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FINANCIAL INCLUSION OF SMALL FIRMS: INFORMALITY, FINTECH SOLUTIONS, AND VOIDS

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ABSTRACT: This paper analyses the relationship between institutional voids, the informality of small firms, and their financial inclusion in Colombia. Data for the analysis were obtained from a dataset available at DANE, which includes a sample of 86,969 small firms in Colombia and 2,467 in the Bogotá region. Descriptive analyses and a tree decision classification were conducted to obtain segments of entrepreneurs in the financial market, predict the formality of small firms, and analyse voids related to digital skills that might limit the solutions based on fintech. Results indicated that entrepreneurs less willing to demand credits represent the current largest segment, that formality and financial inclusion of small firms go hand in hand, and that digital skills might be a limitation for the extension of solutions based on fintech. The analyses allowed for identifying problems and solutions before conducting qualitative analyses with entrepreneurs.

KEY WORDS: *Financial inclusion; Informality; Colombia; Digitisation; C5.0 Decision tree.*

1. INTRODUCTION

Financial inclusion refers to the access to formal financial instruments by individuals and organisations in a country (Sarma & Pais, 2011). Improving the financial inclusion of small and mid-size enterprises (SMEs) has become a priority for governments (Granda et al., 2019) as part of the United Nations 2030 Agenda; Target 9.3 of the Sustainable Development Goals (<https://sdgs.un.org/goals/goal9>) concerns SMEs' financial inclusion. However, COVID-19 impacted the revenue stream of small firms severely and, in countries like Colombia, the high percentage of small firms engaged in informal activities reduced their access to government aids (OIT & CEPAL, 2020).

International organisations have promoted different solutions during the last decade. One of these solutions was microcredits, promoted to fight against usury and as a solution based on trust and social capital (Gatto, 2018). More recent solutions have included crowdfunding and crowdlending, which tend to be based on a platform business model.

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However, asymmetric information and adverse selection have been identified among their drawbacks and might explain lower success than expected (Andrikopoulos, 2020). From a platform business model, the success of these platforms based on fintech would entail strong network effects (Cusumano et al., 2019), requiring several lenders and borrowers to ensure the economic sustainability of the platform. In emerging countries, institutional voids might also explain the failure of some solutions, as companies from developed nations tend to assume customers behave similarly as in their countries (Khanna et al., 2005).

Availability of data related to the financial inclusion of small firms is recent, reducing the literature and studies available that offer knowledge about this theme (Martinez et al., 2020). This paucity of research extends to both in developed and emerging countries, with scant longitudinal data presenting an additional challenge. Therefore, this chapter will focus on analysing some of the ideas raised in previous paragraphs for a specific country, Colombia, to answer the following three research questions:

- RQ1. What customer and non-customer tiers could be detected through funding data?
- RQ2. Can institutional voids related to informality explain the lower financial inclusion of small firms?
- RQ3. Can institutional voids related to digitalisation explain lower use of solutions such as crowdfunding?

The structure of this chapter is as follows. After this introduction, a short literature review is included. Next, the methodology section explains the data used in the analyses, while the results section presents the analyses carried out to answer the research questions. Finally, the conclusions section summarises the main ideas obtained from the analyses.

2. FINANCIAL INCLUSION OF SMEs

Studies about the financial inclusion of SMEs have concluded that access to bank credits remains a constraint for small firms, although those studies proved the stability of the system as banks lend a minor amount of money to many small firms reducing credit risk (Brei et al., 2020). The literature provides examples of authors who tried to measure the financial exclusion of firms, stating the need to understand the impact on the firm and the economy. Kling (2021) indicated that when a small firm has no access to credits, its growth is limited due to its low capacity to finance new investments. Therefore, when exclusion is common in a country, the final impact on the economy may explain why governments are concerned about this target.

International organisations have tried to encourage solutions to the challenge of exclusion for small firms. One of these solutions is microcredits, although critics point out that this financial instrument did not reach small firms in Latin American countries. For example, Durango-Gutierrez et al. (2021) tried to predict the default of customers

in Colombia and concluded that the main factors impacting defaults include the amount of money lent and the gender of borrowers. They also indicated that the institutional environment introduces additional costs in lending money, like guarantees, which might also influence default.

