

ABSTRACT

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AN EVALUATION OF ACTIVE LABOR
MARKET POLICIES IN DEVELOPING
ECONOMIES: THE MEXICAN CASE

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One of the major problems in developing countries is that of unemployment and underemployment. Thus the use of active labor market policies constitutes a very significant part of the policy debate. This dissertation analyzes the training component of one such policies in Mexico: PROBECAT-SICAT (P/S).

First, we provide an overview of some of the institutional elements that are likely to have a bearing in the design, functioning and effects of P/S – in particular those related to the decentralized operation and funding of the program. We find that there is some room for a more explicit definition of the mechanisms that establish the checks and controls to reduce misuse of resources. We suggest the inclusion of indicators of job quality as a concrete objective of the program.

In the second part of the dissertation, using semi-parametric techniques, we obtain the average treatment effect of the program on its participants. We use a set of variables

that capture characteristics of job formality, and find evidence that male and female trainees do increase their probabilities of employment and of employment with health benefits. In addition, we find that, on average, female trainees tend to find employment in more informal jobs than their male counterparts.

The last part of the dissertation consists of an impact evaluation of P/S by training type. We find evidence that participating in mixed training in medium increases the trainees' probability of employment per se and employment with desirable 'formal' characteristics, such as health and housing benefits, a written contract, etc., with respect to any other training type. Secondly, the mixed training in micro and small enterprises is superior to the training for self-employment and in-classroom training. Moreover, we find evidence that female participants increase their chances of obtaining jobs with informal characteristics if they choose to participate in training for self-employment with respect to participation in-classroom training.

We conclude that even with institutional shortcomings, the program seems to have positive effects that justify its original creation and permanency.

AN EVALUATION OF ACTIVE LABOR MARKET POLICIES IN DEVELOPING
ECONOMIES: THE MEXICAN CASE

By

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Dedication

A mis papás, quienes me dieron esta vida llena de fortuna y todo el apoyo para hacer y deshacer cuanto se me ha ocurrido.

A mi hermana Chabela, quien durante todos estos años me ha salvado más de una vez.

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Anand was an amazing surprise, he appeared when least expected and has given me a new direction and great hopes for the future. Thank you for being by my side and loving me in all my different states.

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Chapter 1: Introduction

One of the major problems in developing countries is that of employment, or rather unemployment and underemployment. There are also complications of ensuring social justice and the integration of backward areas and segments of population into the economic mainstream of the country. Further, in countries with troubled political pasts, the government also likes to signal their good intentions to the public. Thus the use of active labor market policies (ALMP), and similar programs, to increase employment and employability of the population constitute a very significant part of the policy debate, particularly for developing countries.

The main objective of the Active Labor Market Policies (ALMPs) is to decrease the risk of unemployment and underemployment, and to raise workers' labor income. OECD economies have a long tradition of implementing and evaluating ALMPs; an important proportion of these programs are the training and retraining components, representing 36% of overall expenditures in OECD countries (Betcherman et al.). Recently, transitioning and developing countries have started following the lead of the economically developed countries in this field. Governments throughout Latin America and other developing regions have put into operation a diverse set of direct policies to promote employment. One of the important components of such policies is the training programs aimed at incrementing the employability¹ of its trainees.

¹ Definition of employability, from <http://www.employment-studies.co.uk/summary/summary.php?id=emplblty>

“...employability is about being capable of getting and keeping fulfilling work. More comprehensively, employability is the capability to move self-sufficiently within the labour market to realise potential through sustainable employment. For the individual, employability depends on the knowledge, skills and attitudes they possess, the way they use those assets and present them to employers and the context (eg personal circumstances and labour market environment) within which they seek work...”

The training component of the ALMPs in Mexico, SICAT (Sistema de Capacitación para el Trabajo or Labor Training System), is one of the most important active labor market policies of the country, functioning as a decentralized training program for the unemployed and underemployed.² The program was created in the early 1980s under the name of PROBECAT (Programa de Becas de Capacitación para Desempleados), and its main objective was to reduce the impact of the debt crisis on the labor market. PROBECAT existed as such for 17 years, from 1984 to 2001, financed first by the Mexican government (until 1986), then receiving funds from the World Bank (1987 to 1996), and finally being supported by the Inter-American Development Bank (since 1997). The main goal of the program has been to upgrade the skills of the unemployed and underemployed to meet the requirements of potential employers.

How to measure its effectiveness, in terms of methods and outcome variables, is not clear, and the diverse effects of the program found in the previous literature, make this still an unresolved question.

This dissertation can broadly be divided in two parts: institutional analysis and impact evaluation.

In the first part I conduct an institutional analysis of the PROBECAT/SICAT (P/S) programs by putting forward a description of the environment in which it operates. In particular, I study the decentralized nature of the program and consider its potential effects. Using interviews with officials in charge of the programs, unpublished documents, and other official releases this study provides a better understanding of the

² The Labor Department defines underemployment as: monthly income of less than two minimum wages (determined by zone) and/or work less than 35 hours a week involuntarily, that is, due to market reasons such as low demand for the products and services offered.

institutional context in which PROBECAT/SICAT operates, allowing for important distinctions between developed and developing countries.

