Access to Formal Financial Markets and Microbusiness Formalization in Colombia

Por:
Manuela Acevedo[a]
Andrés Angel[b]
Camilo Acosta[c]

Keywords: *Informality, Gradual formalization, Microbusinesses, Savings, Credit.*
Palabras clave: *Informalidad, Formalización gradual, Micronegocios, Ahorro, Crédito.*

JEL: *E26, G21, J46, O16, O17.*

Access to Formal Financial Markets and Microbusiness Formalization in Colombia.

Acceso a los Mercados Financieros Formales y Formalización Microempresarial en Colombia.

Primera versión recibida el 6 de octubre de 2023; versión final aceptada el 7 de noviembre de 2023

Coyuntura Económica. Volumen LIII, diciembre de 2023, pp 51-79. Fedesarrollo, Bogotá – Colombia

Abstract

We study the relationship between microbusinesses' access to formal credit and their transit toward formalization in Colombia. We use the country's Microbusiness Survey—a database including both formal and informal microbusinesses—together with two definitions of formality: a binary and a multidimensional definition that exploits the array of rules faced by businesses. We document that those microbusinesses that request formal credit have a 12.5% higher probability of not being completely informal. Using the ownership of collateralizable assets as instruments, we confirm that the relationship between both variables is more than just a simple correlation: formal credit can help a microbusiness escape total informality. This positive effect of formal credit is larger for the first stages in the firms' path toward formalization. On the contrary, informal credit can end up reinforcing firm informality.

Resumen

Este paper estudia la relación entre el acceso de las microempresas al crédito formal y su tránsito hacia la formalización en Colombia. Utilizamos la Encuesta de Micronegocios-una novedosa base de datos que incluye tanto microempresas formales como informales- junto con dos definiciones de formalidad: una binaria y otra multidimensional que explota el conjunto de regulaciones a las que se enfrentan las empresas. Documentamos que las microempresas que solicitan crédito formal tienen una probabilidad un 12,5% mayor de no ser completamente informales. Utilizando como instrumentos la propiedad de activos colateralizables, confirmamos que la relación entre ambas variables va mucho más allá de una simple correlación: el crédito formal puede ayudar a una microempresa a escapar de la informalidad total. Este efecto positivo del crédito formal es mayor en las primeras etapas

a EAFIT University, Medellin, Colombia. Email: macevedom@eafit.edu.co
b EAFIT University, Medellin, Colombia. Email: aangelc@eafit.edu.co
c Corresponding author. EAFIT University, Medellin, Colombia. Email: camiloac@iadb.org

* We thank Pilar Alvarez, José Vicente Cadavid, Cristina Fernández, Astrid Marinoni, Mauricio Ramirez, and the anonymous referee for the valuable comments. All remaining errors are our own.

del camino de las empresas hacia la formalización. Por el contrario, el crédito informal puede acabar reforzando la informalidad de la empresa.

1. Introduction

Microbusinesses, defined as those economic units that have between 1 and 10 workers, are one of the main components of the business fabric of any developing country. In Colombia, of all registered companies, only 1.7% are medium or large, while 93% correspond to microbusinesses (Confecámaras, 2018); this share would be larger if all unregistered businesses were counted. According to recent results from a report written by Torres & Acosta (2021), 63% of all microbusinesses in Colombia have not met any requirements to be considered a formal unit (i.e., completely informal), and only 6.6% can be regarded as totally formal.[1] Additionally, most of these economic units are managed by self-employed workers (61%), while 40% were created for subsistence reasons.

Similarly, the current situation for microbusinesses in the country regarding access to the formal financial system is precarious. Although accessing these services is vital for their sustainability and growth, according to the 2019 Microbusiness Survey, only 1 in 4 microbusinesses in Colombia invest, while 1 in 5 saves. Additionally, there is a great dependence on personal savings as these firms' primary source of financing, as well as low rates of formal credit application.[2] These microbusinesses could greatly benefit from accessing credit, allowing them to accumulate capital and invest in newer technology.[3]

To understand the possible implications of these phenomena, this work aims to examine microbusinesses' access to the formal financial system in Colombia and its relationship with firm formalization. This paper aims to establish the relevance of credit access in the gradual and multidimensional business formalization processes, recognizing the great heterogeneity of microbusinesses in the country. Therefore, we are interested in knowing what the role of credit access is in breaking the vicious circle of informality, which is characterized by the reinforcing relationship between low productivity, low access to input markets, and low rates of labor and firm formalization (Fernández, 2020).

The lack of formalization of businesses in developing nations can be analyzed as the result of three sets of determinants. Firstly, low productivity levels are associated with microbusinesses' limited capacity. Secondly, complex and costly formalization processes, given that costs increase as formalization progresses, while its benefits are diffuse. Finally, the weak institutional capacity of developing countries, manifested in underdeveloped institutions, lack of transparency, and inefficiencies, affect compliance with the law (Torres & Acosta, 2021, p. 24).

The low productivity levels of microbusinesses can be partially explained by their inability to access high-quality labor or capital inputs, as the owners are usually excluded from the formal financial system and end up making suboptimal investments for their firms. This lack of access limits the adoption of better technologies and business practices, reducing the productivity of microbusinesses and reinforcing informality.

In this framework, the underlying hypothesis of this paper is that there is a positive relationship between access to formal financial systems and the formalization of microbusinesses in Colombia. To evaluate this hypothesis, this paper addresses this question from descriptive analysis and in a reduced form.

Given their nature (small and informal), a large share of microbusinesses in developing countries tend to be informal and are not covered in standard

1 Torres & Acosta (2021, 2022) were written as a consulting report on labor and business formalization from Universidad EAFIT to Camara de Comercio de Medellin para Antioquia, Comfama, Corporacion Interactuar, Fondo de Garantías de Antioquia and Proantioquia. The documents are available on request.

2 73% of microbusinesses reported not having applied for a formal credit destined to their business's activity, either because they considered they did not need it (45%), due to fear or aversion to debts (30%), or because of financial barriers (24%).

3 Although some research has shown that the benefits of microcredit are not that clear. See Woodruff (2018) for a review.

firm-level surveys. Therefore, to study this relationship, we use the Colombian Microbusiness Survey. The main objective of this survey is to gather information that allows the study of microbusinesses (firms with up to nine employees) in Colombia. These data include information on microbusinesses regardless of their formalization state, including totally informal businesses, which is quite rare in the literature. Moreover, the data allow us to study formalization as a multidimensional process characterized by the different requirements and regulations that firms must comply with before being considered formal. Descriptive statistics show that microbusinesses in earlier stages of the formalization process have lower access to formal credits and tend to rely more on informal sources of financing.

The results of our baseline econometric model show that microbusinesses that apply for formal credit have a 12.5% higher probability of not being completely informal. However, to get closer to a causal relationship between access to formal credit and firm formalization, we use two-stage linear and ordered probit regression models, using the ownership of assets as instrumental variables. The ownership of assets can facilitate access to the formal financial system as they can smooth information asymmetries in credit markets since borrowers can use these assets as collateral (Galiani & Schargrodsky, 2011). Our identifying assumption is that the ownership of collateralizable assets directly impacts the financial inclusion of microbusinesses through the promotion of formal credit while disincentivizing the use of informal credits. Only through this relationship own assets end up having a role in a microbusiness's formalization process.

After estimating the model using our instrumental variables, we find that having access to credit with the formal financial system can increase by 78% the probability that a microbusiness leaves a state of total informality. On the other hand, having access to informal credit leads to a 142% higher probability that the microbusiness will remain in a state of informality relative to microenterprises that do not apply for any credit. The large differences between the baseline and the instrumental variables specifications can be explained by the negative effects of formalization on access to credit found in recent literature (e.g., McKenzie & Sakho, 2010; Benhassine et al., 2018). Even though we present descriptive evidence suggesting that the identifying assumptions might hold in our case, we consider our estimate to be a conservative upper bound of the true causal relationship between credit access and formalization.

Furthermore, our results from the instrumented ordered probit model suggest that the positive effect of credit access occurs throughout all stages of the formalization process, especially in the first stages (obtaining the tax identification number—RUT—and the business registry) but also on the more advanced steps, such as labor and tax formalization. These results indicate the positive effects of credit on the productivity of microbusinesses in Colombia.

This paper makes two contributions to the literature. First, it contributes to a large body of research studying labor and firm informality in developing countries and its determinants, especially access to credit. Some important references in this area of study are Perry et al., (2007), Dabla-Norris & Koeda (2008), Aga & Reilly (2011), Busso et al., (2012), Caro et al., (2012), Zuleta (2016), Fernandez (2020), Ulyssea (2020), among others. We conduct a more detailed literature review in the next section. We contribute to this literature by analyzing the impact of credit access on firm formalization, considering it as a multi-stage process transited by (some) businesses. In this process, a firm in a stage of total informality must fulfill different registration, labor, and tax requirements to be considered a formal entity. This multi-stage or staggered process has yet to be considered in the literature but is based on the actual behavior of microbusinesses and has been recognized by policymakers in Colombia.[4]

4 Colombia's National Planning Department (DNP) published in 2019 CONPES document 3956 in which they discuss the Government's plans for its business formalization policy, declaring it as a multidi-

Second, to the best of our knowledge, we are among the first papers written using Colombia's Microbusiness Survey, which is a relatively new statistical product developed by the National Statistics Department (DANE) in 2019 (and publicly released in late 2020) to study the dynamics of formal and informal firms in the country. A few notable exceptions are Castro et al. (2020), who find that formalization and the use of the Internet are important determinants in the demand for credit by microbusinesses, and Urueña-Mejía et al. (2023), who study financial inclusion and business practices of microbusinesses in Colombia. Although this is a relatively new data source, it has a series of variables and a representative number of observations that allow us to delve deeper into the study of microbusinesses in Colombia. Moreover, this survey allows us to study firm formalization separately from labor formalization—a distinction not common in the study of formalization in Colombia—while also analyzing other aspects of firm informality, such as tax and registry informality.[5]

The remainder of this paper consists of other sections. Section 2 corresponds to the theoretical framework and literature review. In section 3, we describe our data sources, while in section 4, we present the empirical strategy. Section 5 presents the main results of the article, while the last one concludes and discusses different policy recommendations.