With the advances in fintech, new solutions based on platforms were developed, such as crowdfunding and crowdlending. In crowdfunding platforms, entrepreneurs seek funding through the platform, which organises operations related to funding (Moysidou & Hausberg, 2020), while in crowdlending platforms, customers finance firms directly through the platform (Maier, 2016). Some platforms that specialise in funding startups, while others focus on funding SMEs. The latter became an essential support for small firms, which are considered vital engines in countries' economies. In both cases, those authors indicated that trust needs to be ensured by the platform organisers, as they are the intermediaries between lenders and funders, and investors place greater trust in platforms with which they are familiar (Moysidou & Hausberg, 2020). However, the economic sustainability of the platform also depends on achieving a strong network effect: the increase in the number of lenders attracts more borrowers and vice versa (Cusumano et al., 2019).

The term "institutional voids" refers to the difficulties firms might encounter when they try to replicate their business models in emerging markets (Khanna et al., 2005). These voids might strain relationships between buyers and sellers (Khanna, 2015). Voids will reflect, for example, the use of digital payment by firms and customers, which might hinder the connection between buyers and sellers.

3. METHODOLOGY

Data for the analyses were obtained from the survey elaborated by DANE Colombia called "Encuesta de Micronegocios 2019". This year was selected because it includes a module about financial inclusion. The sample used in this work involves 86,969 firms in Colombia (2,467 in the Bogotá region) with fewer than nine employees. Variables defined for analyses are presented in Table 1: factors related to the level of formality of the firm, financial resources obtained when the firm was founded, and digital skills of firms.

To answer RQ1 and RQ3, descriptive analysis was carried out, applying the variables in Table 1 to the entire database. Frequency of users were obtained for variables related to financial inclusion and digitisation. To answer RQ2, a decision tree with the algorithm C5.0 was created. The sub-sample of firms in Bogotá were selected in this analysis. The decision tree revealed rules that predict the willingness of future entrepreneurs to register their firms in the Chamber of Commerce. For this analysis, variables related to formality and funding were used (marked in Table 1). The R library "C50" by Max Kuhn, based on Quinlan tree models, was applied for the analysis. For training and test samples in the tree, the criteria were two-thirds and one-third of the database, respectively.

Table 1. Variables in the analyses for RQ1, RQ2, and RQ3.

Concepts	Variable	Meaning	Values
<i>Output</i>	ChamberCom*	Firm registered in the Chamber of Commerce	Yes (1), No (0)
<i>Formality</i>	RUT*	Register Unique for Taxes	Yes (1), No (0)
	AccReg*	Register for Accounts	Yes (1), No (0)
	ComName*	Commercial name	Yes (1), No (0)
<i>Financial inclusion in startup phase</i>	FundEntSv*	Funded the startup with own savings	Yes (1), No (0)
	FundFam*	Family credits	Yes (1), No (0)
	FundBk*	Banks credits	Yes (1), No (0)
	FundUsur*	Usury credits (pawnbroker)	Yes (1), No (0)
	SeedCap	Seed Capital	Yes (1), No (0)
<i>Digitisation</i>	Smartphone	Firm uses smartphones	Yes (1), No (0)
	OnlineBank	Firm uses online bank	Yes (1), No (0)
	Apps	Firm uses apps	Yes (1), No (0)
	NCashPay	The firm accepts: Online pay, Debit cars, credit card	Yes (1), No (0)
	PCandOther	Firm uses PCs and other devices	Yes (1), No (0)
<i>Entrepreneur</i>	OwnerGender*	Gender of the firm's owner	Man (1), Woman (2)
	OwnerAge*	Entrepreneur's generation	Silent (74-91), Boomers (55-73), Generation X (39-54), Millennials (23-38), Generation Z (<= 22)
<i>Firm</i>	FirmAge*	Years since the firm was set up	StartScale (≤ 5 years), Mature (>5 years)

(*) variables included in the model for tree decision (RQ2).

4. RESULTS

RQ1 aimed to find customer and non-customer tiers through funding data. Descriptive analysis of the database gave the percentage of entrepreneurs who had access to funding when setting up their new firm (left side in Figure 1). The figure also indicates whether entrepreneurs have access to funding sources nowadays (right side in Figure 1). The project for which the analysis was carried out aimed to design a solution based on crowdfunding; therefore, circles in the figure were included to indicate tiers of non-customers in the sense of Kim & Mauborgne (2017). From this view, entrepreneurs who think that credits are unnecessary and those who fear debts would be the most distant segments for a crowdfunding solution, although they remain important segments due to their size. Platforms able to demonstrate they are worthwhile and trustworthy might offer a solution for these segments. The figure percentages show that the use of credit by small firms in the country is low, implying a low level of financial inclusion for small firms. Low level of financial inclusion is evident in bank credits, which amount to 9-12% of

firms. Moreover, microcredit is not a successful solution; only 1% of entrepreneurs in the samples had access to this financial instrument.

