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Differences in the development of the Latin American microfinance market: identifying reasons

Abstract

This paper explores which macro factors influence the uneven development of the microfinance sector in Latin America. It is based on a literature study to construct hypotheses and it uses cross-country regression analysis on a unique database comprising 32 countries with data until 2003 to test them. Results indicate that microfinance is more present in the countries that receive more international aid. Human capital plays a positive role and the microfinance sector is more developed in countries with lower levels of industrialization.

Keywords: microfinance, Latin America, financial sector development, aid, inflation.
JEL Classification: F35, G21, G28, O54, O57.

Introduction

"Microfinance" refers to the part of the financial sector that provides small-scale financial services to the poorer sections of the population. Its history in Europe goes back to the 17th century. In India, microfinance appeared two or three millenniums ago. All developed countries, as well as some developing countries, have experience with microfinance (Seibel, 2003 and 2005; Hollis and Sweetman, 1997 and 1998; Guinnane, 2004). However, only recently has a new, dedicated kind of organization emerged: the Microfinance Institution (MFI) as such. What started in the 1970s in Bangladesh as an innovative way to bring financial products to the excluded poor has since been reproduced and reinvented in many countries. Currently, thousands of microfinance projects exist and the term covers a lot of different institutions. Despite their specificities, they all share a common goal: to reach the financially excluded poor (Morduch, 1999a; Dichter, 1999).

Although the literature explains the emergence of the microfinance industry as a response to an unmet demand[1], MFIs are not equally spread around the globe. Some regions and countries have developed big microfinance markets, while others have not succeeded in doing so. For example, in Latin America the progress has also been highly unequal. Market coverage figures range from 55.7% in Bolivia to 0.36% in Brazil (Marulanda and Otero, 2005). Although the first Latin American microfinance experiment was launched in Brazil[2], the microfinance market there is much smaller than in Bolivia.

This paper aims at going deeper into the uneven development of MFIs by focusing on Latin American institutions. Latin America comprises a large group of countries that are fairly similar in many respects, but with a different success in terms of microfinance. Therefore, it represents one of the most interesting regions to identify factors explaining the uneven development of the microfinance sector. Our results identify a set of macro factors that play a potential role in developing microfinance markets. In addition, they can help policy makers to gain a deeper insight in the specificities of regions in which microfinance institutions tend to develop.

The paper uses a unique dataset on the outreach of 476 microfinance institutions in 32 countries up to the year 2003. The worldwide survey of MFIs from Christen et al. (2004) is expanded with data from the Mix Market and different rating agencies. The paper first identifies, by means of a literature study, which factors potentially influence the level of microfinance's development in a country. Results indicate that microfinance is more present in countries that receive more international aid. Human capital plays a positive role and the level of industrialization a negative one. We find no evidence that the regulatory environment matters.

The paper is structured as follows. Section 1 describes the peculiarities of microfinance and the sector in the Latin American region. Section 2 reviews the literature on the unequal development of the microfinance sector and formulates new hypotheses. The data and methodology are presented in Section 3. Results are analyzed in Section 4. Finally, conclusions are drawn in the last section.

1. Microfinance in Latin America

Following Vanroose (2008), we identify MFIs as a group of innovative organizations that have found new methodologies to overcome four major problems that financial institutions face when lending.

[1] Robinson (2001), Littlefield and Rosenberg (2004).
[2] In 1973 Acciòn started its first program in Brazil (Rhyne, 2001).

According to Ghatak and Guinnane (1999) these problems are: *adverse selection*, *moral hazard*, *auditing costs* and *enforcement*. Lending to poor people increases these problems, as Barham et al. (1996) show. Stiglitz and Weiss (1981) demonstrate how this leads to market failures and to a significant part of the population being excluded from financial services.

In order to overcome market failures of banks, MFIs have been created. Tirole (2006) shows that it is through group lending that MFIs overcome borrowing constraints. By creating a social guarantee, the loan capacity of the borrowers is enhanced and this way lending is possible. Group lending was indeed the first innovation of MFIs. However, new methodologies have been invented over time, and currently MFIs are also successful in individual lending by using different lending methodologies. Armendáriz and Morduch (2005) explain that by using, for example, the promise to increase lending over time, MFIs create an incentive for poor people to pay back. A lot of MFIs make use of public payments or intensive weekly repayment schemes to overcome auditing costs and enforcement problems. These mechanisms increase the pressure to pay back. Some MFIs even implement an intensive follow-up scheme by loan officers. All these mechanisms increase operational costs for MFIs, which often results in MFI-clients having to pay higher interest rates than those in the traditional banking system. However, this principle has allowed MFIs to lend successfully to poor people and has helped to increase access to banking services throughout the developing world.

The institutions that offer micro-financial services have different legal statuses: Non-Governmental Organizations (NGOs), Non-Bank Financial Institutions (NBFIs), the newly commercial microfinance banks, the state-owned institutions that turned into commercial microfinance organizations, and the credit unions and cooperatives. The paper takes all of them into account.