In the first half of the empirical part of the dissertation I investigate the success of PROBECAT/SICAT of realizing its potential to increase the probabilities of formal employment. Usually, studies on the impact evaluation of a training program in a developed economy would involve three main outcome variables: reduction of the time in job search, probability of employment and wages. I propose that for developing countries it is relevant to study additional variables that capture the impact of the program on the probabilities of obtaining formal employment; with this I aim to tackle the multidimensional nature of the impacts of a training program in a developing country. Using semi-parametric techniques, I obtain the average treatment effect of the program by comparing individuals from a randomized retrospective survey on ex-trainees and a suitable comparison group obtained from a National Employment Survey. The paper contributes to the existent literature in two dimensions: it acknowledges some methodological issues such as the presence of contamination bias and the appropriateness of the comparison group; secondly, it includes in the impact evaluation relevant outcome variables that correspond to the reality of the labor markets in developing countries.

In the second empirical chapter I investigate the differential performance of the diverse types of training programs for the unemployed and underemployed in Mexico, by studying the characteristics of these programs on the basis of their ability to improve the employment prospects of the trainees. Under this scheme the modality of in-classroom training has completely disappeared in the last years giving space to mixed and on-the-job training types. I set the research of the performance of each modality in a multi

treatment setting, where each type will be evaluated contrasting its impacts to other types. With this I provide additional insights on which is the most effective type of training, a matter on which previous evaluations of P/S as well as other programs in Latin American have yet to reach a consensus.

Chapter 2: Origins and evolution of the training component of the Mexican active labor market policies

Brief history of the training component of the ALMP in Mexico

It was during the seventies that the “last attempt to make employment a preponderant objective of economic development... [in Mexico]”³ was made, according to R. Flores Lima, former Director General of Employment at the Ministry of Labor. This attempt basically consisted of the formulation of the National Program of Employment (Programa Nacional del Empleo), a development plan in which it was established that the design of future economic policies would be articulated in terms of employment creation. By the end of the decade, in 1978, the latest reform to the Federal Employment Law took place in order to create the National Employment and Training Service (SNE, for its abbreviation in Spanish for Servicio Nacional de Empleo). Under the supervision of the Ministry of Labor (Flores Lima, 2004), the SNE was mainly established to: a) promote the employment of the unemployed population in active job search; b) promote the training and acquisition of marketable skills by the unemployed; c) promote and conduct formal studies of national and regional labor markets (Flores Lima, 2004; IADB, 2005). The SNE operates through regional offices known as State Employment Services (SEE for its abbreviation in Spanish for Servicio Estatal de Empleo), which runs and oversees the active labor market policies.

Just a few years after the establishment of the SNE, during the last year of the presidential term of José López Portillo (1982), Mexico suffered a major financial and

³ Flores Lima (2004).

economic crisis, caused mainly by the fall of oil prices and increases in interest rates. An important byproduct of the crisis was a rise in the unemployment rate of 60%. As a response to the poor economic conditions and the lack of employment opportunities faced by an important proportion of the population, between 1982 and 1987 the Ministry of Labor, through the SNE, designed and implemented a set of the active labor market programs focused exclusively on training. These programs were to be known as PROBECAT (Programa de Becas de Capacitación para Desempleados in Spanish). and officially started its operations with such denomination in 1984. It was established mainly as an effort to reduce the frictional unemployment that afflicted the fraction of the population with poorer education and job skills, particularly targeting the laid off heads of household. In its beginnings, PROBECAT was mainly focused on workers laid off by industries in urban areas, starting in the capital city of the country. However it was later completely decentralized and operated by the SES in other regions. Each of the regional offices of employment was and still is considered an area of operation of the National Employment Service.

The first version of PROBECAT granted 25,000 fellowships (Ibarra, 2005) to increase the skills and education of the unemployed to meet the requirements of potential employers. The program was operated and funded jointly by the Ministry of Labor and the Ministry of Education, and was conceived as a link between the characteristics of the labor market at the moment and the education supply. As such, the first modality was in-classroom only training, and the cost of the program (teacher's wages, learning material, etc.) was divided between the Ministries. Even though it was originally conceived as a temporary emergency program, PROBECAT gained popularity and was made

permanent, and by 1987 became one of the main instruments of the active labor market policies (ALMP) (Flores Lima, 2005). The number of fellowships awarded that year was more than double that of the original version of the program. During the same period, the World Bank started financing it, giving its support to the program until 1996.

In 1987, PROBECAT included a mixed modality to the training options that combined school-based and on-the-job training. In this case, the Ministry of Labor made agreements with firms that wanted to cover some of their vacancies, and the on-the-job training was done in the firms that had agreements with the Ministry.

Between 1995 and 2001, PROBECAT extended its modalities to include:

- 1) In-classroom.
- 2) Mixed in medium and large firms.
- 3) Mixed in small and micro firms.
- 4) Training for self employment.
- 5) Local Employment Initiatives (ILE) – promoted entrepreneurship, gave support to small business.

Table 1 includes a list of training courses included in categories 1, 2, and 3 for the State of Tamaulipas.

