THE IMPACT OF ACCESS TO CREDIT
ON THE SAVING BEHAVIOR OF MICROENTREPRENEURS

Evidence from 3 Latin American Countries

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ABSTRACT

Since microcredit started to appear on a significant scale 25 years ago, there has been a continual debate about its welfare effects on low-income entrepreneurs: is it as beneficial as many claim – creating opportunities for increased income generation – or does it tend to create a debt-trap that in the end serves to impoverish the borrowers? The critics claim that what is needed is not more credit and debt, but rather savings services.

Standard models of saving behavior indicate that total savings will fall as a result of improved access to credit. Not only will the precautionary saving motive be mitigated, but accumulation of savings for investment, household purchases or social events becomes less important.

The econometric analysis in this paper, which is based on data from IDB evaluations of its Micro and Small Enterprise Global Programs in Ecuador, El Salvador and Paraguay, yields another less predictable result: Increased access to credit induces borrowers to shift their savings from livestock, jewelry and other assets with low or negative returns into deposit accounts with positive returns. This shift takes place as microentrepreneurs develop an understanding of, and confidence in, the various operations and services of the financial sector. As a result of this shift, borrowers tend to achieve a better return on their savings.

The shifting of savings into deposit accounts has welfare and policy implications. Not only is it beneficial to the microentrepreneurs themselves, but their increased access to regular financial services also contributes to the depth and liquidity of financial markets, which are important for the country as a whole.

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I. INTRODUCTION

Saving means setting a fraction of income aside for future use, thereby transferring resources over time. It facilitates consumption smoothing, which is particularly important in developing countries where incomes are often at subsistence levels and falls in consumption could have disastrous consequences. Saving also allows the self-employed to accumulate funds for making investments in their businesses or covering shortfalls in operating cash flow. Finally, saving empowers poor individuals by shifting the saver's perception of his or her situation from "a day-to-day struggle to survive to a longer-term view based on planning with a growing cushion of savings."[1] Whether an individual saves is a function of several factors, including character traits (such as risk aversion or patience), interest rate levels and expectations about the future (see Appendix 1 for a more detailed exposition on savings theory).

This paper aims to shed light on changes in the saving behavior of microentrepreneurs in response to improved access to credit. Several scenarios are possible:

❑ Impatient consumers will be inclined to begin borrowing to increase consumption. Given that their primary concern is the maximization of current consumption, such individuals probably did not save before either. The removal of the constraint would turn them from non-savers to negative savers (borrowers).

❑ Some savers will no longer see the need to reduce current consumption as the particular reason for saving (e.g. an investment in the business or outlays for a social event) can now be financed on credit. This second group will also save less.

❑ A third group will be unaffected by the removal of the borrowing constraint. The saving behavior of very patient or highly risk-averse consumers, for example, will not change since the underlying reason for saving - here character traits - remains unchanged.

Thus, while access to credit might affect saving behavior in several ways, theory predicts that it results in lower overall savings. This paper argues that it is necessary to extend the analysis to the shifting of assets between different forms of savings. It shows that a significant indirect effect of access to credit is to induce microentrepreneurs to shift their savings from cash and illiquid assets (such as land, livestock and jewelry) to deposit accounts in the formal financial system.

It is important to analyze the impact of access to credit on the saving behavior of microentrepreneurs for several reasons:

❑ Most microfinance programs were established to provide credit; few focus on savings mobilization. As a result, the interaction between the two is not yet well documented.

❑ Many microfinance practitioners assume *a priori* that credit leads to higher incomes and asset accumulation. The research proposed here takes a more consistent approach by linking saving and credit at the microenterprise level, thereby obtaining results not usually taken into consideration in designing or evaluating microfinance programs.

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[1] Otero (1989).

❑ Microenterprises are the most common form of business organization in developing countries. For Latin America alone, the Inter-American Development Bank (IDB) estimates the number of microenterprises at 50 million, providing employment to 150 million of the region's 460 million inhabitants.[2] Consequently, the saving behavior of microentrepreneurs has implications for economic policy making.

II. CREDIT AND SAVINGS FACILITIES IN LATIN AMERICA

While the focus of this paper is on Ecuador, El Salvador and Paraguay, it is worthwhile to present the results in the larger context of microfinance programs in Latin America. This section outlines informal financial mechanisms and reviews the experience with savings mobilization as a component of microlending programs.

II. 1.   Credit and Saving in the Informal Sector

Only 5% of Latin America's microentrepreneurs have access to formal sources of credit.[3] They also rarely turn to formal financial institutions to deposit their savings, citing minimum deposit requirements, liquidity constraints, high transaction costs, inconvenient banking locations and opening hours, and unfamiliarity with commercial saving products as reasons. At times, reluctance to deposit savings also results from the realization that banks do not offer them the full range of services that wealthier clients enjoy. For example, in the poor outskirts of Lima, where 1.5 million people held savings deposits of approximately US$ 31m in 1992, residents only received US$ 1 in loans for every US$ 20 deposited.[4] The balance was transferred to other bank branches for lending to wealthier clients, the public sector or large companies. Finally, depositing savings in banks was further discouraged by economic and political instability and high levels of inflation, all common characteristics of the region during the 1980s and early 1990s.

As a result, low-income households often rely on informal financing mechanisms. For credit, microentrepreneurs can turn to pawnbrokers or moneylenders when personal and family savings are insufficient. They can also use the cash flow generated by their businesses or, at times, obtain credit from their suppliers. In some instances, they have access to rotating savings and credit associations (ROSCAs) or 'village banks'.[5] For savings, the options of poor households are often limited to storing excess income as cash at home or in the form of illiquid assets. In Peru, for example, 43% of all households and 37% of low-income households kept some of their wealth in the form of gold and silver jewelry.[6] Other forms of inflation hedges include consumer durables, as well as land and livestock for rural households.[7]

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[2] Inter-American Development Bank (1998a).
[3] Berger and Guillamon (1996).
[4] Castro (1993).
[5] Vogel and Burkett (1986) note that ROSCAs have much less importance in Latin America and serve mainly as an alternative to installment credit in financing consumer durables.
[6] Lepp (1996).
[7] When available, households also try to keep their savings in dollar-denominated accounts. In Bolivia, a country that experienced hyperinflation in the 1980s, 90% of deposits were held in dollar-denominated or dollarized accounts in 1992

Informal financial institutions act as a substitute for only some of the services provided by commercial banks, and most low-income households in developing countries are unable to accumulate savings and smooth consumption efficiently and conveniently.

II. 2.   Savings Mobilization in Microlending Programs

In the absence of commercial banks that were willing or able to work with small-scale entrepreneurs, international donor agencies initially relied heavily on NGOs to channel funds to this target group. Although at first a variety of credit-extension mechanisms were used, many later institutions adopted the group-lending approach.[8] High repayment rates as well as a high percentage of low-income, female and first-time borrowers demonstrated the success of many such programs. As microcredit schemes matured, sustainability – in addition to outreach – increasingly became a matter of concern. The mobilization of local savings was often at the center of the sustainability debate since NGOs are not permitted to capture savings from the public.

