Formal Property and Microfinance in Peru: An Analysis of Their Problems and Potential to Empower the Poor in Peru

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Formal Property and Microfinance in Peru

AN ANALYSIS OF THEIR PROBLEMS AND POTENTIAL TO EMPOWER THE POOR IN PERU

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Abstract:

The author focuses on property formalization, microfinance and their effects on empowering the poor in Peru. For this purpose, the author will first analyze the economic and social conditions in which the microfinance initiative has taken place in Peru as well as its informal economy.

Then, the author will explain the advantages and disadvantages that microfinance and property formalization have had as economic tools used to confront the problem of collateral. The author argues that both economic tools, if used together, may have a greater impact in the poor’s economic empowerment. The poor’s economic empowerment will be understood as the decrease in interest rates in the microfinance sector.

Hence, Peruvian Microfinance Institutions – represented by Peru’s leading MFI “Microfinanzas Prisma – will be analyzed through regression analyses with intervention variables to simulate the correlations between collateral and interest rates in the microfinance sector. The results demonstrate that formal property, although correlated with interest rates up to a certain point, may not have a significant correlation with interest rates beyond that point.

The author will finally interpret the results of the empirical analyses and will make some recommendations that could be implemented as development policies. A proposal would be based on the joint use of microfinance and formal property to further decrease interest rates and therefore empower the individuals borrowing below the point at which collateral has no significance correlation with interest rates. Concepts such as social capital and community organization will be addressed to further enhance the impact of collateral on interest rates.
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SECTION ONE

Introduction

Latin America is currently going through very fruitful times. After going through years of uncertainty and despair that took place in the Lost Decade (Hayes 1988)i, the region has finally achieved a steady level of economic growth and stability. In countries such as Peru, sound fiscal and monetary policies have strengthened the private and public sectors through the promotion of foreign direct investmentii and free trade agreements with developed countries such as the United States. While Latin America’s overall macroeconomic performance has been outstanding and admirable – given the drastic transition from populism to fiscal responsibility – the conditions for sustainable development are still being challenged. Furthermore, while some governments have tried to redistribute the revenues arising from budget surpluses, the overall effect is questionable, given the programs’ real impact on the poor and their path towards economic development. For example, the Peruvian government under the Toledo administration promoted assistance and welfare programs such as “Juntos” (Perova, Vakis 2009)iii. Yet, governments’ attempts to reduce poverty and promote economic development through these programs have not been as effective as expected, given that their effects in the poor’s empowerment in the short-run are vulnerable to political decisions. A recent analysis concluded that there still exists an important ethnic gap that is translated into educational disparities. For instance, “blue collar ‘white people’ have 11 years of schooling, white blue collar ‘indigenous’ have 8 years of schooling, and indigenous peasants/informal self-employed have four years of schooling” (Paredes, Thorp 2007).iv

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1 “Juntos” is a conditional cash transfer program in Peru. A World Bank research study asserts that “Juntos” is improving a number of key welfare indicators of program beneficiaries. Specifically, Juntos has a moderate impact in reducing poverty and increasing monetary measures of both income and consumption. Nonetheless, the main issue with “Juntos” rises is that it could become a clientelar tool given Peru’s weak political institutions that can be used by political authorities for their own political interests.
The main challenge that Latin American policymakers currently face is to find ways in which they can empower the poor through sustainable measures that will help them to escape from the poverty trap and move towards social and economic comfort.

Consequently, Peru has applied orthodox market policies at all levels in the last twenty years. In that scenario, the poor have been seen as potential economic agents that can dynamize the Peruvian economy while empowering themselves and provide solutions to their endemic problems. Certainly, microfinance and property formalization are two economic development alternatives that have been examined and utilized in the developing world in the last decades. Hence, this paper will examine their role in the Peruvian efforts to eradicate poverty and promote economic and social empowerment for the poor.

Certainly, property formalization has had interesting effects in enhancing the economic opportunities for the poor through sustainable initiatives in Peru. Since the 1980s, with Hernando de Soto’s book “The Other Path” – which first explained in detail the informality phenomenon in Peru – property formalization has become a significant way through which the poor can break the poverty cycle and insert themselves in the formal banking sector. While property formalization had an auspicious start, research done on its potential to empower the poor concludes that property formalization has had modest results in successfully integrating the poor in the formal economy in terms of their access to credit (Galiani, Shargrodsky 2007). Furthermore, property formalization could have had a greater impact on the poor’s empowerment had it been used jointly with other economic strategies aiming to the same goal (Kerekes, Williamson 2010).
Accordingly, the microfinance sector in Peru has considerably expanded in the last decade, jumping from eight institutions reporting to the Microfinance Information Exchange Financial Data\(^2\) in 1999 to 59 in 2009. Although encouraging, the Peruvian microfinance sector still faces some challenges, especially with respect to its potential to empower the poor through their integration into the formal banking sector. Currently, interest rates are seen as an important setback in the attempt to empower the poor and facilitate their escape from the poverty trap. Interest rates, also known as the price of loans faced by borrowers, take into account the following costs: the opportunity cost of the loan, the borrower’s risk and the loan’s transaction costs – which are mainly administrative, monitoring, enforcement and transportation costs.

Those costs are reflected on the interest rate’s size and therefore become the price to be paid for the microloans provided to those lacking of collateral. As a matter of fact, interest rates in the microfinance sector tend to be high mainly due to the borrower’s high risk – given their lack of credibility or collateral and the high transaction costs – due to the borrowers’ distance from the banks. Although there has been a steady increase in competition, the Peruvian microfinance sector is a mixture of non-profit and for profit microfinance institutions (MFIs). The issues with competition, according to some studies\(^3\), is that the interaction of non-profit and for-profit institutions in the microfinance sector raise problems that hinder the effects of free competition over the interest rates and their decrease in the microfinance sector. While the poor do not need to present physical collateral to get access to microfinance services, the lack of

\(^2\) Data collected from the Microfinance Information Exchange (Mix) Markets website for Peru.
\(^3\) According to Fr. Richard McGowan, SJ from Boston College, “the traditional economic competitive model assumes that the market consists of profit-maximizing firms. The microfinance industry, however, is made up of many non-governmental organizations (NGOs) and nonprofits that do not seek to maximize earnings. Since some MFIs are not looking to make a profit, more competition may simply reduce economies of scale and drive up costs, jeopardizing the survival of all firms.”
physical collateral – expressed in terms of informal property or no property at all – will be analyzed in order to understand its potential effects in the decrease of interest rates.

Both the microfinance initiative in Peru and property formalization address similar issues on economic development: the empowerment of the poor through their integration to the formal economy driven through the opportunities available in the banking sector. Furthermore, the microfinance initiative and property formalization attempt to solve, among other issues, the problem of collateral for the poor. Among other potential problems, the lack of collateral is one of the main factors that drove economists such as Muhammad Yunus – the Grameen’s Bank Founder – or Hernando de Soto to find mechanisms through which the poor could become credible and reduce their financial risk in order to enter to the financial system. While the former collateralizes social capital – through the creation of solidarity groups or communal banking, the latter promotes a legal revolution aiming to embrace the poor who own property which lacks of formal recognition by the law.

