Do Conditional Cash Transfers Affect Credit Market Outcomes: Evidence from Households in Mexico

Thesis

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By

Malena Svarch, B.S.
Agricultural, Environmental, and Developmental Economics Graduate Program

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Thesis Committee:

Dr. Claudio Gonzalez-Vega, Advisor

Dr. Timothy Haab
Abstract

This thesis explores the potential influence of access to a conditional cash transfer program (CCTP) on credit market outcomes. This influence is theoretically ambiguous. On the demand side, access to a free transfer of funds may reduce the willingness to seek more expensive funds in the credit market (substitution effect). The transfer, however, is not covariant with the household income flows and, therefore, it may induce a change toward more profitable and riskier productive activities (risk-coping effect). On the supply side, the availability of a riskless cash flow improves the lenders’ perception about the household’ ability to repay loans (creditworthiness effect). While the latter two effects are expected to be positive, the former one is expected to be negative. The net outcome will depend on a number of specific initial conditions.

The thesis empirically explores these issues by using household panel data from participants in the Progresa/Oportunidades CCTP in Mexico and non-participant control households. The data are generated by a randomized assignment social experiment, for 2002, 2003 and 2004. Using fixed effects and instrumental variables methods, the econometric results suggest that participation in the program increases the likelihood of participation in credit markets (either as a consequence of the risk-coping effect or the creditworthiness effect). These results also indicate, however, that once a household participates in the credit market, it applies for a smaller amount when it is enrolled in the
CCTP than otherwise (suggesting at least a weak substitution effect). The increased participation in credit markets is a potential contribution of the CCTP to the breadth of outreach of finance in Mexico. The results reflect the behavior of urban households, as there are not credit market data for the rural households and, because of the conflicting effects, they cannot be generalized.
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Vita

October 7, 1983 .......................... Born – Havana, Cuba

2000 ........................................ B.S. Economics, Centro de Investigación y Docencia Económicas, Mexico City

2006-2008 ................................. Graduate Research and Teaching Associate in the Department of Agricultural, Environmental and Development Economics, at The Ohio State University

PUBLICATIONS


FIELDS OF STUDY

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Minor Field: Finance and Development
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Chapter 1: Introduction

This thesis analyzes the potential influence that access to conditional cash transfers may have on the outcomes in the credit market for the participating households. Beyond increasing the household’s access to liquidity and enlarging its budget constraint, the receipt of conditional cash transfers may influence other determinants of the demand for and supply of loans. Indeed, the resulting impacts on credit outcomes both are complex and may be theoretically ambiguous, as they would depend on numerous initial conditions that may have opposite effects on the final outcome.

In addition to discussing the conceptual complexities, to gain some insights on these issues the thesis empirically explores credit market outcomes in Mexico. For this purpose, the thesis uses three waves of panel data, from a sample of urban households that received conditional cash transfers from the Progresa/Oportunidades program. The thesis then contrasts these outcomes with those from a control group without transfers. While this conditional cash transfer program has been develop as an effort to influence human capital formation and alleviate inter-generational poverty, a more complete evaluation of the program should also take into account any beneficial or adverse unintended consequences of the transfers on the credit market. This thesis undertakes a preliminary exploration of these consequences.

A particular motivation for the thesis has been the reasoning that, if the receipt of the conditional cash transfer improves the household’s access to loans in the formal credit
market, the ultimate social goal of improving household welfare might be achieved at a lower fiscal cost, while the participating households might lessen their dependence on government transfers. If this were the case, there might be an additional social justification for this type of intervention.

Moreover, if there were a positive impact on credit markets (in particular, if the transfers induced a potential outward shift in the supply of formal loans), the intervention may indirectly increase the breadth of outreach in the provision of financial services, by incorporating additional segments of society within the frontier of formal finance, and enhance the depth of outreach, by expanding the frontier toward the poor. This supply shift may take place if the creditworthiness of the participating households is improved through their access to a comparatively riskless transfer, which is not covariant with household income. Moreover, the availability of this transfer as a tool for risk coping may also induce changes in the household’s choices of productive activities, which may increase its attractiveness as a client for the various services provided by the financial system. These indirect dimensions of the influence of the conditional cash transfer program may then contribute to financial deepening.

1.1 Impacts of conditional cash transfers

In recent years, diverse programs for the alleviation of poverty have been designed by governments and international institutions. Among these diverse
interventions, several developing countries have implemented conditional cash transfer programs (CCTPs). In Latin America, among the most renowned of these programs have been Progresa/Oportunidades in Mexico, Bolsa Escola/Bolsa Familia in Brazil, and Red de Protección Social in Nicaragua.

De la Brière and Rawlings (2006) define this kind of programs as interventions that provide periodic transfers of money to poor families, on the condition that the beneficiary households send their children to school and use basic preventive health care.

The main objective of such conditional cash transfers has been to break the vicious circle of poverty that emerges when poor uneducated parents either find that the opportunity costs of sending their children to school are too high or that their private returns to schooling are low compared to those costs (Glewwe and Jacoby, 1994; Behrman, 1997). For a number of reasons, moreover, the social returns to schooling may be higher than these private returns and, as a result, there would be a public interest in encouraging the household’s demand for education.

The idea behind these programs has been, therefore, to create enough incentives for poor families to invest in the human capital of their children. Such investments would increase the future income-earning capacity of the household and would induce changes in behavior that may improve the welfare of the next generation. Such investments may also induce a number of positive externalities that may contribute to faster and more broadly-based economic growth (Lucas, 1988; Barro, 1991; Sala-i-Martin, 1997; Krueger
and Lindahl, 2000). The resulting divergence between the private and social returns to these human capital investments thus justifies the intervention (Schultz, 1988).

The literature on CCTPs has been mostly interested in the likely implications that the introduction of conditional cash transfers may have on several determinants of the welfare of low-income households (Das, 2005). In particular, it has attempted to measure the impact of the transfers on the desired schooling outcomes. Parker and Skoufias (2000), for example, find that, for both girls and boys, the rate of enrollment in elementary and secondary school is greater for households that received the Progresa transfers than for those not in the program.

Beyond the usual evaluations, however, this thesis would consider such programs also to be a success if, not only they improved relevant indexes of human capital formation (education and health), as expected by the authorities in charge of the program, but also if – as a result of the program – the participating households gained access (or if it improved its level and quality of access) to several markets where, before the implementation of the program, such access was unattainable. The particular focus here is on changes in access to credit markets.

1.2 Conditional cash transfers and credit

One of the markets where access has been severely constrained has been the credit market. Moreover, changes in access to credit markets – as a consequence of the cash
transfers—may actually reflect either situations where the CCTP breaks a barrier of access to the market or situations where it changes the incentives to participate in the market. Both changes in constraints and changes in incentives may be relevant effects of the program, from the perspective of financial deepening.

A particular motivation for this thesis emerges from the potential benefits from changes in credit market outcomes that may be beyond the original, and narrower, intentions of the authorities. In effect, if these low income households gained (greater) access to formal credit markets as a result of the CCTP, they may not only be able to further increase their incomes but also, in the future, they might become, at least in part, independent of the transfer program.

In effect, its new or increased ability to borrow further increases the household’s current budget constraint, improves the inter-temporal optimization and smoothing of its consumption, and facilitates its management of risk. These effects of access to financial services have been shown to have positive impacts on the household’s demand for schooling and would, therefore, reinforce the desired impacts on human capital formation (Garcia de la Cruz, 2008; Maldonado and Gonzalez-Vega, 2008). Access to formal credit would also allow the pursuit of other welfare-increasing household undertakings.

In this sense, the conditional cash transfer program would have been successful both because it would have increased human capital formation and because it would have
allowed the household to gain access to a market-based source of funds and, thus, become, at least in part, independent of the public funding of its activities.

This potential positive outcome is not inevitable, however. On the one hand, the conditional cash transfer may actually work as a substitute for the credit market. On the other hand, access to credit would increase the household’s income only if the household could take advantage of existing productive opportunities, with marginal rates of return higher than the cost of funds. These productive opportunities are not created by access to credit. Instead, they reflect resource endowments, information, comparative advantages in markets, and entrepreneurial abilities. If they do not exist, moreover, borrowing, *per se*, cannot increase income, while loans that cannot be repaid may actually be impoverishing (Gonzalez-Vega, 2003).

Once they exist, however, credit allows the household to take advantage of these opportunities, even when it does not have sufficient resources of its own to do so. Household income may also increase if the conditional cash transfer changes attitudes toward risk (because the transfer becomes one additional instrument to deal with adverse income shocks) and, therefore, it changes the household’s production choices. That is, given its greater ability to cope with risk, the household chooses higher-return, albeit higher-risk projects (Morduch, 1995).

The potential impact of conditional cash transfers on credit market outcomes is, therefore, not clear. Among a number of possibilities, the benefits from CCTPs may
create incentives for households not to participate in credit markets. On the one hand, in
the case of conditional cash transfers, households do not have to pay in the future for the
increase in current liquidity. In this case, the relative cost of obtaining additional liquidity
from a loan may look high compared to the cost of liquidity from the transfer (i.e., the
conditionality), and the household may avoid accessing the credit market for the funding
of its activities.

On the other hand, households enrolled in the conditional cash transfer program
may be more likely to obtain access to the credit market than those not enrolled in the
program (controlling for the households’ level of income and other relevant
characteristics), because households enrolled in CCTPs have a source of additional
liquidity that is free of risk (that is, the amount transferred is exogenous and it is
guaranteed, as long as the household complies with the conditionality). Thus, the
household enjoys a non-covariant source of funds that can be used to repay loans, if
necessary, as in the case of an adverse income shock. This change in risk profile
improves its creditworthiness. In summary, CCTPs may either increase household access
to the credit market (by improving creditworthiness, as the household’s riskiness is
modified) or they may create disincentives to borrow (given the availability of substitute
liquidity implied by the transfer).
1.3 Objectives and organization of the thesis

The objective of this thesis is to explore if there have been any relationships between a particular CCTP (*Progresa/Oportunidades*) and credit market outcomes in Mexico. Specifically, the aim is to study how the observed credit market outcomes have been affected when the households have been enrolled in this CCTP. These actual outcomes may offer some insights about the net influence of the complex set of forces that shape the impact of conditional cash transfers on credit market outcomes.

In order to achieve this purpose, the thesis is organized as follows. The next chapter is devoted to explaining the nature, goals and challenges of CCTPs. Chapter three describes the specific case of *Progresa/Oportunidades*, a CCTP in Mexico. Chapter four discusses the role of financial services, the difficulties of access to finance for poor households, and the innovations introduced by microfinance. This chapter also discusses the sources of credit for poor households and the limitations of financial markets in Mexico. Chapter five examines the interactions between CCTPs and credit market interventions, as responses to instances of market failure. Chapter six develops a simple conceptual framework, used to clarify the potential interactions that constitute the motivation for this thesis. The challenges of impact evaluation are discussed in chapter seven. The database and the econometric estimations are presented in chapters eight and nine, respectively. Finally, conclusions are presented, followed by some ideas for future research.
Chapter 2: Conditional Cash Transfer Programs

Diverse programs to alleviate poverty have been designed by governments and international institutions in recent years. Among them, the conditional cash transfer programs (CCTPs) implemented in several developing countries have attracted considerable attention (Skoufias, 2005; Maluccio and Flores, 2005).¹ These programs, also known as “social safety nets”, have been used, for the most part, by Latin American countries in their efforts to promote human capital investment and to reduce poverty across generations. CCTPs have been designed and financed not only by national governments but also by international agencies, such as The World Bank, the Inter-American Development Bank, and The International Food Policy Research Institute. International agencies support CCTPs not only financially but also as a neutral referee in undertaking the analysis of the results (impact) of these programs (Skoufias, 1998 and 2000).

There are several examples of CCTPs from around the world. Table 1 describes the most important programs. Among them, Progresa, in Mexico, was the first nationwide CCTP that combined education and health care among the conditions for the transfers. Due to the success of Progresa, several countries in Latin America have

¹ Although CCTPs have been mostly adopted in developing nations, there are some examples of these programs in the United States, such as Opportunity NYC. Opportunity NYC is an experimental CCTP launched in New York City by Mayor Michel Bloomberg since March of 2007.
adopted this model, including *Bolsa Familia* in Brazil (the largest CCTP in the world in the number of beneficiaries) and *Red de Protección Social* in Nicaragua.

<table>
<thead>
<tr>
<th>CCTP</th>
<th>Outreach</th>
<th>Total Annual Budget US$</th>
<th>% GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROGRESA (Mexico, introduced August 1997)</td>
<td>5 million families (about 25% of Mexican population)</td>
<td>777 million in 1999</td>
<td>0.2</td>
</tr>
<tr>
<td>PRAF (Honduras, introduced late 2000)</td>
<td>47.8 thousand households</td>
<td>12.5 million in 2001</td>
<td>0.2</td>
</tr>
<tr>
<td>RPS (Nicaragua, pilot introduced October 2000)</td>
<td>10 thousand households in 2001</td>
<td>10 million in 2001-2</td>
<td>0.2</td>
</tr>
<tr>
<td>FFE (Bangladesh, introduced 1993)</td>
<td>2.1 million students in 2000</td>
<td>77 million in 1999</td>
<td>0.2</td>
</tr>
<tr>
<td>SUF (Chile) (1998)</td>
<td>954,000 students</td>
<td>70 million</td>
<td>0.1</td>
</tr>
<tr>
<td>BE (Brazil) (2001)</td>
<td>11.2 million families (about 44 million Brazilians)</td>
<td>680 million</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*Source: Elaborated by the author with World Bank's information*

Table 1: Data on CCTPs from around the world, 2007

This chapter presents a brief overview of CCTPs, emphasizing their definition and the differences between a CCTP and a Cash Transfer Program (CTP). In particular, it explores the ability of these programs to induce the desired results and the efficiency with which these goals are achieved.

2.1 Definition

A CCTP consists of a transfer of a certain amount of money (cash) in exchange for specific activities (conditions). De la Brière and Rawlings (2006) define this kind of program as an intervention that generally provides money to low-income families conditional on sending their children to school and using basic preventive health care. This definition is similar to the one offered by Rawlings and Rubio (2005), who
emphasize that CCTPs provide money to poor families via creating a social contract with them.