During that period the program was expanded from 50,000 fellowships to 300,000 in 1994, partly responding to requirements imposed by NAFTA. At the end of 1994, under President Salinas De Gortari, the program experienced its biggest increase, which resulted in the number of fellowships being close to 600,000 per year by December of 1995. The last increase was attributed to political pressures, since presidential elections were close (Samaniego, 2005). However, given the rapid increase of the program, the

officials who operated it faced two potential problems (Samaniego, 2005): maintaining the quality of the training services; and not generating false expectations of the possibility of obtaining better jobs because Mexico was facing a crisis that hindered the creation of better positions. In addition, one of the first evaluations of the program concluded that the participation of an important proportion of the women, during the crisis time, was linked mainly to the stipend they received and not to the necessity of upgrading their skills. This was known as the “housewife effect” (Ibarra, 2005) and as a consequence, it was suggested that the participation of women was discouraged.

In 1997 the external funding of the program changed from the World Bank to the Inter-American Development Bank, which has been supporting it since.

Table 1. Examples of training contents, State of Tamaulipas

In-classroom (offered July - September 1999)

Basic Software
 Auxiliary accountant and software
 Electrician
 Administrative assistant
 Auxiliary accountant
 Administrative assistant and software

Mixed in medium and big (offered January - March 2002)

Industrial sewing
 Cashier
 Shop Floor employee training
 Furniture design and manufacture

Mixed in micro and small (offered January - March 2002)

Administrative assistant and software
 Beautician
 Receptionist and auxiliary accountant
 Legal clerk
 Auxiliary accountant and software
 Engine tuning

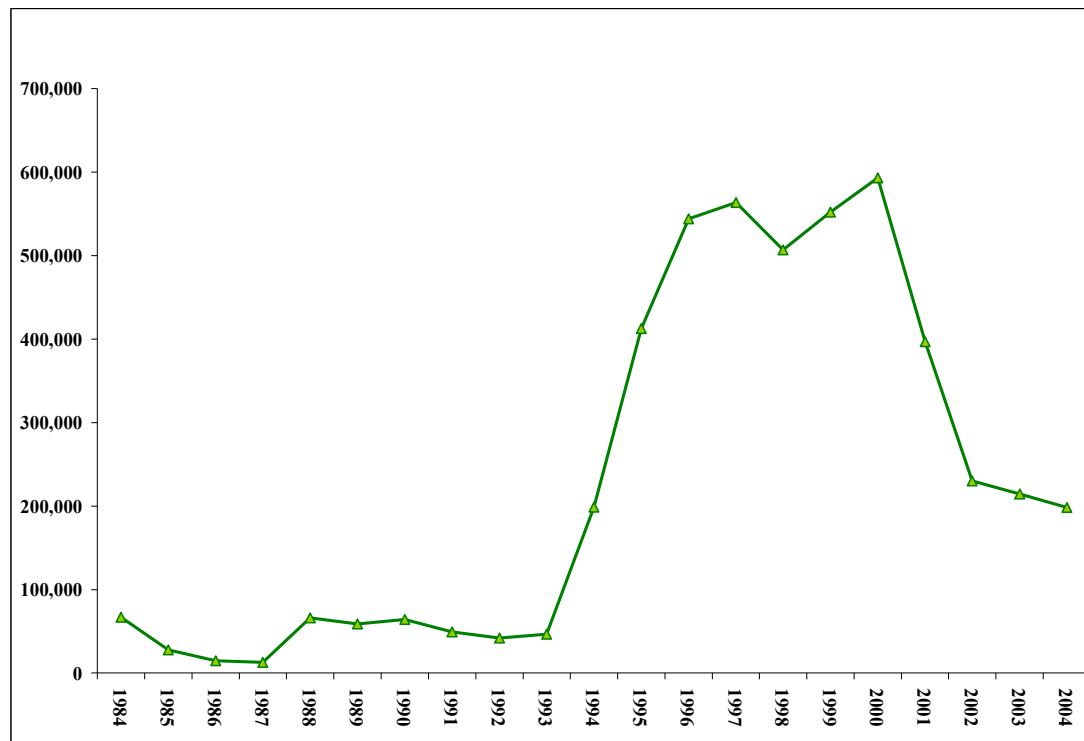
Source: Gobierno del Estado de Tamaulipas (1999, 2002)

With the change of administration in 2002, PROBECAT became SICAT (Sistema de Capacitación para el Trabajo, in Spanish) and the in-classroom modality disappeared. This occurred after officials of the program claimed that the curriculum followed by the educational institutions in charge of the training did not cover the skills employers demanded. At the same time the Local Initiatives for Employment (ILE, for its abbreviation in Spanish) modality was also eliminated. In the same year, the SNE launched three pilots: training for professionals, training vouchers, and training for college students about to enter the labor force.

Simultaneously, the mixed modalities started gaining more importance and became the training component with the highest representation among all training modalities. In 2002, combining the two mixed modalities accounted for more than 50% of the total number of fellowships.

From 2001 to 2002 SICAT experienced a reduction in the number of fellowships given per year, which was mainly because of (GEA Consultores, 2002): a) the elimination of the schooled-based and the ILE modalities, b) the new pilot programs were operated at a smaller scale than the eliminated modalities; and c) the federal funding for SICAT was reduced by 35%, which in turn reduced the federal funds assigned for the program in subsequent years. Figure 1 presents the number of fellowships given per year from 1984 until 2002.

Figure 1. Number of Fellowships per Year.



