bank account and access to credit cards, has a positive effect on economic development. However, bank loans did not show any significance when explaining economic development.

**Key words:** financial inclusion, gender, economic development

**JEL Codes:** J16, O47

## **Introduction**

Financial inclusion, understood as the access to a diverse range of quality financial products and services, has become a subject of considerable interest for governments, researchers, and society in general. This interest is associated with the recognition of large gaps in financial inclusion throughout the world, which presents challenges to achieving economic stability and development. By gaps in financial inclusion we refer to the differences in access to and usage

of financial products, both bank assets and liabilities. As noted by Demirguc-Kunt et al. (2013), by promoting financial inclusion, we help address and reduce inequalities, thereby reducing poverty and improving economic development.

Financial inclusion is normally defined either as the access to different financial products and services or as the proportion of enterprises and individuals who use these services (Kim 2016). Conversely, financial exclusion reflects the incapacity of some social groups to access the financial system (Carbo et al. 2005), which leads to lower levels of investment due to lack of credit and the consequent need for people to turn to the informal sector to obtain credit at very high interest rates (Kim 2016).

These features are exacerbated in the case of women, since the gender gap in accessing formal financial services is large, especially in emerging economies. We talk then of inclusive economic growth in terms of gender inclusion because we believe that sustainable economic development cannot be achieved without empowering women. In fact, according to Global Findex (2014), compared with men women worldwide have 20% less probability of having a bank account and 17% less probability of receiving a formal financial loan. Potential explanations for this gender-based financial gap include either women having, on average, a lower level of financial literacy than do men in most countries (Grohmann 2016) or cultural differences (OECD 2012). According to the OECD report (2013) financial inclusion is strongly linked with income generating capability. Women face wider exclusion, which makes it relevant to address the issue of gender equality in economic activities. Johnson and Arnold (2012) noted that financial inclusion is closely related to employment. That women are unable to access financial products and services impedes them from taking advantage of market opportunities (Porter et al. 2015). Women also face many barriers when seeking adequate sources of financing for their business activities, which blocks their capacity as entrepreneurs (Marlow and Patton 2005).

In this context, and given, to the best of our knowledge, that there has been no comparable prior empirical study this paper aims to analyze empirically whether greater financial inclusion

of women has a significant effect on the economic development of a country. To do this, we use a sample that considers both developed and emerging countries in 2014, and we control for potential endogeneity in the empirical model. By doing so, we advance research on the classic Solow model, incorporating new variables related to financial inclusion and, thus, opening new fields of research.

The rest of the paper is structured as follows: First, we outline the theoretical framework and the hypothesis to be tested. Second, we explain the sample and the methodology used. Third and last, we describe and discuss the results and present our conclusions, together with some ideas for future research.

### **Theoretical Background**

Financial inclusion refers to the access and use of quality, sustainable, and safe financial services by all the economic agents of the population. Financial services can include a long range of products and services provided by banks and other financial institutions, but the main products usually considered are bank accounts, credit cards, ATM services, loans and other forms of credit. A society is financially inclusive when most of its population has access to these financial products. Financial inclusion can contribute to greater socioeconomic equality by reducing poverty and enabling the development of financial services and infrastructure (Shrivastava and Satam 2015). Conversely, financial exclusion can generate lower investment in the economy due to difficulty in accessing credit. Lack of access to financial services can have serious consequences for micro and small enterprises and the poor sectors of the population (Galor and Zeira 1993; Levine 2005; Beck et al. 2007; Honohan 2008). A developed financial system, that is a well-structured and efficient set of financial markets and financial intermediaries, such as capital markets and commercial and savings banks, is fundamental for economic progress, since, through the entry of new enterprises to the economy, these financial markets and institutions promote economic growth. Additionally, and talking always in financial terms, stability is triggered by those institutional reforms that expand access to methods of payment and other bank services, thus enhancing economic development and financial

inclusion (e.g, favoring the use of bank and credit services and products by the majority of the population, as in Law et al. 2014 & Morgan and Pontines 2014).