CCTPs may be analyzed as a two-part transaction, where one component is the cash transferred and the other component is the conditional promise. For poor families, the cash received helps them to mitigate their liquidity constraints in the short run. At the same time, the conditions encourage them to invest in human capital and receive the fruits of this investment in the long run.

The concept of human capital, introduced in the development literature by Schultz (1961), was defined by Becker (1965) as similar to “physical means of production”. Households invest in human capital (for example, via education, training, and medical treatment), and household output changes in reflection of the “rate of return” on the human capital owned, in the form of higher productivity and, therefore, higher wages or returns to a microenterprise.

Das, Quy-Toan, and Özler (2004) propose a more general definition. According to these authors, a CCTP is any program that requires any specific action from the beneficiary as a condition to receive a benefit. The benefit received from the CCTP may be either in cash or in-kind. This definition makes it possible to include as CCTPs different kinds of programs, such as:
(i) cash transfers conditional on human capital investments,
(ii) programs that pay cash contingent on work in specific activities (such as workfare), and
(iii) transfers conditional on the consumption of certain commodities (in-kind transfers).

Workfare is an alternative model to conventional social welfare systems, where recipients must meet certain participation requirements to continue to receive their welfare benefits, such as training, rehabilitation, and work experience.

2.2 CCTP goals

The main objective of the CCTPs is to combat poverty. The macroeconomics and microeconomics literatures as well as the development literature have shown that one powerful way to combat poverty in a developing country is to improve the human capital endowments of its inhabitants. In particular, the literature has suggested strong links between human capital investments and economic growth (Krueger and Lindahl, 2001). The most important purpose of CCTPs is to break the vicious circle of poverty, by reducing short-term poverty through direct cash transfers and by combating long-term poverty through better endowments of human capital.

The main idea behind CCTPs is to induce people to commit to actions that they would not undertake without an incentive. These actions, though not preferred by the individual household, are preferred by society. For example, some households would
rather send their children to work than send them to school. However, society will be better off by having well educated citizens. Because of these misaligned preferences, society uses incentives to induce households, through the adoption of interventions such as conditional cash transfers, to modify their behavior. For this reason, “the fundamental objective of the conditional payment is to increase efficiency by internalizing an externality and thereby avoid a discrepancy between the private and social supply of child time to school” (Rawlings and Rubio, 2005).

Das, Quy-Toan, and Özler (2004) explain that most CCTPs are adopted for two purposes. One is an efficiency rationale (that is, to match the individual’s actions with society’s preferences). The other one is a redistribution rationale (that is, the program helps to screen poor households that deserve the benefit).

In the first case, when the individual’s actions do not match society’s preferences, by offering cash if they change their actions, CCTPs induce individuals to do whatever society prefers. In the second case, when potential household targets are difficult to differentiate from those not interested in the program, CCTPs provide a self-selection method. Being offered the cash by the CCTPs, those households that would send their children to school enroll in the program and those households who have no interest whatsoever continue sending all their members to work.
2.3 CCTPs versus CTPs

CCTPs have been incredibly successful in the past decade. For example, in Brazil, *Bolsa Familia* has been responsible for reducing the labor rate of children and increasing the quality of food for poor families. (World Bank, 2007) *Progresa*, in Mexico, has improved family health by decreasing the incidence of illness in children by 12 percent (Skoufias, 2005).

Although these are laudable achievements, some authors claim that CCTPs may bring about some inefficiency. For example, Das, Quy-Toan, and Özler (2004) explain that some households would be better off if the amount of cash that they receive were not conditional. These authors also provide some examples from around the world, where CCTPs have induced households to consume a smaller amount of the conditional good and more of other commodities. For these reasons, the programs should not ignore the behavioral responses of the beneficiary households. These authors describe an example in Kenya, where the incidence of malaria decreased as households were given insecticide-treated bed nets; but, when asked what they would do if they were given the money value of the bed nets instead, the households answered that they would have used it for food and clothing expenses. The Kenyan example specifically reflects the divergence between private and social preferences.

In most cases, however, CCTPs induce actions that households would not take without a strong incentive (such as cash). Bourguignon, Ferreira, and Leite (2002) and
Cardoso et al. (2003) explain how, in Brazil, the *Bolsa Escola* program would have not been successful in increasing school attendance if the authorities would have used an unconditional program.

Sadoulet (2006) explains that CCTPs should be seen as also creating price effects instead of just income effects. The author points out that household under-investment in human capital reflects the presence of market failures; thus, the income effect is not sufficient to induce families to increase schooling and health care. In order to align individual and social behavior, the key is that the CCTPs produce a price effect. The use of unconditional CTPs, which only produce an income effect, would be a more expensive mechanism to induce households to increase their consumption levels of education and health.

Therefore, there are some cases where CCTPs are effective and some where they are not. Das, Quy-Toan, and Özler (2004) develop what they call a “textbook model”, which explains why, from the standard economics point of view, unconditional cash transfer programs are more effective than CCTPs. They assume that households can consume two different goods: education and milk. In Figure 1, the authors consider three households with different preferences, represented by different indifference curves, dotted for type I households, dashed for type II, and solid for type III.

Under any program implementation, the household’s budget constraint is represented by *AB*. Once the program is implemented, the new budget constraint is given
by AEDC. Under the new scenario, if the household consumes at least $X_o$ of education, it receives $ED$ as additional income. On the other hand, if the household does not consume $X_o$, it does not receive any additional income.

![Figure 1: Effect of a CCTP on the household's consumption of education](image)

As Figure 1 shows, type I households do not participate in the program and they continue to consume the same amount of both commodities as before the program. Their preferences are much skewed away from education. In this case, the cash transfer is not enough incentive to induce a change in behavior. In contrast, after the implementation of the program, type II households consume $X_o$ of education. The amount $X_o$ is greater than
the amount of education that a type II household was consuming before program implementation, and the household is now receiving additional cash, \( ED \), which increases its utility level (to as higher indifference curve). Finally, for type III households, which were consuming an amount of education higher than \( X_0 \) before program implementation, the consumption of \( X \) may remain the same as before the program. There would be no additionality here; rather, all the transfer would be used in the consuming other goods (milk). Given the fungibility of money, this will be the outcome when the household had already decided that it wanted to consume the required amount of the conditional good or more before the transfer was implemented. Although not explicitly considered by these authors, if education is a normal good, the increase in household income would also somewhat increase the consumption of education. This additional education, however, would have increased its consumption level further beyond the social target. Given the fiscal costs of the transfer, the social objective is not to subsidize these extra levels of education, beyond the social target. From this perspective, therefore, the CCTP would be fiscally inefficient.

Using the model in Das, Quy-Toan, and Özler (2004), it can be shown that sometimes CCTPs induce households to take actions that they would not take without an incentive (namely, the cash transfer). For some households, such as a type I household, the incentive is not strong enough, however, to change their choices. In contrast, for other households, such as type II households, the incentive is sufficient to change the
households’ actions and to make them undertake an allocation of consumption according to what society believes is more important (this is the outcome of the conditional component of the agreement). Finally, for households like those of type III, the CCTPs would not be needed as an incentive, because these households were already willing to consume at least the amount of education that the program was designed to generate. The program simply increases the household’s aggregate purchasing power and this increase in the budget constraint is spent, according to household preferences, on other goods and potentially in an additional amount of education, above the authorities’ target, unless education is an inferior good.

It can also be shown that CCTPs produce some inefficiency for households of type I and type II. Due to the distortion of household decisions, household welfare may decrease compare to the case without CCTPs. Figure 2 explains, using a decision tree, under what conditions the households’ choices and welfare are affected by the CCTP. Let us assume that households can decide whether to consume a commodity or not, such as schooling (education). Some of the households think that additional education is desirable (necessary) and some of them think that it is not. Both types of households can also choose to enroll in the CCTP or not.
For households that are on the left-hand side of the decision tree, the CCTP does not affect their own choices, because they are already willing to consume the socially desired amount of the commodity schooling. The implementation of the CCTP for these kinds of households may be fiscally inefficient. The inefficiency arises because the government or the institution in charge of the CCTP is expending money on households that do not need any incentive to adopt the desired actions and, therefore, there is no additionality. It may be desirable, therefore, to develop other programs for these households, more efficient under this fiscal/social impact point of view.
For households on the right-hand side of the decision tree, the CCTP may affect their choices. These kinds of households appreciate education less than society does, and they need an incentive to make them change their choices. In this case, CCTPs for education may increase social welfare more than unconditional CTPs. For some of these households, however, a particular incentive may not be sufficient, and they will select not to participate in the program.

The scenario becomes more complex when the influence of the CCTP on credit markets is included in the analysis. The indirect impacts on (increased) access to finance may have consequences on the schooling choices and other decisions of the households about human capital formation. Maldonado and Gonzalez-Vega (2008) find that the positive influences on access to microfinance loans in Bolivia outweigh potential negative influences (through an impact on child labor) and significantly and substantially improve schooling outcomes. In turn, for a panel of rural households in Mexico, Garcia De la Cruz (2008) finds that access to public transfers and remittances increases the probability of having a deposit in a financial institution and that the holding of deposits significantly and substantially improve schooling outcomes. In contrast to deposits, the influence of access to credit on schooling seems ambiguous in this case.

Therefore, the desired education outcomes may be reinforced by the changes in access to financial services (both loans and deposits) induced by the CCTP. Alternatively, once both the direct impact of the CCTP and the indirect impact through its influence on
credit and on access to other financial services are acknowledged, the fiscal expenditures required to achieve the desired social goal may be less than those estimated when the indirect impact on credit is ignored. Given influences of the CCTP on credit market outcomes in opposite directions, however, the actual impact depends on initial conditions.

2.4 CCTP efficiency

In order to best reach the purposes of the CCTP, policymakers have to identify whether the program is efficient or not. De Janvry et al. (2006) explain three central problems that must be addressed in the implementation of a CCTP. The three challenges are:

(i) the correct identification of the target group,

(ii) the correct identification, among those that qualify for the program, of households that are willing to send their children to school without the payments and households that are not willing to do it, and

(iii) the analysis of whether the amount transferred provides enough incentives to change household behavior.

First, it is important to identify who is going to enroll in the CCTP: the target group. This identification provides a better forecast about the program’s success, because it estimates the likelihood of a person meeting the conditions in response to a transfer. Therefore, the better the target group analysis, the better the program results.
The second problem characterized by De Janvry et al. (2006) is concerned with the selection of the actual beneficiaries among the target group. It is important to identify what households are really qualified to receive the transfer or enroll in the CCTP, in order to optimize the use of fiscal resources. For this purpose, it is not only necessary that the households enrolled do need the cash transfer to undertake the desired action, but it is also necessary to know that those households are not willing to consume, education for example, without an incentive. There are some households that may qualify for the CCTP, because they are poor, but that at the same are willing to consume the target level of education without the need for an incentive. Those households, shown on the left-hand side of the decision tree, should not become beneficiaries, because their choices are exactly the same as those of society. Fiscal expenditures would be, in this case, unnecessary.

The last problem is whether the amount transferred provides enough incentives to change the households’ behavior. As shown in the model of Das, Quy-Toan, and Özler (2004) for households of type I, the incentive (cash) would not be sufficient to change their behavior. The cash that CCTPs should offer has to be at least the same amount that the household is losing by changing its pattern of consumption (mostly, the opportunity cost of reducing the demand for child labor and the cost of school supplies and tuition). Once the indirect impact of the cash transfer on access to credit is incorporated in the analysis, however, the amount of the transfer needed to induce a particular human capital
investment may be less than if there were no effects on financial markets. For this reason, it is important to establish under what empirical circumstances the potential impact of CCTPs on credit market outcomes is positive.
Chapter 3: Progresa/Oportunidades in Mexico

The Mexican Government has distinguished among three types of anti-poverty programs. These programs have aimed at: (i) promoting human capital formation, (ii) increasing income-earning opportunities, and (iii) funding infrastructure development. The first two types of programs have been designed to benefit individuals and households, while the third type has focused on local development. Progresa/Oportunidades has been an anti-poverty program designed to improve both the stock of human capital and income-earning opportunities, since households may use the cash transfer to invest in productive activities.

3.1 Progresa/Oportunidades

Originally known as Progresa, the program’s name was changed, with a new presidential administration in 2002, to Oportunidades. This has been the main anti-poverty program in Mexico. –It is a federal program, in which SEDESOL (the Ministry of Education, Health, and Social Assistance), the Instituto Mexicano de Seguridad Social (Mexican Institute of Social Assistance), and local governments collaborate, in order to create an inter-institutional program.

The program was introduced in 1997, as Progresa, in very marginal, rural communities. By 2002, however, the program began to reach very poor households in
urban and peri-urban communities, with a population between 50,000 and one million inhabitants. The big metropolitan areas, such as the Federal District (Mexico City) and Monterrey have not been included in the treatment areas. Currently, Oportunidades reaches over five million households, in both rural and urban communities. In 2006, the Oportunidades budget was around US$3.2 billion. Of this amount, 4.8 percent was devoted to operational costs and the rest was available for program benefits (Sedesol, 2006). Figure 3 shows the numbers and composition of Oportunidades beneficiaries among types of Mexican localities. As the figure shows, by 2006 most of the Oportunidades beneficiaries were rural households, with only 14 percent of the beneficiaries live in urban communities.

Figure 3: Composition of households with Oportunidades benefits, by type of locality, 2006

Although Progresa/Oportunidades has not been the only Mexican anti-poverty program, in several ways its design represented a methodological breakthrough. First,
*Progresa/Oportunidades* targets households in extreme poverty, in order to ensure that program resources are delivered to the households most in need. According to the definition of poverty for these purposes, the extreme poverty line is represented by a less than US$ 2 daily per capita income, at the household level. Second, the program is designed to simultaneously intervene in the areas of health, education, and nutrition. Third, the experimental designed used in selecting *Progresa* participants may allow an “appropriate” evaluation of some of its impacts. This feature is of particular interest for the evaluation of influences on credit market outcomes undertaken in this thesis.