At present, the objective of MFIs is generally seen as a double one: to reach the financially excluded poor and to become financially sustainable in order to gain independence from donor subsidies (Hartarska, 2005). Until now, the most feasible way to measure the development of the microfinance sector is by measuring the number of clients served. This is mainly due to data constraints[1]. Consequently, this paper measures the development of the microfinance sector through this indicator.

As explained previously, the paper concentrates on the Latin American region. Focusing on one region allows leaving aside some well-known factors that play a role in the uneven development of institutions and thus, most probably play a role in the development of the microfinance sector. Acemoglu et al. (2001), for example, have shown that the colonial background plays an important role in the development of institutions. The countries in the Latin American region have a common colonial background (Spanish and Portuguese) and a long history of political independence in comparison to other developing regions. Todaro (2000) argues that, despite the demographic and geographic diversity, this common background has led to the creation of similar economic, political, social, and cultural institutions.

Even though the Latin American microfinance market is characterized by a true array of institutions that differ in methodology, size, and performance, it still has common characteristics. In particular, the sector reaches proportionally fewer clients than in Asia. Moreover, the average loan portfolio of Latin American MFIs is the biggest of all. Miller (2003) argues that this is due to the higher average GNP per capita. Furthermore, Latin American microfinance leverages more equity, has more assets, and attracts more commercial funds. Overall, the literature argues that Latin American MFIs are more commercially oriented than their African and Asian counterparts (Lapenu and Zeller, 2001; Ramirez, 2004; and Armendáriz and Vanroose, 2009).

This common growth process of Latin American microfinance could partly be explained by the influence of the same international donor community. In this respect, Acciòn and USAID are certainly the main players. These organizations have played a big role in the emergence of the transformation movement – NGOs gradually changing into commercially operating institutions. This said, although microfinance has common characteristics all across Latin America, the movement has not equally spread throughout the region.

Since the Latin American microfinance market is one of the oldest, most developed, and most diverse microfinance markets in the world (Miller, 2003), the region is the most interesting one for identifying factors behind the uneven development. The objective of this paper is to identify these factors.

2. Literature overview and hypotheses

It is increasingly recognized that the macro-context plays a determining role on the performance of MFIs. Recently, scientific studies, like Ahlin et al. (2009), have been putting the performance of micro-

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[1] The CGAP database on which this paper is based does not even report financial performance measures.

finance institutions in their macro-context. Nevertheless, the role that specific factors play is not always that clear. By focusing on one region, this paper aims to contribute to the debate.

The development of institutions can be stimulated by internal and external factors. Internal factors are part of the institutions' policy. Good governance and management play an important role in the success and the further development of an organization. This is equally true for non-profit financial organizations. Governance problems are seen as one of the main reasons hindering the success of cooperatives and credit unions. With the maturation of the microfinance sector, governance and management issues have increasingly gained attention[1]. Though the subject is interesting and relevant, this paper focuses solely on external factors that play a role in the development of the industry. We thus leave organizational issues aside, hereby assuming no systematic relationship between the overall development of the microfinance industry and the management of an individual MFI in that country.

Richter (2004) defines a first framework for looking at the microfinance sector as a newly emerging industry. She uses the "social systems approach" developed by Van de Ven and Garud (1989). The "social systems approach" is here used to identify different sets of external factors that could play a role in the growth of the Latin American microfinance sector. These factors are identified from the literature on individual countries. We have grouped them in four categories: country-specific macroeconomic factors, the geographic and institutional framework, the international context, and the historical changes of the 1980s.

2.1. Factors related to the macro-economic environment. The level of income is a first macroeconomic factor put forward in the literature. In the literature on financial sector development, there has been a huge debate about the direction in which the level of income plays (Levine, 2004). Nevertheless, recent research on microfinance has shown that the impact of microfinance on the overall level of income has been minimal as the sector is still too small to influence it (Ahlin et al., 2009). Westley (2005) shows that regions with higher levels of income have less-developed microfinance sectors, and gives two reasons for that. Firstly, micro-entrepreneurs with higher incomes have more opportunities to self-finance through savings. Secondly, they may benefit more easily from informal finance through family and friends, once

again because they have higher levels of income. Furthermore, micro-entrepreneurs in those regions probably have easier access to formal finance. Consequently, the demand for microfinance services and its potential market is smaller. Similarly, Schreiner and Colombet (2001) argue that one of the reasons why microfinance in Argentina has not developed is that people there earn higher wages. Furthermore, it is well known that one of the poorest countries, Bolivia, has developed a very dynamic industry (Rhyne, 2001). This hypothesis will be tested.

Hypothesis 1: Microfinance is more present in economies with lower GNI per capita.

The effect of macro-economic instability on the financial sector is widely studied. The subject has received increased attention since the 1990s, when a lot of developing countries were hit by severe economic crises. Goldfajn and Rigobon (2000) show that macro-economic stability, determined by stable inflation and real interest rates, plays a major role in financial sector development.

According to Rhyne (2001), the process towards a more stable economy, and especially lower inflation rates, attracts more potential microfinance providers. Also Conger et al. (2009) show that the Peruvian microfinance sector really started to develop after inflation was brought under control. Vander Weele and Markovich (2001) provide evidence of the devastating effects of inflation, and especially hyperinflation, on the performance of microfinance institutions. One could, thus, argue that inflation is one of the hindering factors in the development of the sector, as it erodes the capital basis and diminishes the value of the currency. For borrowers, high inflation means high interest rates and increasing repayment problems[2].