2. Theoretical Framework and Literature Review

Business informality has been a common subject of study for academics and policymakers. Although it is difficult to reach a consensus when defining informality, there are two main approaches in the academic debate. On the one hand, according to the structuralist approach, informality arises from an excess labor force that the formal sector cannot absorb. In this case, informality is a consequence of a country's level of the development process. On the other hand, the institutionalist approach, according to which informality is a voluntary decision by individuals, encouraged by a cost-benefit analysis of the formalization process (Perry et al., 2007).

Regardless of the approach, Fernández (2017) describes the two-way relationship between informality and productivity: companies with a higher level of informality have greater difficulty accessing input markets. This low market access leads to lower productivity levels, hindering their transition to formalization. This result calls for business strengthening programs to increase productivity, promote formalization, and break this vicious circle.

Within microbusinesses in developing countries, informality is a widespread phenomenon and is related to several factors, such as the little or no education of the founder, who in many cases is self-employed; poor organization of the firm's legal and accounting records; high mortality rates (of the microbusiness); and low average productivity. One of the factors that have the greatest impact on informality and low productivity is the lack of access to formal credit systems. This inadequate access limits the growth of enterprises because it reduces their capacity to increase their productive capital, face situations of uncertainty, or adopt new technologies (Dabla-Norris & Inchauste, 2008).

When applying for a bank loan, small entrepreneurs can face a series of barriers and requirements

mensional process instead of the standard binary one (informal vs. formal). This document is available in Spanish at: https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%c3%b3micos/3956.pdf

5 There is a large amount of literature studying the formalization of microenterprises. See Bruhn and McKenzie (2014) for a review.

needed for approval. Among the most important requirements is the collateral, which guarantees that the debt will be repaid if the agent does not have sufficient funds to meet his or her credit obligations. Although access to the financial system is increasing with the degree of business formalization, the latter is not a sufficient condition for accessing formal credit markets. In particular, the lack of collateralization, which is a prevalent characteristic among microbusinesses, can become a major barrier to financial inclusion, even under complete formality.

One of the seminal articles studying the access of small firms to financial services is Stiglitz & Weiss (1981). In this article, the authors study the role of information asymmetries as the main market failure between credit providers and firms, limiting the access of the former. These authors explain that adverse selection and moral hazard problems can discourage the lender from granting financing and lead to equilibrium credit rationing. Since risk levels of potential borrowers are not observable by the lender, lenders cannot charge them a customized interest rate and are forced to charge some average rate. These asymmetries cause low-risk loan applicants to leave the market, reducing the average quality of the pool of applicants that lenders face. Therefore, if lenders use firm size as a signal of the business's potential risk, they end up offering a higher interest rate to smaller firms, making it more difficult for them to access formal financial systems. Consequently, these information failures can lead to higher firm informality.

Nevertheless, empirical evidence on the existence and importance of these information frictions in credit markets tends to be scarce (Chiappori & Salanie, 2000). When information asymmetries exist, it is challenging to distinguish users' information due to selection in the data. For example, a positive correlation between loan default and a randomly assigned interest rate, conditional on observable risk, could be due to ex-ante adverse selection (those with relatively high probabilities of default will be more likely to accept a high rate) and ex-post moral hazard (those charged higher interest rates may have more incentives to cease payments) (Karlan & Zinman, 2009).

Regarding informality, Catao & Rosales (2009) find that formalization rates increase with financial deepening, especially in sectors where firms depend more on external financing. For example, an increase in aggregate credit to firms (as a share of a sector's GDP) of 10 percentage points would increase formalization rates by about 6.5 percentage points in a more financially dependent sector (such as transportation), relative to a less financially dependent sector (such as paper production). Other works studying the financial inclusion of SMEs have made an important differentiation between involuntary and voluntary exclusion in access to credit, where the latter corresponds to the segment of companies that state they do not require credit (Zuleta, 2016).

In this same line, Caro et al., (2012) find a significant (albeit small) negative relationship between access to credit and labor informality. Two channels may explain this result. First, access to credit may allow firms to grow faster and improve their productivity. Second, credit can have a direct effect on the hiring of a more formal labor force. Specifically, a 10% increase in credit to sectoral output ratio increases labor formality between 0.76 and 1.11 percentage points. Nonetheless, this effect disappears for firms facing greater financial constraints. Furthermore, studying the determinants of access to credit for micro and small enterprises, Aga & Reilly (2011) find that informal firms are more credit constrained than formal firms. In addition, firm location, membership in a business association, and maintenance of an accounting register are among the main determinants of access to credit. These authors also conclude that offering collateral, even if partial, can improve access to credit and business formalization.

From the workers' side, Fernández (2017) studies the relationship between household decisions on labor and credit formality. The author finds that an informal worker has a 10 percentage points lower probability of having formal credit relative to a formal worker.

Decisions around labor and credit formality may be governed and linked by different mechanisms, among them household preferences for formality or the aversion to reporting income to avoid tax authorities. Similarly, Dabla-Norris & Koeda (2008) find that informality is significantly associated with lower access to bank credit. Specifically, the authors find that higher tax compliance costs reduce firms' reliance on bank credit, while a higher quality of the legal environment is associated with greater access to credit, even for financially constrained firms. Malkova et al., (2021) argue that the probability of workers switching to formal jobs is higher for borrowers than for non-borrowers, and both rates increase when there is a relaxation in credit constraints.

As the literature has shown, access to the financial system becomes a key tool for solving challenges that arise in the growth and formalization of firms, especially in developing countries. Zuleta (2016) shows that access to credit is correlated with higher growth in sales, higher production margins, and investment in machinery and equipment. Financial constraints decrease the value of the investments made by firms, with the effect being lower if the firm operates in a sector with lower informality (Gandelman & Rasteletti, 2013). Likewise, because of limitations in access to the formal financial system, microbusinesses are forced to turn to informal and illegal sources of financing such as informal credits (known in Colombia as "drop-by-drop lenders" or *préstamos gota a gota*), which usually have high financial and social costs that end up harming microbusinesses (ANIF, 2018).

There is also a large literature studying the effect of formality on access to the formal financial system, which tends to find no causal effect. In Sri Lanka, de Mel et al., (2013) find that firms that formalize are not more likely to obtain a business bank account or business loan. McKenzie & Sakho (2010) and Benhassine et al., (2018) find a null impact of formality on the likelihood of having a bank loan in Bolivia and Benin, respectively. Moreover, there is some evidence that increased access to finance does not result from formalization alone. Campos et al. (2023) find that the use of finance only increased when firm formalization was accompanied by a bank information session. Finally, in a review of the effects of microcredit, Woodruff (2018) argues that the benefits of these are not clear.

In the remainder of this paper, we analyze the relationship between access to the formal financial system and the gradual formalization process while studying the consequences of informal credit sources.

3. Data and Descriptive Evidence

To study the relationship between access to formal credit markets and firm formalization, we use data from the Microbusiness Survey (EMICRON, for its name in Spanish: *Encuesta de Micronegocios*) of the National Administrative Department of Statistics (DANE) for 2019.[6] The main objective of EMICRON is to obtain information that allows the study of the structure and evolution of microbusinesses with up to nine employed persons. The statistics and indicators resulting from this survey provide insight into the operation of these small economic units: their economic activity, reasons for creation, location, characteristics of their personnel (if any), use of ICTs, financial inclusion, costs, expenses and assets, sales or income, and capital stock. This survey covers the 24 main metropolitan areas and 455 municipalities, following the DANE's Household Survey or GEIH (Gran Encuesta Integrada de Hogares). The GEIH is Colombia's main household survey and is conducted monthly to gather information on the employment conditions and general characteristics of the population.

Given their nature, a large share of microbusinesses in developing countries tend to be informal and are not covered in a standard firm-level survey. Therefore,

6 At the time of this study, the microdata for the year 2021 were not yet available. While 2020 were available, this year did not include the module on financial inclusion, where the information on credit application and approvals is available.

DANE follows a two-stage modular mixed survey to build a representative sample of microbusinesses in Colombia. Starting with the GEIH, each month, DANE identifies self-employed workers and employers of microbusinesses. In the second stage, usually the following month, DANE visits these groups once more and applies a questionnaire that focuses on the economic characteristics and structure of these microbusinesses: EMICRON (Dirección de Metodología y Producción Estadística -DIMPE, 2019).

Of the total sample, we focus on microbusinesses located in the 24 largest metropolitan areas. This survey is representative at the national level and for these areas. Our sample includes 75,277 microbusinesses, equivalent to 4,147,080 million units using weights. Of this total, 1.9 million identified themselves as "subsistence" microbusinesses (47.9%), 1.8 million as "opportunity" microbusinesses (43.7%), and 347 thousand as "tradition/other" (8.4%).[7]

One of the main challenges when studying business formalization is its definition. On the one hand, the informality of a firm is often defined based on the affiliation of its owners and workers to the country's social security systems (International Labor Organization, 2021). On the other hand, organizations such as DANE tend to define informality based on firm size, with informal being those businesses with five workers or fewer. According to Colombia's National Planning Department, a firm is formal when it complies with all the rules that apply to it in a mandatory manner (DNP, 2019). Given all the rules and regulations that apply to companies during their consolidation process, it is key to understand formality as a process, not a binary state. According to DNP (2019), this process mainly includes four stages: (i) entry formality, which includes business registration requirements; (ii) input formality, which integrates workers' social security and land use permits; (iii) production formality, which encompasses all the rules and regulations specific to the sector in which the firm operates; and (iv) tax formality, which relates to tax declaration and payment.