The program’s objectives assume that poor households cannot invest in human capital as much as they “should” because they are liquidity/credit constrained. Given the household’s preferences and budget constraint, parents (namely, the household decision-makers) have incentives to take their children out of school and deploy them as part of the household’s labor force, in order to increase their current disposable income. At the same time, however, this decision reduces expected household income in the future, because households with less educated members are more likely to be poor (and to be locked into a poverty trap). *Progresa/Oportunidades* has attempted to change these household incentives and choices. In principle, the program has attempted to compensate for the opportunity cost for poor households of sending their children to school. This opportunity cost mostly consists of the (explicit or implicit) wages that the children would earn if they were working.
The program attempts to promote human capital formation by supporting health, education, nutrition, and income generation choices. For these purposes, the program has three components: education, health, and nutrition interventions. In addition to the cash transferred for each child that is attending school, the program also transfers a fixed amount for food expenditures and it delivers nutrition supplements.

Specifically, the program offers a cash transfer to poor mothers in marginal communities, which is conditional upon whether their children are attending school or not, at any level between the third grade of primary school and the third grade of high school (these are the levels of schooling expected for children ages 9 through 18). In order to continue receiving the transfer, the children should not miss more than three days of school per month. The transfer is paid directly to mothers, under the assumption (based on the available evidence) that mothers (rather than males) have a higher probability of allocating the extra liquidity to expenses related to the health, education and nutrition of children.
The levels of these transfers are not uniform. Table 2 shows the monthly amounts (in Mexican pesos) scheduled for the transfer, according to the level of schooling and the gender of the child, for the second semester of 2006. At that time, the exchange rate was $11.27 Mexican pesos per US dollar. In addition to the cash per child, there was periodic financial support for school supplies, food expenses, and elderly care. There were also maximum amounts allowable per household. The transfer received by these households represented, on average, around 22 percent of household income. Table 10 describes the
additional supports and the average value that they represented for an Oportunidades household, measured in US dollars.

<table>
<thead>
<tr>
<th>Transfer</th>
<th>Amount</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and Nutrition</td>
<td>$16</td>
<td>Support to improve income and food intake. Nutritional complement to children under 5 years old and pregnant and lactating women</td>
</tr>
<tr>
<td>Health</td>
<td>Basic preventive health services Workshops in health and nutrition</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>$11 - $19</td>
<td>Increasing cash transfers from 3rd of primary up to 3rd of High School (12th grade)</td>
</tr>
<tr>
<td>Savings Accounts</td>
<td>$300</td>
<td>Saving account for the students that finish high school with access to new options</td>
</tr>
<tr>
<td>Elder</td>
<td>$23</td>
<td>Cash support for elderly (&gt; 70 years old)</td>
</tr>
</tbody>
</table>

Table 3: Additional components of Oportunidades transfers, 2006

Additional to the monthly transfer received on behalf of each child in the household, the program provides households with other monetary and non-monetary assistance. Table 3 shows that each household receives $16 USD to improve household income, in order to allow it to afford food. Also, those households with pregnant and lactating women or with children under 5 years old receive nutritional supplements. All households must regularly visit the community health center and attend workshops on health and nutrition. Households with students that manage to finish high school receive a savings account per student, with $300 every two months if they continue with higher education. Progresa also provides financial help to the households’ seniors. For every
elderly adult (over 70 years old) in the household, Progresa transfers $23 USD every two months.

3.2 Poverty in Mexico

Due to Mexico’s complexity and sharp regional differences, the territory is usually divided into three regions, Northern Mexico, Central Mexico, and Southern Mexico. The states located at the North are more developed, with competitive industries. Because of their proximity to the United States, the North enjoys much greater trading opportunities. Central Mexico is characterized by a rural economy in transition. It is also the site for the Federal District and other major urban centers. This region is the most densely populated in Mexico, and its large urban conglomerates create a substantial demand for and supply of services. Southern Mexico is the poorest region in the country. This region is mostly characterized by traditional agriculture.

Mexico is one of the richest countries in the world. According to the World Bank (2006), Mexico ranked 14th in the world, with a GDP per capita (PPP) of US$8,066 per year in 2006. At the same time, Mexico is one of the countries with the most income inequality, with a Gini index of 47.3. Thus, despite its high income per capita, there is a high incidence of poverty in Mexico.

The Comité Técnico para la Medición de la Pobreza en México (Technical Committee for Poverty Measurement in Mexico) has defined three different poverty
lines: (i) the food-security poverty line (*alimentaria*), (ii) the capabilities poverty line (*capacidades*), and (iii) the assets poverty line (*patrimonial*). Households below the food-security poverty line are those with an income per household member that is insufficient to afford the basic food basket, as defined by INEGI (Mexican Institute of Statistics) and the U.N. Economic Commission for Latin America and the Caribbean (ECLAC). A household is below the capabilities poverty line if the household cannot afford the basic consumption of health and education services. Households below the assets poverty line are those that cannot pay for clothing or housing.

Table 4 shows the monthly incomes per household member —in Mexican pesos— that define the poverty lines for the years 2000, 2002, and 2004. Since basic living expenses are costlier in urban than in rural areas, the level of income needed in urban areas to place a household above a poverty line is higher than in rural areas. Changes over time in the poverty line mostly reflect price increases.

<table>
<thead>
<tr>
<th>Poverty lines in Mexico</th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>$652.60</td>
<td>$672.30</td>
<td>$739.60</td>
</tr>
<tr>
<td>Capacity</td>
<td>$802.70</td>
<td>$826.90</td>
<td>$909.70</td>
</tr>
<tr>
<td>Patrimonial</td>
<td>$1,312.30</td>
<td>$1,351.90</td>
<td>$1,487.30</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>$485.70</td>
<td>$494.80</td>
<td>$584.20</td>
</tr>
<tr>
<td>Capacity</td>
<td>$577.50</td>
<td>$588.30</td>
<td>$651.80</td>
</tr>
<tr>
<td>Patrimonial</td>
<td>$886.40</td>
<td>$903.00</td>
<td>$1,000.40</td>
</tr>
</tbody>
</table>

Source: Comité técnico para la medición de la pobreza
Note: Monthly income per person

Table 4: Income per household member that defines three types of poverty lines, for 2000, 2002 and 2004 (Mexican pesos)
Table 5 reports the proportion of Mexican households that were below each poverty line, in the three different years. Between 2000 and 2004, the proportion of households below the food-security poverty line declined by 5 percentage points. In the rural areas, the proportion of households below the food-security poverty line declined by almost 12 percentage points. The decline in the incidence of food-security poverty in the urban areas was much less noticeable.

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2002</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>18.6</td>
<td>15.8</td>
<td>13.7</td>
</tr>
<tr>
<td>Capacity</td>
<td>25.3</td>
<td>21.8</td>
<td>19.8</td>
</tr>
<tr>
<td>Patrimonial</td>
<td>45.9</td>
<td>43</td>
<td>39.6</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>34.1</td>
<td>28.5</td>
<td>22.3</td>
</tr>
<tr>
<td>Capacity</td>
<td>41.4</td>
<td>36.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Patrimonial</td>
<td>60.7</td>
<td>57.2</td>
<td>48.8</td>
</tr>
<tr>
<td><strong>Urban</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>9.8</td>
<td>8.5</td>
<td>8.7</td>
</tr>
<tr>
<td>Capacity</td>
<td>16.2</td>
<td>13.3</td>
<td>14.2</td>
</tr>
<tr>
<td>Patrimonial</td>
<td>37.4</td>
<td>34.9</td>
<td>34.2</td>
</tr>
</tbody>
</table>

Source: Comité técnico para la medición de la pobreza

Table 5: Percentage of households below each one of the poverty lines, by rural and urban areas (2000, 2002 and 2004).

There is a strong debate in Mexico about the mechanisms that may have been responsible of the observed reduction, particularly in rural poverty. Government sources (*Comunicado de Prensa de la Secretaria de Desarrollo Social*. No. 066/2005) claim that poverty has declined as a result of federal programs, such as the CCTPs, and specifically
Oportunidades. At the same time, in 2006, Mexican households received another (non-government) transfer, for about $16.6 billion dollars in international remittances, mostly from the United States. Most likely, poverty reduction has been due to a combination of numerous factors including, among others, the CCTPs and the remittances.

3.3 Impact studies in Mexico

Progresa/Oportunidades is a multi-sector poverty alleviation program expected to have complex effects on household welfare. An evaluation of the impact of the program on specific household outcomes, such as degrees of participation in credit markets, may make it possible to improve its design and implementation, so that it will have greater beneficial effects on household welfare. This is one of the reasons why Progresa has been the most studied program in Mexico.

The main findings of these impact evaluations may be classified into two groups: (i) impacts on human capital formation (education, health, and nutrition) and (ii) other impacts (levels and composition of consumption, household time allocation, gender roles, and community relations). The first set of findings analyze whether the goals of the program have been reach. The second set of findings is concerned with effects of the program, on individuals and households that had not been explicitly identified as program goals.
First, *Progresa/Oportunidades* has had a positive impact on school enrollment. Parker and Skoufias (2000) find that, both for girls and boys, the rate of enrollment in elementary and secondary school is higher for households that have received the transfers than otherwise. Schultz (2000) claims that the rate of secondary school enrollment increases from 5 to 8 percent, for boys, and from 11 to 14 percent, for girls, as a result of program participation. In turn, Behrman, Sengupta and Todd (2001) show that children from households that are enrolled in the program are characterized by less grade repetition and better grade progression as well as by higher school re-entry rates, among dropouts.

Second, several studies show the positive impact of *Progresa/Oportunidades* on child and adult health. Gertler (2000 and 2004) reports that children who live in *Progresa* households have a 12 percent lower incidence of illness than children who live in households without *Progresa*. He also explains that the health of adults in *Progresa*-receiving households is better than otherwise.

Third, researchers have also studied *Progresa’s* other impacts, such as changes in consumption patterns. For example, Hoddinott, Skoufias and Washburn (2000) find that, for households enrolled in *Progresa*, the average level of consumption increased 14.5 percent. These authors also report that the rest of the transfer was used for savings and other purchases, specifically durable goods.
Moreover, Skoufias (2005) claims that cash transfer programs (conditional or not) can have general equilibrium effects on the household. In other words, this author explains that the actual cash transfer may have secondary effects on the methods that the household uses to finance its activities. Secondary effects are those effects that the program may have and which are not part of the effects that the program originally pursued.

3.4 Progresa data base

The empirical framework that the management of Progresa chose to evaluate the program’s impact offers an approach to solve the impact evaluation problem. Progresa adopted an experimental design, with a randomization of localities into treatment and control groups. In principle, Progresa data are collected from households in both treatment and control localities, before and after program implementation. This is true only for the rural data base, however. The urban data base does not have information about the households before the program was implemented.

This design of the data collection process allows researchers the ability to evaluate program effects using either a randomization method or a non-randomization method, for the case when the comparison between the control and the treatment groups cannot be implemented but the researcher might make comparisons among the beneficiaries of the program.
The implementation and expansion of the program took place in phases. In August of 1997, phase I incorporated 140,544 households, in 3,369 localities around rural Mexico. In November of 1997, for phase II, the program was expanded to another 160,161 households, in 2,988 localities. In 2002, the program was expanded to peri-urban and urban communities. By 2008, Progresa was reaching over 5 million households in both rural and urban communities.

The sample that has been generally used for the evaluation of Progresa/Oportunidades consists of panel data. These data base can be divided into rural and urban. Although there are some differences between the rural and urban surveys, they are similar in the question asked. Both surveys offer information about household composition, family background, household assets, consumption, time allocation, and employment, among other features.

3.5 Rural data base

The sample created to evaluate the rural Progresa program consists of 24,000 households located in 506 rural localities in seven states (Guerrero, Hidalgo, Michoacán, Puebla, San Luis Potosí, and Veracruz) around the country. Of the 506 localities in the sample, 320 were assigned to the treatment group. All the households in control and treatment communities were classified as eligible or non-eligible for participation in the program, according to the eligibility criteria. As a result, 78 percent of the households in those localities were classified as eligible for program benefits.
A randomized social experiment implies that the distribution of all variables, for both treatment and control groups, should be equal before the program’s implementation. Researchers, including Parker and Skoufias (2000), Schultz (2000), Behrman, Sengupta and Todd (2001), Gertler (2000 and 2004), Hoddinott, Skoufias and Washburn (2000), and Skoufias (2005), among others, have implemented studies to verify whether, in practice, the randomization was successful.

These researchers undertook two comparisons: (i) they compared the mean of key transformed variables in control and treatment localities and (ii) they compared the means of the same variables with household level data. When the comparison tests were performed for locality means for age, education, income, access to health care, and the like, the tests indicated that the differences between control and treatment localities were not statistically significant. However, using household level data, there are statistically significant differences.

Because of the latter randomization problems, the use of second difference in differences estimators is recommended, when the outcome indicator of interest is school enrollment, child nutrition, or labor force participation. For indicators such as household consumption, individual time allocation, or an indicator only available after the start of the program, cross sectional difference in differences estimators may be used.
3.6 Urban data base

The Urban Household Evaluation dataset (Encelurb, for the acronym in Spanish) for the 2002, 2003, and 2004 surveys is a panel created to evaluate urban Progresa’s impacts. The intervention zones were selected among 17 states of Mexico (Campeche, Colima, Chiapas, Guanajuato, Guerrero, Hidalgo, Mexico State, Michoacán, Morelos, Puebla, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxcala, and Veracruz). The final sample, with socioeconomic data for 2004, included a total of 17,023 households and 72,421 individuals.

In the first round of the survey, in 2002, the purpose was to collect the necessary information to classify households as eligible, almost eligible and not eligible for the program. The data from the first phase were used to select the intervention and control groups.

The urban design of the data base allows for four types of comparisons: (i) households in the treatment group, (ii) households in the control group and intervention zone, (iii) households eligible, but not in intervention zones, and (iv) households almost eligible, in intervention zones.

Because the rural data base does not contain information about participation in credit markets, the empirical exercises in this thesis will use only the Oportunidades urban data base. In turn, this urban location defines the types of productive and income-generating activities of the households as well as the presence of various types of
financial institutions. The results obtained from the empirical analysis will reflect, therefore, these circumstances, as initial conditions that will influence the weights that the various influences from the conditional cash transfer program may have on credit market outcomes. Without further investigation, these results may not necessarily apply to the rural areas of Mexico or to other countries. They suggest, however, potential impacts that the authorities in charge of designing a CCTP should take into account, in order to improve its design.
Chapter 4: Finance for the poor

Financial services (in particular, deposit facilities and loans) are important for households mainly for three reasons. First, access to loans allows households to engage in productive activities that require resources beyond the household’s own endowment. Deposit facilities assist, in turn, in the accumulation of the household’s wealth, by reducing the transaction costs and risks associated with other types of assets. Moreover, access to payments mechanisms and to other forms of liquidity enhances a household’s participation in all kinds of markets, allowing it to further exploit its comparative advantages and to stabilize its income flows (McKinnon, 1973; Shaw, 1973; Levine, 2005).