As pointed out by Levine et al. (2000), Christopoulos and Tsionas (2004), and Loayza and Ranciere (2006), the more developed either a bank or a market, the higher the economic growth. Thus, an improvement in banking operations can stimulate the assignment of resources and accelerate economic growth (Boyd and Prescott 1986; Greenwood and Boyan 1990; Levine and Zervous 1998). For example, by improving risk management, increasing asset liquidity for savers, and decreasing the negotiation costs, banks can stimulate investment in potential economic activities (Bencivenga and Smith 1991; Obstfeld 1994; Greenwood and Smith 1997).

However, despite the large expansion of financial products among the population in the world, 2,500 million adults worldwide still lack access to basic financial services (World Bank 2012), which can affect negatively the levels of poverty and prosperity of countries. This is accentuated for women by virtue of them having very low participation and influence in the financial market. Thus, at present, not only do gender differences affect opportunities in areas such as labor, education, and democracy, but this inequality is also reflected within the financial sector, especially when referring to financial inclusion in emerging and non-emerging countries. In this regard, there are significant gaps according to gender when saving, making payments, lending money, and in the quantity of bank loans received. For example, according to the World Bank (2012), only 37% of women in emerging countries are connected with any financial activity, compared to 46% of men. Noreen (2011) highlights that approximately 70% of the world's poor are women, who do not have access to financial and credit services.

A possible explanation is that financial education (understood as the knowledge of financial services and products and the capability of taking informed financial decisions, calibrating risks and improving human well-being) is significantly greater in men than in working women, even after considering age, marital status, and risk tolerance (Kar-Ming et al. 2015). In addition, the men in households more often specialize in making financial decisions than do women, thereby

acquiring greater financial knowledge. In any case, decision-making within a couple depends on the relative education of the spouses. Thus, women and men with similar levels of education to their spouses have the same number of financial responsibilities (Fonseca et al. 2011). Although studies are not conclusive, the literature tends to suggest that increased participation by women in generating their income allows them to improve their quality of life. In fact, women use to have better knowledge of the daily costs of supporting their families (Swamy 2013).

Regarding the potential measurements of financial inclusion, it has been suggested that ownership of a bank account<sup>1</sup> represents a crucial step toward women's financial empowerment. A bank account offers a safe way to save money, pay invoices, and exercise greater control over the household expenses (Global Findex 2016). At the same time, electronic or digital payments make it easier for women to make online financial transactions through the Internet to pay school fees or medical bills, etc., which allows them to have more free time. Demircuc-Kunt and Klapper (2012) note that there are marked differences between emerging economies and high-income economies in relation to the frequency of cash deposits or withdrawals, the form in which people access their accounts, and the payment systems they use. Most account holders in the emerging economies make cash deposits and withdrawals mainly through ATMs. Their counterparts in the high-income economies also use ATMs, although they often use debit cards, checks, and electronic payments, which reflects a higher financial education and inclusion, better control of their economies and overall a higher independence and equality of opportunities with respect to their male counterparts.

However, there are deficiencies in financial inclusion according to social position, with women, the poor, young people, and rural residents the most disadvantaged (Global Findex 2016). That another member of the family already has a bank account or the existence of barriers for accessing one are the principal arguments that women themselves identify as reasons why few women have a bank account (Demircuc-Kunt et al. 2013). These barriers

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<sup>1</sup> The motives for or advantages of using a bank account include the ability to use it to receive money or payments by the government, salaries, and money from family members who live in other places (Global Findex 2016).

range from a lack of assets to the requirements for opening accounts that leave women at a disadvantage, mainly because most commonly women are unemployed, do not have properties or a fixed income and cannot even provide a collateral when requesting a loan. At the regional level, the gender gap is larger in the southern part of Asia, where 41% of the men and only 25% of the women have a bank account. Conversely, in Sub-Saharan Africa, the difference is relatively small, with 27% of men and 22% of women having a bank account (Demirguc-Kunt et al. 2013).

It is important to note that transaction accounts<sup>2</sup> can provide access to banking services for those who are not integrated in the banking system, providing either a basic entry point or a wider path for financial inclusion. The use of transaction accounts for converting cash payments to digital payments facilitate individuals being part of the formal financial system, even when the traditional banks are either too far away or prefer not to accommodate the poor.

