

Financial inclusion and education: An empirical study of financial inclusion in the face of the pandemic emergency due to Covid-19 in Latin America and the Caribbean

Amirreza Kazemikhasragh¹  | Marianna Vanessa Buoni Pineda² 

¹Department of Management, University of Bologna, Bologna, Italy

²Faculty of Economics, University of Bologna, Bologna, Italy

Correspondence

Amirreza Kazemikhasragh, Department of Management, University of Bologna, Via Capo di Lucca, 34, 40126 Bologna, Italy.
Email: amirkazemi@outlook.com

Abstract

Financial inclusion and education contribute to a country's development and economic growth. However, despite the significant efforts being made to increase access to financial products for women, a high percentage still do not have access to and effective use of formal financial services in the countries of Latin America and the Caribbean. This study analyzes financial inclusion (based on gender equality) in the countries studied using a pooled-panel ordinary least squares econometric technique. Furthermore, the impact of interactions between the level of study, use of technology, academic degree during the Covid-19 restrictions, number of credit borrowers, and number of borrowers with the interaction of the restrictions during the health emergency was evaluated employing the Gini coefficient and human development index (HDI). This study confirms that Latin America and the Caribbean countries can increase financial inclusion by changing their social aspects based on gender equality to ease using technology and access to credit. The results of this study are helpful for policy-makers in formulating and implementing policies that lead to action plans that reverse an exclusionary financial system, promote financial education, and empower women.

KEYWORDS

financial inclusion, gender diversity, stringency, sustainable development

JEL CLASSIFICATION

D14; G21; J16; O16

1 | INTRODUCTION

Financial inclusion and education are strategies for developing projects to reduce the gender gaps in financial services by offering adequate and formal access to financial products and services. In addition, financial inclusion guarantee training and advice to improve financial capabilities gain financial autonomy. Furthermore, regarding Girón and Kazemikhasragh (2021), the inclusion of women in the financial system promotes economic growth and development since women contribute significantly to the well-being of families, communities, and society.

Specifically, Latin America and the Caribbean countries face significant lags in access to formal financial alternatives for women. Unfortunately, numerous studies show that the pandemic has brought economic consequences and exacerbated inequalities in the educational, labor, and health system sectors. In other words, gender gaps limit the possession and use of financial products and services, the educational level, and use of and access to technology.

This research shows the importance of financial inclusion and the value of education and the use of technology. Combining these tools allows us to break with gender conceptions and stereotypes. Paying attention to this study will allow the formulation of the policies that guarantee access to financial products, which allow women to carry out entrepreneurship activities, manage their businesses, and participate in the economies and development of the countries studied. Also, women are more likely to invest in their families' education (Xheneti et al., 2019) to manage economic shocks (Jaim, 2021) and restrictions like the Covid-19 pandemic. Also, in this study, we considered the stringency index from Hale et al. (2020), which captures the level of government intervention in citizens' daily lives in the countries studied.

Indeed, the studies by Nomaguchi and Milkie (2020), Llana-Nozal et al. (2019), Ciciolla and Luthar (2019), and Goldberg et al. (2021) confirm that women tend to invest a greater part of their money in the education, health, and well-being of their children. In addition, financial services can contribute to their economic empowerment by providing them with the essential tools to generate income, accumulate assets, and have greater participation in household decision-making, reinforcing family and social well-being.

There are numerous efforts by the international community, non-governmental organizations, and researchers to reduce the gaps in gender financial inclusion and education. However, some studies (Garikipati et al., 2017; Hussain et al., 2019; Zaid et al., 2020) confirm the hypothesis of gender discrimination in the financial system. In contrast, others (e.g., Bonin et al., 2021; Soriano, 2017; UNWomen, 2017) affirm that the barriers to the financial inclusion of women are unfortunately closely related to economic, social, and cultural factors. In this sense, women are usually linked to an informal labor market, temporary jobs, lower levels of training, and prejudices in the assignment of tasks related to gender roles, limiting their professional development and worsening earnings inequalities (Demir, 2021; Feng et al., 2020; Srivastava, 2019).