Second, various tools provided by financial markets may assist households in either managing (ex ante) or coping (ex post) with risk better. Access to emergency credit or the withdrawal of deposits accumulated as precautionary reserves makes other, more costly, strategies —such as sales of productive assets, migration, or pulling children out of school— less necessary, in the presence of an adverse shock. Moreover, the availability of these risk management tools also changes the household’s production choices and increases total factor productivity.

Finally, households may use deposits and/or loans to optimize their inter-temporal decisions. This includes, on the one hand, consumption smoothing, in the presence of seasonal or irregular income and consumption flows, and, on the other hand, life-cycle
patterns of consumption and asset accumulation that optimize inter-temporal household welfare.

This chapter first discusses why access to financial services matters for poor households. Next, it lists barriers that limit the access of poor households to those services. Finally, it describes some of the innovations (in particular, microfinance) that have increased the outreach of financial markets and have incorporated poor households, until recently excluded from these markets. This chapter also presents some information about the case of poor households in Mexico and their interaction with financial markets.

4.1 Importance of financial services for households

Households with access to financial markets have the opportunity of choosing from a wider range of production activities than those depending solely on their own resources. Households with access to financial markets also have the opportunity to adopt less costly strategies to manage risk and to cope with adverse shocks. As a result, households with access to loans and deposit facilities may decide to engage in riskier but more profitable production activities, improving the productivity of their endowment of resources. To take advantage of these opportunities, they must usually gain access to resources beyond their own endowment.

Households may also use financial services to smooth their income or consumption flows. Households can save in their “sunny days” to hold reserves for their “rainy days” and, by making use of deposit services, they can keep their level of
consumption stable, through harsh times, in a less costly and less risky manner (Gomez-Soto, 2007). Thus, access to financial services helps households to keep their consumption stable in the short run and to optimize its path over the long run.

4.2 Barriers of access to finance

Poor households do not have easy access to credit markets, however; among other reasons, their access to credit is constrained by high transaction costs, mostly associated with distance, and by especially acute information, incentive, and contract enforcement problems (Gonzalez-Vega, 2003). Potential lenders also face high systemic risks, which further deter them from offering loans to this segment of the population. This is particularly true for local formal and informal lenders, which enjoy informational advantages but are very vulnerable to systemic risk.

Transaction costs for poor households are high for different reasons. Poor households are located far away from the branches of financial intermediaries, and they usually lack the documentation and credit histories needed for a successful loan application. Frequently, they are illiterate and, because they operate in the informal economy, they do not have records of their productive activities. At the same time, it is difficult for formal financial institutions to accurately verify the poor households’ information, which makes the whole process of screening applicants and monitoring borrowers more expensive than for traditional bank customers. Because of the small size
of the transactions and of shortcomings of the legal and judicial system, financial contracts with poor clients are particularly difficult to enforce.

Moreover, poor households are very vulnerable to idiosyncratic and systemic shocks, given their limited access to medical facilities and their exposure to climate and other exogenous shocks. Moreover, because they mostly operate in local markets, their various sources of income are highly covariant and, while they attempt to build diversified portfolios of household activities, they remain vulnerable to systemic shocks. Indeed, the probability that a household may fall into default on a loan repayment is highly correlated with the probability of it suffering from an adverse systemic shock. In turn, the local financial institutions that may be more likely to offer them loans also have limited opportunities to diversify their portfolios and, in response to this, they severely ration credit. Thus, given these costs and risks, banks and other traditional financial institutions usually do not offer financial services to poor households.

This lack of access to credit and other financial services adversely affects the households’ welfare. In particular, households may have to follow costly strategies to cope with risk, such as taking their children out of school when there is a shock. In this sense, credit-constrained households without access to cost-effective tools for risk coping defeat the purposes of the human capital accumulation that conditional cash transfer programs are attempting to promote.
4.3 Financial innovation and microfinance

Microfinance was born from the idea that poor households may benefit from access to financial services through small loans. Traditionally, the term microfinance has been used to describe the provision of financial services (e.g., credit, deposit facilities, payments instruments, and insurance), to people with no previous access to the traditional financial system. Microcredit is the term used for small loans to low-income households.

Although this traditional definition, focusing on the client, has been broadly accepted in the microfinance literature, some authors emphasize other important characteristics of microfinance. Gonzalez-Vega and Villafani-Ibarneagaray (2007) define microfinance as the supply of several types of financial services under circumstances when, given certain characteristics of the client (e.g., informality and poverty), the transaction (e.g., very small size), or the project to be financed (e.g., difficulty in assessing riskiness), a traditional banking technology (e.g., audited financial statements, mortgages, and court enforcement) would not be profitable or sustainable but when, given a specific set of innovations in lending or deposit mobilization technologies (namely, microfinance) would make this offer possible.

In this sense, microfinance essentially refers to the set of innovations that have made it possible to expand outreach to clienteles that were formerly outside the frontier of institutional finance. These new financial technologies have offered solutions to the information, incentive and contract enforcement problems that are more appropriate for
the circumstances of poor households. They include *in situ* evaluation of the applicant’s creditworthiness, with simple requirements, and the development of a strong client relationship (and a high present value of future services) as the key structure of incentives to repay (Gonzalez-Vega, 2003; Armendariz de Aghion and Morduch, 2005). This process, also known as the “microfinance revolution” (Robinson, 2004), has increased access for millions of poor households around the world.

Microfinance is not the only way, however, for low-income households to gain access to financial services. Even without microfinance institutions, traditionally some people—without any kind of hard collateral—have had access to credit. In most cases, they have used informal lenders to gain access to loans, such as moneylenders, relatives, friends, pawnshops, or ROSCAS. These sources of loans are based either on reciprocity or they represent short-term loans for small amounts, at very high interest rates. They provide a valuable service, but they are not sufficient to offer poor households all of the benefits from access to finance. When there is a local systemic shock, these informal sources are also affected and cannot assist the poor household during its most critical moment. Moreover, because they provide limited intermediation (across space, time, and states of nature), their role in improving the economy’s resources allocation is very limited (Gonzalez-Vega, 2003).

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2 A ROSCA (Rotating Savings and Credit Association) is a group of individuals who agree to meet for a given period of time, in order to save and borrow together. In Mexico, they are usually known as *tandas*.
4.4 Access to finance in Mexico

The extent of the financial infrastructure in Mexico does not correspond to its ranking among the richest nations in the world. Several reasons explain a degree of financial deepening in this country way below what would be expected for its level of income per capita (Gonzalez-Vega, 2004). This thesis is not the place to address these complex issues. Rather, I next describe the limited degree of access enjoyed by Mexican households and some of the recent changes in the financial markets where the poor are gaining some access.

Alpizar, Svarch and Gonzalez-Vega (2006) use the Mexican Household Livelihoods Survey (MxFLS-2002) to study the availability of financial services from a geographic perspective. The survey data are nationally representative and provide information about 150 Mexican communities; one-half of them are located in rural areas. The survey covers the whole country: 38 percent of the communities in the sample are in Northern Mexico, 40.7 percent are in Central Mexico, and 21.3 percent are in Southern Mexico. Approximately 30 percent of the urban communities report the presence of formal financial institutions, either for credit or deposit services, while 19 percent of the rural communities report the existence of these financial services.

Alpizar, Svarch and Gonzalez-Vega (2006) are interested in the extent of the financial infrastructure across the Mexican territory. They define infrastructure as the

presence, in a particular community, of particular types of providers of financial services. These providers are all those organizations or economic agents that supply financial services, especially credit, to households, individuals, or entrepreneurs in a given locality. These providers consist of formal organizations (e.g., banks), informal arrangements (e.g., friends and relatives), and semiformal mechanisms (e.g., input suppliers).

These authors find that informal lenders (friends and relatives) have a presence in a large number of Mexican communities. Specifically, 63 out of the 150 communities in the sample (42 percent) report these informal transactions in the community. The second most frequently present provider is a bank, with 41 percent of the communities reporting the presence of at least one banking branch. While the absence of a branch usually precludes any access the bank services (given prohibitive transaction costs), the presence of the branch does not guarantee that a large proportion of the population would have access to all of its services. Figure 10 shows the proportion of urban and rural localities where there is a presence of a particular type of financial infrastructure. Besides informal lenders and banks, ROSCAS and various types of cooperative arrangements also have an important physical presence in many communities. Most important, however, is the observation that, in more than one-half of the communities, there is no financial infrastructure whatsoever.
Figure 4 shows a difference in the availability of a credit infrastructure between urban and rural communities, where 29 percent of the urban communities have a bank branch, in contrast to 12 percent of the rural communities. None of the rural communities surveyed reported the presence of a moneylender, which is surprising and it may reflect some measurement errors. Most cooperatives are located in urban communities. These figures show that there is a large gap between the development of the urban and the rural financial infrastructure in Mexico.

In their study, Alpizar, Svarch and Gonzalez-Vega (2006) also describe the characteristics of the households that participate in the credit market. They define as households with credit those that successfully secure a loan, participate in a ROSCA, or buy any goods or services using credit. Households with formal credit are those that
receive a loan from formal institutions, such as banks, cooperatives, or savings and loan associations. Households with informal credit are those that receive a loan from informal sources, such as friends, relatives, or employers. Households with semiformal credit are those that receive a loan from a moneylender, traders, stores, input suppliers and similar sources.

Table 5 shows the proportions of households with credit, arranged by source. Alpizar, Svarch and Gonzalez-Vega (2006) obtain these results using the MxFLS-2002. While access to credit is in general limited, there are major differences according to the type of community. The proportion of households with formal and semiformal sources of credit is higher in urban than in rural communities. At the same time, approximately 8 percent of urban households have credit from informal sources, while this proportion is 10.4 percent in the rural areas.

The small proportion of the population that has access to formal sources of credit is evident throughout the country. There are important regional differences, however, in terms of household access to the formal credit market. While 18 percent of households in Northern Mexican have credit with a formal source, 15 percent of Central Mexican households have formal credit, and only 8 percent of households in Southern Mexican households have credit with a formal source.
Table 6 Household participation in credit markets, by region and type of source.

<table>
<thead>
<tr>
<th>% of households with credit</th>
<th>National</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Credit</td>
<td>14.23</td>
<td>17.06</td>
<td>4.86</td>
</tr>
<tr>
<td>Semi-Formal Credit</td>
<td>25.83</td>
<td>27.40</td>
<td>20.55</td>
</tr>
<tr>
<td>Informal Credit</td>
<td>8.43</td>
<td>7.83</td>
<td>10.44</td>
</tr>
</tbody>
</table>

**North**

| Formal Credit              | 17.99    | 19.96 | 7.65  |
| Semi-Formal Credit         | 33.50    | 31.05 | 25.79 |
| Informal Credit            | 5.11     | 7.16  | 8.43  |

**Central**

| Formal Credit              | 15.28    | 17.46 | 6.18  |
| Semi-Formal Credit         | 21.23    | 24.67 | 15.70 |
| Informal Credit            | 10.02    | 9.42  | 12.19 |

**South**

| Formal Credit              | 8.17     | 12.02 | 2.22  |
| Semi-Formal Credit         | 33.11    | 24.91 | 21.14 |
| Informal Credit            | 5.44     | 8.76  | 10.51 |

Source: Alpizar, Svarch and Gonzalez-Vega (2006)

Figure 5 shows the mean interest rate and median amount of credit that the Mexican population borrowed in 2004. Informal sources of credit, such as money lenders, tend to issue loans of smaller amounts at higher interest rates, compared to formal sources. Systemic risk and the high opportunity cost of resources explain most of these rates. The other source poor borrowers can turn to is usually family and friends, which in this case are likely to be as poor as the borrowers themselves and, thus, unable to provide sufficient amounts to fully solve the borrower’s liquidity problem.
Figure 5. Mean interest rates and loan amounts (Mexican pesos), for various sources of credit in Mexico

Chapter 5: Interactions between Conditional Cash Transfers and Credit Markets

Both conditional cash transfer programs and microfinance interventions have been used around the world in attempts to alleviate poverty. Most CCTPs have been implemented, however, by governments or public sector institutions. In contrast, worldwide, most microfinance programs have been implemented by non-governmental institutions (NGOs) and by private commercial suppliers of financial services. While both private (namely, philanthropic foundations and socially-oriented investors) and public international donors as well as some governments have assisted with funds and with technical assistance, microfinance has essentially been a non-government activity. In several of the countries where microfinance has been most successful, it has actually been a response to the failure of state-owned development banks and other direct government interventions in financial markets (Gonzalez-Vega, 2003). Some observers have claimed that Mexico’s lag in financial inclusion and delay in expanding its microfinance sector have been caused, in part, by the traditional heavy presence of the state in these markets. Nevertheless, government intervention, either in the form of CCTPs or in efforts to create a regulatory framework and hospitable environment for the development of microfinance, must be justified in terms of the presence of some form of market failure.
5.1 Market failure

The main objective of a CCTP is to induce households to do what society considers optimal. For example, in the case of cash transfer programs conditional on sending children to school, like Progresa/Oportunidades, the assumption is that society wants educated citizens while some households want to use the children as their labor force. This instance of market failure reflects a divergence between private costs and benefits (namely, the determinants of household choices) and social costs and benefits (which take into account the potential externalities and other spillover effects of human capital formation). Thus, while the CCTP does not change household preferences, it does offer sufficient incentives to offset private choices based solely on those preferences and it thereby induces a different set of actions. That is, a program like Progresa/Oportunidades attempts to change household decisions by shifting the household’s budget constraint (including both income and price effects). When a CCTP achieves its aim of making individual actions respond to social preferences, then the consequences of market failures are overcome and the CCTP is a success.