Source: Dirección General de Empleo, Secretaría del Trabajo y Previsión Social.

Funding and Administration of the Program

The first rounds of training programs for displaced workers after the early eighties crisis were solely operated and paid for by the Mexican government. Not long after its first round of operations, the program started having funding problems and the number of trainees fell from 55,799 in 1984 to 15,629 in 1987 (IADB, 2005). Facing these budgetary difficulties, the Mexican government reached out to the World Bank. By the end of 1986 the World Bank arrived at an agreement with the Mexican government and consented to provide the first credit for the operation of the program. The loan scheme was known as the Manpower Training Project (IADB, 2005), under which the federal

government received a credit of 80 million dollars (Ibarra, 2005). A second credit was approved in 1993 in the amount of 160 million dollars, which was part of a loan project also funded by the World Bank, known as the first Labor Market Modernization Program (LMMP). These two agreements provided PROBECAT with funds to complement those from the federal budget, in order to operate from 1988 to 1996.

Starting in 1997, Phase I of the Second Labor Market Modernization Project was inaugurated with a loan for the operations of PROBECAT and additional smaller programs. This phase went on until 1999, and in 2000, Phase II was initiated. The credits that supported Phase I and Phase II of the second LMMP were provided by the Inter-American Development Bank (IADB). As before, the Mexican federal government agreed to provide additional funding for these active labor market policies. In the case of Phase I, the IADB gave a credit of 250 million dollars, while the country supported the program with 167 million dollars. For the Phase II, these numbers were 200 million dollars and 233 million dollars, respectively, from which 125 were exclusively directed to PROBECAT/SICAT.

While an important proportion of the funds to sustain and expand the operations of PROBECAT historically came directly from loans provided by international organizations, the operability and supervision of the program always remained in the country. The federal government, mostly through the Ministry of Labor, would come into agreements with the state governments, who on their part would determine the number and nature of training classes, specify additional requirements for participants and determine the conditions in which regional businesses could benefit from the program.

In the next chapter I give an account of the institutions surrounding PROBECAT/SICAT, analyzing the decentralized nature of the program and providing the chapters on the impact evaluation with an institutional background.

In the chapters following the institutional chapter I present an impact evaluation of the program alongside two concepts: the efficacy of the program in providing employment with a particular emphasis on formal employment and explore the different effects that result from the range of training formats in existence.

Chapter 3: Institutional analysis

Even though the main purpose of this dissertation is not to study the decentralization but the program itself, it is still relevant to establish a framework for the analysis in order to provide a deeper understanding of the effects of the PROBECAT/SICAT (P/S) training program for the unemployed and underemployed in Mexico.

While the program and its objectives were described in the previous chapter, this chapter is aimed at providing an overview of some of the institutional elements that are likely to have a bearing in the design, functioning and effects of the P/S training program – in particular those related to the decentralized operation and funding of the program.

Although we describe and briefly discuss the beginnings and first years of PROBECAT/SICAT, this chapter focuses mainly in the institutional background of the program under the Second Labor Market Modernization Project (referred to as LMMP hereafter) that is under the partial funding of the IADB, which corresponds to the year of 1997 and onwards. This period in time also corresponds to the same years the impact evaluation in subsequent chapters contemplates.

It is relevant to mention that in the LMMP the training element of the active labor market policies was packaged into a single component -known as Employment Support Program (ESP)- with other services for job seekers, specifically intermediary services such as local job banks that could easily be accessed by the public (CHAMBATEL). The general objective of this component is twofold: a) to reduce the job search and hiring costs faced by the unemployed and the enterprises and b) to promote the employment of

job seekers who were trained by the program (IADB, 2001). This specific component was by far the most important one of LMMP, which also included two other components. In the original loan proposal, the ESP was set to absorb close to 80% of the total resources (IADB, 1996). Operationally, the ESP aimed to improve and increase the coverage of the National Employment Service, and to develop the link between the unemployed and the training and/or labor demand.

The insights of this chapter complement the empirical analysis presented later in the dissertation in two main ways. First, by putting forward a detailed description of the environment in which the program operates, the institutional analysis improves the understanding of the empirical results for interested readers. In particular, this may be useful for those whose knowledge of the issue comes from the experiences of developed countries by making an explicit point of some characteristics that may be unique to developing economies and may also be useful to those who are not so familiar with evaluation analysis. Secondly, if the analysis reveals systematic institutional shortfalls in the design or operation of P/S, these may help explain the relative under-performance of P/S as compared to its counterparts in the developed and transition economies.

While the objective is to analyze the institutional framework of PROBECAT/SICAT with an emphasis on its decentralized nature, it may also be of use to illustrate programs that operate on similar basis in Mexico and other developing countries. It also serves the purposes of explicitly considering some of the differences that set Mexico and other developing countries aside from other, more developed, nations.

Decentralization and publicly funded programs

Two opposing views on the potential effects of the devolution of power to states exist. Supporters of decentralization call attention to the benefits of experimentation and competition among regions that may lead to improvements in policy making. On the other hand, detractors worry about a possible “race to the bottom,” where regions will provide just the minimum called for by the national authority.

The issue of how power is shared across the different levels of government is not a new one. In 1959, Richard Musgrave published his widely (although not universally) accepted Theory of Public Finance, where he set down a role for the government to fix market imperfections, attend to the issue of income distribution and stabilize the economy.