Nonetheless, financial inclusion goes beyond the ownership of bank accounts. To achieve full financial empowerment<sup>3</sup> women need to access a much broader range of financial services, such as loans and credit lines, which are fundamental to women entrepreneurs being able to develop their companies and, thus, stimulate economic growth and create jobs. Therefore, access to credit is an important factor in the economic development of a country by virtue of augmenting competitiveness, contributing to growth, making the economy more dynamic, and creating sources of employment (IFC 2011). In particular, women being able to get access to loans is a mechanism that generates opportunities at the time of starting businesses and that, consequently, can increase women's income, improve their quality of life, and promote the development of their families and communities. In addition, it encourages their empowerment,

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<sup>2</sup> A transaction account has tended to only mean an account in a bank. Nowadays, a transaction account could be a bank account, a mobile wallet, a payment card, or a similar electronic instrument (World Bank 2012).

<sup>3</sup> According to the Inter-American Development Bank (2010 p.3) women's empowerment refers to "*expanding the rights, resources, and capacity of women to make decisions and act independently in social, economic, and political spheres*". The United Nations (2001) defined women's empowerment in terms of five components: women's sense of self-worth; their right to have and determine choices; their right to have access to opportunities and resources; their right to have the power to control their own lives, both within and outside the home; and their ability to influence the direction of social change to create a more just social and economic order, both nationally and internationally.

facilitates their economic independence, elevates their self-esteem, and turns them into agents of their own development (World Bank 2012).

However, there are barriers to women gaining access to either resources or loans that could help them start a business. In general, women usually request loans less often than do men and, when they do so, ask for lower amounts than do men, basically turning to informal financial sources (for example, through networks of friends, family members, and acquaintances), since obtaining a loan in a formal institution (such as banks, savings banks, and cooperatives) is very complicated for them (Swaminathan et al. 2010). The principal obstacles that women encounter are lack of own resources, lack of titles of ownership or other goods that could function as guarantees, lack of business knowledge and financial education, high costs of indebtedness (interest rate), requirement for collateral (guarantees), or periods of indebtedness (short-, medium-, and long-term) (OECD 2013).

In addition, companies that have female participation tend to be smaller, and smaller companies have, on average, less access to external financing compared to large companies, which are mostly managed by men (Aterido et al. 2011, 2013; Asiedu et al. 2012). Women are less likely to be owners of an enterprise, although it is true that, once they are capable of breaking the “glass ceiling”,<sup>4</sup> they seem to be significantly more innovative in terms of not only products but also processes (Aterido et al. 2011).

In the case of many emerging countries, women entrepreneurs face perhaps even more barriers in accessing formal financial services (Rose 1992; Diagne et al. 2000; Goheer 2003; Faisal 2004; Richardson et al. 2004; GEM / IFC 2005; Bardasi et al. 2007; Ellis et al. 2007a and b; Demirgüç-Kunt and Levine 2009; Narain 2009). By emerging markets, we refer to markets such as Brazil, Egypt or Korea, which are characterized by a high increase in economic growth despite of their low income, traditional economies, less developed markets

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<sup>4</sup> The term “*glass ceiling barriers*” appeared for the first time in an article in the Wall Street Journal in 1986 in the United States. The article described the invisible barriers to which highly qualified workers are exposed that impede them from achieving higher hierarchical levels in the world of business, regardless of their achievements and merits (U.S. Department of Labor, Federal Glass Ceiling Commission, 1995).

and high-volatile currency. Although these studies find no evidence of explicit legal discrimination against female borrowers, banks do seem to discriminate against women in their lending practices. For example, in Pakistan, banks require two male endorsers who are not members of the family - female endorsers are not permitted. Nearly all women borrowers are required to have their husbands' authorization to access a loan, even collective loan plans, and single women are commonly not legitimized to access loans (Safavian 2012). The availability of credit may also improve women's status and their households' wellbeing. In fact, women's status increases as long as they have access to financial resources, and also when they invest their savings in other income-generating activities –such as farming or entrepreneurship, rather than just spending their savings in the family consumption (Swaminathan et al. 2010).