Following the above definition, Torres & Acosta (2021) construct a gradual ladder of formalization based on the information available in EMICRON and on results from different focus groups conducted with owners of microbusinesses and self-employed workers in the city of Medellín in 2021. Table 1 characterizes the different stages of this multidimensional process of formalization. This process starts from a null level of formalization in which microbusinesses do not have a Tax ID (RUT), business registry, do not make any payments to social security, and do not pay any taxes; and ends at a fifth step with microbusinesses that comply with all these requirements. The "Others" category includes those microbusinesses that may have other combinations of formalization not considered in the proposed ladder.[8]

Of all the procedures reported within EMICRON, the RUT is the most common one, with around 1.3 million microbusinesses (31.1%). The fact that RUT is the most common procedure among businesses is not surprising, given that it is free of charge and that there are numerous public programs aimed at reducing the costs (pecuniary and non-pecuniary) of obtaining it. In addition, the RUT allows a business to obtain its business registry and accredit and identify its economic activity before third parties with whom it has an economic relationship, thus gaining access to an important group of suppliers and clients.[9]

7 Subsistence microbusinesses were identified as those belonging to owners who expressed as the main reason for creating their business not having another income alternative, wanting to complement or improve the family income, or not having the experience, schooling, or training required for a job. Opportunity microbusinesses were identified as those belonging to owners who identified a business opportunity, or to practice their trade, career, or profession.

8 For example, some microbusinesses have RUT, a business registry, and pay some taxes but do not contribute to the Social Security of their workers. These microbusinesses correspond to 1.46% of the total.

9 Unlike in other countries—for example, in Brazil, as documented by De Andrade et al. (2016)—a municipal registry is not usually a requirement for micro-businesses in different sectors to be considered formal.

Table 1.
Microbusinesses by formalization stage in 2019

Formalization stage	Number of microbusinesses	Percentage
i. None	2,596,086	62.7%
ii. RUT only	436,751	10.5%
iii. RUT and business registry	289,932	7.0%
iv. RUT, business registry, and some social security	179,885	4.3%
v. RUT, business registry, some social security, and any tax	95,351	2.3%
Other	547,075	13.2%
Total	4,147,080	100.00

Note: this table shows the number and percentage of microbusinesses by formalization stage in Colombia in 2019. In stages iv. and v. "some social security" alludes to microbusinesses that made any contribution to pensions or healthcare, be it for the owner or one of their employees. "Any tax" refers to the payment of at least one of the following taxes: income tax, VAT tax, or corporate tax. Source: Made by the authors using data from EMICRON (2019).

As Table 1 shows, 62.7% of all microbusinesses do not have any level of formalization, 10.5% have only RUT, 7.0% have only RUT and business registry, 4.3% have these two registries and make some contribution to social security (health or pension payments either of the employer or of one of the workers), and only 2.3% meet the above requirements and declare some tax. In other words, only 1 in 44 microbusinesses in Colombia can be considered entirely formal under the proposed approach. Moreover, there is an important relationship between a firm's level of formalization and its creation motive: the share of subsistence microbusinesses decreases with the level of formalization, while the share of opportunity microbusinesses increases with it.

Overall, Table A.1 in the Appendix describes the variables included in the analyses in this and subsequent sections, along with some descriptive statistics. In the first two rows, we show the main two definitions of formalization. First, a binary definition of informality according to which all microbusinesses without any formalization requirement are considered informal (equivalent to those in the first row of Table 1). Second, we consider the five formalization stages. Given that the dimensions of formality considered in the different stages are mutually exclusive and that some microbusinesses are outside the standard stages of this process, the initial sample of 4,147,080 microbusinesses decreases to 3,600,005 when we use this definition.

To start analyzing the relationship between formalization and financial inclusion, Table 2 shows the relation between these two variables. This table shows that microbusinesses at a lower stage of the formalization process have lower access to bank loans for the creation or constitution of their business (5.7% for the first stage) compared with the higher stages (20.4% in the last). Moreover, note the high importance of savings for microbusinesses regardless of their formalization stage. Lastly, note how 1 out of 5 informal microbusinesses—and 1 out of 6 that have RUT only—report that they did not require resources to create their business. This may be closely related to the subsistence nature of these economic units.

Table 2.
Income sources by formalization stage in 2019

Formalization stage	Which was the primary source of income used to create this business?		
	Bank Loans	Savings	Was not needed
i. None	5.7%	75.2%	19.1%
ii. RUT only	9.6%	73.6%	16.8%
iii. RUT and business registry	22.7%	72.0%	5.3%
iv. RUT, business registry, and some social security	18.3%	74.9%	6.9%
v. RUT, business registry, some social security, and any tax	20.4%	74.9%	4.8%

Note: This table shows the percentage of microbusinesses by formalization stage according to their answer to the question. Aside from the three main categories on the table, EMICRON considered other sources of income such as family loans, lenders, seed funding, does not know, and others. Family loans were included in "Savings", "does not know," and others in "Was not needed"; the other categories did not make up more than 3% of the total, therefore, they were not included. In stages iv. and v. "some social security" alludes to microbusinesses that made any contribution to pensions or healthcare, be it for the owner or one of their employees. "Any tax" refers to the payment of at least one of the following taxes: income tax, VAT tax, or corporate tax. Source: Made by the authors using data from EMICRON (2019).

Regarding loan applications for the management of the business, Table 3 shows the positive and monotonic relationship between the share of businesses that applied for a credit and/or a loan and the formalization stage, starting with 16.2% of loans made by microbusinesses with no level of formalization, up to 33.1% for microbusinesses with the highest level of formalization. Given the nature of most microbusinesses, their finances tend to be highly connected with their owners' finances. For instance, it may be that microbusinesses' owners recur to personal credits (incl. credit cards) to deal with liquidity problems of their business. If this is the case, and the survey does not consider this link (it is not clear whether the Emicron does), the demand for credit would appear to be lower than the real one.

Of the microbusinesses that requested a loan, access to the formal financial system increases as formalization increases. Specifically, microbusinesses with a higher level of formalization tend to request loans from financial institutions (98%) and avoid informal lenders (0.9%), while the latter plays a prominent role in microbusinesses with no level of formalization (28.4%), who also request relatively few loans from financial institutions (62.5%).

We would like to note two extra results are not shown here. First, EMICRON data shows that 9 out of 10 microbusinesses who applied for a loan obtained it, evidencing their high acceptance. Second, this percentage does not vary substantially through the formalization ladder, not even for the totally informal microbusinesses, where 88% of the ones who applied for credit with a formal financial institution obtained it. This high share makes sense as our 'Financial Institutions' category includes not only large commercial banks but also small banks that cater to microbusinesses (e.g., *MiBanco, Banca de las Oportunidades*), some NGOs, and credit unions that give microcredits and loans to small informal businesses (e.g., *Corporación Interactuar*).[10]

10 These high acceptance rates might be overestimated in the data. Occasionally, when microentrepreneurs request a credit from a financial institution or intermediary, their credit profile is checked before applying. If their credit score is too low, they might not even apply for the credit. Therefore, the acceptance rate would be lower if these cases were considered. Unfortunately, there is no information from the demand side (surveys) or from the supply side (financial institutions) that would allow a better measurement.

Table 3.
Loan applications and sources by formalization stage in 2019

Formalization stage	Did you ask for credit or a loan for your business in the past year?		To whom did you ask for the loan?		
	No	Yes	Financial Institutions	Informal Lenders	Other
i. None	83.8%	16.2%	62.5%	28.4%	9.1%
ii. RUT only	80.6%	19.5%	81.4%	12.5%	6.1%
iii. RUT and business registry	69.4%	30.6%	88.1%	5.8%	6.1%
iv. RUT, business registry, and some social security	68.1%	32.0%	91.6%	0.9%	7.5%
v. RUT, business registry, some social security, and any tax	67.0%	33.1%	98.0%	0.9%	1.2%

Note: This table shows the percentage of microbusinesses by formalization stage according to their answer to the questions posed. The answers to the "Whom did you ask for the loan?" question are conditioned to a "Yes" answer to the previous question. Regarding the sources of the loans, "Financial Institutions" comprise regulated financial institutions (banks, cooperatives, financing companies, etc.) or Microcredit Lenders (NGOs); the "Other" category comprises vendor loans, pawnshops, family, friends, or others. In stages iv. and v. "some social security" alludes to microbusinesses that made any contribution to pensions or healthcare, be it for the owner or one of their employees. "Any tax" refers to the payment of at least one of the following taxes: income tax, VAT tax, or corporate tax. Source: Made by the authors using data from EMICRON (2019).

Table 4.
Reasons for not asking for a loan by formalization stage in 2019.

Formalization stage	Why have you not asked for a loan?		
	Does not need one	Cautiousness/ Does not like being indebted	Financial barriers
i. None	42.6%	31.8%	25.6%
ii. RUT only	45.8%	28.3%	25.9%
iii. RUT and business registry	44.9%	32.2%	22.9%
iv. RUT, business registry, and some social security	54.7%	25.9%	19.4%
v. RUT, business registry, some social security, and any tax	55.2%	23.8%	21.0%

Note: This table shows the percentage of microbusinesses by formalization stage according to their response to the question posed. The answers "Does not need one" includes those who do not need one as well as others; "Financial barriers" include those microbusinesses that do not fulfill the requirements (guarantees, codebtors, and sureties), those who have a negative credit score appraisal and those who consider that the interest rate and commission payments are too high. In stages iv. and v. "some social security" alludes to microbusinesses that made any contribution to pensions or healthcare, be it for the owner or one of their employees. "Any tax" refers to the payment of at least one of the following taxes: income tax, VAT tax, or corporate tax. Source: Made by the authors using data from EMICRON (2019).