The introduction of a multi-layered government added to this scenario the need to discern which level would be best suited to fulfill each task, under the assumption that public welfare would be the ultimate objective. Wallace Oates (1972) proposed in his decentralization theorem that under certain conditions, it would be welfare-maximizing to provide a diverse set of local outputs instead of a uniform level of output across jurisdictions. That is, local provision of certain goods and services tailored to the needs and preferences of the locality would be superior to a nationally determined provision.

There still exists room for decentralization so that local governments, which are better informed about the preferences of their constituents, could provide better services, especially in the presence of mobile households that can sort themselves according to their desired level of provision of public goods, as Tiebout (1956) first advanced. The role of the central government in this context would then be to supply resources for local

provision of the public good/service, while maintaining the lead in equalization and macroeconomic policies.

There are a few issues that make the implementation of the guidelines of the first generation, as laid down in Oates' theorem of decentralization (1972), difficult in real-world policy making. These are brought into the light by a new body of literature arising in the arena of fiscal federalism that builds on this "first generation" by including concepts of asymmetry of information.

As mentioned before, at the core of this "second generation of fiscal federalism" is the realization that public officials may not always have the public good in mind when making their decisions, making it necessary to understand their motives to better comprehend their choices.

Additionally, the second generation highlights the importance that asymmetries of information have on characterizing the relationship between the different levels of government. A new aspect appears here, with the realization that local policy makers may use their informational advantage to further their own interests.

These two elements combine themselves to deepen the problems presented by soft budget constraints. Weingast (1995) stresses the fiscal irresponsibility among the lower tiers of government that may be brought about by heavy reliance on transfers from upper levels. Locally oriented policy makers that count on national bailing-out for their fiscal liabilities are likely to raid the commons of national resources to advance their local policies, even beyond the point where the marginal cost of an additional dollar exceeds its marginal benefit. To avoid this problem, the literature has long agreed that some sort of co-responsibility or reliance on own revenue (as opposed to only national resources) is

desirable to propitiate fiscal responsibility among local policy makers. Other strands of the literature [see reviews by Oates (2001) or Wilson (1999)] propose that fiscal competition may actually exacerbate these problems.

This is a relevant problem in public policies dealing with training for the unemployed and underemployed, since governments often opt for decentralizing the provision of these services.

In fact, some evidence of the institutional dependence of labor policy and decentralization already exists. Klassen and Schneider (2001), in their comparison of the Canadian and German cases, briefly review a body of literature that proposes a positive correlation between decentralization and labor market policy performance, although they warn that it is not mere decentralization that matters, but the actual institutions that configure its functioning.

The case of PROBECAT/SICAT, a framework

The regional employment offices of the State Employment Services (SEE) administer P/S following the general guidelines provided by the National Employment Services (SNE for Servicio Nacional de Empleo in Spanish), under the Ministry of Labor, and using resources that come from the national coffers and the Inter-American Development Bank (IADB). Programs are often not institution-neutral; it seems likely that the interests and particularities of these three agents (the regional agencies, the national secretary of Labor and the IADB) play a role in the way the program is designed and carried out.

A remarkable characteristic of the program comes from the asymmetry of information among the agents involved. Ideally, the agent that has the best knowledge about the service to be provided and its recipients should be the one in charge of its delivery, since this would provide the best possible allocation at the lowest cost. In this case, the local officials are likely to have better information on the types of training that would be most effective in their respective states, which firms are likely to provide better mixed training, how to provide the training at lower cost etc. If this is true, there are reasons to believe the program may be best managed at the local, as opposed to the federal level. This would provide support for the choice of having the SEEs administer the particulars of the program.

However, this general principle runs into trouble when two elements are added: different objectives of agents at the local level (where the program is executed) and national or supra-national level (where the funding comes from); and incomplete information. Local executors could have different objectives in mind (reelection, favoritism, etc.) that could easily be concealed from the funding national or supranational agent. Furthermore, local officials may try to take advantage of their superior information to extract additional funds, even beyond the point where additional money spent in their jurisdiction would provide lower marginal benefits than if it was spent in another jurisdiction.

Various reasons exist that might explain these types of behavior among the local authorities. On the one hand, the training program has an array of visible benefits that come with little to no cost for the local authorities. Politicians working for re-election reap not only the good publicity of providing assistance to unemployed or

underemployed voters, but also of hiring local instructors to conduct the classes, and making the necessary purchases for the operation of the program, as well as providing the local businesses with a more skilled labor force to hire from. At the same time, they bear little of the political cost, since no taxes or fees are collected from the trainees or the community. Additionally, the transfers to conduct the training may substitute some of the funds the SEEs might have otherwise devoted to similar activities, or may help pay for costs the offices would have had to incur even in the absence of the program (administrative help, etc).

The central agency may have reasonably good information about some of the costs associated with the provision of the training services (such as, for example, the rental cost for classrooms or the price of supplies) but may be unsure about others (such as which firms would provide better training at lower cost, or the best places to provide practical training).

If the funding agency was able to determine exactly the cost of providing the training service in each state, then, given a desired level of output, it could provide just enough transfers to cover the costs, thereby avoiding any excessive appropriations for misuse of funds while being able to fix the desired level of output. Even if the central authority may have good information about the prices of some of the inputs, it does not know the cost of some others and hence, cannot determine exactly the cost that the regional administration will incur to provide the training.