Countries experiencing macroeconomic stability may not encounter these problems. On the other hand, they may not be used to the high interest rates that microfinance institutions generally set. Westley (2005), for example, suggests that borrowers in the Caribbean countries are not used to the high interest rates charged by MFIs due to their long history of macroeconomic stability. Consequently, the demand for micro-financial services is low. Latin American countries have indeed a long history of economic instability. Furthermore, the specific characteristics of microfinance could mean that the sector responds in another manner. Patten et al. (2001) have shown that microfinance institutions can play a counter-

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[1] See, for example, Labie (2001), Hartarska (2005), Hudon (2010), and Mersland and Strøm (2008).

[2] Nevertheless, the real value of the remaining part of the loan decreases with high inflation.

cyclical role in times of crisis. During the Indonesian crisis, the microfinance sector performed much better than the traditional financial sector. Also, Marconi and Mosley (2005) show that certain types of microfinance institutions played the role of shock absorber during the Bolivian macro-economic crisis of 1999-2001 and grew while other financial institutions failed[1]. Moreover, Hartarska (2005) found that MFIs reach more clients in the high-inflationary Eastern European countries.

To sum up, the effect of macro-economic stability seems mixed. On the one hand, one could argue that higher inflation educates people, rendering them more familiar with the higher interest rates that MFIs normally ask. It could also create a bigger microfinance market, as it is reasonable to believe that formal financial institutions are less developed in high-inflationary regions. On the other hand, high inflation could also hinder the development of MFIs, by discouraging potential providers and creating repayment problems. This argument is summarized in our second hypothesis.

Hypothesis 2: The financial stability of economies affects the development of the microfinance markets. The relationship is a priori unclear.

2.2. Factors related to the infrastructure and geographical framework. Transaction and information costs influence financial development and, as Stiglitz and Weiss (1981) show, they sometimes lead to market failures. A high population density plays an important role in lowering these costs. According to Sriram and Kumar (2005), this can lead to two contradictory arguments. One argument could be that formal financial institutions may be more developed in regions with higher population density and good regional interconnectivity. Thus, the need for specific microfinance institutions may not be present. The second, contrary to the first one, is that, if the development of the two sectors is complementary, these factors could eventually also stimulate the development of the microfinance sector. Latin American evidence has shown that urban microfinance institutions are more common than rural ones (Rhyne, 2001) and that their development is not mutual-exclusive.

Schreiner and Colombet (2001) argue that the absence of an adequate infrastructure plays a hindering role in the development of microfinance. Moreover, Yaron and McDonald (1997) see the absence of good infrastructure and spare populated areas as one of the main reasons why financial sectors in rural areas are so underdeveloped. Hulme and Moore (2006) also support the hypothesis that microfinance tends to develop much faster in densely-populated areas. Equally, Berger et al. (2006) show that population density stimulates MFI development. So, although MFIs may concentrate on regions where formal financial sector development is lower, they may be quicker to reach more clients in regions with a high population density. A hypothesis could test the relationship.

Hypothesis 3: The density of populated areas plays a role in explaining microfinance development. The relationship is a priori unclear.

The role of human capital in financial sector development is widely recognized. Paulson (2002) finds that regions with higher levels of education have more developed financial systems in Thailand. Guiso et al. (2004) also find positive effects of social capital on the development of financial systems. On the other hand, MFIs are interested in providing financial services to people that do not have access to formal financial institutions. One could, thus, argue that it is expected that they focus on regions where human capital is low. Karlan and Valdivia (2007) have shown that MFIs that provide financial training display better performance. In regions where there is a higher level of human capital, the performance of MFIs could, thus, naturally be higher. Therefore, the relationship is *a priori* unclear. It seems, however, that human capital – in the form of higher education levels and literacy rates – influences the development of microfinance institutions.

Hypothesis 4: The level of literacy rates influences the development of the microfinance sector. The relationship is a priori unclear.

2.3. Factors related to the international environment. Most institutions started as non-governmental organizations and needed external financial intervention to start their activities. For this reason, the international donor community has played an important role in subsidizing the emergence and further development of microfinance program (Imboden, 2005). Microfinance should, thus, be more present where the international donor community encourages it. As Rhyne (2001) shows, the support ideally comes from both domestic and international political actors. According to Weber (2004), the fact that the New Economic Program reform of Bolivia was accompanied by the creation of an Emergency Social Fund, which included a microfinance program, is seen as one of the reasons microfinance has taken off. The World Bank has also played an enhancing role by promoting it financially.

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[1] Though, they highlight the fact that the countercyclical role depended much on the kind of institution.