Schultz (2001) and Sharma (2003) provide an explanation as to why women engage in income earning activities that are distinct from those of their husbands: doing so may give women better control over the resources they produce and, depending on the cultural context, may increase their status and decision-making roles within the household. In cases where they obtain loans for consumption, that is, devoted to stimulate the consumption of goods and services, the status of women is also likely to increase, because the loan still represents an important contribution to their families' wellbeing. The loan is also an important source for financing consumables, such as seeds and fertilizers, which can improve agricultural productivity. An evaluation of a loan program in Bangladesh found that a loan is very important for improving the condition of women by "*increasing their self-esteem, or by bringing something of value to their homes*" (Kabeer 2001 p. 71). Similarly, Zeller et al. (2001) suggested that, in Bangladesh, the participation of women in loan programs had a significant and positive impact on the mobility of women and their social interactions at the community level.

It is quite commonly assumed that microfinance (provision of financial services in small amounts to stimulate small economies, as invented by Muhammad Yunus) has a special ability to empower women. Pitt et al. (2006) found that the participation of women in microcredits has



a positive effect on various indicators of women's empowerment, while the participation of men generally has a negative effect on the empowerment of women.

Finally, when referring to savings, and despite the many differences between men and women, all individuals seek low transaction costs, safety, positive performance rates, and rapid access to funds, although women place more value than do men on anonymity and social support in saving (Vonderlack and Schreiner 2001).

According to Demirguc-Kunt et al. (2013), 36% of adults (38% of men and 34% of women) worldwide either save or have money at their disposal. The gender gap in savings is greater for high-income countries, by seven percentage points (62% of men compared to 55% of women), whereas the gender gap in savings in the emerging countries is four percentage points (33% of men and 29% of women). There are gender differences in methods of saving. In all the regions, except Eastern Asia and Europe and Central Asia, a high fraction of men compared with women save their money using an account in a bank, a credit cooperative, or a microfinance institution. In turn, the women use bank accounts less than do men and tend to utilize microcredit more. Even when women have money, a large part of their income is dedicated to buying food and to the healthcare and education of their children, and they save a smaller proportion of their income than do men (Kumar and Sunderasan 2016).

As a result of studies that conclude that an improvement in banking operations can stimulate the assignment of resources and accelerate economic growth and development (Boyd and Prescott 1986; Greenwood and Boyan 1990; Levine and Zervous 1998), and considering that women tend to have less access to financial services than men, so that facilitating women's access to financial services is a straightforward way of increasing their financial inclusion, we propose the following hypothesis:

**H1:** *There exists a positive correlation between the level of female financial inclusion and the inclusive economic development level of the country.*

We define inclusive economic growth as the increase in gross domestic product (GDP) which takes place due to contribution of both men and women. We are however aware that this relationship is difficult to gauge, due to other interrelationships lying underneath. Aterido et al. (2013, p.102) call our attention to the fact that “when key observable characteristics or individuals are taken into account, the gender gap disappears... In the case of individuals, the lower use of formal financial services by women are explained by gender gaps in other dimensions of the use of financial services, such as their lower level of income and education, their household or their employment status”. Therefore, the net of relationships underneath can be very complex and very difficult to capture empirically. For this reason, the methodology employed for the analysis, which is described in the next section, will take this complexity into account.

## **Sample, Variables, and Methodology**

### ***Sample***

To test the hypothesis presented above, we examined 127 emerging and non-emerging countries worldwide in 2014. However, due to the presence of 36 missing values for different variables, the final sample amounted to 91 countries.

The information relative to the use of the financial services comes from the Global Findex (2015) database, which is the most complete database on financial inclusion in the world. The data are gathered by means of an alliance with the Gallup World Poll, financed by the Bill and Melinda Gates Foundation. The Global Findex is based on interviews of nearly 150,000 adults in more than 140 countries, providing 41 indicators on the use of financial services worldwide. The information is well adapted for measuring the gender gap in access to financing, since it allows direct observation of women’s control over their assets, an important component of economic empowerment. In addition, data related to the dependent and control variables were obtained from The World Bank DataBank, which contains a collection of time series data on a variety of macroeconomic topics for a broad range of developed and emerging countries.