In discussing the role of savings mobilization in microcredit programs, it is important to distinguish between mandatory and voluntary savings. Most of the pioneering microcredit programs in Asia relied on mandatory savings as a form of collateral and, more important, as a screening device for determining the financial discipline of potential borrowers. In Latin America, compulsory savings play a comparatively small role in microcredit programs. Legal restrictions prevent on-lending of deposits and thus limit the usage of such funds. The World Bank reports that only 39% of savings mobilized by microfinance institutions in Latin America are compulsory, compared to an average of 52% in other regions (Table II.1). The data presented later on in the paper confirm this picture as only a minority of credit recipients were required to open a savings account in order to obtain a loan (Ecuador: 22%, El Salvador: 10%, Paraguay: 3%).

The conclusion about voluntary savings is similar. The mobilization of voluntary savings was beyond the mission of most microcredit programs in Latin America and their legal status prevented NGOs from collecting deposits. In order to collect savings, NGO-based microlending programs would have to become commercial banks and comply with banking sector regulations, such as reserve requirements and financial disclosure. However, the desire to capture savings usually did not exert a strong enough motivation to encourage such steps, leading most NGOs to focus on expanding their lending programs rather than focusing on savings collection. The most notable exception is BancoSol in Bolivia, which became a fully licensed commercial bank in 1992 – the first bank in the Western hemisphere to work exclusively with low-income and small-scale

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(MacLean, 1993). However, low-income households can rarely meet the minimum deposit requirements to gain access to these accounts.

[8] Pioneered by Grameen Bank (Bangladesh) and modeled on borrowing mechanisms in the informal sector, this approach allowed microfinance institutions to rely on credit (solidarity) groups to: (i) mitigate problems resulting from information asymmetries, such as moral hazard and adverse selection; (ii) replace collateral requirements with personal guarantees; and (iii) transfer enforcement of repayment obligations to the group itself. The methodology provided a cheap system for assessing creditworthiness that shifted the risk of default from the financial institution to the borrower (Thomas, 1995).

businesses. With no minimum deposit, several types of savings accounts and a good reputation among its borrowers, BancoSol attracted savings of more than US$ 30 million within three years.[9]

TABLE II.1: SAVINGS MOBILIZATION BY MICROFINANCE INSTITUTIONS

	Latin America and Caribbean (LAC)	Other Regions	Total (Worldwide)
Sample size (Number of institutions)	85	120	205
Number of depositors (million)	3.2	41.8	45.0
Volume of savings mobilized (US$ billion)	$1.78	$17.22	$19.00
Compulsory savings as share of total	39%	52%	49%
Average deposit size (US$)	$526	$327	$367
Median deposit size (US$)	$420	$47	$121
Percentage of inst. that take deposits	30%	73%	64%

Source: World Bank, *A Worldwide Inventory of Microfinance Institutions*, 1996

An alternative approach to combining savings mobilization and credit extension is demonstrated by savings-and-loan (S&L) banks. Rather than operating on a 'credit-first' basis, as do microlending programs, they begin by building a large customer base of savers, who are later offered credits. This 'savings-first' approach has several advantages: better information about clients through their savings history; enhanced program sustainability as funds are generated internally; and a more trust-based relationship between client and institution. Disadvantages include the high cost of collecting small amounts of voluntary savings, the length of time required to build a large enough customer base to begin lending operations of a reasonable size, and difficulties in reaching the poor who have never used banks before.[10] The experience of many 'savings-first' programs has been that the mobilization of deposits is difficult and rarely sufficient to cover the demand for loans. For example, an evaluation of 12 municipal S&L banks in Peru revealed that only 57% of credit operations could be funded from collected savings.[11]

In summary, while the positive contribution of savings to the sustainability of microcredit programs has been documented, and low-income households have shown interest in depositing savings, the overall volume of savings mobilized by such programs in Latin America has been comparatively low. Table II.1 shows that only 30% of the microfinance institutions in Latin America accept deposits. With respect to individual programs, there exists a large gap between Latin American and Asian microfinance institutions. The levels of savings reported by individual institutions in Latin America - usually a fraction of US$ 100m, raised from far less than 100,000 depositors - are thwarted, for example, by BAAC in Thailand (US$ 1.9bn, 4.2m accounts) and BRI in Indonesia (US$ 2.6bn, 16m accounts).[12] The figures from Asia have been taken as

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[9] Fidler (1998). However, traditional savings accounts contributed only 12% of deposits. The great majority (88%) stem from long-term Negotiable Certificates of Deposits, primarily demanded by a more up-scale clientele.

[10] Paxton and Fruman (1997).

[11] Lepp (1996). While more than US$ 31m had been accumulated in nearly 65,000 deposit accounts, credits of more than US$ 55m had been extended to 145,000 borrowers.

[12] World Bank (1998a).

evidence that the poor can provide a significant contribution to private savings, assuming that an appropriate institutional framework is in place.[13]

III.   EVIDENCE FROM THREE LATIN AMERICAN COUNTRIES

The remainder of this paper will present empirical evidence from Ecuador, El Salvador and Paraguay on how improved access to credit affects the saving behavior of microentrepreneurs. The data used in this study were collected in 1997-98 under the auspices of the IDB in an effort to evaluate its Micro and Small Enterprise Global Programs ("Globals"). Globals were extended to a large number of countries in Latin America. Funds were channeled through central banks, national development banks or similar institutions for on-lending to financial institutions, which were then responsible for disbursement to microentrepreneurs.[14] These second-tier institutions were usually commercial banks and other financial intermediaries subject to supervision by monetary authorities.[15] A brief overview of the scope and volume of Global lending operations in Ecuador, El Salvador and Paraguay is provided in Table III.1.

TABLE III.1: IDB MICRO AND SMALL ENTERPRISE GLOBAL PROGRAMS

	Ecuador	El Salvador	Paraguay
Year Disbursed	1995	1997	1997
Credit Volume (US$ million)*	$16.2	$24.0	$10.0
Number of Loans Made	10,400	16,000	24,577

Source: IDB (1998b, 1998c, 1998d, 1998e); * US$ 1m of the Ecuador GMC was later canceled.

The three countries included in the Global evaluations were selected because they share several characteristics: relatively small size, similar levels of per-capita GDP and important microenterprise sectors.[16] A further criterion was that all three had undergone financial sector reforms as part of structural adjustment programs in the 1980s and 1990s. Prior to that, financial repression was widespread as governments kept interest rates artificially low and used government-controlled banks to direct credit to favored clients, usually state-owned enterprises. Sweeping financial liberalization led to the removal of market distortions, the opening of the banking sector to competition, and the creation of new legal and regulatory frameworks. Thereby, many hurdles to providing financial services to low-income groups were removed.

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[13] For example, USAID (1997) concludes that the poor "do not need to be taught to save or to respond to incentives… The fact that micro clients in large numbers eagerly and repeatedly deposit at financial institutions that offer attractive savings returns is sufficient evidence."