To gauge the extent of external intervention and international support, the amount of subsidies is a good indicator. However, the specific amount of subsidies going to an institution is hard to obtain. Furthermore, during the last decade, the role of subsidies in microfinance has become a more controversial one. MFIs are increasingly being pushed to become independent from donor subsidies. It is, however, widely known that a lot of microfinance institutions still depend on subsidies (Morduch, 1999b; Hudon and Traça, 2008). Moreover, the role of start-up subsidies or 'smart-subsidies' is still seen as necessary and, therefore, favored (Armendáriz and Morduch, 2005). Due to the fact that the amount of individual subsidies is hard to identify, we argue that the amount of overall donor support is a good proxy. It should be positively related to the development of the sector.

Hypothesis 5: Microfinance is more developed in countries that receive more international support.

2.4. Factors related to economic reforms. Latin American countries have been subject to a set of economic reform programs during the 1980s. These economic reforms were part of the Structural Adjustment Programs (SAPs) pushed by the World Bank and the International Monetary Fund. They consisted of a gradual liberalization of the domestic economy. Also, financial sector reforms constituted an important part of these programs. We use this historical setting to construct our last category of hypotheses.

The international donor community commonly sees the Bolivian microfinance experience as one of the most successful[1]. Bolivian MFIs have increasingly transformed from NGOs into commercial entities. Rhyne (2001) puts the emergence of the industry in the broader story of Bolivian neo-liberal transformation. Part of the economic reform program was the closure of the four state developmental banks. As a result, many poor households were left without any access to financial resources. A vacuum was created, leaving an open market for MFIs. As state development banks were the main providers of subsidized credit schemes, the closure or privatization of these banks reduced the availability of credit. In addition, the financial sector was gradually liberalized. In the literature on the traditional banking sector, the liberalization of the financial sector is seen as an important stimulator[2]. This argument is used to construct hypothesis 6.

Hypothesis 6: The microfinance sector is more developed in countries that have a more liberalized financial banking sector.

A second part of the financial liberalization programs consisted of the liberalization of interest rates. Usury laws and interest rate ceilings are generally seen as one of the reasons why the formal financial sector has left the poor behind. Serving poor clients is a costly and risky business due to their specific characteristics and living environment. Consequently, it is argued that the existence of usury laws hinders the development of microfinance institutions (Nichter et al., 2002; Schonberger, 2001). Helms and Reille (2004) define three kinds of interest rate ceilings: interest rate controls, usury laws, and *de facto* controls. The impact of the interest rate ceiling depends on two factors: its level of and the effective enforcement.

However, some countries exempt microfinance institutions from the interest ceiling. Others have created a special legal status for MFIs. We define this as a specific regulatory environment[3]. Gomez et al. (2001) and Jansson and Wenner (1997) highlight that the creation of a special regulatory framework for the development of microfinance is an important factor for stimulating the growth of the sector. For example, the construction of Fundos Financieros Privados in Bolivia, more commonly known as non-bank financial institutions, has played an important role in the development there. Also in Peru, there exist different kinds of regulatory statuses that MFIs can adopt. According to Conger et al. (2009), this has contributed to the expansion of microfinance in a significant way. Hypothesis 7 examines this argument.

Hypothesis 7: The development of the microfinance sector is determined by the regulatory regime. On the one hand, we expect a positive relation for a specific regulatory environment. On the other hand, we expect a negative relation for the existence of usury laws.

A third part of the economic reform programs of the 1980s was the closure and privatization of state enterprises. Marconi and Mosley (2005) argue that the closure of state enterprises in Bolivia pushed people towards the informal economy. The absence of alternative formal employment opportunities amplified unemployment figures. People started up micro-enterprises to foresee in their needs. Consequently, the demand for microfinance services in-

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[1] See, for example, Christen (2001), Robinson (2001), Rhyne (2001), Marulanda and Otero (2005).
[2] Lee (2002).

[3] Nevertheless, a lot of factors should be taken into account to define whether or not a country has a *favourable* regulatory framework for MFIs. For reasons of simplicity, though, no distinction is made between a favourable and special regulatory framework for microfinance institutions. The classification done by others is followed (see Section 5).

creased. Also, Berger et al. (2006) argue that it is the self-employed who form the main market for microfinance providers. Schneider and Buehn (2007) assemble data on the size of the informal economy all over the world for the year 2006. On average, the informal sector in Latin American countries represents around 40% of GDP, varying from 67.3% in Bolivia to 20.5% in Chile. Unfortunately, not all countries have data on the size of their informal sector.

A couple of authors make the link between the transition to a more service-based economy, the growth of the informal sector and the existence of a microfinance market. It is argued that economies that shift away from primary production (industry and mining) to a more service-based economy tend to develop a higher demand for micro-financial services as this is the major market for microfinance providers (Marconi and Mosley, 2005). This hypothesis will be tested.

Hypothesis 8: Microfinance is more developed in less-industrialized economies.

3. Data and empirical model

In 2004, the Consultative Group to Assist the Poor (CGAP) published a worldwide survey on financial institutions serving the poorer sections of the population (Christen et al., 2004). They identified more than 3,000 such institutions, and sorted them by region and institutional type. For this paper, the Latin American and Caribbean region (LAC) is used. The CGAP database is used to estimate the number of microfinance institutions and the number of clients served by these institutions up to the year 2003. When possible, the database was extended with data from other agencies, namely the MIX Market[1] and three microfinance rating agencies listed by the Rating Fund: MicroRate, PlaNet Rating, and Microfinanza. This allowed us to add more than 70 of the largest institutions to the database. In total, 476 institutions are taken into account. Of these 476 institutions, 329 were at that time operating under an NGO status. Thirty-five institutions were registered as commercial banks, 28 as non-bank financial institution (NBFI), and 58 as Co-operative or Credit Unions.