In this context, the poor’s empowerment is understood as the increase in their likelihood to enter into the formal economy by getting access to loans that may become the first step for them to build up capital and escape from poverty. Property formalization and microfinance aim to solve that problem by making the poor credible while reducing their financial risk. Certainly, interest rates play an essential role in either facilitating or complicating the poor’s escape from the poverty trap once they are in the system. Consequently, it would be assumed that interest rates should be low in order to facilitate or encourage their repayment while leaving some capital for consumption, investment or savings for the poor – since that capital would be essential to pull the poor out of the poverty cycle.
Nonetheless, property formalization, if exercised alone, is argued to have a limited potential for success in empowering the poor (Kerekes, Williamson 2010), which could be understood as a reduced capacity to decrease the poor’s financial risk and increase their credibility in the banking sector. Hence, that problem can be seen as the formal property’s limited potential to decrease interest rates. Accordingly, while microfinance aims to empower the poor and replace the lack of collateral with the collateralization of, for instance, social capital, its effects in empowering the poor – under the same premises explained above – may be limited due to some difficulties within the sector that hinder its potential to empower the poor through the decrease in interest rates. Since MFIs do not require any physical collateral they would be able to present their collateral as an additional means to decrease their financial risk as well as to increase their credibility. Thus, we will propose that formal property, together with microfinance, could enhance their effects on the poor’s empowerment through the decrease of high interest rates existing in the microfinance sector. In that way, microfinance and formal property should help to overcome the difficulties that may rise if used alone by using both the financial and legal strategies together.

Consequently, the thesis will focus on the ways through which microfinance and property formalization could interact and lead to a decrease in interest rates for the poor in Peru. Yet, formal property may have some limitations even if used within the microfinance sector and that possibility will be analyzed as well. It is important, then, to first examine Peru’s economic performance between 1990 and 2009 to understand the paths that country has taken towards economic growth and development.
Peru: A Brief Analysis of its Economic Performance

Peru is one of those Latin American countries that has gone through dire economic and social unrest but is currently experiencing substantial economic growth. As a matter of fact, Peru is a great example of the aforementioned economic recovery and therefore is an important subject of analysis, given that it has also experienced problems in enhancement of economic opportunities for the poor. Peru has had steady growth in the last decade, and has had growth rates of 8.9% and 9.8% in the years 2007 and 2008. However, given the global financial crisis, Peru’s economic growth decreased to 0.9% due to the decrease in demand for raw materials as well as a decrease in domestic demand. While this decrease was substantial, the government’s expansionary fiscal policies helped to cushion the economy from the financial breakdown in the year 2009.

Since Peru continues to be dependent on its exports, potential financial setbacks overtime make Peru’s economic growth extremely vulnerable. For instance, Peru has been unable to discover a sophisticated export basket that could fuel future growth (Hausmann 2007) and therefore is subject to exogenous factors rather than endogenous factors – such as the investment in human capital. On human capital and economic growth, Jeffrey Sachs argues that:

“Growth may enrich households linked to good market opportunities, but it may bypass the poorest of the poor even within the same community. [In that way] the very poor are often disconnected from market forces because they lack the requisite human capital – good nutrition and health, and an adequate education” (Sachs 2005).

Similarly, there are several other concerns about Peru’s economic development and its reliance on economic growth given that Peru heavily dependence on commodity exports limits the potential drive to job growth and economic diversification (Porter 2009). Economic growth,
while important and useful due to its impact on wealth overall, is not reliable for development purposes under these volatile circumstances. Thus, sustainability becomes an essential issue in development and economic tools such as microfinance and property formalization constitute two ways through which the dependency circle can be broken and encourage the investment in human capital. An improvement in human capital – which falls under the scope of social infrastructure and political institutions – through microfinance and property formalization jointly used will eventually improve the microeconomic capability of the economy (Porter 2009)\textsuperscript{xii} and therefore enhance the poor’s opportunities to escape from the poverty trap.

\textit{Microfinance and Land Property: Two Answers to the Problem of Collateral}

The lack of collateral is one of the problems that hinder the poor’s escape from the poverty trap. Microfinance, initially developed by the Nobel Peace Prize Muhammad Yunus with the Grameen Bank (Sengupta, Aubuchon 2008)\textsuperscript{xiii}, became an alternative path for the poor with no collateral. Through microloans that require no collateral, the poor would be capable of starting micro businesses that could be their first step to escape from endemic poverty. Microfinance then is an alternative that comes from the free-market economy and the private sector and adapts itself to the needs of the poor. Accordingly, many of the poor lack of collateral not because they lack of it absolutely, but because they have not formalized what they already own. For instance, the poor may own small land lots where they setup their houses and stay there for decades, as it happened in Peru between the 1970s and 1980s.\textsuperscript{4} Certainly, Hernando de Soto describes this phenomenon as gradual and violent “invasions” that occur in already existing

\textsuperscript{4} De Soto argues that, either gradual or violent, these invasions consist on a form of informal property understood as a contract that has the “immediate effect of establishing a right to the land which has no specific equivalent in the legal world and which [he calls] the ‘expectative property right’.” De Soto further sustains that in 1985, “of every 100 houses built in the capital city, 69 were governed by the extralegal system and only 31 by the formal legal system.” P.23 The Other Path
settlements. Yet, formal property should not be subjected only to land property, but embraces all sorts of property.

The poor do not formalize their property because the legal processes for that to happen are extremely expensive, with enormous bureaucracies and take months or years to formalize property. Given the governments barriers to legalization, people tend to “live and work outside the official law, using their own informally binding arrangements to protect and mobilize their assets” (de Soto 2000). In this context, “it is legality that is marginal; [and] extralegality has become the norm. [Therefore] the poor have already taken control of vast quantities of real estate and production (de Soto 2000). Through government initiatives and policymaking, the poor can go through a better formalization process that may take less time and bureaucracy to formalize their property in a coherent legal framework (de Soto 2000). Hence, while microfinance is mostly a private-sector-driven initiative, legal property formalization is a government-driven initiative. Consequently, this paper will propose that if both economic tools are put together they can enhance the likelihood of their success in empowering the poor through the improvement of human capital.

Peru has experienced an outstanding performance in the microfinance sector. The market for microfinance businesses is mainly local and their products are crafted. According to the Economist Intelligence Unit (EIU) in the four years the evaluation has taken place, Peru has been the best country for the microfinance business environment. The evaluations held in 2007 and 2008 were regional, that is, only in Latin America, while the evaluations held in 2009 and 2008 where held with a greater number of countries from Africa, Central, South and East Asia, the Middle East and Eastern Europe. The EIU evaluated these countries on their performance of their regulatory framework, investment climate, and institutional development. The evaluations
on regulatory framework were mostly focused on the analysis of the MFI’s performance within their operations such as the regulation of microcredit operations and the regulatory and examination capacity. Similarly, the evaluations on institutional development were focused on issues such as the level of competition for MFI’s within those countries. The evaluations on Investment Climate were primarily, but not only, focused on macroeconomic and political issues that have an impact on MFI’s such as political stability, governance standards or the judicial system.

In 2007 Peru ranked second; only behind Bolivia in the overall evaluation ran by the EIU and currently is the best country in Latin America, and the world to promote and expand the microfinance sector given the previous criteria. Due to Peru’s outstanding performances with regard to the microfinance sector, it is suitable for this research to use microfinance as a policymaking tool that has proven potential for success in empowering the poor as well as presenting multiple opportunities for the poor and micro-entrepreneurs.

Yet, microfinance faces several questions given that MFI’s depend on high interest rates that, when given to individuals who already lack collateral, are very difficult to be repaid. Hence, MFI’s need high interest rates to survive, which are difficult to be repaid by the borrowers, and therefore hinder the borrowers’ opportunities to escape from the poverty trap since they are now stuck in a debt-cycle. The poor then would move from being stuck in the poverty trap to be stuck in the debt-trap. In that way, the poor would never be able to create capital enough to save and request higher loans, since they would be permanently paying their debts, not saving and consequently failing to move towards sustainable development.