[14] IDB (1998b, 1998c, 1998d, and 1998e).

[15] The mechanism through which credits are disbursed is important for this study. If borrowers receive loans from NGOs that are not allowed to accept deposits, the coefficients in the subsequent analysis would be downward biased as a smaller number of borrowers enjoys the convenience of being able to make deposits at the same institution. Given that dozens of institutions were used to disburse loans, it is difficult to reconstruct the exact credit source for each microentrepreneur. Moreover, even if such downward bias existed, it would be less worrisome here as the coefficients show a large degree of (positive) significance. Adjustment for credits that were channeled through NGOs would only strengthen the conclusions.

[16] Furthermore, the GMCs for all three countries had already been fully disbursed (IDB, 1998b).

With respect to the macroeconomic parameters of the three countries, particular attention should be paid to inflation as a key determinant of saving and consumption decisions (Table III.2). High inflation rates in many Latin American countries were a prime factor in discouraging private saving during most of the 1980s and early 1990s. Negative real interest rates on deposits, in addition to the lack of access to savings facilities at commercial banks, often led private households to accumulate illiquid assets. In recent years, however, inflation rates have begun to stabilize at a lower level. In addition, the removal of interest rate controls – an important component of financial liberalization schemes – allowed financial intermediaries to increase the spread between deposit and credit interest rates, reflecting not only the cost of funds but also changes in the rate of inflation. As a result, real deposit interest rates turned positive, between 4.1% and 6.4% in the three countries studied here.

TABLE III.2: MACROECONOMIC DATA

	Ecuador	El Salvador	Paraguay
GNP Per Capita 1997 (US$)	$1,590	$1,810	$2,010
Avg. Annual GNP Growth Rate 1996-97	4.4%	3.5%	14.5%
Avg. Annual Inflation Rates 1990-96	36.6%	12.6%	17.0%
Real Deposit Interest Rates (1996)	6.4%	5.7%	4.1%

Source: World Bank (1998a, 1999); Definition: real deposit interest rate is the rate paid by banks for demand, time, or savings deposits, adjusted for inflation as measured by GDP deflator.

III. 1.   Profiles of Survey Participants

Surveys were mostly conducted in the capital cities (Quito, San Salvador and Asunción) and in any case within twenty kilometers of a city. The samples were of approximately equal size (Ecuador: 280 observations, El Salvador: 285, Paraguay: 287). In addition to a sample of borrowers in microlending programs (189, 158, and 191 observations, respectively), clients of commercial banks (40, 19, and 30 observations) and non-borrowers (53, 108, and 66) were also interviewed.[17]

Participants in the surveys represent a cross-section of urban microentrepreneurs in Latin America. Mostly middle-aged, the average microentrepreneur in the study is married or lives in 'free union' with a partner and has between two and three children. More than half the entrepreneurs are women, ranging from 54% in Ecuador to 77% in El Salvador.[18] A more detailed   overview   is   provided   in   Appendix   2.

Survey participants engage in a broad range of activities in commerce, production or services and cover a wide variety of sectors: from ambulant street vendors to small manufacturing shops and

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[17] IDB (1998c, 1998d, and 1998e)

[18] Estimates compare to those of ACCION International (50-55%; Otero, 1991); a survey of 23 microfinance institutions in Latin America (30-59% for banks, 30-48% for credit unions, and 25-100% for NGOs; Almeyda Stemper, 1996); and the *Worldwide Inventory of Microfinance Institutions* (50%; World Bank, 1996).

from shoe-polishers to automotive mechanics. More than half the microentrepreneurs work in commerce, mostly retail. In Ecuador, one quarter of the enterprises is in manufacturing and in Paraguay almost one third provides services, such as hairdressing and car repairs. On average, the survey participants had been working in their current business for 11 or 12 years. Between 37% and 58% of the enterprises were located in the home of the proprietor. Approximately half the respondents owned the premises.

The average El Salvadoran business in the study is much smaller in terms of employment than counterparts in Ecuador and Paraguay. In the latter two countries, there were usually two employees in addition to the owner, while El Salvadoran entrepreneurs on average reported only one additional worker. Moreover, the differential between 'total number of employees' and 'number of family members employed' is much larger for Ecuador, implying that entrepreneurs there relied more heavily on hired workers.[19]

The income profiles of the entrepreneurs differ across the three countries. Survey participants in Ecuador reported much higher annual income from their businesses (US$2,888 – two times the figure for El Salvador and one-and-a-half times the income of Paraguayan microentrepreneurs). Many entrepreneurs also reported substantial additional income from other sources, such as salaried work or pensions. On average, microentrepreneurs in El Salvador have by far the lowest income, which will be reflected in Table III.3 as much lower savings.

III. 2.   Borrowing and Saving Behavior of Microentrepreneurs

Understanding the factors that determine saving behavior is a difficult task for two reasons. First, an individual's decision-making process with respect to saving is very complex.[20] There have been numerous theoretical approaches to explaining why some people save but others do not, and to understand what determines the exact amount that is saved. The Permanent-Income and Life-Cycle Hypotheses have been at the heart of most studies.[21] While these two theories often provide a good approximation to consumption and saving decisions, they can rarely explain all aspects of an individual's saving behavior. Their shortcomings have given rise to a host of other approaches, which center on assumptions such as the presence of uncertainty or borrowing constraints.

The second set of difficulties in analyzing saving behavior pertains to problems with the accuracy and reliability of data collected by household surveys. Any analysis of savings has to rely on the provision of very personal information by the respondent, such as income, wealth, loans outstanding. Furthermore, many relevant variables are subject to substantial fluctuations over time as a result of the unstable economic environment in which the individuals live. As a

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[19] Differences between business assets are difficult to gauge as the figure for Paraguay is out of range. This can largely be attributed to the fact that a broader range of enterprises was surveyed, reflected in the high standard deviation.

[20] Deaton (1995) notes in the opening to the relevant chapter of his book *The Analysis of Household Surveys*: "...to understand the determinants of household savings...is a difficult and speculative undertaking, and one that is a good deal more provisional than anything else in this book".

[21] LCH postulates that people try to smooth consumption over their entire lifetime by saving when they are young and economically active and dissaving when they are old. PIH suggests that people save in good years (when current income is above permanent income) and dissave in bad years.

consequence, data might be either inaccurately reported or difficult to interpret. These problems suggest caution in evaluating quantitative results and point out the possibility of measurement error. In fact, quantitative studies of savings are particularly prone to measurement error as they often calculate savings as a residual, i.e. the difference between income and consumption.[22]

Saving profiles of microentrepreneurs in this study indicate that borrowers from commercial banks are the most regular savers in deposit accounts, followed by microcredit clients and non-borrowers.[23] The difference between commercial bank and microcredit borrowers can be partially attributed to the fact that clients of commercial banks tend to have higher incomes and have been in contact with formal financial institutions for a longer time.