## ***Measuring Variables***

*Dependent Variable.* As shown in Table 1, economic development is the dependent variable employed in this study (ECO\_ DEVELOPMENT); it is defined as the logarithm of GDP per capita, measured in real terms, as provided by the World Bank DataBank (Easterly 2001; Inglehart 2001; World Bank 2012). The economic development of either a country or a society is generally associated with an increase in income, consumption, savings, and investment. If the distribution of the income is very unequal, the growth of the economy cannot be accompanied by progress and cannot fulfil the objectives that are generally associated with economic development (United Nations Development Programme 2014).

*Explanatory and Control Variables.* Our explanatory variable is female financial inclusion. It can be measured through many different dimensions, as shown in Diagne et al. (2000) and Sharma (2015). In fact, the World Bank provides a set of Global Financial Inclusion (Global Findex) indicators that comprise save, borrow, and money payments' measures. In our case, to proxy financial inclusion, and according to the extant literature, we have selected three different measures, each of which refers to a different financial dimension. These measures are bank accounts, loans, and methods of payment.

Our first variable is access to either a saving or a bank account, ACCOUNTFI. Since we are focusing on gender financial inclusion, we measure the percentage of women over 15 years that report having an account at a formal financial institution, as in Demirguc-Kunt and Klapper (2012) and Schaner (2015). According to the OCDE (2012) report, bank account is measured as an account in a bank, a credit union, a cooperative, a post office, or a microfinance institution. In most cases, access to an account serves as an entry point to the formal financial sector. A formal account makes it easier to transfer wages, remittances, and government payments. It can also encourage saving and open access to credit.

Our second explanatory variable is BORROWEDFFI, defined as funds borrowed from a financial institution by the percentage of women who are older than 15 years (as in Augsburg et al. 2012; Shrivastava and Satam 2015; Dutt and Sharma 2016; Ghosh and Vinod 2017).

The overall rate of the origination of new loans is fairly steady across income groups, regions, and individual characteristics. Although both forms of loans, formal and informal, are provided by the Global Findex, we focus only on formal loans, which is a more refined proxy for financial inclusion. On average, slightly more than 30% of adults in both high-income and developing economies report having borrowed money in the past 12 months. Measures of loans are sensitive to the business cycle and current economic factors, and also to the tax, legal, and regulatory environment. Despite this, loans are good measure of financial inclusion, and they should be incorporated in any study.

Our third explanatory variable is also related to credit, but it is also a method of payment itself. We refer to the use of a credit card, which is used both as a method of payment and as a short-term credit mechanism. Thus, we construct the variable CREDITCARD, which is defined as the percentage of women over 15 years who use a credit card. As noted in the OECD (2012) report, the introduction of credit cards has had a big effect on the demand for and use of short-term formal credit. In high-income economies, 50% of adults report having a credit card. Credit card ownership in developing economies, despite a surge in recent years, still lags far behind: only 7% of adults in these economies report having one. The share of adults who report having a credit card is also high in Latin America and the Caribbean, particularly in Brazil and Uruguay, and in Europe and Central Asia. However, the credit card market is virtually nonexistent in economies such as Egypt, Pakistan, and Senegal (with less than 2%).

Additionally, as control variables we considered the following:

Labor force (LABOR\_FORCE): The proportion of the population aged 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period (Bartelsman et al. 2009; Shiferaw and Bedi 2010; Inchauste et al. 2012; Azevedo et al. 2013). Employment is a determining factor for achieving economic and social development. Beyond the crucial importance that it has for individual wellbeing, it is the axis of many broader objectives of society, such as the reduction of poverty, the increase of productivity in the entire economy, and social cohesion. The benefits that employment

generates in development include the acquisition of specialized knowledge, the empowerment of women, and the stabilization of societies that come out of conflicts (OECD 2006).

Capital (TECHNOLOGY): Is measured as the expenditures for research and development (R&D) which are proxied by current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development (Schumpeter 1934; Nordhaus 1969; OECD 1996; Vilaseca and Torrent 2005). Technological change is one of the most important determining factors of growth and economic development, for various reasons, including improving working conditions, reducing working hours, and increasing the production of goods (Mansfield 1968, a and b). In addition, the principal advantage of technological innovation is the multiple synergies that are generated in the rest of the economy (OECD 1996). In general, economic growth is based not only on the accumulation of productive factors, such as capital and employment, but also on innovation in economic activity, that is, in technological progress (Vilaseca and Torrent 2005).