Karol Boudreaux and Tyler Cowe (2008) argue that several of the microlenders are reluctant to lend money for start-ups; they want to promote already established businesses and not take risks with new ones. Under this scope, microfinance would not be used to lift the poor out of poverty, given that it requires guarantees that, for instance, are impossible to be matched by those living in poverty and without meaningful collateral.
Certainly, the poor’s demand for loans is inelastic, given the few available substitutes or alternatives that they could find to high interest rates and therefore are constrained by that problem. Consequently, MFIs dealing with market imperfections such as the hybrid competition between for-profits and non-profits may lack the incentive to decrease interest rates, regardless of the collateralization of social capital. Even with well-informed borrowers, MFIs would be reluctant to decrease their interest rates if potential borrowers have poor collateral. That situation creates a lot of concerns on whether microfinance can actually bring the poor outside of the poverty trap and if microfinance is sustainable for both the borrowers and the MFI’s. Consequently, alternatives to this problem will be given throughout this research in response to the adaptation of financial instruments such as the ones in Peru’s microfinance sector.

In the informal economy, Peru’s policy of property formalization is quite challenging. Peru is among the countries with the greatest percentage of their economy involved in the informal transactions and systems. As of 2007, 53.7% and 47.9% of Peru’s economy was informal. The same research concludes that, of 151 countries examined in 2007, Peru ranked 147th. On average, from 2007 to 2010 Peru’s informal economy accounts for 58% of its total. Among other factors, informal property accounts for a substantial part of their economy. For instance, extra legally held rural and urban real estate in Peru amounts to approximately US$74 billion (de Soto 32).

Among the reasons for the poor to decide to go for informality, there are some problems such as the government mechanisms to raise tax revenue, given that existing law does not address the poor’s needs and because in many occasions, the opportunity costs for the poor to operate in the informal economy were lower than those of operating formally. As long as the
opportunity costs for the poor to become formal decrease, they are prone to enter into this system (de Soto 2000). Consequently, the greatest challenge with informal property is to provide the adequate bureaucratic and governmental mechanisms to execute the formalization process with ease for the poor. The acknowledgment and use of dead capital property as a financial asset in the formal financial sector is what de Soto considers to be the “Mystery of Capital” (de Soto). Dead capital becomes “living” or useful capital once it is represented in terms of a title, security, contract, etc. Property, then, becomes an economic concept about a physical asset that is embodied in legal representation.

SECTION TWO

Questions and Hypothesis

Microfinance and formal property, while addressing the same problem with collateral and the poor’s difficulty to become part of the formal economy, face several problems with respect to their impact in the poor’s empowerment. On one hand, the former has been questioned on its capacity to offer competitively low interest rates for the poor in order to enhance the likelihood of the microloans’ repayment. On the other hand, the latter has been questioned for its limited potential to empower the poor who may formalize their collateral and intend to become part of the formal economy through the use of their formal property as collateral. In principle, De Soto’s arguments appear to be consistent in the sense that formalization should be an essential tool to empower the poor. Nevertheless, De Soto has been criticized for presenting property formalization and the poor’s unique reliance on property titles in order to escape from the poverty trap. In that way, De Soto’s critics argue that government programs that have mainly focused on property formalization as their main poverty eradication plan are proven to be
insufficient and ineffective.\textsuperscript{xxx} Other authors assert that, while property titles are important, to base poverty eradication programs that intend to improve the access to financial collateral only on property formalization is problematic.\textsuperscript{xxxi} Formal property, then, may not be sufficient to successfully empower the poor given the existing possibility that collateral, even if its formalized, could not be valuable enough to reduce the poor’s financial risk or make of them more credible borrowers. Consequently, the banks’ transaction and administrative costs of providing a loan could continue to be, in some situations, higher than the value of physical collateral that an individual may offer to the bank.

Thus, can formal property be used in the microfinance sector to further empower the poor through a decrease in their financial risk as well as an increase in their credibility – effects that would be reflected in a decrease in the interest rate for borrowers? If that is true, to what extent would formal property be significantly useful to decrease the borrowers’ financial risk and increase their credibility and therefore decrease interest rates as well? What is the breaking point in which collateral goes from being significant in the decrease of interest rates to be irrelevant to the fluctuations of interest rates in the microfinance sector?

We believe that the use of formal property in the microfinance sector could be useful to decrease financial risk and increase the borrowers’ credibility, therefore leading to a potential decrease in interest rates. In that way, formal property could have a negative correlation with interest rates in the microfinance sector. Yet, collateral, while useful in many cases, reaches a breaking point in which it becomes irrelevant and has no effect on interest rates at all.

Hence, collateral should have a negative correlation with interest rates within the microfinance sector. However, there is a breaking point in which the possession of collateral is
not significant and has no significant correlation with interest rates at all. In that way, our hypothesis rests on the assumption that formal property, understood as physical collateral available in Peru’s microfinance sector, may have a significant negative correlation with interest rates until it reaches a certain point in which collateral may not have a significant correlation with interest rates. Therefore, interest rates become ineffective in its potential to empower the poor after a certain point, without disregarding its importance up to a certain level of loans.

**Literature Review**

Several scholars have written on issues such as microfinance and land property formalization. Some of them have gone through the use of the social capital theory as a means towards a more efficient way to maximize the borrowers’ potentials with regard to their ability to request and repay loans. For instance, Dean S. Karlan (2007)\textsuperscript{xxxii} argues that social connections within organizations in general are a broader form of social capital that can lower the transaction costs of otherwise expensive aspects of microfinance such as the monitoring of the microloans.\textsuperscript{xxiii} Karlan studied the case of FINCA-Peru, a MFI focused on lending microloans to women. Through a mechanism of dual-savings accounts as well as loans – that is, the women receive loans from FINCA-Peru as well as from the savings accounts they create for themselves. Both loans are made at a 3\% interest rate, which is extremely low compared to the interest loans that are used in other MFI’s. If any of the women fail to pay their respective loans on time, they can pull funds from the savings account cushioning their debts while they repay their loans. Through this mechanism women can break both the poverty and debt cycles that would have otherwise affected them. Similarly, MFI’s can achieve their objective of empowering women and encouraging them to request higher loans in the future which may lead to a gradual transition from the microloan sector to the mainstream financial sector. Karlan considers this condition to
be caused by “Joint Liability Mechanisms.” Karlan demonstrated that in the Finca-PERU’s case, the use of group liability reduced screening, monitoring and delivery costs as well as a greater likelihood of responsible payment from the lenders.

With regard to poverty, Copestake, Dawson, Fanning, McKay and Wright-Revolledo (2005) analyzed the characteristics of poverty in Peru. The researchers found that borrowers lived in poor households and, on average, owned less valuable assets, spent less on clothing, and were more likely to be headed by a woman. The authors also found that NGO’s such as Promuc in Peru have difficulties proving to their sponsors the range of effectiveness that microfinance has as an instrument for poverty reduction. These findings are consistent with the arguments proposed in this research, since the alternative would be to use the joint-liability mechanisms as well as with formal land property. Finally, the authors conclude that reducing cost-effectiveness while meeting the minimum standards of reliability can be improved by developing methods that generate information in a more timely way and in sufficient detail.

Katherine Rankin (2002) conducts extensive work analyzing the effects of social capital in microfinance and the politics of development. Rankin argues that social capital has a great potential for policymaking since it is considered an adequate theoretical framework for poverty alleviation. Similarly, its success stories linked to microfinance make social capital an interesting framework to be applied in the microfinance business. The author emphasizes the “feminization of development” and how microfinance is suitable for that mobilization. Rankin also mentions the importance of combining liberal economic measures – that is, promoting economic development through conventional market tools – with cultural and union traditions.
Matthieu Chemin (2007)\textsuperscript{xxxvi} did research on microfinance and its effects in Bangladesh. The author argues that microfinance does not seem to benefit the poorest of the poor since only those who can keep up with the weekly repayments that MFI’s such as the Grameen Bank uses. Yet, the author’s findings reflect a strong correlation between microfinance and male/female school enrollment as well as a strong correlation between the aforementioned dependent variable with supply of labor. Microfinance then has a positive impact in independent variables such as the ones previously mentioned. In conclusion, Chemin asserts that microfinance in Bangladesh empowers women formerly restricted by social customs, promotes self-sufficiency and enhances education. Consequently, although there are some limitations to microfinance, it does have a positive effect on poverty reduction.