The figures for El Salvador merit particular attention. The average amount saved is only one third of the figures reported for Ecuador and Paraguay. Although some of the difference can be explained by the lower income of El Salvadoran entrepreneurs - which can be attributed to the smaller size of their businesses, both in terms of assets and employment - the size of the difference is puzzling. Possible explanations include the existence of an income threshold below which few savings are accumulated, particular characteristics of the El Salvadoran economy or a financial system that simply induces households to save less. Another possibility is that the low savings level is related to the recent end of the prolonged civil war in El Salvador, which destroyed many productive assets, forcing entrepreneurs to re-invest in their businesses rather than accumulate savings.[24]

Given the focus of this study, it is important to take a closer look at differences in saving profiles between entrepreneurs who have access to credit (grouping together borrowers from commercial banks and microfinance institutions) and those who do not. For all three countries, the data clearly show that on average borrowers save more regularly than non-borrowers. Moreover, for Ecuador and Paraguay, borrowers save higher amounts.[25]

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[22] A further complication usually arises in the compilation of time-series data due to difficulties in tracking down earlier respondents (attrition). For the GMC survey, researchers encountered only one third of a sample selected from borrowers of microfinance institutions. This problem reached similar dimensions in all three countries. In Ecuador only 189 of a sample of 631 microentrepreneurs could be found (30.0%). The figures for El Salvador are 158 of 500 (31.6%) and for Paraguay 191 of 500 (38.2%) (see Annexes No. 2 of IDB, 1998c, 1998d, 1998e). The econometric analysis presented in this paper is based on cross-sectional data only.

[23] The figure for commercial bank borrowers in El Salvador might be distorted due to small sample size (19).

[24] Personal conversation with Mr. W. Gheen, project manager of the evaluation project at the IDB.

[25] The El Salvador data have to be interpreted with caution as the number of savers among GMC clients and non-borrowers is very small, so that the reported figures may be distorted.

TABLE III.3: CREDIT AND SAVING PROFILES

	Ecuador		El Salvador		Paraguay	
	Mean/ Value	Std. Dev.	Mean/ Value	Std. Dev.	Mean/ Value	Std. Dev.
DISTRIBUTION (% of Total)						
Commercial Bank Borrowers	14	---	7	---	10	---
Microfinance (GMC) Borrowers	67	---	55	---	67	---
Non-Borrowers	19	---	38	---	23	---
Amount of Last Credit (US$)						
Commercial Bank Borrowers	3,478	4,880.4	1,630	2,721.3	2,516	2,561.3
Microfinance (Global) Borrowers	1,479	1,901.1	1,405	6,481.8	1,070	867.9
Opening of Savings Account Required (%)						
Commercial Bank Borrowers	3	---	11	---	13	---
Microfinance (Global) Borrowers	22	---	10	---	3	---
Regular Savers (%)						
Commercial Bank Borrowers	49	---	22	---	50	---
Microfinance (Global) Borrowers	45	---	37	---	35	---
Avg. for all Borrowers	45	---	36	---	37	---
Non-Borrowers	31	---	14	---	20	---
Savings in 3 Months Prior to Survey (US$)						
Commercial Bank Borrowers	528	451.7	112	82.0	158	176.9
Microfinance (Global) Borrowers	546	586.9	186	293.5	759	1,403.7
Avg. for all Borrowers	542	562.2	181	284.8	646	1,287.4
Non-Borrowers	419	425.0	334	415.8	516	362.6
Obtained Informal Credits (% of Total)*	39	---	16	---	12	---
Sample Size	280	---	285	---	287	---

Source: Author's Calculations, *GMC Database*, Inter-American Development Bank
* For all three groups; excluding suppliers' credit; including family, friends, moneylenders, etc.

The saving profiles already shed some light on the hypothesis posed in this paper that removing borrowing constraints increases the amount of savings that microentrepreneurs hold in deposit accounts. Not only are borrowers always more regular savers than non-borrowers, but in two of the three countries they also save larger amounts. Hence, there is a positive correlation between access to credit and savings deposits. This can be attributed to the fact that obtaining credit and making regular repayments introduces entrepreneurs to formal financial intermediaries and increases their confidence in, and understanding of, the institutions' operations and services. As a result, there will be a tendency to deposit funds at financial institutions that would otherwise have been kept in cash, land, jewelry or other inflation hedges. The conclusion that access to credit raises savings deposits will be corroborated by the econometric study in the next section.

III. 3.   The Econometric Model

In order to capture the impact of access to credit on saving behavior, it is useful to subject the data to econometric modeling. The model presented here estimates the determinants (explanatory variables) of an individual's decision to save in line with the savings model presented in Appendix 1. The model is not intended to provide a comprehensive analysis of saving decisions, but to

focus on the impact of access to credit on saving behavior. For this reason, and given that space is limited, a compromise has been made with respect to the level of detail. For example, while it is recognized that age is an important determinant of saving decisions, and its non-linear nature is accounted for by introducing it as a squared variable (age^2), no further adjustments, such as regressions on different age groups, are carried out.

It is also worth mentioning that income has not been included as an explanatory variable because it cannot be seen as exogenous with respect to savings, but rather depends on the effort and skills of the entrepreneur.[26] Finally, interest rates were also not included. Many studies found that for low-income households interest rates are less important than availability and security of deposit opportunities.[27] Moreover, it can be assumed that interest rates were roughly the same in each of the three data sets as the surveys concentrated on specific urban areas (See Appendix 4 for more details on the econometric model).

In deciding whether to save, entrepreneurs are concerned about the finance and investment requirements of their business as well as their personal well-being in the future. Consequently, the selected determinants reflect the fact that both the characteristics of the entrepreneur and the profile of the business affect saving decisions.[28] To account for differences in household characteristics, the following socio-demographic determinants (β coefficients) are included in the model: gender, number of children (also a proxy for household size), marriage status, level of education, and age (used as a squared variable). Furthermore, a dummy variable has been included to account for the fact that some households have additional income from sources other than the enterprise.[29]

To account for differences in microenterprise profiles, the following explanatory variables have been included (γ coefficients): type of business (more capital-intensive enterprises require more investment, which should lead to more saving in the presence of borrowing constraints); length of time the entrepreneur has been in business (investment dynamics change over the lifetime of a business); value of the business; and ownership of the premises (rent-payers have an additional expenditure item that reduces the share of income that can be saved).

Finally, and most important for this study, access to credit from commercial banks *(cgwc=control group with credit)* and microfinance institutions *(gmc=Global Microenterprise Credit)* will be included as binomial (dummy) explanatory variables (δ coefficients), where *1=access to credit* and *0=no credit*. Hence, the model takes the following form:

$$\begin{aligned}
\text{Savings Deposits} = \alpha\ &+ \beta_1(\text{gender}) + \beta_2(\text{number of children}) \qquad\qquad\text{(III. 1)}\\
&+ \beta_3(\text{marriage status}) + \beta_4(\text{education level}) + \beta_5(\text{age})^2 + \beta_6(\text{other income})\\
&+ \gamma_1(\text{type of business}) + \gamma_2(\text{time in business}) + \gamma_3(\text{value of business})\\
&+ \gamma_4(\text{ownership of premises}) + \delta_1(\text{gmc}) + \delta_2(\text{cgwc}) + \varepsilon
\end{aligned}$$

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[26] It is of comfort to note that other variables might be more important than income in the aggregate (see Otero, 1989).