Following Levaggi (2002), this can be represented graphically by depicting the isocosts of the two levels of government. Assuming (for simplicity) that the delivery of the training services requires two inputs (or two bundles of inputs), and the central

agency knows the cost of one, but not of the other, we can present the problem in the following graph, where the dashed line represents the state government's real isocost, and the shadowed area represents the estimate the central government has about the costs of delivering the service. Note that the shaded area is always above the solid line (which represents the assumption that the state government is more efficient in the provision of training services); and that as more of the input whose price is unknown to the central authority is required to deliver the service, the uncertainty of the central government regarding the cost of training increases.

Using its superior information the state government could “exaggerate” the real cost of providing the training services and use the remaining resources for its own purposes, hire factors at a higher price to gain the favor of the providers, etc.

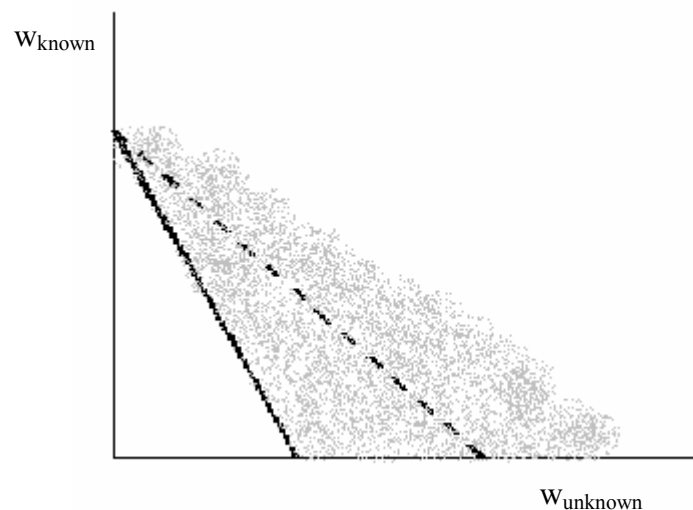
As a result of this asymmetry of information, the central government may transfer more resources than needed to provide the good. This excess of transfers is usually referred to as “informational rents” and can be considered as the “price” the higher tier of government has to pay for the increase in efficiency of the provision of the good.

The exact amount of the transfer is limited above by the maximum expected value of provision, which will be in the contour of the cost that the central government would face if it were to provide the service itself. The minimum possible amount of the transfer is in the contour of the regional government's actual cost of providing the service/good.

Although very simple, figure 2 is useful in representing the potential problems the funding authority may face in deciding to provide training services through the SEEs.

We turn now to discuss how the design of the program tried to reduce the potentially pernicious effects of the asymmetries of information while retaining the advantages of decentralized execution, and point to places with room for improvement.

Figure 2. State and central governments' isocosts.



Source: the authors

Reducing the asymmetries of information in PROBECAT/SICAT

It is established then that the organization of the program will have three levels:

- 1) Central. The execution of the program takes place in the context of the existent structure of the Ministry of Labor. Specifically the Sub-Ministry of Training, Productivity and Employment (STPE), through the General Office of Employment (DOE), which is responsible for the

credit administration and the quality of the technical advice services given to the states.

- 2) State. The states' governments will be responsible for the planning, executing and supervision of the resources that they receive, through the State Employment Services.
- 3) Local. The state employment offices, offices of the State Employment Services and the Training Promotion Offices (OPC, Oficinas Promotoras de la Capacitación in Spanish) are in charge of delivering the services and giving assistance to the unemployed and underemployed who seek the services.

The IADB was obviously aware of the potential issues derived from the uneven information and in the original proposal of LMPP Phase I, (IADB, 2001) it cites the decision of the Ministry of Labor to transfer the authorization of training plans and payments to states' agent as a potential risk in terms of supervision and monitoring.

With its decision to decentralize, the Ministry of Labor is foregoing some control over the uses of funds in the operation of the program. Aware of the possibilities of misuse, the IADB negotiates with the Ministry of Labor that the transfer of authority would take place in phases, in which only those states that show enough resources to hire personnel and a demonstrated minimum level of instruments to administer the program would obtain that power of authorization each year the program runs. At the moment of the presentation of the proposal, ten states (out of thirty-two) are cleared to hold such authority. In its proposal, the IADB recommends the implementation of internal financial

control systems to be utilized at the level of the central executor (the Ministry of Labor), and in the state offices in charge of the payments and authorizations. The authorization of fund transfers for the program financier to the states is done at the central level by the Ministry of Labor. Along with the responsibility of authorizing specific syllabus for training and payments, it is established that the state government should absorb the payments to the administrative personnel.

The existence of possibilities of misuse of resources is recognized in the official summary of Phase I of LMMP (page 5). It is acknowledged that there is a risk in the operation of the ESP, whose funds (from an international organization and the federation) are given to the National Employment Service, so that the execution of the operation will be decentralized and carried out by the State Employment Services. In accordance with the Proposal for LMMP, in order to diminish the risk of misuse of resources by the state governments, who act as the agents responsible of the program, the states were to be audited periodically. The supervision and the inspection of spent resources would be done through the state divisions of the DOE and the NES, whose agents would participate along with the IADB in the visits devoted to spending reviews. In the case of some misuse being detected, the state will be object of more audits and the receipt of next period's resources would be restricted to the total correction of such misuse. The specific way in which the corrections would take place would be determined by the Bank and the Mexican Government.