These institutions serve around 13 million clients[2].

Three shortcomings of our database must be kept in mind[3]. Firstly, not all institutions reported the num-

ber of clients, even though almost all provided the number of outstanding loans or active borrowers. When the number of clients was available, this number was used; when it was missing, it was proxied by the number of loans outstanding. The number of loans is generally bigger than the number of clients. This could lead to a slight overestimation of the number of clients being served. A second problem is the problem of multiple borrowing and might also lead to an overestimation of number of people served in one country[4]. A final problem is that there is no obligatory reporting procedure for MFIs in the different countries (CGAP, 2004), which might underestimate the size of the market. However, the addition of MFIs listed by the MIX Market and the Rating Fund ensures that the main operators are covered[5].

The number of clients divided by the number of the population gives a relative measure to compare the outreach of the sector. This percentage is used as our dependent variable. LAC microfinance institutions serve on average 11% of the population. In table 1, the descriptive statistics for the outreach variable are given.

The empirical model used to test the hypotheses is:

$$OUT_i = f(ME_i, INF_i, INT_i, ER_i) + \varepsilon_i, \quad (1)$$

where OUT_i is the percentage of the population served by microfinance institutions in country i in 2000, 2001, or 2002, and ε_i is the residual. ME_i are the macro-economic variables, INF_i are the infrastructure and geographical framework variables, INT_i – the international support variable, and ER_i – the economic reform variables.

The macro-economic variables include *GNI* per capita and inflation. The infrastructure and geographical framework encloses population density and literacy rates. The total level of aid per capita the country receives is used as a proxy to assess the level of international support[6]. Finally, the economic reform variables include the foreign assets per capita

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[1] The MIX Market is the largest on-line database of MFIs: http://www.mixmarket.org/ (Accessed in December 2009).

[2] This figure is large compared to the number provided by the Micro-credit Summit (2002). The Summit mentions only some two hundred LAC institutions, 1,973,352 clients in total. However, the authors pinpoint that the low number is due to not having a regional Summit-coordinator there to assemble data.

[3] These are the same as mentioned by Vanroose (2008).

[4] Bolivia and Peru, for example, are countries where such a problem surely exists. Nevertheless, multiple borrowing is often related to competition and one could argue that competitive markets are more developed (Rhyne, 2001). This paper, however, focuses only on outreach as a measure of development. Further research could relate competition with the macro factors here tested.

[5] The big institutions cover more than 60% of the market (Honohan, 2004).

[6] This is the best proxy available so far. We are aware that microfinance is only a small proportion of this total aid per capita. Nevertheless, the level of aid per capita gives us a good measure of international exposure. Also Latortue et al. (2007) argue that data is poor. They estimate that the outstanding portfolio of multilateral development banks in MFIs is about 5.8 bn of dollars in 2004 and that it is the biggest amount of the three main sources of international microfinance funding: bilateral agencies, IFIs, and multilateral development banks.

to approach the level of liberalization[1]; a dummy that equals one if the country has a usury laws, and zero otherwise; another dummy that becomes one if the country has some kind of special regulation for MFIs, and zero if not; and finally, industry value added to assess the level of industrialization.

Most of the data comes from the Word Development Indicators. The UNDP-Human Development Index is used as a proxy for the level of human capital. Helms and Reille's database (2004) is used to construct a dummy for the existence of usury laws and the presence of special regulation for MFIs. Their data is incomplete, but the Microfinance Regulation and Supervision Centre[2] dataset on special regulation completes the database.

The functional specification then becomes:

$$OUT_i = \alpha_i + \beta_1 \times \ln GNI_i + \beta_2 \times INFL_i + \beta_3 \times DENS_i + \beta_4 \times HCL_i + \beta_5 \times \ln AID_i$$
$$+ \beta_6 \times FORAS_i + \beta_7 \times CEIL_i + \beta_8 \times REG_i + \beta_9 \times INDVA_i + \beta_{10} \times MFIs_i + \varepsilon_i, \tag{2}$$

where *lnGNI* is the log of gross national income per capita; *INFL* is the average inflation rate over the last five years; *DENS* is the population density of a country; *HCL* – the literacy rate; *lnAID* is the log of the amount of international aid per capita; *FORAS* is foreign assets per capita; *CEIL* – a dummy that becomes one if the country has interest ceilings and zero if not; *REG* – a dummy that becomes one if the country has a favorable regulation regarding microfinance institutions, and turns zero if not; *INDVA*, the industry value-added; and finally, *MFIs* the number of MFIs in a country to control for the fact that outreach is not only explained by the number of institutions.