[27] Vogel and Burkett (1986).

[28] Improved access to credit exemplifies the high degree of interrelation between household and business finances as business loans are often used for a multitude of purposes, including household consumption (see Appendix 2).

[29] Although income in general is excluded for endogeneity reasons, 'Other Income' is included as a dummy variable since it usually took the form of a fixed payment, such as pensions.

Equation (III.1) was estimated as a binary choice model (probit) where 'savings deposits' is a binomial variable *(1=respondent saves regularly; 0=respondent does not save regularly)*.[30] This regression will indicate whether borrowers are more likely to save than non-borrowers, and will show whether there is a difference between the saving behavior of entrepreneurs who received credit from commercial banks and those who obtained loans from microfinance institutions participating in the Globals.[31] In light of the hypothesis that access to credit has a positive effect on savings deposits, the expected econometric result is that the coefficients on 'gmc' and 'cgwc' will be positive and significant.

III. 4.   Regression Results

The results of the estimations are presented in Table III.4. This is the final iteration of the model and does not include all explanatory variables originally considered. The full regression results are shown in Appendix 3. Variables from both categories (household characteristics and enterprise profiles) are significant. Across all three countries, *age*, *education,* the presence of *other income* (see footnote 32), and the *type of business* were of particular importance in determining whether an individual saves in deposit accounts. It is interesting that neither gender nor the length of time that the microentrepreneur had been in business played an important role in saving decisions.[32] Finally, the Pseudo R^2 values for all three regressions are low, which can be attributed to the fact that saving decisions are complex and difficult to explain by any formal modeling process.[33] The χ^2 statistic, however, indicates that the explanatory variables are jointly highly significant.

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[30] Survey participants were asked specifically 'Do you save on a regular basis?', introducing some ambiguity with respect to the interpretation of saving as 'regular'.

[31] The same regression was run as a Tobit model with 'gmc' and 'cgwc' reflecting the actual amount of the last loan. The results were more complex and, for conciseness, are not presented here.

[32] The first finding is in contradiction to the belief that women save more than men (see Almeyda Stemper, 1996).

[33] Due to unobserved heterogeneity, R^2 values for microdata are often low. Furthermore, it should be noted that Pseudo R^2 statistics, here based on the Likelihood Ratio Test, are themselves problematic. Greene (1997) notes: 'whether they have any relationship to maximizing any type of fit… is a question that needs to be studied. The maximum likelihood estimator is *not* chosen so as to maximize a fitting criterion based on prediction of y, as it is in the classical regression (which maximizes R^2). It is chosen to maximize the joint density function of the observed dependent variables.'

TABLE III.4: IMPACT OF ACCESS TO CREDIT ON THE DECISION TO SAVE

Binary Choice Model (Probit): Do you save on a regular basis?	Ecuador	El Salvador	Paraguay
Sample Size	256	267	266
PERSONAL PROFILE			
Education Level	-0.012	0.165	0.322
	(-0.107)	(1.752)*	(2.434)**
Age	-0.000	-0.000	-0.000
	(-2.544)**	(-1.849)*	(-2.487)**
Other Income	0.491	0.377	0.191
	(2.860)**	(1.813)*	(1.123)
ENTERPRISE PROFILE			
Type of Business	0.073	0.145	0.100
	(1.512)♦	(2.029)**	(1.773)*
Ownership of Premises	0.060	-0.112	-0.329
	(0.366)	(-0.793)	(-1.940)*
ACCESS TO CREDIT			
Microfinance Borrower (GMC)	0.524	0.826	0.374
	(2.116)**	(4.260)**	(1.746)*
Commercial Bank Borrower (CGWC)	0.567	0.438	0.818
	(1.765)*	(1.166)	(2.564)**
(Pseudo) R^2	.06	.10	.11
Probability $> \chi^2$	.0094	.0001	.0000
MARGINAL EFFECTS (dF/dx)			
Microfinance Borrower (gmc)	.19	.25	.13
Commercial Bank Borrower (cgwc)	.22	.15	.31

Note: z-value in parentheses, based on heteroscedasticity-adjusted standard errors;
** significant at the 5% level, * significant at the 10% level, ♦ significant at the 20% level

The coefficients on 'gmc' and 'cgwc' are not only positive, but also mostly significant. This result has two implications. First, access to credit results in a higher probability of regular saving in deposit accounts. Access to credit raises the probability that an entrepreneur saves by 13-31% (see marginal effects). Hence, there is a significant positive relation between obtaining credit and regular saving.[34] Second, while borrowers from microfinance institutions (gmc) always exhibit more regular deposit savings in response to receiving credit, this behavior is not as pronounced among borrowers from commercial banks. Although always positive, the coefficient on 'cgwc' is only significant for two of the three countries. This result is logical as commercial bank borrowers are usually wealthier and tend to have had previous contact with the formal financial sector. Either they have been credit recipients for a long time or have used other financial services. In summary, the model has demonstrated that access to credit raises deposit savings.

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[34] With respect to the quantification of the effect, caution should be exercised given the potential econometric problems outlined in Appendix 4. The marginal effects presented here are measured at the mean, but a more complete picture could be gained by considering certain 'archetype' values as well.

IV. CONCLUDING REMARKS

Microenterprises, recognized as vital players in the economies of Latin America, have been the focus of a multitude of assistance programs, many of which have been aimed at the provision of credit. Although savings mobilization was incorporated in some programs, it rarely took center stage as in many assistance schemes in Asia. As a result, issues pertaining to savings mobilization as a component of credit-extension programs have been under-researched in the Latin American context.[35]

The hypothesis that access to credit is a significant determinant of saving behavior is widely mentioned. Two arguments provide theoretical support for the belief that improved access to credit lowers savings. First, access to credit mitigates the precautionary saving motive as people could turn to banks in case of an emergency. Second, entrepreneurs would no longer have to save up for investments. These explanations provide important insights, but fail to recognize that low-income households are not only borrowing-constrained, but often also lack opportunities to keep deposits.

This paper suggests that while the overall amount of savings might fall when credit is extended, the share of savings that is held in deposit accounts will rise due to the indirect impact of introducing microentrepreneurs to formal financial institutions. Most recipients of loans were excluded from services provided by commercial banks and developed a genuine distrust of financial institutions. Sufficient information is provided by the survey participants to conclude that use of financial services is the exception rather than the rule.[36] The repeated interaction with financial institutions as part of the loan extension and repayment process instills trust and increases the borrower's knowledge of the institution's operations and services.[37] In consequence, if safe and convenient deposit facilities as well as positive returns are provided, this experience shows clients that there is an incentive to convert illiquid forms of savings, as well as cash that is kept at home, into deposits at financial institutions.