Still, in practice, only a few states are visited by the representatives of the IADB in Mexico. For example, during the year 2001, eight states were visited, and in one of them, Tabasco, irregularities were detected. Although the details are unclear in the

official documents, the transfer of resources to the state was immediately ceased and a special audit was performed by a third party, a consulting firm, which evaluated the problems that were identified and recommended changes to improve internal controls. There is, however, no record of whether the changes were implemented and no mention of a follow-up evaluation is ever made in the official documents.

In general, as previously discussed, a number of checks have been put in place so that the resources for the program are spent in accordance with the objectives of the Ministry and the IADB. In spite of this, a number of complaints of misuse serve as examples of the differing objectives of the central players and the local administrators. In some specific cases, official complaints from regional deputies make it all the way to the central agents. In one, it is claimed that through the State Employment Service, a proportion of the federal and international resources are being used to buy votes for the then official political party, PRI in Tabasco (Cámara de Diputados, 1999). In other cases, the specific use of the misappropriated funds is not specified; such is the case of Jalisco (Cámara de Diputados, 2000) and Quintana Roo (Ibarra, 2005). Because the methods in place are not able to completely eliminate the asymmetries of information between the levels of government and there is evidence of some differences in objectives, it may be advisable to strengthen the controls on the execution of the program and/or better identify its objectives.

PROBECAT/SICAT objectives and formal jobs

Since the very early stages of the cooperation between the IADB and the Ministry of Labor, it was acknowledged that an important proportion of the Mexican labor force was, and is, employed in the informal sector, and that it is desirable for these workers to move to the formal sector because of higher productivity and better employment conditions. "...this sector [the informal sector] is mainly characterized by low productivity, low wage and low skill jobs. Workers receive little or no training and jobs are unstable, leading to frequent spells of unemployment..." (Page 3, IADB 1996b).

In all official documents it is evident that the kind of employment that the IADB and the Ministry would like to promote with the training programs is such that the workers are protected, have higher productivity, and require more than just very low skill, *i.e.*, employment with the characteristics of formality. Hence the importance of a qualitative and quantitative analysis of the characteristics of the employment that ex-trainees are obtaining, so that these would serve as a base for modifications (in terms of the contents and training categories) that more efficiently promote the desired work characteristics. Completion documents of phases I and II LMMP do not refer to any of the job characteristics obtained by ex-trainees.

As stated before, another potential problem with the decentralization of the provision of training services stems from differences in objectives among the upper and lower levels. The upper levels (IADB and Ministry of Labor) state that their main objective is to create employment, but not any kind of employment. In the Program Operation Rules (STPS, 2001) the Ministry of Labor markedly qualifies that the program is to provide training to the unemployed and underemployed population in precarious

economic situations, so that they can acquire the skills and qualifications required by the productive sector, with the purpose of promoting their employment and enhancing their employment quality.

However, local executors may have different priorities and consider the success of the program in terms of more visible outcomes. In particular, quantity of employment (rather than quality) may be a more desirable measure of success for election-bound agents, since the community members may notice it more easily.

Additionally, if providing the kind of training needed to facilitate formal employment is more expensive than conducting training leading to informal employment, it would be possible to increase the number of trainees with successful outcomes (as perceived by the local authorities) by investing in training not as likely to improve employability in the formal sector.

Table 2 contains the set of indicators used to evaluate the success of PROBECAT/SICAT.

Table 2. Indicators used to evaluate the success of PROBECAT/SICAT

| INDICATOR | TYPE | FORMULA | PERIODICITY |
|---|---------|--|-------------|
| Trainees' satisfaction | Quality | Average grade(1 to 4), where 1=unsatisfactory and 4=fully satisfactory | Half-yearly |
| Satisfaction reported by enterprises that demand training courses | Quality | Average grade(1 to 4), where 1=unsatisfactory and 4=fully satisfactory | Half-yearly |
| Percentage of employment among trainees (3 months after graduating) | Impact | Number of employed trainees Total number of trainees | Quarterly |

Source: Reglas de Operación, STPS 2001

From table 2 we can observe that none of the three indicators that the Ministry of Labor uses to evaluate PROBECAT/SICAT deals with formality. The same is true for the IADB benchmarks of success: in the End of Operations Report of LMMP's Phase I (IADB, 2000), it is stated that the two indicators used to evaluate the training subcomponent of the program are the percentage of trainees that find employment and the number of scholarships given out. Furthermore, quality of employment is displaced by quantity as an objective outcome of the training program, The quality of training is evaluated only indirectly through the opinions of the trainees and the enterprises and although the literature that links formal evaluations with self-reports is just starting to develop, serious studies such as Smith, Whalley and Wilcox (2006) suggest that self-evaluations are "...very poor substitutes for rigorous experimental or non-experimental estimates of program impact".