Following the World Bank classification, data from 32 countries are used. In Table 1 a summary of the different countries with their outreach measures is presented. Due to data limitations, the Cayman Islands and Bermuda had to be eliminated from our database. Table 2 gives a table of the hypotheses, the variable that we will test in equation (2), and the expected sign of the coefficient. Table 3 provides descriptive statistics.

Table 1. Summary of the countries and their outreach measures

Country	Outreach	Number of MFIs
Antigua and Barbudo	19.54%	1
Argentina	0.02%	10
Bahamas	8.59%	2
Barbaros	39.77%	1
Belize	27.65%	2
Bolivia	8.15%	35
Brazil	0.77%	34
Chile	0.92%	14
Colombia	4.40%	40
Costa Rica	5.53%	10
Dominican Republic	3.09%	17
Ecuador	16.12%	38
El Salvador	5.66%	35
Grenada	19.25%	1
Guatemala	5.69%	30
Guyana	0.67%	2
Haiti	1.50%	25
Honduras	6.42%	26
Jamaica	26.13%	4
Mexico	1.06%	26
Netherlands Antilles	9.56%	1
Nicaragua	5.18%	28
Panama	3.80%	5
Paraguay	10.98%	8
Peru	4.23%	70
St.Chris and Nevis	25.08%	1
St. Lucia	17.08%	1
St. Virginia and Grenadines	27.28%	1
Suriname	10.92%	2
Trinidad and Tobago	35.82%	2
Uruguay	21.29%	8
Venezuela	0.57%	5

Notes: *Outreach* is defined as the total number of clients served in a country, divided by total population. *Number of MFIs* is the number of microfinance institutions active in the country.

Table 2. Summarizing table of hypotheses

	Hypothesis that will be tested	Variable	Expected sign
1.	Microfinance is more present in countries with lower GNI per capita	GNI per capita	Negative
2.	Microfinance is influenced by the financial stability of the economy.	Average inflation rate 5 years	Unclear
3.	The population density plays a role in explaining microfinance sector development.	Population density	Unclear
4.	The level of literacy rates influences microfinance sector development.	Literacy rate	Unclear
5.	Microfinance is more developed in countries that receive more international donor subsidies	Aid per capita	Positive

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[1] The level of foreign assets per capita is used as proxy, as the level of foreign assets is highly correlated with financial liberalization and privatization (Lee, 2002).
[2] http://microfinancegateway.com/resource_centers/reg_sup (Accessed in July 2009).

Table 2 (cont.). Summarizing table of hypotheses

	Hypothesis that will be tested	Variable	Expected sign
6.	The microfinance sector is more developed in countries that have a more liberalized financial banking sector[1]	Foreign assets per capita	Positive
7.	Microfinance is more present in countries that have special regulatory frameworks for these institutions	Dummy	Positive
8.	Microfinance is more developed in less industrialized economies	Industry value added	Negative

Table 3. Descriptive statistics

Variable	Number of observation	Mean	Standard deviation	Minimum	Maximum
OUT	32	0.12	0.11	0.00017	0.4
lnGNI	30	7.9	0.81	6.17	9.63
INFL	31	10.17	12.25	0	48.54
DENS	32	122.57	139.77	3	620
HCL	31	88.79	10.69	50.8	98.85
lnAID	29	3.18	1.53	0.69	6.51
FORAS	32	3589.44	17667.74	-840.6422	100347.1
CEIL	32	0.34	0.48	0	1
REG	32	0.31	0.47	0	1
INDVA	30	28.35	7.39	16.5	48
MFIs	32	15.16	16.81	1	70

Notes: *OUT* is the outreach, or the total number of clients divided by total population, *lnGNI* is the natural logarithm of GNI per capita; *INFL* is the average inflation over 5 years; *DENS* – population density in square km; *HCL* – the percentage of people that are literate; *lnAID*, the natural logarithm of official development aid per capita: *FORAS* – the amount of foreign assets per capita; *CEIL*, the dummy that becomes one if the country has a ceiling and zero if not; *REG*, the dummy that becomes one if the country has a special regulation and zero if not; *INDVA*, the amount of industry value added per capita; *MFIs*, the number of microfinance institutions reporting.

4. Empirical testing and discussion of the results

Table 4 gives the correlations between the different variables. Note that there is a significant correlation between *GNI* per capita and the literacy rates. There also exists a significant correlation between the dummy for special regulation and the number of *MFIs*. Consequently, in order to test the robustness of our results, the value is estimated three times: once with literacy rates, once without them, and once without the special regulation and ceiling dummies.