Jonathan Morduch (1999)\textsuperscript{xxxvii} recognizes that while MFI’s can have operational sustainability, they will be depleted if they cannot cover the full cost of capital – hence, they are not financially sustainable. Several of these problems arise because MFI’s have several difficulties becoming self-sufficient since they depend on subsidies from donors – which they certainly have to receive given the constraints they face. The author recognizes that no more than 1 percent of NGO programs worldwide that are engaged in the microfinance business are currently financially sustainable. He then argues that group lending has taken the most of the spotlight within microfinance across the research analysis he made of several MFI’s. Hence, will microfinance has potentiality according to social capital theory, it could lead to inefficiencies that in the long-run affect the MFI’s.

Abhijit V. Banerjee and Esther Duflo (2007)\textsuperscript{xxxviii} analyzed the situation of the poor in Peru and Guatemala, among other countries. The authors acknowledge that the market for credit for the poor is adverse with regard to mainstream financial services. They also argue that credit
from informal sources tends to be expensive, but that the poor also have an easier access to formal credit market and that the interest rates are likely to fall on a monthly basis for each additional hectare of land owned. This does not mean that the poor have to have greater amounts of land. What the poor need is greater amounts of land *recognized as their property.* Consequently, formal property is a great tool that can strengthen the reach of microfinance, given that formal property can lead to lower interest rates for the poor. The authors continue with their argument and assert that the situation of informal property for the poor is quite problematic, since they tend to own a lot of the land that was either recently cleared or recently encroached upon, which is typically the land where tilling is incomplete. They cite Erica Field who argues that in Peru, for instance, the poor spend a lot of time protecting their claims to the land. In that way, the poor, instead of having formal property titles that may become collateral for their future loan requests, spend their time protecting the land they informally own and therefore engage in activities that are not productive for their economic advancement. Furthermore, the potential to dissave in this circumstance is greater given that the poor have to spend their scarce resources engaging in unnecessary activities.

Bruce Wydick (2002)[xxxix] reports that individuals who get access to microloans tend to use their profits in their households’ subsistence – for example, buying food, clothing, etc. This could be interpreted as a problem that comes with the westernized application of financial instruments that work with individuals in rural areas that are mostly community-based. Therefore the poor, in this case mainly women, see that their possibilities of taking riskier business decisions are constrained. Information asymmetries are also an issue given the limited range of several MFI’s in rural areas. Wydick’s research also concluded that, through microfinance ventures, the poor are, or even more, able to generate employment than men. Employment
stability through these microfinance businesses is greater in female-operated enterprises. That finding becomes an essential factor for microfinance since employment stability is crucial in countries where the poor are always vulnerable with unstable jobs.

Carrie B. Kerekes and Claudia R. Williamson (2010)xii study the impact of formal land property titles in the poor’s capacity to use those titles as collateral for loans. Their studies show a positive impact from government land titling in Peru’s urban areas by providing access to credit and increasing investment. Yet, their findings suggest that land titling in rural Peru does not achieve its intended effects. That is, government land titles are not sufficient collateral to guarantee a loan. Similarly the authors found that in the presence of government land titles, the enforcement of property rights is not achieved through public institutions. The authors conclude that land titling is not a magic bullet that guarantees sufficient collateral to secure a loan through either public or private institutions. The authors also state that while the method of government land titling may fail to achieve secure property rights institutions, economic development can be achieved through this method. Thus, government-driven land property formalization has to go together with initiatives from the private sector.

James Midgley (2008)xiii argues that microfinance and microenterprise have had a wider impact on the poor communities in which they operate, as well as raising their people’s standards of living. The strengthening of communities and social capital mobilization are aspects that have been achieved through microfinance to an extent. Nonetheless, Midgley also asserts that microfinance is unlikely to contribute to global poverty eradication and social development unless it is integrated into a wider developmental strategy of its kind. He mentions that countries that have made the most progress in poverty reduction have relied extensively on strategies that effectively combine economic growth with a range of economic and social interventions such as
microfinance. Hence, he recognizes the importance of economic growth, which should go together with government and private-driven initiatives to truly improve the lives of the poor in the long-run and lead to a sustainable transformation of their realities.

SECTION THREE

Proposal and Methodology

Formal property may lead to a decrease in interest rates and therefore empower the Peruvian poor through a greater capacity to repay their loans as well as to use the earned capital in consumption, investment decisions or savings. Yet, given the variety of characteristics per each borrower, formal property, if available, may not have a significant effect in interest rates. Therefore, the first objective will be to determine whether formal property has a significant correlation with interest rates and if that correlation is negative. The second objective will be to determine whether formal property has a significant correlation with interest rates at all levels or not. If formal property does not have a significant correlation with interest rates, we will determine the level in which formal property goes from having a significant relationship with interest rates to not having a significant relationship with interest rates.

The data will be taken from three main sources: The World Bank Development Indicators (WBDI), the Microfinance Information Exchange (MIX) Market website and “Microfinanzas Prisma” – Peru’s leading MFI. Consequently, we will use the variables provided by “Microfinanzas Prisma” and analyze their behavior and effects over interest rates over 10 years between 1999 and 2009. Microfinanzas facilitated the use of 269,769 individual observations within the aforementioned period of time, each observation accounting for an individual micro-borrower. Our main objective will be to confirm the negative correlation between formal
property – in terms of the availability of collateral – and interest rates in the microfinance sector, represented by “Microfinanzas Prisma” in our analysis. In addition, the other independent variables available will be used to strengthen the analysis through more robust results in order to reduce a potential omitted variable bias. Finally, we will find the breaking point in which formal property – that is, collateral – goes from having a negative correlation to have no significant correlation with interest rates, as well as to define the level at which it goes from having a significant correlation to not having a significant correlation with interest rates.

The data provided by “Microfinanzas Prisma” holds individual observations in a time period of 10 years. Hence, a pooled-cross sectional times series regression became the most adequate way to analyze the collateral’s correlation with interest rates given that we would be able to run a multiple regression with a variable accounting for the time factor. “Microfinanzas Prisma” emphasized that they did not require any collateral at all to their borrowers given that, as an MFI, they tend to collateralize the borrowers’ lack of collateral through solidarity groups and communal banks constituted by women – who tend to be less risky individuals relative to men.

Yet, they asserted that micro-borrowers tend to give some of their property as a form of collateral which may be taken away if the micro-borrowers are not able to successfully repay their loans. While that form of collateral exists, “Microfinanzas Prisma” also asserted that many times the enforcing and monitoring costs incurred to make the property’s embargo effective are often higher than the value of the collateral offered and therefore tend not to be taken into account in the borrowers’ financial assessment. Thus, we will analyze the extent to which collateral may or may not be significant in reducing interest rates.
An initial step would have been to monetize the collateral’s value in order to insert those values for each observation in the regression and examine whether there are any significant fluctuations of the interest rates with respect to the presence of collateral. Since “Microfinanzas Prisma” does not have a valuation of the borrowers’ collateral on its accounting books, the presence of collateral in the data’s observations would be presented through an intervention variable that would account for the presence of collateral in some loans while leaving other loans without the use of collateral. Consequently, a simulation analysis would be executed in order to determine the collateral’s significance and its breaking point. Given that there are no data available over the monetized value of the micro-borrowers’ property, the size of the loan granted will be considered as an indicator for the possible size of the property’s value as a collateral. The reason for that determination is based on the greater likelihood that borrowers that are granted greater loans tend to be more credible and less risky, regardless of the interest rates offered to them. Therefore, an individual borrowing higher loans may not be as poor as the individuals borrowing smaller quantities and may own collateral valuable enough to offset the size of the loan – that is, the individual borrowing higher loans may own collateral that is valuable enough that exceeds the size of the loan as well as the MFI’s expenses associated with risk, credibility and transaction costs.