Type of country (COUNTRY): Dummy variable that equals one for emerging countries and zero otherwise, since, according to different authors, the economic behavior of each type of country may diverge from that of other types, due to the influence of both geography and culture (Assidon 1992; Deininger and Squire 1998; Kraay 2004; Weisbrot and Ray 2011; Swamy 2013).

**Table 1. Definition of Variables**

<b>Panel A: Dependent variable</b>	
<b>Variables</b>	<b>Description</b>
ECO_DEVELOPMENT	GDP per capita [included as logarithm in the analyses]. GDP is the sum of gross value added by all resident producers in the economy, plus any product taxes, and minus any subsidies not included in the value of the products. It is calculated without making deductions either for depreciation of fabricated assets or for depletion and degradation of natural resources.
<b>Panel B: Explanatory and control variables</b>	
ACCOUNTFI	Account at a financial institution, female (5 age 15+).
BORROWEDFFI	Borrowed from a financial institution, female (5 age 15+).
CREDITCARD	Credit card, female (5 age 15+).
LABOR_FORCE	The proportion of the population of ages 15 and older that is economically active: all people who supply labor for the production of goods and services during a specified period.
TECHNOLOGY	Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.
COUNTRY	Dummy variable that equals one for emerging countries and zero otherwise

### **Methodology**

Although causality is difficult to gauge, we have still analyzed the correlation among our variables from a sophisticated model, which takes endogeneity into account by means of the used of lagged values which are traditionally considered as instrumental variables. We thus employ a two-step estimation procedure where the instruments are the lagged values for the explanatory and control variables. The values for 2011 have been used as lags due to the time coverage of the Global Findex database. In any case, we consider that, by having a relative time lag between the dependent variable and the independent variables, a possible problem of endogeneity is being controlled better. In addition, robust models have also been estimated to control for heteroskedasticity. Our attempt behind the use of this methodology has been to control for endogeneity and clarify the causation or correlation relationship which lies underneath in our hypothesis, as far as the data available allow it.

The final model is as follows:

$$ECO\_DEVELOPMENT = \alpha + \beta_1 ACCOUNTFI_{t-3} + \beta_2 BORROWEDFFI_{t-3} + \beta_3 CREDITCARD_{t-3} + \beta_4 LABOR\_FORCE_{t-3} + \beta_5 TECHNOLOGY_{t-3} + \beta_6 COUNTRY_{t-3} + \varepsilon$$

(1)

Where  $\alpha$  is the constant and  $\epsilon$  is the error term.

## Results

Table 2 presents the main descriptive statistics. They show that, for our sample, 12% of the women have financial participation through loans, and 18% have a credit card. A total of 52% of women have access to a bank account. The mean level of economic development is 15,913.69. Table 3 lists the correlation coefficients of the variables used in the estimations. Although some of the variables show a statistically significant correlation, analysis of the variance inflation factors (VIF) has revealed no evidence of multicollinearity, as all VIF values remain below 10 (Kleinbaum et al. 1998).

**Table 2. Summary statistics**

<b>Panel A: Continuous variables</b>				
Variable	Min.	Max.	Mean	St. Dev.
ECO_DEVELOPMENT	286.002	117,507.8	15,913.69	20,022
ACCOUNTFI	3	100	52.534	32.629
BORROWEDFFI	0.3	40.2	12.062	7.552
CREDITCARD	0.1	76	18.129	20.438
LABOUR_FORCE	41.3	89.1	62.423	9.165
TECHNOLOGY	0	2.834	0.033	0.297
<b>Panel B: Dummy variables</b>		Frequency (percentage)		
COUNTRY		73.63%		

n = 91

**Table 3. Correlation matrix for the dependent and explanatory variables**

Variables	1	2	3	4	5	6	7
1. ECO_DEVELOPMENT	1						
2. ACCOUNTFI	0.868***	1					
3. BORROWEDFFI	0.538***	0.518***	1				
4. CREDITCARD	0.799***	0.789***	0.556***	1			
5. LABOUR_FORCE	-0.276**	-0.235**	-0.058	-0.116	1		
6. TECHNOLOGY	0.148	0.143	-0.050	0.097	-0.014	1	
7. COUNTRY	-0.614***	-0.649***	-0.406***	-0.704***	0.159	-0.172	1