Table 4. Correlation matrix

	OUT	INFL	lnGNI	DENS	HCL	lnAID	FORAS	CEIL	REG	INDVA	MFIs
OUT	1.00										
INFL	-0.16	1.00									
lnGNI	0.34	-0.20	1.00								
DENS	0.43	-0.32	0.06	1.00							
HCL	0.29	-0.02	0.61	-0.30	1.00						
lnAID	0.26	-0.16	-0.33	0.19	-0.18	1.00					
FORAS	0.02	-0.04	-0.14	-0.16	0.10	0.01	1.00				
CEIL	-0.26	0.39	-0.18	-0.45	-0.13	-0.01	0.26	1.00			
REG	-0.38	0.20	-0.36	-0.20	-0.26	-0.20	-0.15	0.24	1.00		
INDVA	-0.05	0.26	0.13	-0.13	0.33	-0.23	-0.05	0.26	0.19	1.00	
MFIs	-0.47	0.18	-0.40	-0.24	-0.37	-0.14	-0.11	0.28	0.79	0.06	1.00

The analysis relies on a multiple regression (Ordinary Least Squares; see Table 5). Looking at our first regression, we find an adjusted-R^2 of around 32%. Twenty-eight observations are included in the analysis. Four small countries are left out: Bahamas, Barbados, the Netherlands Antilles, and Trinidad and Tobago. All these are very small countries and are also classified as high-income countries by the World Bank. Furthermore, they all have special characteristics and are very different from the other Latin American countries, so we think it is reasonable to say that they are not that important to take into account when trying to explain microfinance sector development in the region.

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[1] As not enough data on government-owned banking assets is available, the level of foreign assets in the banking system is used as a proxy. The World Bank shows that with the privatization of the banking system the number of foreign investors has increased tremendously. Therefore, we will test the hypothesis whether microfinance is more developed in countries that have more foreign assets.

In order to test for the stability of our regression, we included and excluded some variables. The results are presented in respectively columns (2) and (3). Furthermore, a leave-one-out analysis is performed in column (4), where one country is left out and our main model is re-tested.

For all the different regressions, we report goodness of fit measures (F-statistics and adjusted R-squared). We also report the Root Mean Square Error (RMSE), which is often noted as the standard error of the regression (Baum, 2006). We find an RMSE of around 0.07 for our different models, which is close to zero. Furthermore, we notice that our third model explains most variations (adj. R-squared of 35%) and also has the

lowest RMSE. This is the regression where the regulatory variables are left out.

Next to the adjusted R-square and F-statistics, the skewness and kurtosis tests are used to test the normality of the residuals. The results of these tests for the different regression are presented in Table 6. The skewness and kurtosis tests are generally accepted to test whether there are any outliers or influential observations that are driving our results. An *outlier* is a data point with an unusual value and is often associated with a large residual or, in other words, a data point that fits the model poorly (Baum, 2006). From Table 6, we conclude that our residuals are normally distributed. The null hypothesis is rejected in the three cases. So, we conclude that outliers do not drive our results.

Table 5. The relation between outreach of MFIs and macro factors

Dep. var.	Outreach M1	Outreach M2	Outreach M3	Outreach LOO
lnGNI	.0264 (.0248)	.0561 (.0184)***	.0269 (.0243)	.0285 (.0217)
Inflation	.0014 (.0012)	.0016 (.0013)	.0016 (.0013)	.0016 (.0011)
Population density	.0003 (.0002)	.0002 (.0002)	.0003 (.0002)	.0003 (.0002)
Human capital	.0036 (.0019)*	Not Included	.0031 (.0015)**	.0037 (.0017)*
lnAID	.0116 (.0046)**	.0137 (.0046)***	.0115 (.0045)**	.0108 (.0048)**
Foreign assets	1.92e-07 (4.37e-07)	6.36e-07 (3.32e-07)*	3.05e-07 (3.73e-07)	1.71e-07 (4.08e-07)
Ceiling	.0250 (.0377)	-.0039 (.0314)	Not included	.0348 (.0406)
Regulation	.0422 (.0347)	.0504 (.0423)	Not included	.0349 (.0364)
Industry value added	-.0058 (.0028)**	-.0042 (.0027)	-.0047 (.0025)*	-.0060 (.0028)**
# MFIs per country	-.0013 (.0010)	-.0018 (.0011)	-.0004 (.0007)	-0.0013 (0.0012)
Constant	-.3401 (.1602)**	-.2802 (.1682)	-.3257 (.1827)*	-.3668 (.1661)**
Model statistics				
N	28	28	28	27
F-test	5.69***	6.52***	5.36***	5.02***
R²-adjusted	0.32	0.27	0.35	0.32
Root SME	0.08	0.08	0.07	0.08

Notes: We regress MFI outreach on different macro factors. In Model 1 (M1) we test our complete model. In Model 2 (M2), we leave out the human capital (HC) variable, due to significant correlation between GNI and HC. In Model 3 (M3) we leave out the dummy for ceiling and special regulation. In the LOO (Leave-one-out) model, we leave one country out to test the stability of our regression. Standard errors (in brackets) are heteroscedasticity and autocorrelation-robust. *, **, and *** denote statistical significance at the 10%, 5%, and 1% significance levels.

Table 6. Test for outliers: skewness/kurtosis for normality of the residuals

	Outreach M1	Outreach M2	Outreach M3
Pr (skewness)	0.17	0.11	0.18
Pr (kurtosis)	0.77	0.80	0.72
Adj Chi-squared	2.18	2.95	2.06

Examining our results in Table 5, we notice that there are only a couple of variables that explain the variation in microfinance outreach in the Latin American region. First, looking at our first hypothesis, we see that the coefficient of *GNI* per capita is only significant in the second regression, i.e., when literacy rates are left out. The level of income per capita on an aggregated country level seems to play a role within

the Latin American region, but especially in the form of higher literacy rates that are associated with more developed economies. Nevertheless, the sign of *GNI* per capita is positive, contrary to what we expected. This could be explained by the fact that microfinance focuses on the poorer parts of a population within a country and not so much on the poorest countries as such. Furthermore, other recent research has shown

that MFIs perform better in the relatively richer countries of the developing world (Vanroose, 2008).