EMICRON also asks those microbusinesses that did not request loans or credits for their reasons for not doing so and categorizes these answers into three: (i) they do not need it, (ii) they are afraid or do not like to borrow, or (iii) they have financial restrictions or face other barriers (e.g., lack of collateral, high rates, among others). Table 4 presents the distribution of these three categories along the formalization ladder. Among all the microbusinesses that reported not having applied for any credit or loan, not needing one was the main reason for not doing so, regardless of the level of formalization; followed by fear/aversion to debts and, finally, the existing financial barriers. It is worth highlighting the relatively low percentages of these last two categories for firms in the final stages.

Along the same lines, we show in Table 5 the low savings rates of microbusinesses in Colombia: less than half of these economic units save, regardless of the degree of formalization. These seemingly low saving rates can be partially explained by the fact that many people do not consider simplified or digital savings accounts (such as Daviplata or Nequi) alternatives in the formal financial system.

However, savings rates increase with formalization: there is a difference of 18 percentage points between the savings of microbusinesses in the lowest level of formalization (24%) and those in the highest stage (42%). Additionally, of microbusinesses with savings, informal ones tend to save at home (84.7%), and only 1 in 10 do so in financial institutions (9.3%). In contrast, between 59% and 68% of the microbusinesses in stages 4 and 5 of formalization save in formal financial institutions, and between 25% and 34% do so at home. When asking the microbusinesses that did not save their main reason for not doing so, almost all of them answered that their income was insufficient.

Table 5.
Savings percentage and its destination by formalization stage in 2019

Formalization stage	Did you save money for your business in the past year?		Where did you put your savings?		
	No	Yes	Financial institutions	Home	Others
i. None	76.0%	24.0%	9.3%	84.7%	6.0%
ii. RUT only	71.1%	28.9%	24.5%	68.5%	7.1%
iii. RUT and business registry	71.3%	28.7%	30.0%	61.9%	8.1%
iv. RUT, business registry, and some social security	60.9%	39.1%	68.0%	25.3%	6.7%
v. RUT, business registry, some social security, and any tax	58.1%	41.9%	58.8%	33.5%	7.7%

Note: This table shows the percentage of microbusinesses by formalization stage according to their answer to the questions posed. The answers to the "Where did you put your savings?" question were conditional to a "Yes" answer to the previous question. The "Others" category includes those microbusinesses that save through a rotating savings and credit association, through family or friends, or through the purchase of assets (jewelry, real estate, furniture, etc.). In stages iv. and v. "some social security" alludes to microbusinesses that made any contribution to pensions or healthcare, be it for the owner or one of their employees. "Any tax" refers to the payment of at least one of the following taxes: income tax, VAT tax, or corporate tax. Source: Made by the authors using data from EMICRON (2019).

As evidenced by the literature, most microentrepreneurs in developing countries have a precarious savings culture, and those few who save allocate it to other objectives unrelated to the development of the economic activity of their firm (Banca de las Oportunidades, 2021). Therefore, the low savings rates of microbusinesses and their high aversion to the financial system (tacit or explicit) are worrisome as greater savings can translate into greater efficiency in the use of resources and higher investment, contributing to the growth and sustainability of the businesses.

Finally, it is relevant to mention that, concerning the records used to keep accounts, the percentage of microbusinesses that do not keep records decreases with the formalization stage. In particular, 77.8% of the completely informal firms do not keep any accounting, while for those business that declare some tax, the share is 2.9%. Simple record systems (i.e., a notebook, Excel, or cash register) are the most used in the middle stages of formalization. In contrast, the use of advanced records (i.e., balance sheets, P&Ls, or financial/labor/tax reports) is notably lower in the first steps, but its use increases with the level of formalization. We present this relation in Table A.2. Finally, regarding microbusinesses that receive cash as the only form of payment, the percentages vary from 94% for microbusinesses without any level of formalization to 42% for the most formalized microbusinesses. The latter accept different forms of payment, such as checks, transfers, credit cards, and debit cards, among others.

4. Empirical Strategy

From the previous descriptive statistics, it is evident that there is a positive relationship between microbusinesses' access to the formal financial system and their transition toward formalization. Following this same line, this section will present the empirical strategy to find the causal relationship between these two variables.

First, we estimate a linear regression model using Ordinary Least Squares (OLS) and a Probit model, where the dependent variable takes the value of 0 if the microbusiness is in the lowest stage of the formalization process (i.e., it is completely informal), and 1 if it has met any of the formalization requirements. In particular, we estimate the following equation:

$$formalization_i = \alpha_1 FormalCredit_i + \alpha_2 InformalCredit_i + \beta_i' X_i + \delta_s + \lambda_d + \mu_i \quad (1)$$

where $formalization_i$ represents the dependent variable previously described; $FormalCredit_i$ and $InformalCredit_i$ are dummy variables that equal 1 if the microbusiness obtained credit from a formal or an informal financial institution, respectively.

Based on the theoretical framework, we also include a vector of observable characteristics of microbusinesses (X_i) that influence both formalization and financial inclusion and whose omission would bias our results. These variables are the owner's savings behavior and gender, number of employees, firm age, indicators for Colombia's three largest cities (Bogota, Medellin, and Cali), and the maintenance of an accounting record. Furthermore, δ_s and λ_d represent sector (s) and department (d) fixed effects, which capture characteristics of the different sectors or departments that do not vary over time but that may affect the relationship of interest—for example, consistently higher rates of firm and credit informality in some regions of the country. Table A.1 presents descriptive statistics for the main variables. Finally, μ_i represents the error term, which indicates the variation in the dependent variable not explained by the model and for which we include robust standard errors.

Second, considering formalization as a gradual process, we estimate the same relationship using the following ordered Probit model, exploiting the natural order given by the 5 formalization stages presented in the previous section:

$$formalization.stage_i = F(\alpha_1 FormalCredit_i + \\ + \alpha_2 InformalCredit_i + \beta_i' X_i + \mu_i) \quad (2)$$

If the unobservable factors affecting formalization and financial inclusion are not correlated, then the probability of financial inclusion would be exogenous, and the estimated parameters would be causal. However, as the literature has documented, the vicious circle of informality suggests the existence of double causality between these two variables: while it is true that greater access to the formal financial system could explain higher levels of formalization, a higher level of formalization could lead to more credit applications (Locke & Wellagale, 2017; Fernandez, 2021); upward biasing our results. Moreover, as other research has shown (e.g., McKenzie & Sakho, 2010; Benhassine et al., 2018)), there seems to be a null effect of formalization on access to credit. This null effect would downward bias our results.

Therefore, it is essential to look for an exogenous source of variation that allows us to address this endogeneity concern and allow a causal interpretation of our results. In our case, we follow an instrumental variable approach estimating equations (1) and (2) using a two-stage least squares (2SLS) and an instrumented ordered Probit model, respectively. For the exclusion restriction to be met, the instrumental variables must be related to the endogenous variables (formal and informal credit) and not directly to the dependent variable (formalization).

For this reason, in the first stage, we instrument access to formal and informal credit with two variables related to the ownership of assets or collateralizable assets by a microbusiness owner. As mentioned by Galiani & Schargrodsky (2011), in the presence of effective property rights, asset holding can smooth information asymmetries in credit markets since borrowers can use these assets as collateral. On the other hand, asset ownership may not be a relevant instrument given the subsistence nature of most microbusinesses in Colombia, characterized by a low wealth and value of assets (Besley & Ghatak, 2010).

Based on this discussion, the first instrumental variable (*Collateral 1*) is a dummy variable that equals 1 if, in the previous year, the owner of the micro business invested in the acquisition of land, a shop, or establishment; machinery or tools; computer or ICT equipment; furniture or office equipment; vehicles or other assets, and 0 otherwise. The second variable (*Collateral 2*) is equal to 1 if the shop, establishment, vehicle, or place where the microbusiness develops its activity is owned and fully paid for or owned but is being paid for. In particular, the first stage regressions are given by:

$$FormalCredit_i = \phi_1 \cdot Collateral1 + \phi_2 \cdot Collateral2 \\ + \pi_i' X_i + \nu_s + \eta_d + \epsilon_i \quad (3)$$

$$InformalCredit_i = \varphi_1 \cdot Collateral1 \\ + \varphi_2 \cdot Collateral2 + \zeta_i' X_i + \nu_s + \eta_d + \epsilon_i$$

where *Collateral1* and *Collateral2* relate to both instrumental variables; *Xi* correspond to the vector of control variables; ν_s and η_d represent sector and department fixed effects; and ϵ_i denotes the error term. Our identifying assumption is that the ownership of collateralizable assets directly impacts the financial inclusion of microbusinesses through the promotion of formal credit while disincentivizing the use of informal credits, and only through these relationships it ends up having a role in their formalization process.[11] We formally test the relevance of our instrumental variables in section 5.2 below.

Finally, the exclusion restriction would be violated if our instrumental variables would directly influence firm formalization. For example, if the business registry required firms to show proof that they are legally using the premises where they carry out their activity, as in Sri Lanka or other countries (de Mel, et al., 2013).