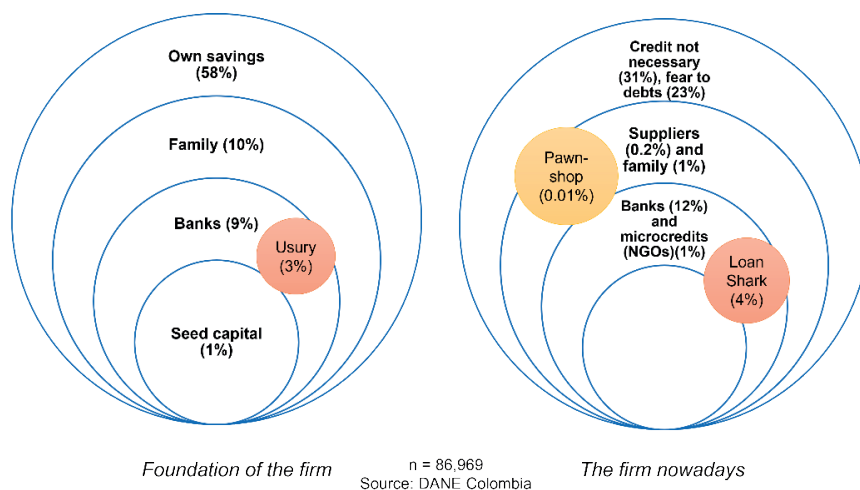


Figure 1. Financial inclusion of small firms in different phases. Sample of Colombia.

RQ2 intended to find any explanation for institutional voices related to the informality of small firms and its impact on the financial inclusion of these firms. As the output was the registration in the Chamber of Commerce, the sample consisted of the 2,467 small firms in the Bogotá area. Tree decision with C5.0 algorithm allowed for understanding the decisions of entrepreneurs considering the two concepts, informality and financial inclusion. Table 2 presents the rules that predicted whether the entrepreneurs would register in the Chamber of Commerce. Six rules were obtained, three indicating factors that would explain no registration in the Chamber, while the other three suggested registration. Rules revealed that the lack of formality would result in no registration in the Chamber. The rules also indicated that financial exclusion goes hand in hand with informality. Therefore, informality and lack of access to credit banks will result in no registration in the Chamber. The errors from the rules amounted to 10.8%, with 177 out of 1,644 cases in the training classified incorrectly. In the sample tested, there were 823 users, 725 correctly classified, 51 predicted as ‘yes’ but not registered, while 47 were predicted as ‘no’ but did register. The accuracy of the tree is, therefore, 88.09%.

Figure 2 shows the tree decision, with nodes representing visually how entrepreneurs’ choices influence their final decision about registration in the Chamber of Commerce. The decision of registering a commercial name when setting up a new firm is an important node, with attribute usage when rules were generated of 97.45%. A Colombian unique taxpayer identification number, known as a Registro Único Tributario (RUT), is also a significant factor (58.09% of usage in rules) that encourages adherence to the Chamber. The tree indicates that entrepreneurs who decided not to formalize the payment of taxes would not be willing to register in the Chamber. When entrepreneurs obtain a commercial

name resulting in higher formality (RUT and AccReg), the entrepreneur would be more willing to register in the Chamber, independent of access to bank credit or use of own savings to set up a new business. The tree also indicates that when there is financial inclusion and access to bank credit, the entrepreneur will be more likely to register in the Chamber.

Table 2. Rules extracted from C5.0 algorithm.

Rules*	IF	THEN (Prediction class)	Accuracy
R1	RUT = No	Class <i>No</i> (No register in Chamber of Commerce)	98.4%
R2	[FundEntSv = No] AND [FundBk = No] AND [AccReg = No]	Class <i>No</i> (No register in Chamber of Commerce)	93.0%
R3	[FundBk = No] AND [ComName = No]	Class <i>No</i> (No register in Chamber of Commerce)	92.0%
R4	[FundBk = Yes] AND [ComName = Yes]	Class <i>Yes</i> (Register in Chamber of Commerce)	83.3%
R5	[FundBk = Yes] AND [RUT = Yes]	Class <i>Yes</i> (Register in Chamber of Commerce)	77.4%
R6	ComName = Yes	Class <i>Yes</i> (Register in Chamber of Commerce)	66.8%

*Default class in output: No.