(p-value) \* Statistically significant at a 0.1 level \*\* Statistically significant at a 0.05 level \*\*\* Statistically significant at a 0.01 level

Table 4 summarizes the results of the multivariate analysis through a hierarchical regression. Our estimations were obtained using the STATA12 program. For Model 1, only the

three control variables are included; Model 2 adds the proxy variable for saving or bank account, ACCOUNTFI; Model 3 incorporates the proxy for bank liabilities, BORROWEDFFI; and the final extended model, Model 4, includes all the variables simultaneously. Focusing on Model 4, our estimations support Hypothesis 1, since two out of the three selected proxies come up significant when explaining inclusive development. The model shows that women having accounts at a financial institution (ACCOUNTFI) is positively correlated with the country's economic development ( $\beta = 0.023$   $p = 0.005$ ), and the variable CREDITCARD is positively correlated with the economic development ( $\beta = 0.023$   $p = 0.015$ ). However, the variable BORROWEDFFI, or funds borrowed from a financial institution by a woman, is not statistically significant, which implies that, regarding female inclusion, borrowing from financial institutions is not driving higher development, whereas the use of bank accounts and credit cards are triggering economic development.

These results are in line with other previous studies (Pitt et al. 2006; Asiedu et al. 2013; Saroj et al. 2015; Terrence et al. 2017) that suggest a positive correlation between financial inclusion and economic growth. Our original contribution is to focus our results on *female* financial inclusion. From these we can conclude that female financial inclusion is positively correlated with economic growth.



**Table 4. Results**

Variable	Model 1	Model 2	Model 3	Model 4
ACCOUNTFI		0.032*** (5.16)	0.025*** (3.24)	0.023*** (2.84)
BORROWEDFF			0.035 (1.41)	0.004 (0.17)
CREDITCARD				0.023** (2.43)
LABOUR_FORCE	-0.025 (-1.24)	-0.009 (-0.66)	-0.011 (-0.77)	-0.015 (-1.09)
TECHNOLOGY	6.123 (0.95)	1.105 (0.54)	1.582 (0.69)	-0.800 (-0.49)
COUNTRY	-1.144** (-2.48)	-0.268 (-0.91)	-0.273 (-0.97)	-0.65 (-0.23)
F	4.24**	34.68***	24.89***	36.55***
R-Squared	-1.13	0.72	0.68	0.76
No. observations	91	91	91	91

(t-statistic) \* Statistically significant at a 0.1 level \*\* Statistically significant at a 0.05 level \*\*\* Statistically significant at a 0.01 level

### *Robustness and Additional Results*

With the aim of establishing the robustness of the results obtained, we tested additional estimations. Firstly, the models were re-estimated considering an alternative proxy for borrowed funds. More specifically, BORROWEDFFI was substituted by BORROWEDFF, which denotes funds borrowed from a private informal lender by a woman. Secondly, instead of using an instrumental variables' approach, we employed an OLS analysis considering as explanatory and control variables those refer to 2011 year. The conclusions from this analysis were the same as in the main model, supporting our hypothesis.

### **Discussion and Conclusions**

The current paper analyses whether female financial inclusion affects economic development, using samples from both developed and emerging countries. Our results suggest that the gender gap in financial inclusion (understood as the access to the financial system) has a negative effect on development. In other words, the participation of women in the financial system improves both economic and social wellbeing globally.

In addressing this issue, we considered three different main dimensions of financial inclusion: access to a bank account, access to credit, and measures of payment. We found two of those

dimensions - access to a bank account and access to a credit card - to be significant when explaining economic development. Conversely, access to a formal loan does not come as significant when explaining this relationship. The combination of the bank account and the credit card works as a good indicator for female financial inclusion, since the availability of economic funds in the short-term seems to be more relevant for personal development and entrepreneurial initiative.