Second, the coefficient of literacy rates in the first, third, and fourth equations is positive and significant at the 10% and 5% level. Our **fourth** hypothesis is therefore confirmed: literacy rates influence microfinance development and this influence is positive. This finding is consistent with the literature on financial sector development (Paulson, 2002). The observation that GNI per capita or literacy rates are not simultaneously significant supports the existence of correlation between the two variables. So, the microfinance sector reaches more clients in countries with higher levels of human capital. It seems thus that a certain level of human capital has to be in place for microfinance to reach significant outreach levels.

Third, the role that international donors play is highly significant in all the regressions. Hypothesis **five** is therefore verified. Countries that receive more international aid have developed considerably bigger microfinance markets. This is an important result in times when donor intervention is questioned. It shows that international donor organizations are important. The specific role of the international donors is not clear though. Whether the financing of the industry is the most important role, or if it is the pressure of international donors on domestic governments to stimulate the development of microfinance markets that is more important, should be further investigated.

The results do not confirm the hypotheses **two, three** and **six**. Inflation does not seem to influence microfinance outreach in the Latin America region and neither do microfinance institutions reach more clients in densely populated countries. Moreover, coefficient of the percentage of foreign assets per capita only plays a significant role in the second regression. The result does not seem stable among the other regressions.

Next, looking at hypothesis **seven,** regulation seems not to play an important role either, since the coefficient of usury (*CEIL*) laws or the one of a favorable regulatory environment (*REG*) are not significant. One of the reasons why special regulation may not play a significant role is that only a few countries have already created a special status for microfinance institutions. Furthermore, a special regulatory framework is not always effective, as noted by Hartarska (2005). It could, thus, even hinder the development. Also, in a later study, Hartarska and Nadolnyak (2007) find no evidence that the regulatory environment matters. Note that there exists a high correlation between the dummy of special regulation for MFIs and the number of MFIs in a

country. This could mean that such a special regulation is put in place when the number of institutions is big enough. On the other hand, it could mean that a special regulation makes it easier to identify MFIs. This should be further investigated.

Finally, the results confirm hypothesis **eight** in the first, third, and fourth equations. The coefficient of industrial sector development is negatively significant. This means that countries that have less-industrialized economies have higher microfinance outreach. This could be explained by the fact that, in less-industrialised countries, the number of people that are in the informal sector or are self-employed is higher and, therefore, the potential market for MFIs is bigger. Note also that in none of the estimations the number of MFIs is associated with higher microfinance outreach. Thus, a higher number of MFIs in a country does not explain higher outreach.

Conclusion and further research possibilities

This paper studies the uneven development of the microfinance sector in Latin America. Insights from the literature on individual countries are used to construct a set of hypotheses that are tested on a cross-sectional basis. The study finds that microfinance tends to serve more clients in the countries that have higher degrees of human capital, here approached by literacy rates. It seems, thus, that higher levels of human capital stimulate MFI-outreach. Moreover, the paper shows that the microfinance sector is reaching more clients in the Latin American countries that receive more international aid. It, thus, highlights the importance of the international community. This is an important result in times where donor intervention is increasingly questioned. However, the specific role that international donors play should be further investigated. Additionally, the part that domestic governments play in the encouragement of the industry is left for further research. So far, regulation does not seem important. The reasons put forward by Hartarska and Nadolnyak (2007) could explain this, i.e. regulation means also additional costs on MFIs.

Potential microfinance providers should take these factors into account. Specifically, they indicate that regions with other characteristics need special attention in developing microfinance markets. In addition, donors, microfinance institutions and commercial investors can use the results of the paper to analyze the macro-environment in which they operate and identify significant factors. Such an analysis would help them to identify and implement adequate policies.

The paper has a number of drawbacks and further research is obviously needed. First, the paper is

based on a literature study and tries to identify factors from there. The difficulty to assign clear signs to hypotheses 2 to 4 shows that the relationship between macro-factors and microfinance development is *a priori* not always clear. The contradictory arguments seem to pinpoint towards interactions between formal financial sector development and the microfinance sector. Indeed, one could wonder whether MFIs are influenced on the same manner by the same factors as formal financial sector development. A theoretical framework could be developed to explain the relationship between the two sectors more deeply. Second, the paper concentrates solely on the outreach of microfinance institutions. The average loan size could shed a light on the depth of outreach of the microfinance sector in a country. Third, the role that informal markets play could be studied. The literature indicates that it is a main market for microfinance institutions. To obtain a more accurate view of the potential of microfinance markets, this measure might be more precise than total population. Fourth, possible interactions between the different variables can be studied. Finally, assembling and analyzing panel data sets to go deeper into the causal relationships would be particularly valuable.

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