The context of the crisis caused by Covid-19, during which this research was carried out, shows the need to accelerate the process of financial inclusion of women to achieve economic independence in the face of the crisis. CEPAL (2021) reported that women's employment fell by 4.2% globally. In Latin America and the Caribbean, employment dropped by 46% in 2020.

This paper aims to identify education and access to financial services in the region's countries during the pandemic, to present a financial inclusion index (based on gender equality) to measure the access to financial services, and to highlight that opening a bank account, the number of branches, and ATMs are not necessarily indicators of financial inclusion. In addition to expanding the literature on gender equality in Latin America and the Caribbean, in particular, this study addresses the following research hypotheses:

Hypothesis 1: Education has a positive impact on financial inclusion.

Hypothesis 2: The use of technologies increases financial inclusion.

Hypothesis 2.1: The interaction of stringency index and education positively impact financial inclusion considering the use of technology in education during Covid-19.

Hypothesis 3: Income inequality has a negative impact on financial inclusion.

Hypothesis 4: The HDI has a positive impact on financial inclusion.

2 | LITERATURE BACKGROUND

Gender equality and financial inclusion are objectives in the 2030 agenda of the United Nations Sustainable Development Goals. In recent decades, efforts have multiplied in most economies worldwide to formalize the use of and access to financial services. Also, inclusive policies have been implemented to reduce gender inequality, boost the economy, and reduce the barriers that multiply the difficulties of growth and empowerment of women. Therefore, according to various authors (e.g., Mader, 2018; Ouma et al., 2017; Park & Mercado, 2018), financial inclusion becomes a vital tool for reducing poverty and impacting their quality of life.

According to Allen et al. (2016), financial inclusion promotes economic development since it encourages the user to save, provide financing for consumption and investment of households and companies, manage risks, and face economic crises. To counteract the negative effects of the Covid-19 pandemic, national governments in Latin America and the Caribbean have used economic support programs aimed at the most vulnerable groups. For example, Argentina offered digital financial products and increased access subsidy and compensation benefits. However, financial products in Argentina, specifically the credit system, are minimal (Sabourin et al., 2020).

According to Blofield et al. (2020) and Busso et al. (2021), other Latin American countries such as Bolivia have granted social aid to the vulnerable population with informal jobs to mitigate the socioeconomic impacts. In contrast, Chile has introduced economic benefits and social assistance programs (Gerard et al., 2020). Chile has also promoted financial inclusion through opening online bank accounts.

Despite advances in financial inclusion in the region to achieve greater participation of the population in the financial sector, the levels of inclusion in any of its dimensions remain low.

However, Latin America is lagging in terms of education, and access to and use of financial services by women to promote financial well-being and economic and social inclusion and an important warning to consider in the face of economic shocks such as economic shocks generated by Covid-19.

There is evidence from various studies (Durst & Gerstlberger, 2021; Rudolph et al., 2022; Wernick & Correia, 2020) on gender gaps in access, training and use of the products and services offered by the financial sector. In the context of Latin America and the Caribbean, the evidence from scientific studies agrees that there is a gender gap. Moreover, almost 70% of small and medium-sized companies belonging to women who requested a loan could not obtain it through banking institutions. In this sense, the population resorts to informal savings and financing mechanisms, excluding investment opportunities or risky alternatives with little return. Gender inequality restricts women's access to financial services.

The results of the study by Girón and Kazemikhasragh (2021) show that gender inequality negatively impacts economic growth and that women with low educational levels are more affected by gender inequality. Another study by Moşteanu (2020) indicates that the inclusion of women in new financial services has increased investment and the growth of production and economic growth in the countries studied. According to Lenis Escobar et al. (2020) and Kong and Loubere (2021), the importance of creating financial opportunities and new technologies that integrate coordinated and articulated actions to reverse an exclusive financial system that expands coverage and promotes the integration of women in the education and financial sector. Moreover, Fowowe and Folarin (2019) show that inclusive growth occurs directly and indirectly through financial inclusion.