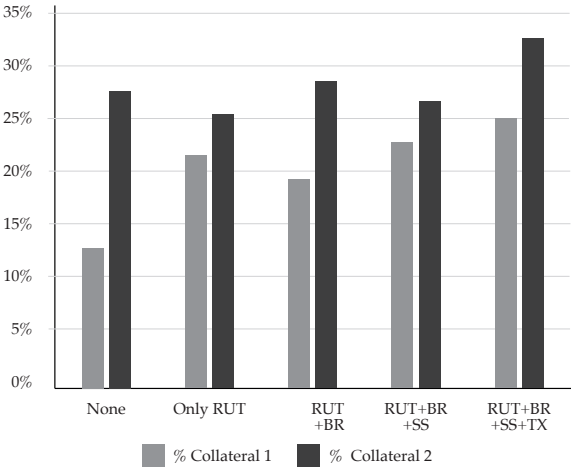
11 Specifically, *Cov(Collateral1,financial.inclusion)≠0, Cov(Collateral2,financial.inclusion)≠0, Cov(Collateral1,μ)=0, Cov(Collateral2,μ)=0.*

We do not believe this represents a problem in our setting as the business registry in Colombia is self-reported, and the Chambers of Commerce do not have to cross-validate the information reported by firms. Another violation of the exclusion restriction can happen if having secure property rights over its assets induces firms' likelihood of making longer-term investments in other types of capital or advertisement. Although this assumption cannot be tested, in our robustness checks, we present the 2SLS estimation, including a different set of control variables aimed to control for this sort of expense and investment. As we will show below, our main results do not change. Moreover, in Figure 1 we show that the share of microbusinesses that have collaterals does not have a clear monotonic relationship with the businesses' level of formalization, instead it presents some interesting 'ups-and-downs' along the formalization stages. These results represent descriptive evidence suggesting that the ownership of collateralizable assets does not necessarily affects the level of formalization directly.

5. Results

This section presents the main econometric results of the paper. First, we present the estimations of equation (1) using OLS and 2SLS, where the potential endogeneity problem between informality and access to formal credit is considered. Second, we exploit the heterogeneity of firms in their transition towards formalization, using ordered Probit models without and with instrumental variables.

Figure 1.
Share of Microbusinesses with Collaterals and Formalization Stage



Note: This figure shows the percentage of microbusinesses by formalization stage according to their ownership of collateral. Collateral 1 is a dummy variable that equals 1 if, in the previous year, the owner of the micro business invested in the acquisition of land, a shop, or establishment; machinery or tools; computer or ICT equipment; furniture or office equipment; vehicles or other assets, and 0 otherwise. Collateral 2 is equal to 1 if the shop, establishment, vehicle, or place where the microbusiness develops its activity is owned and fully paid for or owned but is being paid for. BR corresponds to the possession of a business registry; SS corresponds to "some social security," which alludes to microbusinesses that made any contribution to pensions or healthcare, be it for the owner or one of their employees; TX refers to "any tax," which alludes to the payment of at least one of the following taxes: income tax, VAT tax, or corporate tax. Source: Made by the authors using data from EMICRON (2019).

5.1. Informality and Access to Credit

First, Table 6 shows the results for estimating equation (1) using the binary definition of formalization as a dependent variable, i.e., 0 for all microbusinesses in a state of total informality (62.7% of them) and 1 otherwise. As this variable can be defined for the entire sample, it captures the relationship between financial inclusion and formalization among microbusinesses more accurately. In column (1), we present the main coefficients of the model estimated by OLS. We observe a strong positive relationship between access to formal credit and formalization, while a negative relationship with access to informal credit. In particular, having a

credit from the formal financial system is associated with a 23% higher probability of not being informal.

These correlations hold even after including control variables and departmental and sector fixed effects, as shown in columns (2) and (3). Including these controls and fixed effects is an important step towards obtaining the causal effect between these two variables, given the existence of observable variables, as well as unobservable variables at the department or sector level that affect the relationship between them. For example, it is possible that, in the food services sector, it is more complicated for a microbusiness to exit informality given (i) the greater number of requirements to operate formally and (ii) the relatively low levels of physical and human capital required to establish this type of economic activity. Moreover, in some peripheral regions of the country, both access to the financial system and formalization rates may be lower, given the relatively low levels of economic development and other cultural factors.

Table 6.
OLS and Probit Models

Variables	(1) OLS	(2) OLS	(3) OLS	(4) Probit	(5) Marginal Effects
Formal credit	0.230***	0.126***	0.125***	0.390***	0.116***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Informal credit	-0.112***	-0.089***	-0.048***	-0.318***	-0.095***
	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Formal saving		0.191***	0.148***	0.647***	0.193***
		(0.001)	(0.001)	(0.003)	(0.001)
Informal saving		-0.041***	-0.018***	-0.135***	-0.040***
		(0.001)	(0.001)	(0.002)	(0.001)
Observations	4,147,080	4,147,080	4,147,080	4,147,080	4,147,080
R-squared	0.025	0.246	0.297	0.200	0.200
Controls	NO	YES	YES	YES	YES
Department FE	NO	NO	YES	NO	NO
Economic Sector FE	NO	NO	YES	NO	NO

Note: This table shows the estimates of the regressions of a dummy variable that takes the value of 0 if the microbusiness is completely informal (does not fulfill any of the requirements to be formalized) and 1 if not. Independent variables include a dummy that equals 1 if the microbusiness has had access to formal or informal credit, or if the microbusiness saves formally or informally, and other control variables. Column (1) shows the results of the OLS regression; column (2) is also an OLS regression, but it includes the set of control variables, while column (3) includes department and sectors fixed effects; column (4) shows the results of the probit model, and column (5) depicts its marginal effects. Robust standards errors in the parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Made by the authors using data from EMICRON (2019).

As shown in column (3), access to formal credit and formal savings continue to be positively and significantly related to formalization. Specifically, microbusinesses that have credit in the formal financial system have an average 12.5% higher probability of not being completely informal compared to microbusinesses that do not haver credit. On the other hand, microbusinesses that have informal credit have an average 4.8% higher probability of being completely informal compared to microbusinesses that do not have credit. Similarly, microbusinesses that deposit their savings in the formal financial system have a higher average probability (14.8%) of not being informal. For informal savings, this probability is 1.8% lower.

Finally, given the discrete nature of the dependent variable, column (5) presents the estimation of equation (1) using a probit model, together with its respective marginal effects in column (5). The marginal effects derived from this estimation are similar in size to those presented in column (2), showing a negative relationship between formal credit and savings and microbusiness informality and a positive relationship between informal credit and informality.

To address the endogeneity between access to formal credit and formalization and establish their causal relationship, we estimate equation (1) using instrumental variables and a 2SLS estimation with equation (3) for the first stage. As mentioned in the previous section, we use as instrumental variables the ownership of collateralizable assets by the owners of the microbusinesses since these assets potentially affect the probability of a microbusiness applying for and obtaining formal or informal credit.

The first stage results, which we present in columns (2) and (3) of Table 7, reveal that there is indeed a positive relationship between ownership of collateralizable assets by microbusinesses and formal access to credit markets. As mentioned above, the ownership of these assets helps mitigate information asymmetries in formal credit markets and might allow for an easier acceptance of a credit application. On the other hand, microbusinesses that do not operate out of their premises are more likely to obtain informal sources of credit. The last row of Table 7 presents the F-statistic of the Kleibergen-Paap test for weak instruments. This statistic is well above the levels of 10, or even 105, as suggested by the literature (Lee et al., 2021), indicating that these instrumental variables are not weak.

Using these estimates, column (4) presents the results of the second stage of the 2SLS model. These parameters show a positive impact of access to formal credit on the probability that a microbusiness leaves informality. In particular, having access to formal credit can increase by 78% the probability that a microbusiness leaves a state of complete informality. Nonetheless, having access to informal credit leads to a 142% higher probability that the microbusiness remains in a state of informality relative to a unit that does not have credit.

These results suggest that accessing formal credit markets has the power to break the vicious cycle of low productivity and high informality present in developing countries. However, having access to informal sources of credit can deepen this vicious cycle, and it may even be better not to have access to these sources of finance at all. Moreover, the large differences between the OLS and the 2SLS estimates could be pointing to the large array of results in the literature showing no effect of formalization on access to credit (e.g., McKenzie & Sakho, 2010; Benhassine et al., 2018)), which could be biasing the OLS estimates.

Table A.3. presents the complete estimation results of these specifications. All the variables have the expected direction in the OLS and the 2SLS specifications. In particular, being an older business is associated with a higher chance of being formal, which could come from the fact that older microbusinesses that have survived could be slightly more productive and have accumulated more resources to overcome the barriers to becoming formal. Moreover, as shown in Table A.2., having a more structured accounting record is associated with being a more formal microbusiness.

Table 7.
Two-Stage Least-Squares Regression

Variables	(1) Fixed Effects	(2) 1st Stage (IV) Formal credit	(3) 1st Stage (IV) Informal credit	(4) 2nd Stage (IV)
Formal credit	0.125***			0.777***
	(0.001)			(0.011)
Informal credit	-0.048***			-1.421***
	(0.001)			(0.049)
Collateral 1 (IV)		0.111***	0.024***	
		(0.001)	(0.000)	
Collateral 2 (IV)		0.031***	-0.007***	
		(0.000)	(0.000)	
Observations	4,147,080	4,147,080	4,147,080	4,147,080
Kleibergen-Paap rk F stat	**1,372.2**			

Note: This table shows the estimates for regressions of a dummy variable that takes the value of 0 if the microbusiness is completely informal (does not fulfill any of the requirements to be formalized) and 1 if not, on variables such as if the microbusiness has had access to formal or informal credit, if it saves formally or informally, other control variables and fixed effects for department and economic sector. Column (1) depicts estimates for an OLS model; column (4) depicts the model using 2SLS instrumenting access to formal and informal credit with two variables: (i) a dummy variable that has a value of 1 if the owner of the microbusiness invested in the purchase or acquisition of real estate, vehicles or other assets in the last year; (ii) a dummy variable that has a value of 1 if the locale, vehicle or place where the microbusiness operates is owned and totally paid for or owned and is currently being paid for. The estimations of the first two stages are presented in columns (2) and (3). Robust standards errors in the parentheses. *** p<0.01, ** p<0.05, * p<0.1. The coefficients for other variables are not shown, as no clear identification strategy exists for them. Source: Made by the authors using data from EMICRON (2019).