Financial markets also suffer from various types of market failure which, in part, explain the limited degrees of access to financial services for large segments of the population. In particular, asymmetric information between lenders and borrowers creates two types of market failure: adverse selection and moral hazard (Stiglitz and Weiss, 1981).
Because lenders cannot distinguish applicants by type (adverse selection) and because borrowers can behave opportunistically (moral hazard), lenders that offer pooling contracts then engage in non-interest credit rationing (Keeton, 1979). Increasing the interest rate, in order to clear the market, would only increase the adverse selection and moral hazard problems. As a result, many potentially creditworthy borrowers (even when informationally indistinguishable from some who get loans) are excluded from access to credit. Adverse selection may emerge in the credit market when the better informed party, the borrower, knows more about his/her characteristics than the lender. For example, the borrower knows more than the lender about the pattern and ranges of his/her income flows, the extent of his/her budget constraint, and the probability of repayment. Moreover, the applicant has incentives to portray an over-optimistic perspective about his/her creditworthiness, and the costs of verification for the lender may be too high.

Moral hazard appears, in turn, when the borrower changes the nature of the project, increasing the risk associated with the loan, or when the borrower is not sufficiently diligent to protect the interests of the lender. Moral hazard also emerges when the borrower opportunistically defaults, even if he/she have sufficient ability to repay. Lenders that fear the consequences and do not possess a lending technology that allows them to address these challenges will opt out of segments of the market where these problems are particularly acute.
The outstanding contribution of microfinance has been that it has been associated with the development of lending technologies that can, at least in part, overcome these information and incentive problems, without direct government intervention in financial markets (Gonzalez-Vega, 2002). As a result of these innovations and intensive learning, microfinance has been able to expand the outreach of the supply of financial services to previously excluded clienteles. There are important externalities, however, in any process of innovation, human capital formation, and learning. These externalities create other types of market failure, and the extent of financial innovation and outreach remain below the social optimum. Interventions that create an appropriate regulatory framework and that promote innovation and human capital formation in the microfinance sector can then complement the non-government initiatives that have been responsible for the success of microfinance.

One important challenge for public policy, therefore, is to determine how much in fiscal resources to devote to CCTPs or to microfinance promotion. There has been little investigation of the associated trade-offs. The purpose of this thesis, moreover, is to illustrate how this policy choice may not be a simple one. In particular, CCTPs and financial market outcomes may not be independent and, if this were the case, their interactions must be considered in policy formulations. One key purpose of the thesis is to suggest how these two kinds of programs may be interrelated.
5.2 Target population

Both microfinance interventions and CCTPs may correct for market failures in order to bring about a more socially optimum allocation of resources (by households, in their human capital choices, and by financial intermediaries, in their lending practices). Moreover, both microfinance and CCTPs share the same target population, low-income households. From a general equilibrium perspective, these interventions should influence each other. The purpose of this thesis is to highlight how conditional cash transfers may influence credit market outcomes. Further research should explore, more fully, the reciprocal interactions between these two interventions.

Figure 6 describes the potential overlapping. There is a population of low-income households, some of which are clients of a microfinance institution or otherwise participate in credit markets and some of which are enrolled in a CCTP. Some of these households belong to both subsets. The purpose of the thesis is to explore: (i) changes in behavior among the households in the intersection of these two subsets and (ii) changes (positive or negative) in the size of the finance subset, as a consequence of the presence of the CCTP. There is also a possibility that (iii) the degree of financial development may influence the size of the CCTP subset, by affecting the choices of households as to whether participate in the conditional program or not. The latter effect is not explored in this thesis, but it would be a natural extension to this research. Under some circumstances, the two subsets may complement each other and, therefore, the subset of
people with both a CCTP and credit - would increase from the mutual interactions. Under other circumstances, the two subsets may be substitutes.

5 million Mexican households are enrolled in a CCTP, *Progresa/Oportunidades*. Moreover, 25 percent of the population below the poverty line is a client of at least one financial institution. These figures offer some idea about the magnitude of the current potential overlapping between these two types of interventions.
Chapter 6: Conceptual Framework

Conditional cash transfer programs may affect credit market outcomes from both a supply and a demand perspective. On the supply side, households enrolled in CCTPs receive a given amount of money, free of risk (the amount transferred), which increases their repayment capacity. In this case, the lenders’ perception about the riskiness of the households may change, because the transfer is not covariant with the other sources of household liquidity. This is the *creditworthiness* effect of the transfer.

On the demand side, there are two conflicting effects. On the one hand, there is a *substitution* effect. When the households receive this “free money,” they may be less inclined to pay interest on their access to additional liquidity. On the other hand, however, the transfer also improves the household’s management of liquidity. Given the availability of a safer source of income, the household may change its production plans, and these changes may increase the demand for credit. This is the *risk-coping* effect.

Therefore, the effect of CCTPs on credit market outcomes is theoretically ambiguous. In a particular circumstance, it may be positive (when the creditworthiness effect and/or the risk-coping effect prevail) or negative (when the transfer discourages the use of financial markets to increase the household’s liquidity, through the substitution effect). The aim of this chapter is to present a conceptual framework to explain under what circumstances CCTPs affect credit market outcomes.
6.1 The household’s demand for credit

Let us consider a representative poor household. Let us assume that, initially, the household is endowed with $H_{Ro}$ resources. Let us also assume that the household faces a well-behaved production function, which represents the set of its opportunities. The marginal rate of return of uses of resources through the household’s production function is positive and declining, given the diminishing marginal returns associated with the household’s set of opportunities.

If, for a level of resource use equal to $H_{Ro}$, the marginal rate of return is higher than the interest rate charged on loans, an optimizing household would like to acquire additional resources and expand its production efforts, until its marginal returns are equalized to the interest rate. If this were not possible (that is, if an excess demand for credit persisted), then the household would be credit-constrained.

The portion of the curve that represents the marginal returns, beyond $H_{Ro}$, defines the household’s demand for credit curve. This negatively-sloped demand curve, $L^D$, depends on both the nature of the productive opportunities and the household’s initial endowment, and it links the interest rate, which is assumed to be given to the household, to loan amounts demanded of size $L$. If there is no credit rationing, the household will get loans that satisfy the amount demanded. If there is rationing, the household will get less than it demands and it will stay credit-constrained.
The impact of a CCTP on the household’s credit market outcome will depend on a number of initial conditions, including the relationship between the household’s marginal rate of return and the interest rate faced by the household. When the marginal rate of return on the use of resources, is lower than the interest rate \( i \), for all levels of resource use, the household does not demand credit. In this case, a conditional transfer does not have any impact on the credit market outcome for the household. There are two interrelated reasons for this result. One possibility is when the household does not have sufficiently attractive productive opportunities to justify borrowing, before or after the transfer. The other possibility is when, given a set of productive opportunities, the expected cost of funds is too high, in reflection of the typical barriers to credit transactions. If, for example, there are no financial institutions in the community, in addition to the interest rate, the transaction costs of borrowing may make loans prohibitively expensive.

Either instance of this case is equally represented by Figure 7 Given an initial endowment \( HRo \), the household’s marginal rate of return (at \( C \)) is lower than the interest rate (more generally, the cost of funds) at which the household might have access to credit. In this case, there is no demand for credit before the transfer, and the household only uses its own endowment. When the transfer is received, the household’s command over resources increases by that amount, and its marginal rate of return declines (at \( D \)).
There is no demand for credit, again. So, the credit market outcome does not change (there is no demand before and no demand after the transfer).

If, given the initial endowment, $HRo$, the household’s marginal rate of return is higher than the interest rate charged on loans, there will be a demand for credit. This case is represented in Figure 8. There, the (not too large) transfer, $T$, reduces the amount of credit demanded, given the increased amount of resources available to the household. However, if the marginal rate of return is sufficiently high even with the new amount of resources, the household will still demand some credit, albeit a lower loan amount. This is a weak substitution effect. In this case, one would observe a demand for credit before and a (smaller) demand after the transfer.

Figure 7 Impact of a conditional cash transfer, when the household does not have a demand for credit (because of limited productive opportunities or too high cost of funds)
In this case of a *weak* substitution effect, the decision of requesting a loan does not change, because the household’s initial productivity is comparatively high and, despite the diminishing marginal returns that result from the transfer, these returns are still higher than the cost of the loan after the transfer. In the figure, the red dot represents the highest level of the interest rate at which there would be a demand for credit, given the household’s initial endowment of resources. Before the transfer, the household’s demand for credit includes both the blue and the green dots. If there were no credit rationing, the household would get a loan of that size (the sum of the distance associated with the blue and the green dots). When the household receives the transfer, its new command over resources lowers the marginal rate of return, to the yellow point. In this case, the household’s demand for credit shrinks to the green points. If there were no credit rationing, the household would receive a smaller loan than before the conditional transfer.

If, instead, before the transfer, credit is being rationed and the household is left credit-constrained, the loan it receives will be less than the sum of the distance associated with the blue and the green dots. After the transfer, a number of possibilities emerge (not explicitly shown in the figure), depending on the relationship between the size of the “rationed” loan before the transfer and the loan amount demanded after the transfer. If the loan amount demanded after the transfer is less than the original loan size, there will be a weak substitution effect, and the household will get a smaller loan after the transfer. If,
instead, the loan amount demanded after the transfer is more than the original loan size, there are two possibilities. One emerges if the extent of rationing remains unaltered. In this case, the household receives the same size of loan as before and the conditional transfer and the loan are *complementary*. Moreover, this effect would be even greater if, after the transfer, the degree of rationing is lessened, and the household receives the transfer plus a larger loan size than before. In all of these variations, there is a demand for credit before the transfer and there is a demand after the transfer.

Figure 8: Impact of a conditional cash transfer, when the household is sufficiently productive to have a demand for credit before and after the transfer

Figure 9 shows a scenario where a *strong* substitution effect prevails. In this case, the household’s marginal rate of return is higher than the cost of funds, before receiving the transfer (as shown by the red dot). The household’s demand for credit before the
transfer is depicted by the blue dots. Once the transfer is received, however, because of a diminishing marginal rate of return on additional resources is assumed, the interest rate exceeds the new level of the marginal rate of return (at the yellow dot). In this case, the household would demand a negative amount of credit and it may become a lender, depending on the costs and risks of lending being less than the difference between the interest rate to be charged and the marginal rate of return on its own resources. After the transfer, the (potential) supply of credit is then given by the green dots. To supply a loan, the household would withdraw resources from the exploitation of its own productive opportunities. The higher the interest rate, the more it would shift from production to lending.

Figure 9: Impact of a conditional cash transfer, when the demand for credit disappears due to diminishing marginal returns
An additional set of scenarios would take place when there is a risk-coping effect on the production choices of the household or when there is a creditworthiness effect of the transfer on the supply side. The former effect leads to an upward shift of the curve of the marginal returns on the household production function (and, therefore, an associated upward shift in the demand for credit), while the latter effect leads to a downward shift of the interest rate (an increase in the supply of credit faced by the household).

Figure 10 shows the case when the transfer changes the perception of lenders about the household’s creditworthiness. The transfer may change these perceptions mainly for three reasons. First, it is relatively easy for the lender to verify that a household is enrolled in a CCTP and, therefore, it will be cheaper to resolve the lender’s information problem about the household’s ability to repay. This reduces the lender’s screening costs associated with the loan. Second, the transfer is comparatively riskless, if the government’s commitment to the program is credible and if the household fulfills the eligibility conditions. This increases the household’s expected income flows. Third, the conditional transfer is not correlated to adverse idiosyncratic or systemic shocks experienced by the household. This absence of covariance gives this source of household liquidity much robustness.

The lower screening costs and less vulnerability to shocks improve the household’s creditworthiness and should lead to a supply shift. For simplicity, this is represented in the figure by a downward shift of the interest rate charged on loans to this
household. Before the transfer, the demand for credit was represented by the blue dots, up to the loan size that equated the household’s marginal rate of return to the going interest rate. After the transfer, there will be a demand for credit if the household’s marginal rate of return from its own endowment plus the transfer is higher than the new interest rate charged on loans. In the figure, this is represented by the green dots. If the transfer is too large, even with the improved creditworthiness, there will not be a demand for credit. The outward shift in the supply curve, *per se*, is an improvement in the potential credit market outcomes for this household. Because it represents an improvement in the information set for the operation of credit markets and a reduction of the systemic risk faced by lenders, it does contribute to financial deepening.

Figure 10: Impact of a conditional cash transfer, with a supply of credit shift (improved creditworthiness)
A similar situation emerges if the risk-coping effect is working (not shown). In this case, rather than the supply curve, it is the demand curve that shifts outward, as the household elects to implement more productive (albeit also riskier) production plans. In this case, the transfer changes the risk behavior of the household, by making it more willing to undertake risky projects. After the transfer, the household will demand more credit if the (horizontal) outward shift in the demand curve is larger than the transfer itself. In this case, the CCTP and the demand for credit are complementary. If the outward shift of the demand curve is less than the amount of the transfer, there will be a weak substitution effect, but not as pronounced as in the case when the risk-coping effect is not present.
Chapter 7: Program Evaluation

Governments, international agencies, and researchers from around the world have been interested in studying the impact of public programs and other state interventions. Indeed, they have spent considerable amounts of money, time, and human resources in order to determine: (i) whether a program’s impact in achieving a certain objective has corresponded to the expected impact, (ii) whether the program could be designed better, in order to more fully accomplish its purpose, and (iii) whether the resources have been spent efficiently, among other effects of the program.

The results from many of these program impact evaluations have been, however, the subject of severe criticism, and many policy recommendations have been ignored due to methodological flaws in the evaluation of their impact (Duflo, Glennerster and Kremer, 2006). In response to the weaknesses of earlier evaluations, there has recently been a rigorous development of evaluation methods, which has attempted to overcome the shortcomings of the earlier studies.

This chapter briefly discusses the main methods available for program evaluation. The fundamental challenge in the evaluation of a social program is the fact that the agents who are enrolled in the program cannot be —at the same time— observed outside of the program. In other words, it is not possible to observe the same individual
(simultaneously) under two different circumstances. Although it is indeed possible to observe the same individual at two different moments in time, if researchers compare a given agent before and after her enrolment into a program, it may be the case, however, that the observed changes in the agent’s behavior (changes in consumption patterns, for instance) are due to some pre-existing circumstance and not to the program’s effect. This is the challenge of attribution, namely, how to associate a particular choice or change in behavior (i) to participation in the program and not to (ii) other influences not associated with the program or (iii) other agent characteristics.