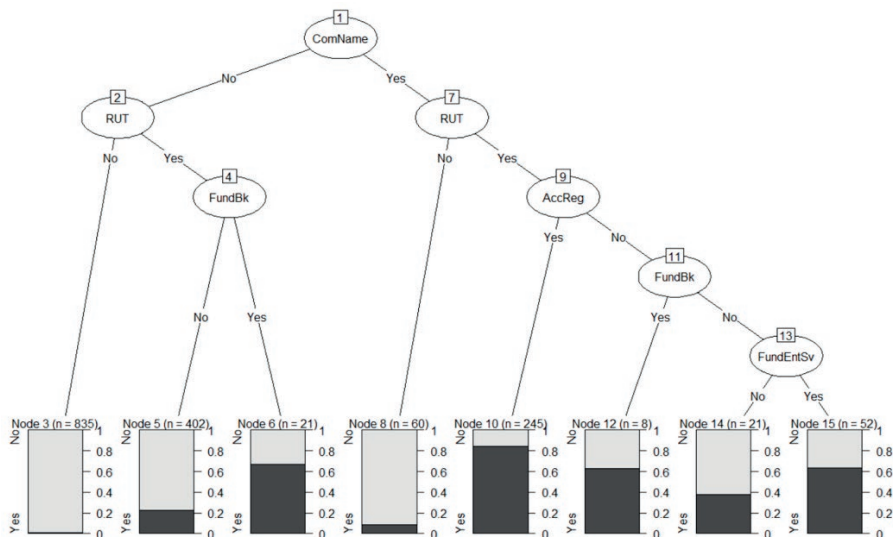


Figure 2. Tree decision obtained with C5.0 algorithm in R. Sample of Bogotá.

RQ3 aimed to identify whether the institutional voids related to digitalisation might encourage or discourage the use of platforms based on crowdfunding. These platforms are based on technology, which entails the the users’ digital skills, such as using a smartphone,

being comfortable with online banks and making online payments. Figure 3 indicates that half of the firms in the database use smartphones, although there is low proportion of computer use. Moreover, few small firms perform online operations through a bank or accept payments by clients other than cash. Therefore, solutions based on fintech should consider a smartphone as the device more frequently used by small firms.

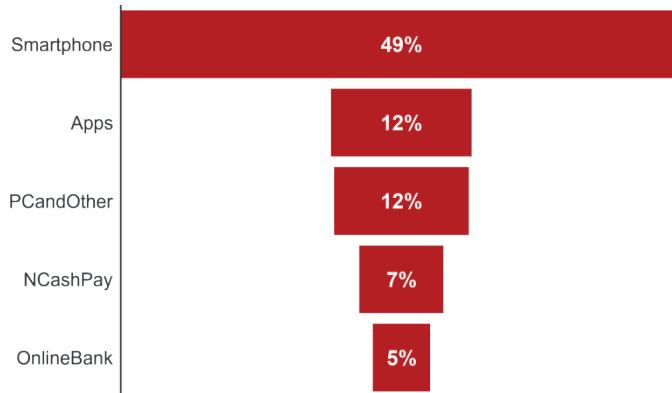


Figure 3. Percentage of firms. Sample of Colombia.

5. CONCLUSIONS

This chapter has presented analyses of financial inclusion and informality in Colombia. Through data available for a survey of small firms elaborated by DANE, three research questions were answered to derive three main conclusions. The first was the low level of financial inclusion among small firms in the country, implying that the government needs to progress toward this target to encourage the country's economic growth. The second conclusion was related to the need for reducing informality among small firms, as informality decreases their opportunity to obtain bank credit and, thus, diminishes the country's capacity to increase the financial inclusion of these firms. Moreover, less organised firms because they are not registered with the Chamber of Commerce, possess less capacity for negotiation with governments and credit institutions, as was evident during the pandemic-related lockdown. The third conclusion exposed the need to improve the digital skills of these firms and consider solutions for financial inclusion based on smartphones instead of other devices. Finally, the analyses also underscored the need for more research to offer new ideas that might be more successful than some solutions offered to date and to improve the design of current solutions.

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CONFLICT OF INTERESTS

There is no conflict of interest related to the project or the content in this chapter.

AUTHOR CONTRIBUTIONS

Maryi Cadrazco-Suarez participated in the conceptualisation of the chapter, co-writing the introduction and the literature review, collecting data, elaborating the conclusions, and editing the final version. Blanca de-Miguel-Molina participated in the conceptualisation of the chapter, co-writing the introduction and literature review, collecting and analysing data, and supervising the conclusions and the final version. Jorge Juliao-Rossi participated in the conceptualisation of the chapter, in the data preparation, in the supervision and validation of the analysis, and in the supervision of conclusions. Carlos Rincón-Díaz participated in the conceptualisation of the chapter, in the supervision of the introduction and literature review, in the data acquisition, in the supervision and validation of the methodology, and in the supervision of conclusions.

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