In that way, in each simulation round the intervention variable would be inserted on loans of specific sizes while leaving other loans greater than a specific benchmark without the intervention variable (that is, with D=0, while those loans with a potential collateral available would be inserted the intervention variable D=1). Thus, we will analyze the effect that a potential collateral for a certain number of loans of a maximum size could have on interest rates if the
loans of greater size than a specific benchmark are left constant – that is, without the effects of the intervention variable – and therefore relying on their existing variables.

The size of the loans granted will be referential and would give us a means to quantify the possible availability of formal property in each specific observation. In that way, as each loan’s size decrease there will be a greater likelihood that the borrower is worse off in terms of its financial risk and credibility and therefore may not have property, if any, of significant value. Additional variables will be included – given that a decrease in financial risk or an increase in credibility could be associated with the borrowers’ sex, age or type of group banking, etc. – and therefore they will take into account any effects on interest rates that may not be related to the presence of collateral in each observation’s case.

Thus we will ascertain whether the presence of collateral in loans of a certain size could have an effect over interest rates while leaving other loans greater than the selected benchmark not affected by the intervention variable. The benchmark would be selected in terms of the size of the loan granted to the micro-borrowers. Firstly, a pooled-cross sectional times series regression would be ran without the presence of any intervention variable to figure out the model’s goodness of fit as well as the significance of each independent variable’s correlation with interest rates.

Next, we will run the same regression but now with an intervention variable with a benchmark that would be determined by the size of the loans granted. In that way, all the loans smaller than the size established by the benchmark would have an intervention variable of D=1. Meanwhile, all those loans equal or greater than the benchmark would not have the intervention variable, meaning that the value of the intervention variable would be of D=0. Consequently, the
The correlation between interest rates and the presence of collateral would be expected to be negative.\(^6\)

If, as expected, the intervention variable – namely, collateral – is significant within the established parameters, a new regression would be run and the benchmark would now be reduced, given that the regression using the initial benchmark was significant and assigning the intervention variable of D=1 to all the observations smaller than the previous benchmark were significant. Since the objective is to find the benchmark at which the there is no significant correlation, the same process will be repeated – that is, to reduce the benchmark with respect to the size of the loans granted – until the presence of collateral in microloans less or equal than the benchmark is not significantly correlated to interest rates. The benchmarks will be reduced by 100 units (which in terms of the size of the loans would be expressed on Nuevos Soles – the Peruvian currency) and that reduction would be referential as well.\(^7\)

In order to proceed with the regression analysis, the variables that will be used to determine the correlation between property and microfinance are the following:

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\(^6\) The use of dummy variables as established above in order to define the ownership of property has been used in previous studies, such as journal article wrote by Sebastian Galiani and Ernesto Schargrodsky titled “Property Rights for the Poor: Effects of Land Titling.” In the article, Galiani and Schargrodsky also use dummy variables to indicate the possession of a title.

\(^7\) As of May 1\(^{st}\) of 2011, the exchange rate for US$1.00 is equivalent to S/.2.826.
<table>
<thead>
<tr>
<th>Age at the time in which the loan was received - (Log Age in the model).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex: Male, Female.</td>
</tr>
<tr>
<td>Economic Activity: Commerce (Base), Agriculture, Production, Services.</td>
</tr>
<tr>
<td>Loan Size Granted.</td>
</tr>
<tr>
<td>Loan Period (Expressed in number of months).</td>
</tr>
<tr>
<td>Cycle (Number of times in which the borrower has been granted a loan and repaid it successfully).</td>
</tr>
<tr>
<td>Inflation</td>
</tr>
<tr>
<td>Type of Borrowers: Individual (Base), Communal Bank, Solidarity Group.</td>
</tr>
<tr>
<td>Area: Urban, Rural.</td>
</tr>
<tr>
<td>Time (Years going from 1999 to 2009).</td>
</tr>
<tr>
<td>Interest Rate (Penalty): Additional interest rate charged if borrower defaults and does not repay his, her or their loan on the established time period.</td>
</tr>
<tr>
<td>Payment Plan: The number of payments to be made within the loan period. For example, some loans may be given for a period of 6 months with six payments per period, while there may be loans given for a period of 6 months but with 24 payments per period (one per week).</td>
</tr>
<tr>
<td>Region: Lima (Base), Center, South, North, East.</td>
</tr>
<tr>
<td>Age at the time the loan was granted</td>
</tr>
</tbody>
</table>

Source: Microfinanzas Prisma

The initial regression will take into account the aforementioned independent variables and will not take into account the intervention variables for collateral – with each simulation round assigning the ownership of collateral to the observations with a loan size smaller than the benchmark. For instance, the base equation to be used in the regression analyses will be conducted as follows:
\[
\text{Interest\_Rate} = \beta_0 + \beta_1\text{Loan\_Granted} + \beta_2\text{Months} + \beta_3\text{Pay\_Plan} + \beta_4\text{Cycle} + \beta_5\text{Inflation} + \beta_6\text{Econ\_Act\_Prod} + \beta_7\text{Econ\_Act\_Ag} + \beta_8\text{Econ\_Act\_Ser} + \beta_9\text{Reg\_Center} + \beta_{10}\text{Reg\_East} + \beta_{11}\text{Reg\_North} + \beta_{12}\text{Reg\_South} + \beta_{13}\text{Comm\_Bank} + \beta_{14}\text{Solid\_Group} + \beta_{15}t + \beta_{16}\text{LogAge} + \beta_{17}\text{Sex} + \beta_{18}\text{Area} + \beta_{19}\text{Int\_Rate\_Penalty} + \epsilon
\]

The Collateral Intervention Variables (CIV) will be added to each additional regression analysis and they will be distributed in each case to all the observations with loans granted smaller than the benchmark previously established. The variable will be of the form \(\beta_\text{xCollY}\) where \(Y\) is the size of the loan granted established as a benchmark for that specific equation. In that way, the regressions will be conducted following the parameters described above.

There will be two main hypotheses: the first hypothesis is that collateral does have a significant negative correlation with interest rates at different levels, implying that the ownership of collateral by specific individuals could lead to a decrease of the interest rates. That significant correlation will take place even under a situation in which other individuals with less financial risk or more credibility lacked formal property – represented as the lack of collateral (\(D=0\)) for those observations with a loan size granted greater or equal than the benchmark established.

The second hypothesis will be that, while collateral has a significantly negative correlation with interest rates at different levels, there is a point – using the size of the loans granted as a referential benchmark – at which collateral goes from having a significant negative correlation with interest rates to have no significant correlation with interest rates past that benchmark. If the second hypothesis is proved is confirmed with the empirical results then the next step would be to find the referential benchmark – in terms of the size of loans granted – at which it could be concluded that people receiving loans smaller than those amounts would not
see a decrease in their interest rates even with the ownership of collateral. Certainly, collateral would be small enough to not decrease of financial risk, the transaction costs or increase the borrowers’ credibility.

In conclusion, this research will be based on two important parts: the empirical analysis of the correlations between collateral and interest rates and a policy recommendation if both hypotheses are confirmed through the regression analyses. The first part of the research will be focused on the aforementioned econometric regressions; the second part of the research will be focused on the recommendations drawn from the conclusions that may rise after the empirical analyses and that will be strictly related to the way in which formal property could increase its potential to decrease interest rates if used together with other mechanisms, for instance those currently used such as the application of the Social Capital Theory. The combination of a private-driven initiative with government-driven initiatives – in terms of a further promotion of formal property – and the encouragement of women’s social communities for a greater effect in their human development will be the main objective of this research.