In Table A.4., we present different robustness checks for this 2SLS specification. First, in column (1), we measure credit access using dummy variables that equal 1 if the microbusiness applied to a formal or informal credit, instead of whether they obtained it. Results are highly similar as 88% and 100% of microbusinesses who apply for a formal or an informal credit, respectively, obtains it. In column (2), we include variables for the businesses' expenditures in advertisement, professional services, or telecommunication technologies to control for the fact owning assets may increase firms' incentives for making investments in advertising and telecommunication technologies. In column (3), we further include a dummy variable that equals 1 if the business invested in other types of assets (vehicles, land, machinery or tools, hardware or software, or furniture) and if its owner is saving for education or health purposes as a proxy for human capital accumulation, to control for the fact that owning assets and having credit can incentivize the owners of microbusinesses to invest in other types of physical or human capital. Both sets of results lie around our main results. In column (4), we present the results of our main specifications but include month fixed effects to account for potential seasonal differences affecting microbusinesses in month of the year where the survey was implemented. Results are statistically equal in this specification.

We would like to finish this section by noting that, even though we present descriptive evidence suggesting that the identifying assumptions might hold in our case and our 2SLS results are robust to different specifications, we consider our estimates to be a conservative upper bound of the true causal relationship between credit access and formalization. As we discussed in the descriptive evidence, credit and savings rate could be underreported if the data ignores the links between owner and personal finances, and the existence of digital savings account. If these issues are stronger for informal firms, our results could be upward biased. To exactly point out the causal relationship between these variables, a more robust identification strategy or a more detailed dataset is needed.

5.2. Gradual Formalization and Access to Credit

The previous section presented evidence of the critical role that access to the formal credit system plays in exiting informality. In this subsection, we explore the impact that access to credit has on the transition of a microbusiness to complete formalization, using ordered Probit models. For this model, we use as a dependent variable a categorical value that takes values between 1 and 5 depending on the location of a microbusiness within the formalization ladder defined previously.

Although most microbusinesses in the country follow this "natural" order towards formalization (Torres & Acosta, 2021), some microbusinesses do not, and, therefore, the ordered Probit estimation loses these observations. Of the 4,147,080 observations we used in the previous subsection, 547,975 (13.2%) microbusinesses are outside these five formalization stages and in other intermediate formalization stages. If these omitted microbusinesses are particularly distinct from those within the formalization stages, the ordered Probit estimates could suffer from selection bias. For example, if the omitted microbusinesses have higher rates of informality despite having greater access to the financial system, the effect of access to formal credit on formalization could be overestimated.

For this reason, we compare the mean of the variables of our econometric specification among different groups of microbusinesses: those within one of the five gradual stages of formalization and those outside this order. Generally, the average of all the variables—which we present in Table A.5—shows a comparable behavior between groups. Microbusinesses outside the natural formalization order seem to be relatively similar to those located between the second and fourth stages: those in intermediate steps of formalization characterized by having a tax identification number, a business registration and contributing to some of the required social security payments. Therefore, the omission of these observations does not represent a major threat to the estimation of our ordered Probit models.

Table 8 shows the main results of our ordered Probit model without using the instrumental variables; column (1) shows the estimated coefficients, while the other columns present the marginal effects for each formalization stage. These results show that microbusinesses that apply for a formal credit have an average 13.7% lower probability of being in the first formalization stage (i.e., being completely informal) than those that do not apply for a credit. At the same time, microbusinesses that deposit their savings in formal financial institutions have a lower probability (18.0%) of belonging to this level of formalization. It is worth noting the similarities between these marginal effects and those presented in Table 6.

For the remaining stages, in which microbusinesses already register a certain level of formalization, the marginal effect of each of the four variables of interest follows the expected direction and is decreasing in the level of formalization of microbusinesses. This decreasing pattern can be explained by the decreasing number of microbusinesses along the formalization ladder.

Table 8.
Ordered Probit Regression

Variables	Coefficients	Marginal Effects				
		Stage I	Stage II	Stage III	Stage IV	Stage V
Formal credit	0.402***	-0.137***	0.052***	0.050***	0.028***	0.008***
	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Informal credit	-0.269***	0.076***	-0.036***	-0.026***	-0.011***	-0.003***
	(0.004)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Formal saving	0.509***	-0.180***	0.063***	0.066***	0.039***	0.012***
	(0.003)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Informal saving	-0.154***	0.046***	-0.021***	-0.015***	-0.007***	-0.002***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,600,005					
Prob(tier=i)		0.759	0.141	0.072	0.024	0.004

Note: This table shows an ordered probit regression (column 1) and its respective marginal effects (columns 2 to 6) in which the dependent variable has values ranging from 1 to 5 depending on the formalization stage in which the microbusiness is currently on, as a function of whether the microbusiness has had access to formal or informal credit, and other control variables. The last row is the predicted probability for each formalization stage. *** p<0.01, ** p<0.05, * p<0.1. Source: Made by the authors using data from EMICRON (2019).

Finally, to understand the causal impact of access to formal and informal credit on the transition to formalization, we estimate the ordered Probit model using the same instrumental variables used in the 2SLS model presented in Section 5.1. We show these estimated coefficients in Table 9 and the respective estimated marginal effects for each formalization stage. The first estimation stage is equivalent to that used in the previous subsection (equation 3) but estimated using probit models. The results show that greater access to formal credit positively and significantly affects the probability of belonging to any formalization stage.

However, these results also show important differences along the formalization ladder. In particular, the effect of formal credit is larger for the probability of advancing through the first stages, i.e., accessing formal credit can lead a microbusiness to move out of total informality and obtain its RUT (tax identification number) and business registry. Two forces may be behind this effect. First, a mechanical effect whereby microbusinesses must process these two requirements to access formal credit. Second, a productivity effect, whereby greater access to formal credit leads microbusinesses to acquire more capital or adopt better production processes, which increases their income with which they can more easily cover the costs associated with the first steps of formalization. Although the first effect likely plays an important role, the fact that a positive effect is observed for stages 3 to 5 leads us to conclude that the productivity effect is relevant, given that the procedures associated with these latter stages are not usually a prerequisite for obtaining a formal credit.

Table 9.
Ordered Probit Regression with Instrumental Variables

Variables	Coefficients	Marginal effects				
		Stage I	Stage II	Stage III	Stage IV	Stage V
Formal credit	0.620***	-0.155***	0.047***	0.046***	0.035***	0.027***
	(0.008)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)
Informal credit	-0.196***	0.049***	-0.015***	-0.014***	-0.011***	-0.008***
	(0.022)	(0.006)	(0.002)	(0.002)	(0.001)	(0.001)
Observations	3,600,005					
Prob(tier=i)		0.717	0.123	0.084	0.050	0.026

Note: This table shows the results of an ordered probit regression with instrumental variables (column 1) and their respective marginal effects (columns 2 to 6) in which the dependent variable has values ranging from 1 to 5 depending on the formalization stage in which the microbusiness is currently on, as a function of whether the microbusiness has had access to formal or informal credit, and other control variables. The model is estimated using an ordered probit regression with instrumental variables (using Roodman's (2011) **cmp** routine), instrumenting access to formal and informal credit using two variables: (i) a dummy variable that has a value of 1 if the owner of the microbusiness invested in the purchase or acquisition of real estate, vehicles or other assets in the last year; (ii) a dummy variable that has a value of 1 if the locale, vehicle or place where the microbusiness operates is owned and totally paid for, or owned and is currently being paid for. The first stage is estimated using probit models, and the second stage uses an ordered probit. Robust standards errors in the parentheses. *** p<0.01, ** p<0.05, * p<0.1. The coefficients for other variables are not shown as no clear identification strategy exists for them. Source: Made by the authors using data from EMICRON (2019).

In contrast, microbusinesses that access informal credit markets decrease their probability of being in any formalization stage, increasing their probability of being completely informal. Moreover, the marginal effect of this sort of credit also decreases as the level of formalization increases, suggesting that going to an informal market has a lower incidence on more formalized microbusinesses.

6. Conclusions

Of the total number of registered firms in Colombia, 93% are microbusinesses, and 66% of these do not have any degree of formalization. Moreover, more than 70% reported never having applied for a loan to manage their business. These patterns are not unique to Colombia but rather common among developing countries. For this reason, it is vital to understand the important role of microbusinesses in the economy of developing countries and the relationship between access to financial products and their formalization process.

In general, low formalization rates of microbusinesses in developing countries are explained by low productivity levels, complex and costly formalization processes, and weak institutional capacity. In turn, low productivity leads to lower firm growth, negatively impacting firm and labor formalization, limiting access to formal financial systems, and restricting the capacity to accumulate capital and invest in new technologies, leading to even lower productivity levels.

This paper estimates the relationship between microbusinesses' access to formal financial markets and their transition toward formalization in Colombia. To evaluate this relationship, we use the Microbusiness

Survey, which was created in 2019 aimed to gather information on formal and informal microbusinesses in Colombia and study their characteristics. Using these data, we carry out a descriptive analysis and the estimation of different econometric models (both linear and discrete) to analyze how financial inclusion affects the formalization process of microbusinesses. Given the endogeneity between both variables, our identification strategy relies on instrumental variables and the inclusion of a large vector of control variables, sector and department fixed effects. In particular, we exploit information on the ownership of collateralizable assets by microbusinesses (such as their own place, vehicles, or large machinery) to build two instrumental variables for credit access to both formal and informal institutions.