It is imperative that governments and international organizations effectively implement gender equality policies by increasing access, training, education of services, and new financial technologies. According to Pradhan et al. (2021), financial inclusion increases the opening of companies, increases the number of entrepreneurs, increases employment, and changes consumption patterns. Consequently, these factors generate sustainable and long-term growth.

3 | DESCRIPTIVE STATISTICS, METHODOLOGY, AND ANALYSIS

Table 1 provides definitions of the variables used in this study as well as our data sources. Table 2 shows descriptive statistics for the selected countries in Latin America and the Caribbean. We collected pairs of annual data for 21 countries in Latin America and the Caribbean for 2020 and 2021. We built a financial inclusion index (based on gender equality) employing principal component analysis (PCA). Following the research of Girón and Kazemikhasragh (2021), we used variables such as number of ATMs per 100,000 adults, number of commercial banks per 100,000 adults, and account ownership at a financial institution. Additionally, following Seema et al. (2021), we added a gender equality rating to the model to create a financial inclusion index (based on gender equality) for the first time. The PCA approach reduces the original set of three financial inclusion indicators to a smaller set of composite factors to compute the financial inclusion index. Statistics show that only 30% of financial inclusion is based on gender equality financially included. Therefore, following Ali et al. (2021), we used Gini and HDI to control our results for inequality and education. While

TABLE 1 Description of variables and data sources

Variable	Definition	Data source
Financial inclusion (based on gender equality)	The index is calculated using principal component analysis on variables related to measuring the levels of access to and usage of financial services considering the gender equality rate.	To create the index, we used data on the number of ATMs per 100,000 adults, the number of commercial banks per 100,000 adults, and the account ownership at a financial institution's branches from the World Bank.
Mobile banking	Mobile banking refers to the percentage of respondents who report having an account (on their own or with someone else) at a bank or other type of financial institution, or personally using a mobile money service (% age 15+).	World Bank
Primary	The gross enrollment ratio at the primary level is the ratio of total enrollment, regardless of age, to the age group population that officially corresponds to the level of education shown.	World Bank
Secondary	The gross enrollment ratio at the secondary level is the ratio of total enrollment, regardless of age, to the age group population that officially corresponds to the level of education shown.	World Bank
Tertiary	The gross enrollment ratio at the tertiary level is the ratio of total enrollment, regardless of age, to the age group population that officially corresponds to the level of education shown.	World Bank
HDI	The Human Development Index is a summary measure of average achievement in key dimensions of human development.	UNDP
Gini	The Gini index is a measure of income distribution across a population.	World Bank
Stringency index	The stringency index is a composite measure based on nine response indicators: school closures, workplace closures, and travel bans rescaled to from the range 0–100 (100 = strictest).	Oxford Coronavirus Government Response Tracker (OxCGRT)
Borrowers	Borrowers from commercial banks (per 1,000 adults) (World Bank).	World Bank

TABLE 2 Summary statistics

Variable	No. of countries	Obs.	Mean	Std. Dev.	Min.	Max.
Financial inclusion based on gender equality	21	42	0.299	3.423	-10.819	13.4
Mobile account	21	42	2524.33	1,161.376	161	5,011.5
Primary	21	42	100	11.864	70.18	121.27
Secondary	21	42	86.444	34.111	4.14	168.83
Tertiary	21	42	51.847	23.469	24	113.71
HDI	21	42	73.7	8.065	50.8	85.1
Gini	21	42	45.897	4.286	38.8	56.59
Borrowers	21	42	215.843	166.852	10.5	665.6
Stringency index	21	42	51.51	19.376	8.33	84.26

Abbreviations: Max, Maximum; Min, Minimum; No. of countries, Number of countries; Obs, Number of observations; Std. Dev, Standard deviation.