**Empirical Analysis**

In order to test the first hypothesis – which is that collateral does have a significant negative correlation with interest rates at different levels, implying that the ownership of collateral by specific individuals could lead to a decrease of the interest rates an initial regression with no intervention variables was conducted.

The equation used was defined as:

\[
\text{Interest}_\text{Rate} = \beta_0 + \beta_1 \text{Loan}_\text{Granted} + \beta_2 \text{Months} + \beta_3 \text{Pay}_\text{Plan} + \beta_4 \text{Cycle} + \beta_5 \text{Inflation} + \beta_6 \text{Econ}_\text{Act}_\text{Prod} + \beta_7 \text{Econ}_\text{Act}_\text{Ag} + \beta_8 \text{Econ}_\text{Act}_\text{Ser} + \beta_9 \text{Reg}_\text{Center} + \beta_{10} \text{Reg}_\text{East} + \ldots
\]
\[ \beta_{11}\text{Reg\_North} + \beta_{12}\text{Reg\_South} + \beta_{13}\text{Comm\_Bank} + \beta_{14}\text{Solid\_Group} + \beta_{15}t + \beta_{16}\text{LogAge} + \]
\[ B_{17}\text{Sex} + \beta_{18}\text{Area} + \beta_{19}\text{Int\_Rate\_Penalty} + \varepsilon \]

The results are attached in the Table that collects all the coefficients obtained after the first pooled-cross sectional times series regression as well as the subsequent results obtained after inserting the CIVs that will be explained later. The table with all the final results can be found at the end of this document.

The results of this initial empirical analysis released some expected significant correlations between the interest rates and the independent variables. The regression’s \( R^2 \) had a goodness of fit of 0.304 which implies that a 30% of the changes in the interest rates were explained by the independent variables used. Certainly, while the \( R^2 \) is not substantially high it implies that there is an acceptable goodness of fit in which the variables explain the interest rate’s variations.

The variables that presented a significantly negative correlation at the 1% level with interest rates were:

| Sex: Female. |
| Economic Activity: Production, Services. |
| Loan Period (Expressed in number of months). |
| Type of Borrowers: Communal Bank, Solidarity Group. |
| Area: Rural. |
| Time (Years going from 1999 to 2009). |
| Payment Plan: The number of payments to be made within the loan period. For example, some loans may be given for a period of 6 months with six payments per period, while there may be |
loans given for a period of 6 months but with 24 payments per period (one per week).

<table>
<thead>
<tr>
<th>Loan Size Granted.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle (Number of times in which the borrower has been granted a loan and repaid it successfully).</td>
</tr>
<tr>
<td>Inflation</td>
</tr>
<tr>
<td>Interest Rate (Penalty): Additional interest rate charged if borrower defaults and does not repay his, her or their loan on the established time period.</td>
</tr>
<tr>
<td>Region: Center, South, North, East.</td>
</tr>
</tbody>
</table>

The variables that presented a significantly positive correlation at the 1% level with interest rates were:

Although we wanted to use a variable that would take into account the potential effects of competition on interest rates – through a variable that would consider all the MFIs reporting to MIX Markets between 1999 and 2009. Yet, the “competition” variable was highly collinear with the “time” variable, and – when used together – the sign for the “competition” variable’s coefficient was positive, when in principle it was expected to be negative. Since the time” variable had, as expected, a negative coefficient and a significant correlation with interest rates at the 1% level it was kept.

Accordingly, initially the “age” variable was used to find significantly negative correlations with interest rates. Nonetheless, the “age” variable happened to have a positive coefficient, which became an interesting phenomenon worth to analyze since it is assumed that,
overtime, borrowers reduce their financial risk as they get older. A possible reason could have been that “age” is not a linear variable and should be replaced by a log variable. “Age” could have had a negative significant correlation with interest rates until “age” stops having a negatively significant correlation with interest rates and starts having a positively significant correlation with interest rates, assuming that borrowers could run in greater debts as they get older. Yet, since the overall assumption is that interest rates should decrease as age increases we used a log variable to control for those effects – that is, we decided to use the variable “logage”.

Another unexpected result was that the cycle had a positively significant correlation with interest rates. However, a possible explanation to that phenomenon could be that, overtime, the more cycles a borrower is inserted, greater will be the likelihood that he or she is in debt due to some repayment defaults in previous cycles and the higher the interest rates for the loans requested for each subsequent cycle may be, given the increase in financial risk and the borrower’s inelasticity of demand for loans given their debt.

Besides those unexpected correlations, the other variables had significant correlations with interest rates that were expected to follow predictable patterns in which they happened to have either significantly positive or negative correlations with interest rates. For instance, all the regions examined had a positive correlation with interest rates. Those regions, when compared to Lima – Peru’s financial, economic and political centers – are worse off economically and therefore may be a liability for the borrowers who may live in those regions and request for loans due to the MFIs lack of access to some locations, for example. Accordingly, inflation has a significantly positive correlation with interest rates, as expected. As inflation increases, nominal interest rates (usually understood as Nominal Interest Rate \( i = \text{Real Interest Rate} \ (r) + \text{Inflation} \ (\pi) \) or \( i = r + \pi \)) are expected to increase. In the same way, interest rate penalties have a positive
correlation with nominal interest rates, that is, when interest rate penalties increase, nominal interest rates will increase as well. Loans granted for agricultural activities were higher relative to those loans used for commercial activities – an expected outcome since agricultural activities tend to be riskier than other economic activities such as commercial, productive and service activities. Finally, the size of the loans granted have a positive correlation with nominal interest rates as well, which implies that as the size of the loan granted increases, nominal interest rates may increase as well – probably due to the greater difficulties that paying a loan of greater size may create.

The “sex” variable had a significantly negative correlation with interest rates, as expected, implying that women borrowers tend to experience a decrease in the interest rates for their loans granted relative to men – given that women are perceived as more accountable and responsible than men. Accordingly, loans granted in urban areas tend to experience lower interest rates than those granted in rural areas – given a probable decrease in transaction and administrative costs. Meanwhile, economic activities such as those related to production and services are negatively correlated to interest rates relative to loans used in commercial activities. That positive correlation implies, as expected, that those economic activities are financially safer than commercial activities and even safer than agricultural activities – which, as said before, have a positive correlation with interest rates, relative to loans used in commercial activities.

Borrowers who participate in communal banks or solidarity groups have a negative correlation with interest rates since, as expected, the collateralization of social capital decreases financial risk and increases credibility. The loan period expressed in months also has a negative correlation with interest rates, as expected – the longer the time to repay the loan, the smaller the interest rate due to a decrease in a possible repayment default. In the same way, repayment plans
have a negative correlation with interest rates since the greater the number of shares in which the loan may be repaid decreases the potential for repayment default and therefore may lead to a decrease in interest rates. Finally, overtime interest rates tend to decrease. The decrease of interest rates overtime may be caused by the Peruvian economy’s outstanding performance as well as the effects of monetary policy over the interest rates – for example, in April of 2008 the Peruvian economy injected US$100 million dollars as well as decreased its referential interest rate due to the financial crisis. Those policies could have also influenced the fluctuations of interest rates and therefore their negative correlation with the “time” variable.