When we use traditional binary definitions of formalization (i.e., considering a microbusiness to be informal when it does not comply with any formalization requirements), we find a negative correlation between access to the formal financial system and informality. Microbusinesses that apply for credit or save in the formal financial system have a 12.5% and 14.8%, respectively, higher probability of not being informal compared to microbusinesses that do not apply for credit. Microbusinesses that apply for informal credits or save in informal sources (i.e., at their residence) have an average of 4.8% and 1.8%, respectively, higher probability of being informal compared to microbusinesses that do not apply for credit or do not save. After including the instrumental variables, results suggest that access to credit with the formal financial system can increase by 78% the probability that a microbusiness has some formalization compared to microbusinesses that do not apply for any type of credit. This result suggests that applying for credit with a formal financial institution can help microbusinesses escape informality. On the other hand, having access to informal credit can reinforce the state of informality.

Nonetheless, recent discussions in academia and policy circles have argued that it is important to consider formalization as a process, not a binary state. This multidimensional process is given by the fact that a new firm must comply with many requirements and regulations before being considered formal. As shown by Torres & Acosta (2021), for most microbusinesses these requirements tend to follow a natural order starting with a level of total informality in which they do not have a tax identification number, business registry, make no payments to social security and do not pay any taxes; and ending with a fifth step with microbusinesses that comply with all these requirements.

Therefore, we study the distribution of financial inclusion along these different formalization stages. Descriptive statistics show a positive monotonic relationship between the share of businesses that applied to formal credit and their formalization stage. Moreover, microbusinesses with low levels of formalization tend to rely more on informal sources of credit and present a lack of bookkeeping methods. We exploit this multidimensional formalization process to estimate ordered probit models, with and without including our instrumental variables. Results from these models suggest that the positive effect of formal credit occurs throughout all stages of the formalization process, especially in the first steps (obtaining the tax identification number and the business registry) but also in the more advanced steps, such as labor and tax formalization. This is a possible indication of the positive effect that credit has on the productivity of microbusinesses in Colombia.

Although access to the formal financial system increases with the degree of firm formalization, the latter is not a sufficient condition for accessing formal credit markets. In addition, the lack of access to formal financial systems does not stem only from the financial barriers imposed by financial institutions on microbusinesses, but also from information asymmetries between credit providers and demanders and different behavioral barriers. Our data show the high share of microbusinesses that claim not to have applied for credits because they "do not need them" (even with their low productivity levels), because they are afraid of getting into debt, or because they do not trust fi-

nancial institutions. These statistics clearly show a lack of awareness of the advantages of accessing credit to accumulate capital and increase the capacity to invest in new technologies.

We consider our estimates a conservative upper bound of the true causal relationship between credit access and formalization. If Emicron ignores the connection between owner and personal finances and survey respondents fail to consider digital savings accounts (such as Nequi or Daviplata) as a formal source of savings, our results could still suffer from an upward bias. To study in more detail the financial conditions of microbusinesses in Colombia, it would be highly valuable if Emicron started to collect data on these issues, for example, on the adoption and usage of digital banking instruments.

In recent years, different countries in Latin America have made enormous efforts to reduce the costs associated with formalization (Ulyssea, 2020). The question arises as to whether a policy based on cost reductions is sufficient or, on the contrary, a gradual formalization policy accompanied by conscious efforts to increase productivity would be more beneficial for businesses and the whole society. Reductions in the costs associated with formalization may generate a phenomenon of formalized and low-productive firms. In other words, this type of formalization has the danger of ending up being a "labeling" process that does not solve the structural problems associated with informality. Therefore, business formalization programs should aim to increase firm productivity, especially among promising microbusinesses, that ensure access to higher quality input markets and improve internal management practices. As a result, the vicious circle of informality could be broken by increasing productivity, which would positively impact the level of formalization and the entrepreneurial dynamism of the economy.

References

Aga, G. A., Reilly, B. (2011). Access to credit and informality among micro and small enterprises in Ethiopia. International Review of Applied Economics, 25(3), 313-329.

Anif. (2018). La inclusión financiera de las Mipymes en Colombia. http://anif.co/Biblioteca/politica-fiscal/la-inclusion-financiera-de-las-mipyme-encolombia

Banca de las Oportunidades. (2021). Demanda de los Productos Financieros En los Micronegocios Colombianos. Unidad de Análisis Económico - Banca De Las Oportunidades. https://www.bancadelasoportunidades.gov.co/sites/default/files/2021-03/Reporte%20micronegocios%20final.pdf

Benhassine, N., McKenzie, D., Pouliquen, V., & Santini, M. (2018). Does inducing informal firms to formalize make sense? Experimental evidence from Benin. Journal of Public Economics, 157, 1-14.

Besley, T., & Ghatak, M. (2009). Property Rights and Economic Development. Handbook of Development Economics, vol 5, edited by Dani Rodrik and Mark Rosenzweig. Amsterdam: North Holland.

Bruhn, M., & McKenzie, D. (2014). Entry regulation and the formalization of microenterprises in developing countries. The World Bank Research Observer, 29(2), 186-201.

Busso, M., Fazio, M., y Algazi, S. (2012). (In) formal and (un) productive: The productivity costs of excessive informality in Mexico. IDB Working Paper Series 4789.

Campos, F., Goldstein, M., & McKenzie, D. (2023). How should the government bring small firms into the formal system? Experimental evidence from Malawi. Journal of Development Economics, 103045.

Caro, L., Galindo, A., y Meléndez, M. (2012). Credit, labor informality and firm performance in Colombia (No. IDB-WP-325). IDB Working Paper Series.

Castro, F., Londoño, D., Cruz, Á. J., & Gómez, C. P. (2020). ¿Qué factores inciden en la demanda de crédito de la microempresa en Colombia? Archivos de Economía, (522).

Catão, L., y Rosales, M. R. (2009). Financial dependence, formal credit, and informal jobs: new evidence from Brazilian household data. Formal Credit, and Informal Jobs: New Evidence from Brazilian Household Data (December 2009).

Chiappori, P. A., & Salanié, B. (2000). Testing for asymmetric information in insurance markets. Journal of Political Economy, 108(1), 56-78.

Confecámaras (2018). Nuevos Hallazgos de la Supervivencia y Crecimiento de las Empresas en Colombia. Red de Cámaras de Comercio de Colombia. https://confecamaras.org.co/analisis-economico

Dabla-Norris, E., & Inchauste, G. (2008). Informality and regulations: What drives the growth of firms? IMF Staff Papers, 55(1), 50-82.

Dabla-Norris, E. & Koeda, J. (2008). Informality and bank credit: Evidence from firm-level data. IMF Working Papers 2008/094.

De Andrade, G. H., Bruhn, M., & McKenzie, D. (2016). A helping hand or the long arm of the law? Experimental evidence on what governments can do to formalize firms. The World Bank Economic Review, 30(1), 24-54.

De Mel, S., McKenzie, D., & Woodruff, C. (2013). The demand for, and consequences of, formalization among informal firms in Sri Lanka. American Economic Journal: Applied Economics, 5(2), 122-150.

Departamento Administrativo Nacional de Estadística (DANE) (2012). GLOSARIO DE TÉRMINOS GRAN ENCUESTA INTEGRADA DE HOGARES GEIH.

Departamento Administrativo Nacional de Estadística (DANE) (2021). Encuesta de Micronegocios -2019. Dirección de Metodología y Producción Estadística - DIMPE.

Departamento Nacional de Planeación (DNP) (2019). Documento CONPES 3956 – Política de Formalización Empresarial https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%c3%b3micos/3956.pdf

Dirección de Metodología y Producción Estadística - DIMPE. (2019). Encuesta de Micronegocios-2019.

Fernández L., F. (2017). Impacto de la informalidad laboral sobre el acceso a crédito formal. Coyuntura Económica. 47(1 y 2). Junio-diciembre, pp. 169-204. Fedesarrollo, Bogotá.

Fernández, C. (2020). Informalidad empresarial en Colombia. Coyuntura Económica, 50, 133-168, diciembre. Fedesarrollo, Bogotá.

Galiani, S., & Schargrodsky, E. (2011). Land Property Rights and Resource Allocation. Journal of Law and Economics, 54, S329-S344.

Gandelman, N., & Rasteletti, A. (2013). Credit constraints, sector informality and firm investments: Evidence from a panel of Uruguayan firms.

International Labor Organization (2021). Empleo e informalidad en América Latina y el Caribe: una recuperación insuficiente y desigual. Nota técnica, Serie Panorama Laboral en América Latina y el Caribe.

Karlan, D., & Zinman, J. (2009). Observing Unobservables: Identifying Information Asymmetries with a Consumer Credit Field Experiment. Econometrica, 77(6), 1993–2008.

Lee, D.S., McCrary, J., Moreira, M.J., & Porter, J.R. (2021). Valid t-ratio Inference for IV. NBER Working Paper w29124.

Locke, S., & Wellalage, H.N. (2016). Informality and credit constraints: evidence from Sub-Saharan African MSEs. Applied Economics, 48(29), 2756-2770

Malkova, A., Peter, K. S., & Svejnar, J. (2021). Labor Informality and Credit Market Accessibility. Working Paper.

McKenzie, D., & Sakho, Y. S. (2010). Does it pay firms to register for taxes? The impact of formality on firm profitability. Journal of Development Economics, 91(1), 15-24.

Perry, G., Maloney, W., Arias, O., Fajnzylber, P., Mason, A., & Saavedra- Chanduvi, J. (2007). Informality: Exit and Exclusion. The World Bank.

Roodman, D. (2011). Fitting fully observed recursive mixed-process models with cmp. The Stata Journal, 11(2), 159-206.

Santa María. M., & Rozo. S. (2009). Análisis cualitativo y cuantitativo de la informalidad empresarial en Colombia. Revista Desarrollo y Sociedad, (63), 269-296.