TABLE 3 Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financial inclusion based on gender equality (1)	1.00								
Mobile account (2)	0.17	1.00							
Primary (3)	-0.27	-0.61	1.00						
Secondary (4)	0.25	-0.48	-0.85	1.00					
Tertiary (5)	0.64	0.29	-0.15	-0.26	1.00				
HDI (6)	0.33	-0.45	0.71	0.88	-0.55	1.00			
Gini (7)	-0.07	0.17	-0.19	-0.04	-0.33	-0.08	1.00		
Borrowers (8)	0.09	-0.10	0.57	0.58	-0.02	0.39	0.02	1.00	
Stringency index (9)	-0.30	-0.81	0.49	0.31	-0.32	0.27	0.01	-0.01	1.00

the mean of the Gini index is relatively high and equal to 46 in our sample, the mean of the HDI is equal to 73.7.

Following Morgan and Long (2020), we employed three education levels (primary, secondary, and tertiary) to measure the impact of the level of education on financial inclusion. Tertiary-level enrollment is equal to 52%. Also, there is a high percentage of enrollment at the primary and secondary levels. Finally, following Ashraf and Goodell (2021), we used the stringency index to interact with education enrollment during the pandemic restrictions, credit borrowers from the financial institution, and technology. Significant interaction terms would show the interaction of restrictions during Covid-19 with the variables mentioned above. The average stringency index is equal to 51.

The correlations of the variables used in this study are shown in Table 3. We used the pooled-panel regression technique to show the relationship between financial inclusion based on the gender equality index and independent variables such as education level, technology use, number of borrowers, HDI and Gini. In addition, we used the stringency index as the restrictions during Covid-19 to interact with variables related to the education and number of borrowers in Latin America and the Caribbean. There is a positive relationship between mobile accounts as technology use, secondary education level, tertiary education level, HDI and the number of borrowers with financial inclusion based on the gender equality index. On the other hand, there is a negative correlation between the primary, Gini, and stringency index with financial inclusion based on gender equality.

4 | MODEL

Taking into account the research of Cicchiello et al. (2021) and wanting to analyze and determine the extent of financial inclusion in Latin America and the Caribbean, we employed the following pooled-panel OLS model:

$$X_{it} = \alpha + \beta A_{it} + \varepsilon_i,$$

where X represents the financial inclusion-based gender equality index, i represents the country dimensions, t represents year, A represents the independent variables, and ε_i represents the error term.

In line with Sarwar et al. (2017), we standardized data for all variables to run the model. We employed the stringency index from the Oxford Coronavirus Government Response Tracker (OxCGRT) and other variables from the World Bank. Following Ashraf and Goodell (2021), we employed the stringency index to interact with enrollment in education during the pandemic restrictions, credit borrowers, and technology. This study tries to understand the impact of the independent variables such as education, credit borrowers, and technology use (mobile banking) on financial inclusion based on equality with interactions of the restrictions during Covid-19.

5 | RESULTS

The model results show that use of technology has a significant relationship with financial inclusion-based gender equality. In line with Kazemikhasragh and Buoni Pineda (2022), we controlled for heteroskedasticity, autocorrelation, and multicollinearity. We did not find any of the problems mentioned among the explanatory variables. Our variables explained 81.1% of the

financial inclusion based on *R*-squared. The results of Table 4 show that mobile accounts increase financial inclusion. The results clearly show that increasing literacy without advancing the education level does not positively impact financial inclusion. So the results confirm that primary education does not affect financial alternatives and inclusion knowledge (Coulibaly, 2022; Seghers et al., 2012). Alternatively, completing secondary and tertiary education levels have a

TABLE 4 Results

	Financial inclusion (based on gender equality)
Mobile account	0.134** (0.197)
Education variables	
Primary	-0.267 (0.314)
Secondary	0.236** (0.075)
Tertiary	0.906** (0.174)
Education variables with interaction restriction during Covid-19	
Primary × stringency index	0.076* (0.062)
Secondary × stringency index	0.358** (0.098)
Tertiary × stringency index	0.929** (0.201)
Control variables	
Borrowers	1.665** (0.566)
Borrowers × stringency index	-1.329** (0.566)
HDI	0.119** (0.025)
Gini	-0.364** (0.129)
Constant	0.122** (0.204)
<i>R</i> -squared	0.811
Number of countries	22
Number of observations	42
Breusch-Pagan	0.061
Wooldridge test	0.18
Mean VIF	8.29

p* < .1; *p* < .05.

positive and significant relationship with financial inclusion-based gender equality. In line with previous studies, advanced education levels increase financial inclusion-equality based index (Arora, 2012; Cicchiello, Kazemikhasragh, Monferrá, et al., 2021; Mouna & Jarboui, 2021; Yan & Qi, 2021). The results with the interaction of Covid-19 restrictions show that all education levels increase financial inclusion in Latin American countries. The results show that education advanced during Covid-19 by involving technology.