Given that inflation hedges and cash tend to have either no or negative returns, keeping savings in deposit accounts with positive real returns will be welfare-enhancing. There are two further benefits: (i) financial assets are better protected in deposit accounts at well-regulated institutions than at home or in informal arrangements, and (ii) the ability to accumulate financial assets for business investments is enhanced. In addition to personal benefits, there are externalities to keeping savings in bank accounts that lead to welfare gains for society as a whole. The economy's investment efficiency is improved as financial intermediaries allocate funds collected from depositors to the most profitable investment opportunities: "Greater use of the financial

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[35] See Farbman and Steel (1992) and Timberg (1992).

[36] Only 23% of microentrepreneurs in El Salvador reported that they had worked with a financial institution in the year prior to the survey. The figures for Ecuador and Paraguay are 49% and 34%, respectively, and exclude credit extension. However, they already include the number of people who opened a current or savings account after a loan had been extended. Hence, it can be expected that the true figure of interaction with formal financial institutions among microentrepreneurs in Latin America will be lower.

[37] This effect might be magnified if access to credit raises the income of borrowers and allows them to save more.

system generates social efficiencies through the pooling of risks and through information economies in the allocation of funds for investment."[38]

In this paper, both the tabulation of raw data (Section III.2) and the econometric results (Section III.4) have shown that for microentrepreneurs the net effect of access to credit will be more regular, as well as increased, saving in deposit accounts. This welfare-enhancing indirect effect of access to credit requires further research as it is not usually taken into consideration in designing and evaluating microcredit programs or savings mobilization schemes.

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[38] Vogel and Burkett (1986).

APPENDIX 1: SAVINGS THEORY

In discussing savings in developing countries, it is useful to distinguish between the importance at the economy and household levels. At the economy level, the role of savings in economic growth has long been at the heart of economic research. A key determinant of growth is the level of domestic investment in physical and human capital.

In a closed economy, such investments can only be financed by postponing consumption and using the resulting savings to expand the economy's productive capacities. This positive correlation between domestic saving rates and economic growth has been well documented, leading some researchers to believe that savings drive growth.[39] (It should be noted that financial intermediation, which is at the core of this paper, introduces the possibility that those who save and those who invest are not the same economic agents. Thereby, the economy's investment efficiency is improved as capital is transferred to those who hold the most profitable investment opportunities.)

In an open economy, domestic savings can be substituted or augmented by foreign capital. Although the amount of private foreign capital invested in developing countries has risen tremendously, many LDCs still have only limited access to international financial markets as economic or political instability impair their credit-worthiness. As Gersovitz (1988) writes: "Threats of expropriation, repudiation, and other hostile acts against foreign suppliers of capital, and donor resistance to significant increases in aid, mean that domestic saving is likely to remain the predominant source of capital accumulation in developing countries". Furthermore, even for open economies, a broad array of empirical studies across countries has demonstrated a high correlation between national savings and national investments.[40] Hence, domestic savings cannot be ignored and can only be enhanced, but not fully supplanted, by foreign capital.

At the household level, saving allows individuals to set a fraction of income aside, i.e. to transfer some resources over time. In other words, "an act of saving is intertemporal trade (of current consumption for future consumption)."[41] Saving thereby allows for consumption smoothing, which is particularly important in developing countries as incomes are often at subsistence levels and any fall in consumption could have disastrous consequences. In addition to mitigating income shocks and smoothing consumption, savings play an important role by allowing microentrepreneurs to accumulate funds for making investments in their businesses or covering shortfalls in operating cash flow. Moreover, it has been argued that saving has an educational function as it instills a sense of planning and discipline. For example, Otero (1989) argues that the habit of saving empowers individuals by contributing to a "shift in the borrower's perception of his or her situation – from a day-to-day struggle to survive to a longer-term view based on planning with a growing cushion of savings."

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[39] While the positive correlation between savings and growth has been recognized, there is still a lively debate about the direction of causation. While an increase in savings might result in higher growth, increased savings could also be caused by higher income, i.e. economic growth. Hence, they might be determined simultaneously, allowing for multiple savings/growth equilibria (Deaton, 1997).

[40] Deaton (1997).

[41] Besley (1995).

I.   A Model of Saving Behavior

Early saving models go back to Lewis and Kaldor, who postulated that there are two groups of people in the economy: savers and non-savers.[42] In the simplest form, their models suggested that workers are non-savers who spend their earnings and capitalists are savers who aim to invest their income. Alternatively, as suggested by Kaldor, there is a difference between the propensities to save/consume from earnings and profits, with workers having lower propensities to save out of wage income than capitalists out of profit income. With respect to the context of this paper - the saving behavior of microentrepreneurs - it is interesting to note Deaton's suggestion that the term 'capitalists' is open to interpretation and could refer to the small business sector.

In setting up the model, which will provide a theoretical foundation for the econometric modeling in this paper, the traditional approach in the literature is adopted.[43] The welfare criterion used is the utility of the economic agent, which is expected to be a function of current consumption: $\upsilon = f(c_t)$. Assuming that the per-period utility function is constant, i.e. υ is time-invariant[44], the agent will maximize the sum (V) of per-period utilities[45]:

$$V = E_t \sum_{t=0}^{T-1} \upsilon(c_t) \qquad\qquad (I.1)$$

where E_t is the expectations operator, based on information available at time t, υ is the instantaneous sub-utility function, which depends on consumption in period t (c_t). The termination point in terms of time is T, the death of the individual agent. (Note that to make the model more realistic, a further variable to capture household characteristics and tastes could be included.) The budget constraint states that lifetime consumption cannot exceed lifetime income. Hence:

$$C \equiv \sum_{t=0}^{T-1} \left[\frac{c_t}{(1+r)^t} \right] \leq \sum_{t=0}^{T-1} \left[\frac{y_t}{(1+r)^t} \right] \equiv Y \qquad\qquad (I.2)$$

where C and Y are the aggregate lifetime consumption and income values, from the time of birth (t=0) until the last period prior to death (T-1). Per-period income[46] and consumption are indicated by y_t and c_t. The interest rate, assumed to be constant, is denoted r. Given the context of this paper, it is important to note the consequences of this simplification with respect to r: By assuming that the interest rate is constant, we also imply that it is the same for loans and deposits.

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[42] Deaton (1997).

[43] Gersovitz (1988) and Deaton (1995 and 1997).

[44] As Deaton (1995, p. 357) notes, this is not a very plausible assumption: "In general, we need to recognize that the subutility functions will change with time, if only because needs change with age, and because we shall usually have to work with household-level data, and the structure of the households changes over time."

[45] This model is slightly simplified in that is does not account for the discounting of future utilities.

[46] It is important to note that income in this (and most other) savings models is treated as stochastic and exogenous – an assumption that might be unrealistic for microentrepreneurs whose income depends to a large extent on their own choice with respect to the allocation of time, money, and other resources.