Researchers have adopted two methodological approaches that, in practice, may work in social program evaluations: (i) experimental designs and (ii) non-experimental designs. The advantages and disadvantages of both methods are discussed next.

7.1 Evaluation problem

When researchers are evaluating a social program, in most of the cases they are answering questions such as: if a household enrolled in a program would spend more money on education than it would have spent if it were not enrolled in the program. Since it is not possible to compare the same individual, simultaneously, in the program and out of the program, the impact of the program for a given agent cannot be identified. However, it is possible to estimate the average impact of a program (or of a circumstance associated with a particular variable) on a group of agents, by comparing them to a
similar group of agents, who are not participating in the program or who are not facing the circumstance represented by the variable of interest. The accuracy of the average estimator obtained from this comparison will depend on the method used to calculate it.

In order to explain how impact can be estimated in this way, the example developed by Duflo, Glennerster and Kremer (2006) may be useful. Let us suppose that we are interested in measuring the impact of a CCTP on the household’s access to credit. Denote \( Y_i^T \) as the average amount of credit that a household in community \( i \) receives, when the household is enrolled in the CCTP, \( Y_i^C \) as the average amount of credit that a household in community \( i \) receives, when the household is not enrolled in the CCTP, and \( Y_i \) as the credit access outcome that is actually observed for community \( i \). We are only able to observe one out of two possible circumstances, either the household is enrolled in the CCTP or it is not.

We are able, however, to get some information about the expected average effect that the CCTP has on the households in a population, \( E[Y_i^T - Y_i^C] \). Let us assume that we have data on a large number of households, some of them with access to the CCTP and some of them without access. We then can take the average of the loan amount for both groups and examine the difference between the average amount of credit in households with and households without CCTP, namely:

\[
D = E[Y_i^T \mid CCTP] - E[Y_i^C \mid CCTP] = E[Y_i^T \mid T] - E[Y_i^C \mid C] \tag{1}
\]
\[ D = E[Y_i^T - Y_i^C | T] + E[Y_i^C | T] - E[Y_i^C | C] \]  

(2)

The first term in equation (1), \( E[Y_i^T - Y_i^C | T] \), answers the question: what is the average effect that the CCTP has on the access to credit (loan amount) for households that are enrolled in the CCTP. The second term in the equation, \( E[Y_i^C | T] - E[Y_i^C | C] \), measures the selection bias. The selection bias captures the difference in potential untreated outcomes between the treatment and the comparison (control) households.

On average, treatment households might have received a different amount of credit than control households, even if they had not been treated. There are a number of alternative reasons for this. First, households in the treatment group may demand less credit because they possess sufficient wealth of their own and/or they have exhausted any productive opportunities with high marginal rates of return that they may have.

Second, households in the treatment group may be more entrepreneurial and diligent, so they seek loans to take advantage of productive opportunities more frequently than households not in the treatment group. They may also be more inclined to participate in the CCTP. Third, even before participation in the CCTP, households in the treatment group may have characteristics that make them look more creditworthy, in the eyes of lenders, than those not in this group. Fourth, households in the treatment group may have accumulated assets and acquired other characteristics because of their past access to credit and, given those credit histories, they can get cheaper loans than those not in the treatment group.
Thus, selection bias may emerge either because the households that demand credit have unobserved characteristics that induce them to seek the loans or because the screening methods of the lenders are not random but, rather, systematically favor certain observable characteristics of applicants. Differential degrees of access to credit will then reflect these circumstances and not just program participation.

When these other circumstances imply that the households in the treatment group were less credit constrained than those not in the group, in the sense that originally they had a smaller demand for credit, before program implementation they would be expected to hold smaller loans. In this case, $E[Y_i^C | T] > E[Y_i^C | C]$. The bias may also work in the opposite direction, as given by $E[Y_i^C | T] < E[Y_i^C | C]$. This will be the case when the households in the control group were originally less creditworthy than those in the treatment group.

It may also be the case that the CCTP is a component of a more general policy intervention. For example, the households that receive the CCTP may also receive information about how to improve household health or may become eligible for targeted credit programs. The effect of the other components of the intervention would be embedded in the measure of impact $D$. The issue in this case is that, in addition to any effect of the CCTP, there may be systematic differences between households with access to the CCTP and those without this access.
Since $E[Y_i^C | T] > E[Y_i^C | C]$ is not observed, it is in general impossible to evaluate the magnitude (or even the sign) of the selection bias. Therefore, the selection bias cannot be studied.

7.2 Experimental designs

One way in which the selection bias may be avoided is when a group of agents is divided into two subgroups: a treatment group ($N_T$) and a control group ($N_C$). Note that the group of agents selected and to be allocated into the two subgroups does not have to be a random sample of the entire population. The treatment group is composed of those agents that participate in a given program and the control group is composed of those who are not enrolled in the program. The key of the division into the two subgroups is the randomization of the process. In other words, the agents must be randomly assigned to each subgroup.

In this case, the average treatment effect can be estimated as the difference in the empirical mean of $Y$ between the two groups, $\hat{D} = \hat{E}[Y_i | T] - \hat{E}[Y_i | C]$, where $\hat{E}$ converges to $D = E[Y_i | T] - E[Y_i | C]$ as sample size increases.

Because both treatment and control groups have been randomly assigned, the agents only differ in expectation through their exposure to the treatment. This implies that $E[Y_i^C | T] - E[Y_i^C | C] = 0$. Therefore, the selection bias problem is no longer present.
If, in addition, it is assumed that the potential outcome of an agent is unrelated to the treatment of any other agent, then:


Given these assumptions, \( \hat{D} \) can be estimated by using OLS. The regression equation will be: \( Y_i = \alpha + \beta T + \varepsilon_i \), where \( T \) is a dummy variable equal to 1 for treatment agents and 0 otherwise, and \( \beta = E[Y_i | T] - E[Y_i | C] \).

Therefore, a randomized or experimental design evaluation provides an unbiased estimate of the impact of the program under study.

### 7.3 Problems with randomized evaluations

Although experimental designs hope to solve the selection bias problem, their use is not always feasible. Occasionally, some technical issues do not allow a researcher to answer the impact question by using this analysis. One of these problems is unconditional randomization. When social experiments are implemented, their aim is to select two groups with the same (sample) probability of participating in the program, without taking into account any condition that separates the groups.

This kind of separation, associated with unconditional randomization, is almost impossible to implement for the evaluation of anti-poverty programs. Generally, anti-poverty programs are focused on agents with certain characteristics, usually households with income levels below the poverty line. Therefore, most program assignments are
partially randomized, only on certain observable variables. For the evaluation of impact, it is assumed that all other, observed and unobserved, attributes prior to the program are independent of whether the agents are enrolled in the program or not. This would be a strong assumption in cases like Progresa/Oportunidades.

Another restriction on the analysis, when using an experimental design, is that it allows a researcher to evaluate overall effects but not marginal effects. In other words, it allows the evaluation of the overall effect of the program on a certain output, taking into account that other variables are changing at the same time. It is not the same to measure the overall impact of a CCTP, on the demand for credit, than to measure the marginal effect. The first measure answers to the question: what happens to the demand for credit in the presences of the CCTP, allowing for changes in other variables? The second measure answers to the question: what happens to the demand for credit in the presences of the CCTP, keeping all other variables constant (ceteris paribus)?

Moreover, experimental design with unconditional randomnization does not account for the effect that the CCTP may also have on an agent’s behavior, even when the agent is not in the treatment group. “Hawthorne” effects are those effects produced by changes in behavior among the members of the treatment group. “John Henry” effects are those effects produced by changes in behavior among the members of the control group. One way to indentify this problem is by running a survey after the program ends, and
then compare the mean of the variable of interested for the control and the treatment groups.

Besides the technical problems that the experimental design may bring, there are also ethical problems. There is, indeed, some debate about whether an experimental design should be used for the evaluation of anti-poverty programs. There are some perceptions that the people selected to participate in the randomization are being used and that sometimes policymakers take advantage of the situation of low-income people. When experimental designs are used, people in the control group typically need the benefits of the program as much as people in the treatment group and, because of the randomization, the control group cannot enjoy the privileges that the treatment group does. When the researcher is unable to use an experimental design, there are other methods, besides randomization, that may solve the problem of selection bias. The aim of these methods is to generate valid (under certain assumptions) comparison groups. Often, the assumptions are not robust enough to justify the method used to solve the selection bias problem.

7.4 Controlling for observables variables

One way to control for selection bias is by controlling for observable variables. Conditional on a set of observable variables, $X$, the treatment agents can be considered to
be as random as those in a social experiment. The only requirement needed is a vector $X$ such that:

$$E[Y_i^C | X, T] - E[Y_i^C | X, C] = 0. \quad (4)$$

This method is also known in the literature as the “matching method.” It is useful when the number of variables in $X$ is small and when there are no continuous variables. This method only can be used under the assumption that, conditional on observed variables that are controlled for, there are no differences in potential outcomes between the control and the treatment groups. Testing for this assumption is not easy, generally, because it depends on the availability of data.

7.5 Regression discontinuity

For some research topics, the probability of assignment to the treatment group is a discontinuous function of one or more observable variables. For example, some microfinance institutions may limit eligibility to women with more than one child. If the correlation between any unobservable variable and the variable used to assign treatment is smooth, then the selection bias is zero. An important assumption to take into consideration is that the difference between the treatment and control group’s error has to be small.

Although this method has been used by some researchers, the method has some problems. Morduch (1998) explains that the use of regression discontinuity in the evaluation of Grameen Bank is not appropriate. Although Grameen Bank requires that
households do not own more than one acre of land to get a loan, credit officers make discretionary decisions. Therefore, the selection bias is not zero. Furthermore, a second problem may be the selection of the level of the underlying variable that determines eligibility. An accurate level is important to guarantee that the underlying variable is exogenous.

7.6 Difference in differences and fixed effects estimations

The difference in differences estimation uses pre-period differences in outcomes between the treatment and the control group, controlling for pre-existing differences between the groups. The main obstacle in difference in differences estimations is data availability, because information about the two groups is needed before and after program implementation.

Fixed effects estimation is similar to difference in differences estimation, except that there is more than one time period or there is more than one treatment group.
Chapter 8: Data

For the empirical analysis, I use the data collected by the authorities for the evaluation of the program, in order to analyze the influence of Progresa/Oportunidades on credit market outcomes. Although the database contains information on both urban and rural areas, I only use the information related to the urban areas, because the rural database does not include information about credit transactions for rural communities.

The data come from the Urban Household Evaluation Surveys (Encelurb, for the acronym in Spanish) for 2002, 2003, and 2004. The Progresa evaluation group developed a questionnaire to be implemented both onto program beneficiaries and non-beneficiaries. This questionnaire worked as a tool to observe the impact of the program and also to isolate this impact from other social factors that may have had an effect on poverty. Because both beneficiaries and non-beneficiaries are eligible for the program, the populations are similar and the observed differences may be attributed to the effect of the program.

The questionnaire was multi-topical and it collected information on the household and household members regarding socio-demographic, health, education, occupation, consumption, expenditure, income, gender, addictions, and reproductive health aspects, among others. The questionnaire did not suffer substantial modifications along the three years of the waves of the panel used here and, thus, the information gathered with this instrument can be used to build a panel data set. Only those households that answered the
questionnaires in all three years will be considered, however, in the exercises of this thesis.

One issue to be considered when working with panel data is the effect of sample attrition. For the purposes of the panel analysis, however, I use only those households that are in all of the waves of the data set. Attrition becomes a problem when households that do not participate in follow-up surveys show intrinsic differences with those households that participated in all of the survey waves. This is because those differences are precisely what explains their non-participation in subsequent waves, therefore biasing regression estimates. Cho (2005) explains that, in the case of Progresa, although the data present some attrition, this attrition seems to be a result of administrative fault rather than a systematic loss which may induce selection bias based upon households characteristics.

8.1 Descriptive data

A simple statistical analysis of descriptive information allows an initial understanding about the behavior of the households during the period when they were interviewed. This section describes the most important variables used in the empirical research. First, I define the variables to be used and then I look at their statistical features. This exercise provides an initial approximation about the effect of CCTPs, such as Oportunidades, on credit market outcomes.
The statistical analysis of the sample suggests that the substitution effect may dominate among this group of households. Indeed, Table 7 shows the proportion of households that had had at least one loan in the previous 12 months, for 2002, 2003, and 2004. The table reports this information for the whole sample, including both Oportunidades and non-Oportunidades households. Access to credit was fairly limited. For the whole sample, the proportion of households that participated in the credit market in at least one of those years is around 20 percent. Since the difference in the proportion of households that had at least one loan in any one of these three years is not statistically significant, it seems that the participation of the sample households in the credit market remained unchanged over this period.

In turn, for the Oportunidades participants, the percentage of households with a loan does not increase significantly in any of the surveyed years. These figures are consistent with the possibility that these households are using the transfer to solve their liquidity problems, without changes in either their production choices (namely, changes in their demand for credit) or changes in their creditworthiness, as a signal for lenders. Nevertheless, the observation here is participation in credit markets or not and no inferences about amounts of credit demanded are possible from these data.

In contrast, the non-Oportunidades households increased their participation in credit markets over this period. For example, between 2002 and 2004, the percentage of households with at least one loan in the previous 12 months increased by 10 percentage...
points (and this difference is statically significant at the 5 percent level). This observation is consistent with the idea that since these households are not receiving any transfer, they have to approach financial markets in order to solve their liquidity problems.

The full data set contains 44,103 observations, three (one for each year) for each one of the 14,701 households included in the exercise. The questionnaire asks whether or not any household member requested and obtained a loan during the previous 12 months. Table 7 also shows the amount of credit requested by the households, \( d_{\text{credit}} \), and the average size of loan they received, \( a_{\text{credit}} \), for 2002, 2003 and 2004. The difference between the amount requested and the actual amount received by the borrower is not statistically significant. That is, it appears that there is not significant evidence about credit rationing for this data. The most likely explanation is that borrowers “know” beforehand (perhaps, as informed by loan officers) the amount that they are likely to get and thereby avoid the potential transaction costs of not approximating this amount in their loan application. There may still be a latent unsatisfied demand for credit that is not measured by these data.