The results controlled for the number of borrowers, the results confirm the positive relationship between the number of borrowers and financial inclusion, in line with Ali and Khan (2020). Nevertheless, the coefficient of the number of borrowers with restrictions of Covid-19 is negative. Covid-19 restrictions decrease financial inclusion based on the equality index. However, the pandemic may have brought opportunities for digital financial services to accelerate and enhance financial inclusion (Sahay et al., 2020). The results show that the number of borrowers as a key indicator of financial inclusion decreased financial inclusion during the health crisis. The results confirm the need for easing regulations on the credit policies to the small businesses.

Additionally, similarly to Singh (2018), the number of borrowers is an important aspect of financial inclusion. This can result from decreasing the efficiency of financial inclusion during Covid-19 and confirming that financial inclusion does not increase just by increasing the number of bank accounts, ATMs, and branches. However, considering small businesses is an important aspect of financial inclusion by offering credit to borrowers. Similarly to Menyelim et al. (2021), we used Gini as a control variable for financial inclusion. The results confirm that increasing inequality in the distribution of income decreases financial inclusion. Moreover, the HDI increases financial inclusion in the countries studied (Ade'Soyemi et al., 2020).

Observations of the results indicate that governments need to implement empowerment policies to advance education and ease regulations for small businesses and borrowers to increase financial inclusion. Empowerment policies can lead to increased education and income and ultimately sustainable growth and development.

6 | CONCLUSION

This study provides an empirical analysis to identify the effect of Covid-19 on education and important elements of financial inclusion in Latin America and the Caribbean. It shows that the results influence financial inclusion factors, including education, number of borrowers, inequality in income distribution, technology use, and the human development index (HDI). Also, this study considered the interaction of Covid-19 with education and borrowing. These variables are directly related to financial inclusion. This means that advancing education, HDI and the number of borrowers directly increase the financial inclusion-based equality index.

Additionally, this study measured a financial inclusion index (based on gender equality) for the first time to measure the impact of the financial inclusion elements. This study's results align with Altarawneh et al. (2020) and Dar and Ahmed (2021), confirming that countries can increase financial inclusion by increasing the level of education (secondary and higher), use of technology, the HDI, and equal income distribution by implementing empowerment policies using financial resources. Furthermore, the results show that the interaction of the number of borrowers and Covid-19 restrictions has a negative impact on financial inclusion caused by the reduction of credit to small businesses from the financial institutions, so policy-makers would do well to tackle increasing financial inclusion by considering small businesses and borrowers. Our hypotheses H.1, H.2, H.3, and H.4 are thus confirmed. Furthermore, the technology used for education during Covid-19 caused by restrictions increased the impact of education on financial

inclusion, confirming out hypothesis H.2.1. This means that easing access to technology will lead to financial inclusion. These results are consistent with Evans (2018), who says that increasing access to the internet and use of technology use will lead to financial inclusion.

Increasing use of technology and access to the internet allows societies to increase HDI levels and improve financial inclusion (Shen et al., 2021). This study confirms that Latin America and the Caribbean can increase financial inclusion by changing their social aspects to facilitate the use of technology and improve access to credit. Policy-making can increase the financial inclusion level by applying the new approach based on equality and equity. Advancing education increases knowledge, and this increases financial knowledge and literacy.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Amirreza Kazemikhasragh  <https://orcid.org/0000-0001-9257-2505>

Marianna Vanessa Buoni Pineda  <https://orcid.org/0000-0002-0439-7901>

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