In deciding whether to save and transfer income to the next period or consume now, the individual will be concerned with equalizing his/her marginal utility of consumption across time. This process of intertemporal optimization can be represented in the form of (I. 3), a version of the Euler Equation:

$$\upsilon'(c_t) = \left[\frac{1 + r}{1 + \delta} \right] E_t \, \upsilon'(c_{t+1}) \qquad \qquad \text{(I. 3)}$$

This equation indicates that decisions regarding the postponement of consumption are a function of the constant rate of interest (r) and the rate of time preference (δ), which measures the rate at which next period's sub-utility is discounted. Less formally, δ is a measure of the level of patience that the individual exhibits. Hence, whether some of the current income is saved for future consumption depends on the characteristics of the sub-utility function, as well as on the interest rate, the rate of time preference, and expectations about the future.

It should be noted that contrary to the common wisdom that savings rise in response to a rise in the interest rate, this model is unable to make such a prediction. On the one hand, the income effect would lead to a reduction in savings as consumers could achieve the same level of future consumption by putting aside less today. Hence, there is an incentive to save less and increase current consumption. On the other hand, the substitution effect indicates that by saving now, the reward in terms of future consumption would rise as a higher interest rate provides higher returns on savings. Hence, there is an incentive to reduce current consumption and save. The net effect is ambiguous. For example, by noting that interests on deposits are a reward for waiting, one possible case would be where $r > \delta$, when the rewards for waiting dominate the consumer's impatience and are high enough to entice the individual to save.

For the purpose of this paper, and for adopting savings theories to the developing country context in general, it is necessary to introduce further assumptions. One of the most important, both with respect to treatment in the literature and to the study at hand, is that individuals in developing countries face borrowing constraints. In fact, based on the low penetration of the formal banking system, one could believe that the borrowing constraint is fully binding as the great majority of people does not interact with formal financial institutions and cannot obtain credit. However, informal mechanisms exist in all developing countries, allowing for some borrowing to take place.

The informal financing institutions most frequently encountered are money-lenders, pawnbrokers, rotating savings and credit associations (ROSCAs), and similar forms of village banking organizations. Furthermore, many people borrow from their family and friends. Hence, while it might be possible to obtain some credit, either interest rates are exorbitantly high (borrowing in the informal sector), making large or long-term loans unattractive, or only available in limited amounts (family and friends). In either case, the individual faces a borrowing constraint.

For simplicity, it will be assumed that the borrowing constraint is severe and that the individual cannot borrow at all.[47] Hence, we introduce a second budget constraint in addition to the lifetime budget constraint in (I. 2). For each single period, the individual cannot spend more than the sum of current income and assets accumulated in previous periods. If he/she did not save in the last period, all income earned during that period (y_{t-1}), which is assumed to consist *only* of earnings (i.e. excluding interests,…) [48], would have been consumed ($y_{t-1} = c_{t-1}$). With savings ($y_{t-1} > c_{t-1}$), however, a certain amount (A_t) would have been transferred to the current period. As a result, consumption in the current period would be constrained by current income plus the savings from the last period (A_t):

$$c_t \leq y_t + A_t \qquad\qquad (I.\ 4)$$

Through further saving in the current period, the individual would be able to transfer
$A_{t+1} = (1 + r)[A_t + y_t - c_t]$ to the next period.

In principle, A_t could represent a positive or negative asset as the individual could have transferred either savings or debts to the current period. By assuming that the individual is unable to borrow, we introduce the constraint that $A_t \geq 0$. The inequality is important as it indicates that while the individual is unable to borrow, he/she can save. Hence, if the individual were concerned about the future, risk-averse, or exhibited a high level of patience, he/she could accumulate assets as a buffer stock from which to cover any shortfalls in future consumption. It should be noted at this point that savings (here A_t) could take many forms in addition to deposits in bank accounts.

In developing countries, lack of access to, and insufficient trust in, formal financial institutions prevents individuals from depositing savings. As an alternative, some liquidity is maintained by holding cash at home, while most income that is not consumed is invested in durable goods, gold and other jewelry, or livestock in the case of rural households. Hence, depositing money in a savings account is just one form of transferring assets. This distinction is important as it is argued in this paper that the most significant impact of access to credit on the saving behavior of microentrepreneurs, and poor households in general, is to induce them to maintain their assets in deposit accounts.

Introducing the additional constraint ($A_t \geq 0$) into equation (I. 3) yields:

$$\upsilon'(c_t) = \max \left[\ \upsilon'(A_t + y_t),\ \frac{1 + r}{1 + \delta}\ E_t\ \upsilon'(c_{t+1})\ \right] \qquad\qquad (I.\ 5)$$

Thus, in addition to the factors named above, the marginal utility of consumption now also depends on ($A_t + y_t$), which is commonly defined as 'cash-on-hand'. If the consumer were not

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[47] As Deaton (1995 and 1997) points out, this is equivalent to saying that the interest rate r is infinite.

[48] There is an important branch of the literature that analyses situations in which the individual is consumer and producer at the same time, blurring the distinction between earnings and consumption. This possibility is not pursued here as it usually focuses on the rural context, where farmers might consume a share of their own produce. The individuals in this study are microentrepreneurs in an urban setting.

constrained in saving, but only in borrowing, the constraint would be irrelevant if $r > \delta$, as the individual would be saving. Consequently, the availability of loans is less important for individuals with a strong precautionary saving motive. However, if $\delta > r$, the borrowing constraint would be binding. Individuals for whom the borrowing constraint is binding as $\delta > r$ will dissave until $A_t = 0$ and thereafter consume the entire per-period incomes. For poor households at the subsistence level, such behavior could be devastating as there would be no resources to cover possible income shocks in the future.

In conclusion, the model's prediction about the effect of removing the borrowing constraint (A_t can then be positive or negative) is that several scenarios are possible. On the one hand, individuals with a high rate of time preference, i.e. impatient consumers, will be inclined to borrow in order to raise consumption. As these people probably did not save before in order to maximize current consumption, the removal of the constraint would turn them from non-savers to negative savers.

On the other hand, two more scenarios can be envisioned for the group that used to save before. Some savers will no longer see the need to reduce current consumption as the particular reason for their saving, such as the purchase of machinery for their business or outlays for a social event, can now be financed by taking out a loan. Hence, this second group will also save less. A third group, however, will be unaffected by the removal of the borrowing constraint. The saving behavior of very patient or highly risk-averse consumers, for example, might not change as the underlying reasons for saving, here character traits, will remain unchanged. Thus, while there are several possibilities of how the removal of a borrowing constraint affects saving behavior, the model makes the prediction that on average access to credit will lower the total amount of savings.