Stiglitz, J. E., & Weiss, A. (1981). Credit Rationing in Markets with Imperfect Information. The American Economic Review, 71(3), 393-410.

Torres, A. y Acosta, C. (2021). Diseño de una ruta de formalización laboral gradual. (Informe N °1 – Diagnóstico). Universidad EAFIT.

Torres, A. y Acosta, C. (2022). Diseño de una ruta de formalización laboral gradual. (Informe N °2 – Propuesta de Política). Universidad EAFIT.

Ulyssea, G. (2020). Informality: Causes and consequences for development. Annual Review of Economics, 12, 525-546.

Urueña-Mejía, J. C., Gutierrez, L. H., & Rodríguez-Lesmes, P. (2023). Financial inclusion and business practices of microbusiness in Colombia. Eurasian Business Review, 13(2), 465-494.

Woodruff, C. (2018). Addressing constraints to small and growing businesses. International Growth Centre, London, 20.

Zuleta, L. A. (2016). Inclusión financiera de la pequeña y mediana empresa en Colombia. CEPAL, Serie 262. Financiamiento para el desarrollo.

Appendix – Supplementary Material for Online Publication

Additional Tables and Figures

Table A.1.
Variable Description

Variable	Description	Mean	Min	Max
Formality	Dummy, 1 if the microbusiness has any formalization stage and 0 if not.	0.374	0	1
Formalization stage	Categorical, ranging from 1 if the microbusiness is in the first formalization stage to 5 if it is in the fifth degree.	1.538	1	5
Formal credit	Dummy, 1 if the microbusiness owner obtained credit for managing their business in the formal financial market, 0 if they did not ask for one or did in the informal market.	0.111	0	1
Informal credit	Dummy, if the microbusiness owner obtained credit for managing their business in the informal financial market, 0 if they did not ask for one or did in the formal market.	0. 044	0	1
Formal saving	Dummy, 1 if the microbusiness owner saved money from their business in the formal financial market, 0 if they did not save or did in the informal market.	0.061	0	1
Informal saving	Dummy, 1 if the microbusiness owner saved money from their business in the informal financial market, 0 if they did not save or did in the formal market.	0.184	0	1
Women	Dummy, 1 if the microbusiness owner is a woman, 0 otherwise.	0. 411	0	1
Self-employed	Dummy, 1 if the microbusiness owner is self-employed, 0 otherwise.	0. 870	0	1
Age	Natural logarithm of the number of years in which the microbusiness has existed.	1.121	0	1.61
Bogotá	Dummy, 1 if the microbusiness is in Bogota, 0 otherwise.	0.165	0	1
Medellín	Dummy, 1 if the microbusiness is in Medellín, 0 otherwise.	0.080	0	1
Cali	Dummy, 1 if the microbusiness is in Cali, 0 otherwise.	0.064	0	1
Manufacture	Dummy, 1 if the microbusiness is part of the manufacturing industry, 0 otherwise.	0.123	0	1
Accounting records	Dummy, 1 if the microbusiness has any accounting record, 0 otherwise.	0.37	0	1

Note: This table shows the mean, minimal, and maximum values for the main variables of interest used in the empirical models. Source: Made by the authors using data from EMICRON (2019).

Table A.2.
Bookkeeping by formalization stage in 2019

Formalization stage	Which is the primary record used to carry out bookkeeping?		
	None	Simple	Advanced
i. None	77.8%	22.1%	0.1%
ii. Only RUT	59.2%	40.2%	0.6%
iii. RUT and business registry	21.0%	71.7%	7.3%
iv. RUT, business registry, and some social security	9.6%	57.8%	32.6%
v. RUT, business registry, some social security, and any tax	2.9%	59.9%	37.2%

Note: This table shows the percentage of microbusinesses by formalization stage according to the primary record used for accounting; the "None" category refers to microbusinesses with no recordkeeping. The "Simple" category contains those microbusinesses that do their accounting through a transaction journal and other kinds, such as notebooks, Excel, or cash registers. The "Advanced" category includes those microbusinesses that use a balance sheet or income statement and financial/labor/tributary statements. Source: Made by the authors using data from EMICRON (2019).

Table A.3.
Two-Stage Least-Squares Regression – Full Estimation

Variables	(1) Fixed Effects	(2) 1st Stage (IV) Formal credit	(3) 1st Stage (IV) Informal credit	(4) 2nd Stage (IV)
Formal credit	0.125***			0.777***
	(0.001)			(0.011)
Informal credit	-0.048***			-1.421***
	(0.001)			(0.049)
Collateral 1 (IV)		0.111***	0.024***	
		(0.001)	(0.000)	
Collateral 2 (IV)		0.031***	-0.007***	
		(0.000)	(0.000)	
Formal Savings	0.148***	0.045***	-0.025***	0.079***
	(0.001)	(0.001)	(0.000)	(0.002)
Informal Savings	-0.018***	-0.009***	0.002***	-0.014***
	(0.001)	(0.000)	(0.000)	(0.001)

Variables	(1) Fixed Effects	(2) 1st Stage (IV) Formal credit	(3) 1st Stage (IV) Informal credit	(4) 2nd Stage (IV)
Age	0.098***	0.054***	0.015***	0.081***
	(0.000)	(0.000)	(0.000)	(0.001)
Women	-0.079***	0.019***	-0.006***	-0.101***
	(0.000)	(0.000)	(0.000)	(0.001)
Self-employed	-0.238***	-0.064***	0.006***	-0.183***
	(0.001)	(0.001)	(0.000)	(0.001)
Accounting Record	0.276***	0.059***	0.003***	0.241***
	(0.000)	(0.000)	(0.000)	(0.001)
Observations	4,147,080	4,147,080	4,147,080	4,147,080
Kleibergen-Paap rk F stat	**1,372.2**			

Note: This table shows the estimates for regressions of a dummy variable that takes the value of 0 if the microbusiness is completely informal (does not fulfill any of the requirements to be formalized) and 1 if not, on variables such as if the microbusiness has had access to formal or informal credit, if it saves formally or informally, the other control variables presented in the table and fixed effects for department and economic sector. Column (1) depicts estimates for an OLS model; column (4) depicts the model using 2SLS instrumenting access to formal and informal credit with two variables: (i) a dummy variable that has a value of 1 if the owner of the microbusiness invested in the purchase or acquisition of real estate, vehicles or other assets in the last year; (ii) a dummy variable that has a value of 1 if the locale, vehicle or place where the microbusiness operates is owned and totally paid for or owned and is currently being paid for. The estimations of the first two stages are presented in columns (2) and (3). Robust standards errors in the parentheses. *** p<0.01, ** p<0.05, * p<0.1. The coefficients for other variables are not shown, as no clear identification strategy exists for them. Source: Made by the authors using data from EMICRON (2019).

Table A.4.
Two-Stage Least-Squares Regression – Robustness Checks

Variables	(1)	(2)	(3)	(4)
Formal credit	0.752***	0.735***	0.799***	0.787***
	(0.011)	(0.011)	(0.013)	(0.011)
Informal credit	-1.771***	-1.558***	-1.289***	-1.490***
	(0.056)	(0.049)	(0.034)	(0.051)
Observations	4,147,080	4,147,080	4,147,080	4,147,080
Kleibergen-Paap rk F stat	1,261.9	1,436.8	2,227.02	1,354.6

Note: This table shows the estimates for regressions of a dummy variable that takes the value of 0 if the microbusiness is completely informal (does not fulfill any of the requirements to be formalized) and 1 if not, on variables such as if the microbusiness has had access to formal or informal credit, if it saves formally or informally, other control variables and fixed effects for department and economic sector. All columns use 2SLS instrumenting access to formal and informal credit with two variables: (i) a dummy variable that has a value of 1 if the owner of the microbusiness invested in the purchase or acquisition of real estate, vehicles or other assets in the last year; (ii) a dummy variable that has a value of 1 if the locale, vehicle or place where the microbusiness operates is owned and totally paid for or owned and is currently being paid for. In column (1),

we measure credit access using dummy variables that equal 1 if the microbusiness applied to a formal or informal credit, while in columns (2) and (3) use dummy variables that equal 1 if the microbusiness obtained a formal or informal credit. In column (2), we include control variables for the businesses' expenditures (if any) in advertisement, professional services, or telecommunication technologies. In column (3), we further include a dummy variable that equals 1 if the business invested in other types of assets (vehicles, land, machinery or tools, hardware or software, or furniture) and if its owner is saving for education or health purposes as a proxy for human capital accumulation. In column (4), we estimate the baseline specification but include month fixed effects.

Robust standards errors in the parentheses. *** p<0.01, ** p<0.05, * p<0.1. The coefficients for other variables are not shown, as no clear identification strategy exists for them. Source: Made by the authors using data from EMICRON (2019).

Table A.5.
Mean Analysis across Formalization Stages

Variable	Stage I	Stages II to IV	Stage V	Left out
N	2,598,086	906,568	95,351	547,075
Formal credit	0.074	0.183	0.277	0.138
Informal credit	0.053	0.033	0.009	0.024
Formal saving	0.022	0.107	0.245	0.137
Informal saving	0.189	0.182	0.181	0.164
Woman	0.451	0.352	0.304	0.338
Self-employed	0.941	0.743	0.410	0.822
Age	1.060	1.222	1.363	1.199
Manufacture	0.118	0.156	0.134	0.095
Accounting records	0.222	0.624	0.966	0.510

Note: This table shows the mean of the main independent variables of the empirical model for the various subgroups: those microbusinesses that are completely informal (stage I), microbusinesses in the middle of a transition towards formality (stages II to IV), formal microbusinesses (stage V), and microbusinesses in other parts of the ladder, those who follow non-conventional paths towards formalization. Source: Made by the authors using data from EMICRON (2019).