The Application of CIV’s in the Pooled-Cross Sectional Times Series Regression Analysis

The regression results were significant and, although there were some unexpected results, once they were explained and understood the analysis was consistent with our initial expectations. The application of CIVs (Collateral Intervention Variables) will be applied to determine whether the existence of collateral for loans smaller than an established benchmark – using the size of loans granted as the reference to establish those benchmarks – has a negative correlation with their interest rates even if individuals receiving loans equal or greater than the benchmark appear to have no collateral. If that situation holds, then it implies that those individuals receiving loans smaller than the benchmark could perceive a smaller nominal interest rate for their loans had they presented some type of formal property to back up their loan request, leaving all their other characteristics equal.

The initial benchmark to be considered in this analysis was established at S/.1000.008 (which from now on will be referred to as “Coll1000”) for simplicity since several other CIVs

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8 S/.1000.00 = US$352.75 as of May 1st, 2011
higher than S/.1000.00 were tested and showed significantly negative correlations with interest rates. Hence, it became appropriate to start with a referential benchmark at S/.1000.00 – which is understood as the size of loans granted at S/.1000.00 or greater than S/.1000.00 – and reduce the benchmark by S/.100\(^9\) each simulation round if the CIV appeared to be negatively significant in order to reach a point in which the CIV used may not be significant at all. In that way, a dummy variable would be used as follows:

**Correlation Intervention Variable (CIV) at Loan Size Granted = S/.1000.00**

| If the size of loans granted to individuals < S/.1000.00, then Coll1000 = 1 |
| If the size of loans granted to individuals \(\geq\) S/.1000.00, then Coll1000 = 0 |

Consequently, all those loans smaller than S/.1000.00 would be allotted the ownership of collateral, while all the loans bigger or equal to S/.1000.00 would be assumed not to have collateral in order to account for the effects of the ownership of collateral by those individuals borrowing at less than S/.1000.00. The equation for that regression used took the following form:

\[
\text{Interest\_Rate} = \beta_0 + \beta_1 \text{Loan\_Granted} + \beta_2 \text{Months} + \beta_3 \text{Pay\_Plan} + \beta_4 \text{Cycle} + \beta_5 \text{Inflation} + \\
\beta_6 \text{Econ\_Act\_Prod} + \beta_7 \text{Econ\_Act\_Ag} + \beta_8 \text{Econ\_Act\_Ser} + \beta_9 \text{Reg\_Center} + \beta_{10} \text{Reg\_East} + \\
\beta_{11} \text{Reg\_North} + \beta_{12} \text{Reg\_South} + \beta_{13} \text{Comm\_Bank} + \beta_{14} \text{Solid\_Group} + \beta_{15} t + \beta_{16} \text{LogAge} + \\
\beta_{17} \text{Sex} + \beta_{18} \text{Area} + \beta_{19} \text{Int\_Rate\_Penalty} + \beta_{20} \text{Coll1000} \quad + \varepsilon
\]

The regression’s R\(^2\) had the same robustness as the initial regression, with a goodness of fit of 0.304. Consequently, the additional variable did not affect the regression’s R\(^2\) and reflected that the same percentage changes in interest rates were reflected by the regression’s independent

\(^9\) S./100.00 = US$35.28 as of May 1\(^{st}\), 2011
variables. All the independent variables’ signs kept the same, with the similar unexpected results for variables such as “cycle.” Yet, all else equal, the estimates suggest that the CIV at the S/.1000.00 benchmark for the loans size granted was significant and negatively correlated to interest rates.

Therefore, if those individuals borrowing at S/.1000.00 had presented a type of formal property to back up their loans while all other borrowers had not presented collateral they would experience a decrease in the interest rates for their loans relative to their peer borrowers who did not present any collateral to back up their loans. Consequently, these results would imply that those individuals requesting loans up to S/.1000.00 could own property that is valuable enough to offset some problems related to financial risk, credibility and transaction costs. Nevertheless, the coefficient could be significant and negative given that some borrowers, close to the S/.1000.00 benchmark could be credible and safe enough to offset those risky borrowers who lack of credibility. Therefore, the second simulation round of regressions will now establish a new benchmark at S/.900.00\textsuperscript{10} and the condition would be set as follows:

**Correlation Intervention Variable (CIV) at Loan Size Granted = S/.900.00**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Coll900</th>
</tr>
</thead>
<tbody>
<tr>
<td>size of loans granted to individuals &lt; S/.900.00</td>
<td>1</td>
</tr>
<tr>
<td>size of loans granted to individuals ≥ S/.900.00</td>
<td>0</td>
</tr>
</tbody>
</table>

Hence, all those borrowers who were given collateral in the first simulation round and requested loans between S/.900.00 and S/.999.00 will now be located in the group of borrowers who do not present collateral to back up their loans in order to analyze the significance of

\textsuperscript{10} S/.900.00 = US$318.02 as of May 1\textsuperscript{st}, 2011.
collateral for those borrowers borrowing less than S/.900.00. The results would reflect whether those borrowers granted loans smaller than S/.900.00 could face decreasing interest rates if they had formal property to back up their loans. The equation will be similar to the previous with the difference that now we will use the CIV “β_{20}Coll900” instead of “β_{20}Coll1000.”

All the coefficients were the same as in the previous regressions and the regression’s R² had the same robustness as the initial regression and the regression using the CIV at S/.1000.00, with a goodness of fit of 0.305. Accordingly, the CIV at S/.900.00 showed a significant and negative relationship with interest rates, meaning that all those individuals borrowing at less than S/.900.00 had a negative correlation with interest rates – relative to the individuals borrowing at quantities greater or equal to S/.900.00 – if they owned formal property and had presented it to back up their loans. Yet, the coefficient could be significant and negative given that some borrowers, close to the S/.900.00 benchmark could be credible and safe enough to offset those risky borrowers who lack of credibility and therefore create a bias in the regression whereas, had those borrowers been excluded from the intervention analysis, the correlation may not had been significant. Therefore, the third simulation round of regressions establishes a new benchmark at S/.800.00\(^{11}\) and the condition would be set as follows:

**Correlation Intervention Variable (CIV) at Loan Size Granted = S/.800.00**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Formulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the size of loans granted to individuals &lt; S/.800.00, then Coll800 = 1</td>
<td></td>
</tr>
<tr>
<td>If the size of loans granted to individuals ≥ S/.800.00, then Coll800 = 0</td>
<td></td>
</tr>
</tbody>
</table>

\(^{11}\) S/.900.00 = US$318.02 as of May 1\(^{st}\), 2011.
The equation took a similar form to the equations previously used, with the only difference that now the CIV “Coll800” only took into account those borrowers with loans smaller than S/.800.00\(^{12}\) and left all those borrowers with loans greater or equal to S/.800.00 with no collateral in order to assess the effects of collateral on interest rates for borrowers with loans smaller than S/.800.00. The equation, similar to the previous with the difference that now uses the CIV “β\(_{20}\)Coll800” instead of “β\(_{20}\)Coll1000.”

Certainly, the same results that took place with the CIVs at S/.1000.00 and at S/.900.00 also took place with the CIV used at S/.800.00 – all the variables used were significant and had the expected positive or negative correlations, except for “cycle” which had already been explained. The regression’s R\(^2\) was of 0.304, which means that the independent variables explained the same proportion of variations in the dependent variable as in the other cases. Yet, the same bias hypothesized before held steady. Consequently, a fourth simulation round of regressions, establishing a new benchmark at S/.700.00, took place. Again, the equation took the same form although with a different CIV, now replacing “Coll800” for “Coll700” and applied in the following situations:

**Correlation Intervention Variable (CIV) at Loan Size Granted = S/.700.00**

| If the size of loans granted to individuals < S/.700.00, then Coll700 = 1 |
| If the size of loans granted to individuals ≥ S/.700.00, then Coll700 = 0 |

The equation will be similar to the first one with the difference that now we will use the CIV “β\(_{20}\)Coll1000” instead of “β\(_{20}\)Coll700.”