APPENDIX 2:   CHARACTERISTICS OF SURVEY PARTICIPANTS

	Ecuador		El Salvador		Paraguay	
	Mean/ Value	Std. Dev.	Mean/ Value	Std. Dev.	Mean/ Value	Std. Dev.
HOUSEHOLD CHARACTERISTICS						
Age	40.5	10.4	40.9	11.4	43.6	12.0
Gender (Women as % of Total)	54	---	77	---	64	---
Marriage Status (% of Total)						
Single	14	---	25	---	17	---
Married	67	---	41	---	62	---
Divorced	7	---	5	---	3	---
Widow	3	---	7	---	5	---
Free Union	8	---	21	---	11	---
Other/No Response	1	---	0	---	2	---
Number of Children	2.7	1.6	2.8	1.8	2.7	1.9
Education (% of Total)						
None	1	---	11	---	0	---
Primary	25	---	32	---	38	---
Secondary	50	---	47	---	48	---
Higher/University	24	---	10	---	13	---
Monthly Gross Business Income (US$)	2,888	10,267.7	1,479	1,936.1	1,858	3,418.6
Reporting Other Inc. (% of Total)	39	---	23	---	43	---
Amount of Other Income (US$)	336	542.5	185	198.4	463	559.3
Residing in Capital (% of Total)*	60	---	98	---	85	---
ENTERPRISE CHARACTERISTICS						
Number of Years in Business	12.2	9.8	11.9	9.6	11.3	9.9
Type of Business Activity (%)						
Manufacturing	25	---	0	---	3	---
Construction	0	---	1	---	1	---
Commerce (Food Service, Hotels)	9	---	23	---	19	---
Commerce (Retail)	51	---	54	---	37	---
Transport	0	---	1	---	3	---
Services (Social and Personal)	13	---	9	---	32	---
Other/Undefined activities	1	---	1	---	1	---
Business Closed	3	---	0	---	3	---
Use of Borrowed Funds (% of Total)						
Commercial Bank Borrower						
Business: Merchandise	66	---	67	---	50	---
Business: Machinery, etc	3	---	17	---	10	---
Private: Expenditure, Durables,...	13	---	11	---	33	---
Repayment of Last Credit	3	---	6	---	0	---
Other	16	---	0	---	7	---
Microfinance (GMC) Borrower						
Business: Merchandise	82	---	90	---	57	---
Business: Machinery, etc	12	---	6	---	16	---
Private: Expenditure, Durables,…	3	---	1	---	14	---
Repayment of Last Credit	1	---	2	---	3	---
Other	2	---	2	---	9	---
Total Number of Employees	2.34	2.9	1.28	1.5	2.10	1.4
Family Members	0.95	1.3	0.76	1.0	1.64	1.1
Worth of Business/Assets (US$)	11,512	22,948.4	9,437	20,689.0	31,957	55,374.5
Business Located at Home (%)	37	---	39	---	58	---
Owner of Bus. 'Premises' (%)	42	---	58	---	56	---
Sample Size	280	---	285	---	287	---

Source: Author's Calculations, *GMC Database*, Inter-American Development Bank

APPENDIX 3: ACCESS TO CREDIT ON THE DECISION TO SAVE FULL REGRESSION RESULTS

Binary Choice Model (Probit): Do you save on a regular basis?	Ecuador	El Salvador	Paraguay
Observations	247	242	248
PERSONAL PROFILE			
Gender	0.170	0.226	-0.237
	(1.000)	(1.000)	(-1.188)
Number of Children	-0.101	0.062	-0.023
	(-1.395)♦	(1.031)	(-0.417)
Marriage Status	-0.062	-0.031	0.055
	(-0.710)	(-0.462)	(0.792)
Education Level	-0.076	0.121	0.407
	(-0.612)	(1.222)	(2.938)**
Age	-0.000	-0.000	-0.000
	(-1.346)♦	(-1.951)*	(-1.497)♦
Other Income	0.519	0.447	0.073
	(2.878)**	(2.089)**	(0.402)
ENTERPRISE PROFILE			
Type of Business	0.074	0.135	0.128
	(1.468)♦	(1.792)*	(2.010)**
Time in Business	0.006	0.002	-0.007
	(0.551)	(0.188)	(-0.641)
Worth of Business	0.000	0.000	-0.000
	(0.550)	(0.104)	(-0.336)
Ownership of Premises	0.075	-0.159	-0.289
	(0.436)	(-1.028)	(-1.536)♦
ACCESS TO CREDIT			
Microfinance Borrower (GMC)	0.518	0.721	0.403
	(1.939)*	(3.478)**	(1.645)*
Commercial Bank Borrower (GCWC)	0.438	0.439	0.734
	(1.298)♦	(1.130)	(2.129)**
City Dummy	0.059	0.147	-0.154
	(1.041)	(0.374)	(-0.888)
Mandatory Saving Dummy	-0.430	0.273	-0.347
	(-1.845)*	(0.749)	(-0.751)
Constant	-0.743	-1.875	-1.399
	(-1.209)	(-2.596)**	(-1.929)*
(Pseudo) R^2	.08	.10	.13
Probability > χ^2	.0139	.0129	.0001

Note: z-value in parentheses, based on heteroscedasticity-adjusted standard errors;
** significant at the 5% level, * significant at the 10% level, ♦ significant at the 20% level

APPENDIX 4:   NOTES ON THE ECONOMETRIC MODEL

Dummy variables were included to account for differences in business environments (city dummy) and to correct for borrowers whose saving decisions were not voluntary (mandatory saving dummy). Both were suppressed in the further analysis. Whereas the city dummy was not significant, the mandatory-saving dummy was only slightly significant for Ecuador where a larger fraction of survey participants were required to open savings accounts.

The z-values were calculated using robust variance estimators (Huber/White/sandwich procedure) in order to adjust the standard errors for heteroscedasticity.

In interpreting the econometric results presented here, three notes of caution should be kept in mind.

1.   As mentioned before, the potential for measurement error cannot be underestimated. If there is measurement error in savings, i.e. the dependent variable, estimates of the coefficients on the explanatory variables will remain unbiased but will be inefficient. If there is measurement error in any of the independent variables, the coefficient estimates will be biased and inconsistent.

2.   There is a possibility that the omission of relevant variables biases the coefficients on other explanatory variables. The potential for this problem is augmented by the complexity of saving behavior and the simplified nature of the model presented here.

3.   The issue of endogeneity cannot be ignored. It could be argued that the microentrepreneur's potential to save was already taken into consideration by the loan officer at the financial institution that extended the credit. While this is possible, there are several arguments that indicate that this was not the case. Given that very few microentrepreneurs were saving at formal financial institutions before receiving credit, it would have been nearly impossible for credit officers to gauge the exact saving potential. Also, given that savings mobilization was not within the scope or legal parameters of most microlending programs, it is unlikely that the possibility of receiving savings deposits was influential in the decision to extend credit.[49] Moreover, as stated above, only a small section of microentrepreneurs in Latin America have access to credit. Hence, inclusion in the group that received credit contains an arbitrary component introduced by credit rationing. In other words, borrowers and non-borrowers are not necessarily different.

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[49] If endogeneity were a problem, we would have to use systems estimation to model it or instrumental variable (IV) estimation to control for it. With respect to IV, auxiliary regressions showed that the variables that affect an individual's decision to save are different from those that determine whether the person received credit. For example, while the number of children played a role in the saving decision, it was irrelevant to the loan officer's decision to extend credit. With respect to credit extension, the time that the entrepreneur had been in business was nearly always significant, whereas it proved to have little bearing on the entrepreneur's saving decision.

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