Since higher financial inclusion drives higher economic growth, we can also conclude that it is associated with less poverty and vulnerability for women, as women benefit from greater financial independence, and an increase in productivity as also noted by Demirguc-Kunt et al. (2013). Financial inclusion generates opportunities to start a business and succeed in such a business; female financial inclusion improves the quality of women's lives and promotes development of their families and their communities. It promotes the employment of women, encourages their economic independence, raises their self-esteem, and turns them into agents of their own development, ultimately making the economy more dynamic and creating employment (Kim 2016).

Regulatory authorities, at both international and national levels, have adopted financial inclusion as a priority for stimulating economic development. Our analysis indicates that female financial inclusion is crucial for exercising women's economic autonomy and helping countries advance in terms of gender equality, in addition to fighting poverty, improving productivity, and promoting sustainable growth. It was already noticed by the World Bank (IFC 2013) that when women participate actively within the financial system, economic growth is higher, inequalities decrease, and both physical and social wellbeing are greater. Women's access to safe, easy, and affordable credit, and other financial services in emerging countries is recognized as a necessary condition for accelerating economic growth, reducing disparities in income, and reducing poverty. Access by women to a financial system that functions well, through the creation of conditions of equal opportunities, allows those women who are economically and socially excluded to be integrated better in the economy and to contribute actively to economic

development and to protecting against economic crashes (Swamy 2013). This research clearly shows not only the importance of developing mechanisms that favor female access to bank accounts and credit, eliminating any type of barrier that might exist, but also the need to promote financial education, culture, and literacy in women. Although it is not mentioned by Swamy, the reason could also be that women are discouraged by the environment or their families or even prevented from having financial autonomy. Gender differences persisting in financial education are found in nearly all surveys; in most countries women are less likely to give precise responses to questions related to financial education, and they often ignore the answers or do not fully complete the survey (Lusardi and Mitchell 2007; ANZ Banking Group 2008; Delavande et al. 2008; Hung et al. 2012; OECD 2013). Greater economic empowerment of women will have a positive effect on their entrepreneurial capacity, their investments, and their planning for the future. Moreover, and in particular, the entire country can benefit, experiencing a higher level of economic development and make it inclusive economic development, i.e., an economic development that takes into account the role of women in equal conditions.

Thus, our main conclusion supports the need to promote financial literacy among women in both emerging and developed countries and, consequently, increase their financial inclusion. It is imperative to make efforts to induce banks and financial institutions to increase financial services for those sectors that are considered priority and help women and the poor increase their income and wealth and achieve inclusive economic development.

Although the methodology employed does not allow us to assert that all the relationships here are causal, we believe we have filled an important gap in knowledge. We hope it will be fruitful from an academic perspective as well as to inform the policy debate. In this sense, we are willing to build a panel, which helps us apply more robust methodologies to address this problem, although the lack of a continuous time series makes it difficult in the short-run. We also attempted to incorporate other relevant variables, such as those related to mobile banking, as in Gichuki and Mulu-Mutuku (2018) but they were unavailable for our whole time period.

However, in future research, we would calibrate the impact of broader indicators of financial inclusion, specifically, in relation to mobile banking and other forms of digital banking, once the available time period is long enough for the analysis. In future research, it could also be interesting to study the factors determining greater female financial inclusion and the potential moderating effect of the type of country (developed versus emerging markets), the institutional context (for instance, the provision of private credit is frequently higher in countries with better creditor protection and broader credit information coverage), and the interaction among female financial inclusion and interest rates and their impact on economic development. Finally, as mentioned throughout the paper, we would like to address the effects of education and, specifically, financial literacy in financial inclusion and women's capacity for both developing and managing business activities (OECD 2013). The moderating effect of women's marital status and educational level could be very relevant, as suggested by Fonseca et al. (2011).

Gathering all this information would be useful in designing measures that could reduce the gender gap in financial inclusion and promote not only the integration of women in labor and business but also their equal access to economic-financial resources, thus improving the position of women in relation to their economic planning and to savings, which is fundamental for improving a country's economic wellbeing.

The importance of reducing the gender gap in financial inclusion is highlighted by this investigation, and new fields of research and new databases are opened for improving the study of women's equality. Governments and financial institutions should work together to reduce the gender gap in financial inclusion and to improve economic development by empowering women. Our analysis suggests that these two objectives could be achieved simultaneously.

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