In contrast, the difference for both amounts, \( d_{\text{credit}} \) and \( a_{\text{credit}} \), between \( Oportunidades \) households and non-\( Oportunidades \) households is statistically significant. On average, the amount requested and received by non-\( Oportunidades \) households is greater than the amount requested and received by the \( Oportunidades \) households. This fact is another indicator of the possibility that the substitution effect dominates in the case
of the Oportunidades households. That is, given the availability of the transfer, these households require smaller amounts of credit than those without the transfer, and there is at least a weak substitution effect.

Because of the way how the survey was built, the sample started with both Oportunidades and non-Oportunidades households having the same levels of wealth. Once the Oportunidades households received the transfer, however, their liquidity problems and overall economic situation improved. The non-Oportunidades households, instead, are not receiving any transfer and still living in the same situation as before the implementation of the program. When needed, they turn to financial markets to get any liquidity they may require. These households get extra cash by accessing the credit market, either through its formal or informal institutions. In order to do as well as the Oportunidades households, non-Oportunidades households must request more money in the credit market.

As explained in the previous chapters, the transfer provided by the program supplies households with a liquidity source that is not covariant with other sources of income. The financial institutions may use this non-covariant source of cash flows as an indicator of creditworthiness. There are different reasons that may explain why Oportunidades households do not (cannot) take advantage of being enrolled in the program as a signal of creditworthiness. On the supply side, the lending technology available to the financial institutions may not be capable enough to recognize the
household’s enrolment in the program as an indicator of creditworthiness or, even if this were the case, many not provide the tools to undertake the evaluation of the other determinants of creditworthiness in a cost-effective manner. In Mexico, most financial institutions do not yet have this type of lending technology. On the demand side, the households enrolled in the program may not face productive activities attractive enough to encourage them to generate an actual demand for loans.

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.</th>
<th>credit</th>
<th>dcredit</th>
<th>acredit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>14,701</td>
<td>0.18</td>
<td>560.63</td>
<td>574.59</td>
</tr>
<tr>
<td>2003</td>
<td>14,701</td>
<td>0.25</td>
<td>1,017.92</td>
<td>1,006.02</td>
</tr>
<tr>
<td>2004</td>
<td>14,701</td>
<td>0.22</td>
<td>1,024.71</td>
<td>994.93</td>
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</table>

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<th>dcredit</th>
<th>acredit</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4,327</td>
<td>0.23</td>
<td>531.87</td>
<td>590.26</td>
</tr>
<tr>
<td>2003</td>
<td>5,111</td>
<td>0.27</td>
<td>740.76</td>
<td>708.25</td>
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<td>2004</td>
<td>4,614</td>
<td>0.24</td>
<td>830.89</td>
<td>764.18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Obs.</th>
<th>credit</th>
<th>dcredit</th>
<th>acredit</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.15</td>
<td>572.62</td>
<td>568.06</td>
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<td>2003</td>
<td>9,590</td>
<td>0.25</td>
<td>1,165.63</td>
<td>1,164.71</td>
</tr>
<tr>
<td>2004</td>
<td>10,087</td>
<td>0.21</td>
<td>1,113.37</td>
<td>1,100.49</td>
</tr>
</tbody>
</table>

Table 7 Credit observations for treatment and control households in Oportunidades, from 2002 through 2004.

Table 8 shows another interesting socio-demographic characteristic of the households in the survey. This table also shows the information for the whole sample, including Oportunidades and non-Oportunidades households.
The household is linked to a proxy for a microenterprise (*proxy*) if, during the week before the interview, any household member: (i) sold any product, (ii) made any product to sell, or (iii) provided household services to others in exchange for payment. Typically, the household needs inputs to produce an output. Around 12 percent of the households have a microenterprise, in this sense. In turn, around 10 percent of the households own a firm (*firm*), for which they spend around 850 Mexican pesos per year (*firmexp*). Around 10 percent of the households that own a firm employ some help from a family member (*help*).

Less than 50 percent of the heads of household report they are working (*work_h*) while less than 10 percent of the spouses work (*work*). On average, households have the same number of girls and boys of ages below 20 years old. The number of years of education is almost five for the head of the household and almost half of this for his/her
spouse. Just 6 percent of the households hold financial savings, either in the formal or the informal sector.

The descriptive statistical analysis provides an initial explanation about how Oportunidades may impact credit markets outcomes. This exercise shows that the effect that the program may have on the credit market in the case of these households may be a dominant substitution effect. This is a first approach, however, because I am not controlling for other important variables that may be affecting the results. In the next chapter, a more robust analysis will be implemented, to corroborate if indeed the substitution effect is the one that predominantly characterizes these urban households during 2002, 2003, and 2004.
Chapter 9: Econometric Estimations

This chapter implements an econometric exercise to analyze the effects that the Oportunidades program may have on credit market outcomes in Mexico. The advantage of this exercise is that it makes it possible to identify household characteristics that have a significant impact on credit market outcomes while controlling for all other influences. Specifically, this approach makes it possible to identify if being enrolled in the program is an important characteristic that increases or decreases the likelihood of access to credit markets. Different econometric techniques are implemented, in order to address some of the issues and challenges that the data present.

9.1 Econometric equation

The following econometric model will be generally used in this exercise:

\[ \hat{D}_{ijt} = \Pr(D_{ijt} = 1) = \theta_0 + \theta_1 Oportunidades + \theta_2 A_{ijt} + \theta_3 E_{ijt} + \theta_4 A_{ijt} + \theta_5 S_{ijt} + \theta_6 O_h_{ijt} + \theta_7 O_s_{ijt} + \theta_8 G_{ijt} + \theta_9 B_{ijt} + \theta_{10} Proxy + \theta_{11} FF_i + \theta_{12} FF_j + \theta_{13} FF_t + \varepsilon_{ijt} \] (5)

\( \hat{D}_{ijt} \) represents the expected probability that a household \( i \) in community \( j \) at time \( t \) had at least one loan during the 12 months prior to the interview.

\( A_{ijt} \) is the value of household assets at the time of each observation. The value of the household’s assets is calculated by summing up the household reported values of the house, cars, livestock, and other household property. The inclusion of this variable seeks
to control for the household’s level of wealth. The hypothesis is that, the greater the value of the household’s wealth, the higher the household’s level of creditworthiness and, therefore, the higher the probability of having credit.

$E_{ijt}$ is a dummy variable that indicates if the household owns a firm or not. In the survey, the household is asked about whether they own a microenterprise or not. Households operating a firm may have an increased demand for credit, in order to fund operating expenses and investment in their small business. The presence of a business makes it more likely for the household to be a deficit unit and, therefore, demand credit. The presence of the business may also increase the supply of credit, by increasing the creditworthiness of the household. Many microfinance programs make loans only to firms that have been operating for some time.

The variable $E_{ijt}$ controls for observable characteristics that may have an influence on access to credit, but the inclusion of $E_{ijt}$ also brings endogeneity problems in the econometric estimation. I do not know if households have a loan because they own a firm (which creates opportunities to use external resources that promise high marginal rates of return) or if they have a loan because having had access to credit, they had the opportunity of starting a production project (which would not have been possible if the households were credit-constrained).

The variables $Sh_{ijt}$ and $Ss_{ijt}$ measure the level of education of the head of household and of her/his spouse, respectively, in years of schooling. The inclusion of these variables
allows me to control for the human capital effect on repayment ability. A higher level of human capital within the household will boost its ability to operate a microenterprise and to further understand the financial market. The human capital of a poor individual may also be seen as an approximation of his/her permanent income.

The variables $Oh_i$ and $Os_i$ are dummy variables that indicate whether the head of household or her/his spouse are working or not as salaried employment. These variables indicate not only a certain level of income of the household but also the lower volatility that this income presents. This variable may be an indicator of creditworthiness, because the greater the sources of income of a household, the greater the possibility of loan repayment.

The variables $G_{ijt}$ and $B_{ijt}$ indicate the number of female and male offspring in the household, respectively. The numbers of girls and boys are included in the regression analysis because the amount of the cash transferred from Oportunidades depends on the child’s gender. The inclusion of these variables has the purpose of verifying if the exogenous fact of the number of girls and boys in the household affects credit market outcomes.

9.2 Problems with the data set

The data used in the regression come from a panel. Specifically, the data contain repeated observations of the same households across three years: 2002, 2003, and 2004. According to Gujarati (2003), using databases that combine time series with cross-
sections makes it possible to improve the quality and quantity of the data, making it richer and more powerful. This data set also allows inferences from either the cross-sectional data or the evolution of the households over a period of time.

When analyzing panel data, it is important to take into consideration that the unobservable variables that affect the dependent variable may be fixed or vary over time. Given this distinction, there are two econometric methods to control for these effects: the fixed effects estimation and the random effects estimation (Wooldridge, 2006).

9.3 Fixed effects method

The fixed effects model is used when there is a set of characteristics, not observable by the researcher, that affect household behavior and that remain constant over time. For example, for the unit (each household in this case) there are some unobservable characteristics that affect the dependent variable. If a model is run using the OLS method at the household level, without a constant term to control for those unobservable characteristics specific to a household, the estimated coefficients will be biased and inconsistent, mainly because of the omission of a relevant variable.

A fixed effects model has constant slopes but also differing intercepts, according to the cross-sectional unit, which in the case of this thesis it may be a household, a community, or time. For example, one type of fixed effects model may have constant slopes for households but intercepts that differ in time. This may be the case under the assumption that there is a shock that affects the households in a particular year. For
instance, there may be a natural disaster or a national election, which are events that affect all households equally. Consequently, there is no significant difference in the impact of this circumstance across households, but there might be autocorrelation in the time effects.

Another type of fixed effects model considers a constant slope coefficient for each household and this coefficient does not vary over time. In this case, there are some unobservable household characteristics that remain constant and that affect each household every year. An example of these unobservable variables may be the household’s preferences.

I believe that, given the characteristics of this database, fixed effects methods should be used. I will make the assumption that there are constant unobservable household, community, and year characteristics that affect each household. There is also a group of characteristics that differ for each household, for which I cannot account and that may or may not vary over time (like preferences towards borrowing, saving, working, or sending the children to school). If I do not run the fixed effects model, the regression estimators will be biased.

9.4 Random effects model

The random effects model is used when unobserved individual heterogeneity can be assumed to be uncorrelated with the independent variables considered in the model.
A random variable is a function of a mean value plus a random error. This error term, indicating the deviation from the constant of the cross-sectional unit (households in this example), must be, however, uncorrelated with the errors of the independent variables.

The random effects model may not be appropriate in this particular case, because the explanatory variables may be correlated with the unobserved characteristics. Also, I can correct for any heterogeneity in the data by using the fixed effects model with a large number of observations (Greene, 2008).

I use a Probit model that accounts for the discontinuity of the variable, because the dependent variable is a dichotomous one. The OLS procedure is used to estimate coefficients when the dependent variable is continuous. The Probit model takes into consideration that the dependent variables is dichotomous. The marginal effects generated by the Probit estimation can be interpreted as probabilities. Therefore, combining the solution to these two issues, the panel data set and the dichotomous dependent variable, a Probit model with fixed effects is used for the estimation.

The difference between the results from the fixed effects Probit model and the linear probability model with fixed effects and instrumental variables should be highlighted before I discuss the results from the estimation. Table 19 presents the marginal effects derived from the Probit model estimation, which are not equal to the Probit coefficients. To obtain the marginal effects, one must differentiate the probability
of observing the dependent variable when it equals one with respect to the independent variables. The marginal effects are observation specific, because they are a function of the full vector of the dependent variable.

There are two possible methods to calculate the marginal effects: (i) evaluate the marginal effect for the sample’s average individual or (ii) evaluate the marginal effect for every individual in the sample and then take the sample average. I use the first approach in this thesis. The results obtained by estimating the fixed effects model are similar to those obtained with the linear probability model, because the linear model runs the estimation over the mean and I am evaluating the marginal effect over the average household. However, the Probit model takes into consideration that the dependent variable is continuous just between zero and one, while the linear model considers the dependent variable to be continuous over the real numbers.

9.5 Regression results

Table 9 shows the parameter coefficients for the independent variables for the case when the dependent variable signifies whether the household has a loan or it does not. The first column in the table presents the estimated coefficients for the fixed effects estimation when the dependent variable is a dummy variable that represents whether the household has a loan (=1) or it does not (=0). The coefficients are the marginal effects.
These results suggest that receiving the conditional cash transfer increases the probability of participation in the credit market for reasons either of demand, supply, or both. The coefficient is statistically significant and positive. The probability of having loans increases by 16 percentage points for the households enrolled in *Oportunidades*, compared to those households not enrolled. Given the observed low levels of participation in credit markets, generally, this is a substantial difference in access to credit. From this perspective, participation in the conditional cash transfer program has a positive impact on the likelihood of credit market participation. That is, the presence of the CCTP increases the breadth of outreach of finance. For this to occur, either the risk-coping or the creditworthiness effect should be at work. That is, the transfer changes the perception of risk of the households, the lenders, or both.

Wealth also positively and significantly influences the likelihood of participation in the credit market. The probability of having credit increases as the value of the household’s assets increases. Some entrepreneurial activities also increase credit market participation. Those households that own a firm (*firm*) have a significantly greater probability of participating in credit markets than those without a firm. This probability is 12 percentage points higher for households with a firm. Furthermore, for those households with micro-entrepreneurial activities, as defined here (*proxie*), the probability of participating in credit markets is 22 percentage points higher for *Oportunidades* households and the influence is statistically significant. It seems that, the potential
influence of the CCTP on credit market outcomes is strongly related to the existence of household productive opportunities.

The number of children in the household also has a significant and positive influence on the household’s participation in credit markets. The channel for this influence is not clearly identified, because this variable is expected to have a complex influence on access to credit. The presence of many dependents reduces the household’s cash flows for the repayment of loans, while it also increases the potential for child labor when the household does not participate in the CCTP. At the same time, a greater number of children enrolled in school will generate a larger amount of cash from the transfer for households participating in Oportunidades. However, a larger transfer may also have ambiguous effects on participation in credit markets. If participation in Oportunidades were having a positive influence on the likelihood of credit market participation, a larger transfer, from a larger number of children in school ages, may reinforce this effect.