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\(^{12}\) S/.800.00 = US$282.69 as of May 1\(^{st}\), 2011.
The CIV at S/.700.00 neither affected the other independent variables’ significance nor the signs for each coefficient. Certainly, the R² was the same as in the previous regressions, with a goodness of fit 0.304. However, the remarkable difference with respect to the previous regressions is that the CIV at S/.700.00 was not significant anymore. Consequently, the estimate suggests that, all else equal, those individuals borrowing less than S/.700.00 did not experience any decrease in their interest rates when some kind of formal property had been presented, relative to those individuals who borrowed quantities greater or equal to S/.700.00. In that way, the bias hypothesized in previous regressions happened to be true. Now, that those individuals borrowing at greater quantities who had been assumed to present collateral as a means to back up their loans were removed, the individuals borrowing at quantities smaller than S/.700.00 did not experience a decrease in the interest rates for their loans, since their collateral, if available, may have been not valuable enough to be considered relevant in the reduction of financial risk, the increase of credibility or the reduction in transaction costs.

In order to prove that the results obtained with the CIV at S/.700.00, we decided to run another regression but now with a new CIV at S/.600.00 – reducing the previous CIV by S/.100.00 – in order to find out whether those individuals borrowing amounts smaller than S/.600.00 would not be benefitted from the ownership of collateral, if available, relative to the individuals borrowing amounts greater or equal to S/.600.00.

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13 As argued before, in previous cases the correlations may have been significant and negative since some borrowers, close to the S/.700.00 benchmark could be credible and safe enough to offset those risky borrowers who lack of credibility and therefore create a bias in the regression. Yet, had those borrowers been excluded from the intervention analysis, the correlation may not had been significant, which happens to be the case in this situation.
<table>
<thead>
<tr>
<th>If the size of loans granted to individuals $&lt; S/$.700.00$, then Coll600 = 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the size of loans granted to individuals $\ge S/$.700.00$, then Coll600 = 0</td>
</tr>
</tbody>
</table>

The equation will be similar to the previous with the difference that now we will use the CIV “$\beta_{20}\text{Coll900}$” instead of “$\beta_{20}\text{Coll1000}$.” The new regression analysis brought up the same results that took place in the previous regression analysis. While the $R^2$ showed that the independent variables explained the variations in interest rates on a 30.4% and all the independent variables were significant and either positive or negative – confirming the expected correlations in each case, the CIV at $S/\$.600.00$ showed that, everything else remaining the same, those individuals borrowing at $S/\$.600.00$ that could have presented collateral were not benefitted by their ownership of collateral relative to those individuals that were granted loans higher or equal to $S/\$.600.00$ but who did not present any collateral under this simulation.

Hence, under these simulations, the Collateral Intervention Variables have shown that, firstly, collateral does have a negative correlation with interest rates. The ownership of formal property and therefore the availability of collateral, all else equal, should be correlated with a decrease in the interest rates allotted to those loans. However, once the CIVs are inserted, some observations – specifically those located closer to the benchmark – may create a bias since they would offset the actual effects that the CIV may have over interest rates for individuals borrowing at smaller quantities than the established benchmark. With respect to this analysis, other things remaining the same, those individuals borrowing at less than $S/\$.700.00$ will not see a decrease in their interest rates that may be related to their ownership of property. Thus, collateral,
while useful and significant in the reduction of poverty, is not a panacea and should not be taken as a solution by itself even when applied together with microfinance initiatives.

**Conclusions and Implications:**

The Literature Review illustrates the ideas, conclusions and results of several scholars and their research in Peru and related to the topics examined, which analyze the effects of collateral over interest rates. Economic growth is important for the poor’s economic and social development. However, economic growth by itself will not provide sustainable and self-sufficient solutions for the poor.

Both microfinance and property titles address the same problem of a lack of collateral, and try to provide solutions to this problem. Many of the authors conclude that microfinance is an important economic tool that enhances women’s empowerment. On one hand, while microfinance has shown several problems when applied to individuals – such as the MFI’s financial sustainability problems, monitoring issues and high interest rates for the poor – it has shown to be more effective when applied to groups of people, namely, women’s community organizations. The implementation of joint-liability mechanisms – social capital theory – is important for a greater effect of microfinance on women’s employment or education. Still, with the implementation of these social capital mechanisms, some authors recognize that microfinance should be implemented with other development tools that may improve its final effect given that, by itself, microfinance still has important limitations.

On the other hand, property titles help enhance people’s capacities to request loans given that property titles facilitate the poor’s participation in the formal financial sector. However, property titles are not sufficient enough to provide substantial financial collateral in cases such as
the one facing those individuals borrowing less than S/.600.00 per loan – specifically those borrowers who belong to the poorest of the poor. The authors recommend that property titles should be combined with other mechanisms that may improve their effectiveness in empowering women, which is the subject of this research.

The analyses made using a pooled-cross sectional times series regression have demonstrated that the hypotheses made were proven. As a matter of fact, collateral has a significant correlation with interest rates, and to several extents collateral has a negative correlation with interest rates, as expected. Yet, when the simulation using CIVs started in order to fix other effects and just evaluate the effects of collateral on interest rates – using the size of loans granted as the benchmark for those intervention variables – it was demonstrated that collateral, while having a negative significant correlation with interest rates in general, it goes from having a significant correlation to having an insignificant correlation with interest rates. In that way, while collateral is important and should be used as a tool to reduce financial risk, transaction costs and increase borrowers’ credibility, it should not be taken as the only means through which those goals may be reached. Collateral alone, due to its value or its size may not be high enough to offset the aforementioned problems. In that way, collateral should be employed within microfinance initiatives to contribute to a further decrease in interest rates and therefore enhance the poor’s ability to repay their loans and escape from the poverty trap.

Consequently, MFIs should be encouraged to increase the percentage of loans given to women who may request their loans in solidarity groups or communal banking and that may be related to productive, commercial or service economic activities whenever these loans are below the breaking point at S/.600.00. In addition, since borrowers at that borrowing level may not have property valuable enough to offset the problems related to financial risk, credibility and
transaction costs, they should offer their individual collateral as communal collateral. The communal collateral would follow the same dynamics used with communal banking and solidarity groups. In this situation, borrowers would be able to gather their individual properties in order to, as a whole, increase its value and offset the problems related to risk, credibility and transaction costs.

In that way, if the borrowers happen to be women that request loans smaller than S/.600.00, they should be encouraged to gather their individual properties and make of them one valuable communal property so that, as one property, all those individual properties may increase their value and may be capable to offset the aforementioned problems. Thus, joint property, just for the purposes of the loan, would have a greater value and would be consistent with the idea behind communal banking and solidarity groups, since borrowers are already being encouraged to pay their individual loans, otherwise all the group gets penalized. The same condition would be set for property, since it would continue to be owned by individuals but everybody would be penalized in case of repayment defaults. Hence, joint property offered as communal collateral to MFIs may lead to a further decrease of interest rates relative to the potential initial decrease related to the borrowers’ location, sex and economic activity.
# APPENDIX: Table – Correlation of Collateral with Interest Rates - (Microfinanzas Prisma – Peru)

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*statistics in parentheses
Notes:


vii Banco Central de Reserva del Perú (BCRP): Estadísticas de Indicadores Trimestrales.

viii The Economist. “Big Dipper: Peru’s Economy has Shrunk but it should escape Recession”. Published on September 2nd, 2009.


WORKS CONSULTED

Banco Central de Reserva del Perú (BCRP): Estadísticas de Indicadores Trimestrales. URL: http://www.bcrp.gob.pe/docs/Estadisticas/Indicadores-Trimestrales-II.pdf


CIA World Factbook. Data from 2010.


MixMarket (Microfinance Information Exchange) Data.