The human capital of the household, measured by the years of schooling of the head of household and his/her spouse are introduced in the regression as spline variables. By using spline variables in a regression, I allow the regression to estimate different linear slopes for different ranges of years of education (0-7 years of education, 7-10 years, and 10 years and over). This procedure makes it possible to account for the non-linearal effect that the level of education may have on different variables related with income. I assume that the impact of education on the probability to get a loan is not linear
and, therefore, I account for this by using this discontinuity in the education variable. The coefficients of Table 19 show that the effect of each range of education on the probability of having a loan is not the same, even though it is positive for each range. The probability of having a loan is greater for those households where the head of household has between 7 and 10 years of education.

Households with a savings account are 22 percentage points more likely to access a loan than those without any financial savings. It seems that either households use their savings account as a signal of their creditworthiness or lenders are able to recognize the deposit as an indicator of creditworthiness. This suggests the value of client relationships in influencing the probability of participating in credit transactions.

The second column of Table 19 reports results for the same regression, by using information on the dependent variable only for those households with participation in credit markets in 2004. In this regression, two dummy variables are included to indicate whether the households had credit in 2002 and 2003, respectively.

In 2004 the credit market outcomes of Oportunidades households and households not in the program are not different, since the coefficient is not statistically significant. In other words, the probability of households enrolled in Oportunidades having a loan during this year is not higher than for those in the control group. For this regression, I am including as explanatory variables whether the households have a loan in 2002 and whether they have a loan in 2003, to account for their credit history. The lack of
significance of the CCTP coefficient denotes the marginal effect of participation in *Oportunidades* on having a loan in 2004, given the fact that the households had had a loan in 2002 and/or 2003. This extra effect, given the credit market outcome of the previous two years, is not significantly different from zero.

The probability of having a loan in 2004 is 11 percentage points greater for those households that own a firm and 16 percentage points greater for those that operate a microenterprise, in the sense defined here, than for those without these entrepreneurial activities. Similar to the previous result, the number of children in the household significantly and positively affects the household’s probability of having credit. Assets do not have a significant influence in this case.

Those households that had had a loan in 2003 have a lower probability of having a loan in 2004, and the effect of having had credit in 2002 is not statistically significant. The available information does not allow me to explain why there is a lower generalized probability of participating in the credit market in 2004 compared to 2003.

The third column of table 19 presents results from a similar regression. In this case, the dependent variable is whether the households participate in credit markets in 2003 or do not.

In 2003, as is the case for the full panel, the probability of having a loan is greater when the household is enrolled in *Oportunidades* than when it is not. The marginal difference is 14 percentage points. This is a substantial difference, and it reinforces the
potentially positive impact of participation in the program on participation in credit markets.

The influence of the value of household assets is not statistically significant in this case. The coefficients indicating whether the household owns a firm or operate a microenterprise are positive and statistically significant. However, in this case, the number of girls and boys in the household negatively and significantly affects the probability of having credit in 2003.

It is important to mention that all three regressions control for fixed effects at the household, community, and year levels. Therefore, the fixed effects term should control for any shocks or unobservable characteristics that affect the household and/or the community in one of the years of the survey.
Table 9: Regression results for a fixed effects estimation of the probability that a household participates in the credit market, for different years.

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Semi-robust z-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Marginal Effects Reported

Column (-1-) Fixed Effects Probit
Column (-2-) Fixed Effects Probit for credit in 2004
Column (-3-) Fixed Effects Probit for credit in 2003
9.6 Endogeneity problems

The fixed effects Probit model estimation does not control for endogeneity problems. I do not know if some households participate in credit markets because they operate a microenterprise or if they have been able to develop a business because they have had access to credit. The usual way to solve for endogeneity is to use instrumental variables. Any instrumental variable should satisfy two conditions: (i) it should affect the dependent variable (namely, the household’s decision to apply for credit) and (ii) it should not be correlated with the error term.

Among others, Pitt, Khandker, Mckernan and Latif (1999) explain how, when the dependent variable is related to credit, the ideal instrumental variable is the interest rate. As an alternative, Pitt and Khandker (1998) propose the use of a price vector at the community level. The database used in this thesis does not contain the interest rate or the price vector. Consequently, I propose a set of variables to instrument the variable firm. I use the predicted value of a household’s probability of having a firm rather than the observation of a household’s ownership of a firm, as it would be endogenously determined with access to credit.

The variables used here as instruments are: (i) the amount of money that the household spends on the firm, (ii) whether there is a family member who helps in the firm, and (iii) whether the household had credit in 2002 and 2003. These variables affect the decision to apply for a loan in 2004 and are uncorrelated with the error term. While
these variables might not be fully exogenous do the ownership of the firm, given the limited availability of data, I use them in an attempt to correct for some of the endogeneity.

The econometrics literature has not yet developed a fixed effects Probit model that uses instrumental variables. Therefore, I use a linear model, assuming that the dependent variable is continuous, in order to correct for the endogeneity problem. It is possible to use an instrumental variable in a linear probability model. This is not the first time that a linear probability model is used, even if the dependent variable is dichotomic (de Janvry, Finan, Sadoulet, and Vakis, 2006a).

I estimate a linear probability model with fixed effects and I use instrumental variables to control for endogeneity problems. Columns 1, 2, and 3 in Table 10 present the estimated coefficients. The dependent variable for the estimation reported in column 1 is whether the household has participated in credit markets or not (as was the case in the earlier estimations). In column 2, the dependent variable is whether the household participated in credit markets in 2004 or not, and the dependent variable for the results shown in column 3 is whether the household participated in credit markets in 2003 or not.

Table 10 shows that, in 2003, the effect of participation in the program on the household’s probability of having a loan is significant but comparatively small (only 3 percentage points), given that the linear probability model is a better fit for the data set. While participation in the conditional cash transfer program still has a positive influence
on credit market participation, after correcting for endogeneity, this result suggests that
the substitution effect may somewhat offset the positive influence of the CCTP on credit
market participation and lead to a lower positive net influence.
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Semi-robust z-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%
Instruments: Firmexp, help, proxie, cre02, cre03

Column (-1-) Linear Probability Model with Fixed Effect and Instrumental Variables
Column (-2-) Linear Probability Model with Fixed Effect and Instrumental Variables for credit in 2004
Column (-3-) Linear Probability Model with Fixed Effect and Instrumental Variables for credit in 2003

Table 10: Estimation of the probability of a household participating in credit markets using a linear probability model and instrumental variables
9.7 Estimation for credit applications

In this section, I explore potential determinants of a household’s decision to apply for a particular amount of credit, for those households that have loans. In this case, the sample includes only 9,629 households, which is the number of households with a loan in at least one of the three years of the panel.

When I estimate the determinants of the application for a given amount of credit, while taking into consideration that the data are from a panel and the endogeneity problem, I have a censored data set. The data are censored because the amount of money that I see that households apply for is not necessarily the amount of credit that the household would ask for. Frequently, households ask for the loan amount that they know that the lender is going to lend and not the amount of money that they would like to receive. Since there is credit rationing in the market for loans, the quantity demanded is not necessarily equal to the quantity supplied (Stiglitz and Weiss 1981).

If OLS are used in an econometric analysis with censored data, the estimated coefficients will be biased. To solve for the censored data problem, the Tobit procedure is frequently used. The problem is that there is no currently available procedure for a fixed effects Tobit estimation.

To estimate the an equation for the application for a given amount of credit when the households have CCTP access, I first estimate a fixed effects model with instrumental variables, assuming that the data are not censored. I use the same instruments as before.
Table 1 shows the regression results for the fixed effects estimation with instrumental variables, where the dependent variable in column 1 is the household’s amount of credit in the loan application, the dependent variable in column 2 is the household’s amount of credit in the loan application in 2004, and the dependent variable in column 3 is the household’s amount of credit in the loan application in 2003.

The coefficient for CCTP is negative, but it is not statistically significant. Therefore, there is no significant effect of participation in the conditional cash transfer program on the amount of credit apparently demanded, per the amount in the loan application. While for some households the weak substitution effect would be important (and the influence would be negative), in other cases the risk-coping effect may be more influential (and the effect would be positive). In this group of households, it is not possible to significantly highlight one group over the other. No one of these effects dominates and the net result is not significant.

The coefficient for owing a household firm is not significant, either, except for the loan applications in 2003. For those households that participate in the credit market in 2003 and own a firm, the amount of credit demanded is over 600 Mexican pesos higher than for households without a firm (column 3). Also, in column 2, we see that the coefficient for the fixed 2003 year effect, which is introduced to control for the National election, is negative and large (-800 Mexican Pesos). We may interpret this result as a potential failure to keep political promises negatively influencing the demand for credit.
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Absolute value of z-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%
Instruments: Firmexp, help, proxie, cre02, cre03
We drop educ_h: (7,10) to avoid multicollinearity

Column (-1-) Fixed Effects and Instrumental Variables
Column (-2-) Fixed Effects and Instrumental Variables for credit in 2004
Column (-3-) Fixed Effects and Instrumental Variables for credit in 2003

Table 11: Estimations of the amount in the loan applications, for borrowers, using fixed effects models
Due to the fact that the data are censored, the coefficients of the OLS estimation are biased. To solve for this problem, I run a Tobit model, and the estimated coefficients are shown in Table 12. First, owning a firm does not affect the amount of the loan application. In other words, once I control for the fact that some households do not have a loan, or the amount of the loan is zero, operating a business does not influence loan size.

Table 12 also shows that the influence of participation in the Oportunidades program on the amount of the loan application is significant and negative. Thus, while participation in the program seems to positively influence the likelihood of participation in credit markets (potentially as a result of a creditworthiness effect), once this participation is given, the amount of the loan application is much lower for those in the CCTP than for those not in the program. This suggests a weak substitution effect, which is not sufficient to prevent participation. In other words, the receipt of the conditional transfer increases the likelihood that the household has credit, but it reduces the size of the loans that are requested. Non-participant households, in contrast, have a lower probability to participate in credit markets but, when they do, they apply for larger loans, because the weak substitution effect does not work in their case.
### Table 12: Demand for credit estimation using Tobit Models

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<td>(12.59)**</td>
<td>(6.38)**</td>
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<td>92.94</td>
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<td>(13.45)**</td>
<td>(2.36)*</td>
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<td>(8.30)**</td>
<td>(0.17)</td>
<td>(3.76)**</td>
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<td>-390.07</td>
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<td>(8.60)**</td>
<td>(3.38)**</td>
<td>(7.47)**</td>
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<td>(2.55)*</td>
<td>(7.39)**</td>
<td>(0.74)</td>
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<td>(4.21)**</td>
<td>(5.10)**</td>
<td>(0.48)</td>
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<td>307.67</td>
<td>-492.65</td>
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<td>(2.38)*</td>
<td>(2.13)*</td>
<td>(1.11)</td>
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<td>(4.63)**</td>
<td>(1.03)</td>
<td>(1.53)</td>
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<td>Constant</td>
<td>3,670.73</td>
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<td>(30.74)**</td>
<td>(31.76)**</td>
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Absolute value of z-statistics in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%
We drop educ_h: (.7) to avoid multicollinearity
Column (-1-) Tobit
Column (-2-) Tobit for 2004
Column (-3-) Tobit for 2003
I have used diverse econometric models to explore different dimensions of the influence of CCTPs on credit market outcomes. First, I have looked at how Oportunidades affects the likelihood of credit market participation. Second, once the households have had access to credit, I have looked at how the Oportunidades transfer affects the amount of credit apparently demanded by the households. I find that Oportunidades households are more likely to have credit than households that do not receive Oportunidades transfers. However, the effect of Oportunidades on the size of the loan demanded seems to be negative, suggesting a weak substitution effect.
Chapter 10: Conclusions

Mexico is both one of the richest countries in the world and one with many inequalities. Different tools have been used to fight poverty in Mexico. Oportunidades is a CCTP aimed at increasing human capital formation among the poor and breaking the inter-generational poverty that traps them.

Diverse studies show the significantly positive effect of Oportunidades on socioeconomic indicators of Mexican households. However, there are few studies that analyze the effects of Oportunidades on credit market outcomes. This is the purpose of this thesis.

I develop a conceptual framework to show the effect demand and supply side implications on credit market outcomes of participation in a CCTP. On the supply side, there is the creditworthiness effect of the transfer. Households enrolled in CCTPs receive a transfer of money that is risk free and that increases repayment capacity. In this case, the lenders’ perception about the riskiness of the households may change, because the transfer is not covariant with the other sources of household liquidity.

On the demand side, there are two conflicting effects: (i) a substitution effect and (ii) a risk-coping effect. In the case of substitution effect, households receiving this “free money” may be less inclined to pay interest on their access to additional liquidity. In the case of the risk-coping effect, the transfer also improves the household’s risk
management. The household may change its production plans if there is a safer source of income available. These changes may increase the household’s demand for credit.

Therefore, the effect of CCTPs on credit market outcomes is theoretically ambiguous. Under particular circumstances, the effect may be positive, when the creditworthiness effect and/or the risk-coping effect prevail. However, the effect may also be negative, if the transfer discourages the use of financial markets to increase the household’s liquidity, through the substitution effect.

Using a random assignment social experiment, in which treated households receive a conditional transfer (Oportunidades) and control households receive nothing, I explore econometrically how the Oportunidades transfers affect the households’ probability of participating in credit markets. I find, using different econometric techniques, that households with Oportunidades transfers are more likely to have a loan. I estimate the determinants of the likelihood of access to a loan and of the size of the loan application, and I find that households enrolled in the program have a higher likelihood of participating in the credit market, but that they demand loans of smaller size than those demanded by non-Oportunidades households.

Our estimations indicate that the presence of Oportunidades enhances the Mexican financial market, because it increases the probability of that households enrolled in the program are successful in gaining access to credit. The size of the loan is smaller, however, for Oportunidades households than for non-Oportunidades households,
indicating the presence of a weak substitution effect. Once they have established their creditworthiness and created a credit history, households enrolled in the Oportunidades program might demand larger loan amounts, if they were left without the benefits of the program.

It is important to mention that the results of this thesis reflect the data available and the econometric methods used. The estimated results may be sensitive to new sources of information, such as information regarding shocks faced by the households or information about interest rates and prices of commodities in the community.

This thesis sheds some light about the effects of a CCTP on credit market outcomes. It also opens the window to more research in this area. In the future, it would be interesting to study if households that were once enrolled in Oportunidades, and whose children have grown beyond eligibility are able to have larger loans than those that never participated.
References:


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