Given the importance placed by the IADB and the Ministry of Labor on job formality, its importance for long-term effects on trainees and the potential incentives from local executors to concentrate on outcomes other than formality, it would be advisable to include measures of job formality as indicators of the success of the program. Making this not only an explicit objective but also a key measure of the success of the different types of training would provide local agents with an incentive (now lacking) to offer the types of training that are more likely to facilitate access to a job in the "formal" sector.

This may be particularly important in the case of training provided for women. The empirical results in the later parts of this study show that females are more likely to

be employed in the informal sector or in jobs that lack the characteristics of the informal sector, after training, than their male counterparts.

Another example of the disconnection between the upper and lower levels involved in the training stems from the selection of candidates. Given the stated objectives of the program, it is reasonable to believe that the funding institutions would prefer to provide training to those who are likely to complete the course and use the skills/experience acquired to obtain formal employment. However, because of the aforementioned potential existence of different objectives, the local executor may be inclined to relax the entrance requirements.

If the program is not operating at its full capacity, accepting trainees that do not fulfill the requirements may not be seen as a problem, but a) the program costs could be reduced by reducing the number of courses offered/trainees, b) low participation could signal inadequacy of the training program to the needs of the population. Artificially high rosters could conceal and hence prevent solving this problem.

Indeed, some evidence exists that the entrance requirements for the program are sometimes not observed. Based on interviews with ex-officials of the program, (Ibarra, 2005) it is known that in a number of cases, requirements (such as age and previous education) were not formally enforced, which is also evident from the after-training surveys with the program participants.

Simple checks would suffice to guarantee compliance with training pre-requisites. However, since one of the advantages of decentralizing the training services is the increased awareness of the local population's needs, it may not be advisable to enforce complete homogeneity in the admission process *a priori*. A viable alternative would be to

include a procedure for the purposes of allowing deviation from the general acceptance guidelines, which would not need to be done in an individual basis, but on a community basis. This would allow a better match between the needs of the community where the recipients of the program live and the characteristics of the training, while providing some reassurance that the deviations from the general guidelines are supported by sound reasons.

Budgeting of PROBECAT/SICAT

The funds that the IADB and the national budget devoted to PROBECAT/SICAT are directly administered by the Ministry of Labor, who is in charge of distributing these resources among the states. The exact amounts that each state receives every fiscal year is approved by the Chamber of Deputies and recorded in the year's Degree on the Federal government's appropriation for expenditure.

In the PROBECAT Operation Rules 2001, (STPS, 2001) it is recognized that there are important differences in the demographic characteristics of each state, as well as in their labor markets. Moreover, it is pointed out that the operative capacity of each of the SES' to effectively utilize PROBECAT's budget varies because of the differences in their administrative structure, the resources available from the state government, their promotion strategy, negotiation ability with the private sector, etc. By accounting for these differences, the Ministry justifies that the amounts received by each of the states for the operation of the training program are not homogenous.

More specifically, the Operation Rules 2001 (STPS, 2001), approved by the Ministry of Treasury (Secretaría de Hacienda y Crédito Público) and also by the Chamber of Deputies, dictate that the amounts received by the states are determined by the following formula:

$$P_i = f(Psb_i, Ee_i, Vpo_i, Dip_i, Pr p_i),$$

where:

P_i is the total budget assigned to state i .

Psb_i is the projected unemployed population, plus the projected employed population that does not receive any labor income or receives less than one time the minimum wage. These projections are based on the National Population Census and the national employment surveys.

Ee_i represents the number of businesses in the state, in accordance with the National Economic Census; this includes all firms, regardless of whether they are registered or not in the IMSS (Instituto Mexicano del Seguro Social). According to the Rules, the number of businesses will indicate the job seeker's probability of employment in that particular state.

Vpo_i equals the employed population of the state calculated via national employment surveys.

Dip_i corresponds to the performance indicators of the SES, such as the number of scholarships given the preceding fiscal year and the proportion of individuals that find

employment. The execution of expenditure from the previous year is also taken into consideration

Finally, $Pr p_i$ is the size of the population that resides in the municipalities classified as having medium, high, and very high socioeconomic marginalization.

Since the 2001 fiscal year, the actual transfer of the assignation of the resources takes place in two stages: a first part takes place early during the fiscal year, and after a mid-year review of the states' expenditure exercise, a second transfer happens. This conditioning of the receipt of the second part of the transfers to a review is aimed at providing oversight over the way in which the program operates financially and serves as an opportunity to exert some control on the process. Additionally, since the reviews are conducted while the operations are taking place rather than ex-post, these controls have the potential to correct mistakes rather than to simply punish them.

Two issues of different natures and levels of importance exist with this financing mechanism. An administrative issue was pointed out in the completion report of phase II (IADB, 2001), where the Ministry noted that an important issue arises when at the beginning of each fiscal year the biggest proportion of the resources for the program are not immediately available for the states to operate the program. The practical solution has been to create "bridge credits" so that the states cover with their own budget the program's expenses and later on the federation provides the funds assigned to each.

More importantly, and unmentioned by any of the agents, is the fact that although the Operation Rules of the training program are thorough in listing the elements that play a part in the distribution of the resources among the thirty-two states, the document is not

as careful in mentioning the exact way, or the proportions, in which each element enters the equation, leaving vast room for interpretation. Leaving undetermined the relative importance of each of the factors that condition the amount of transfers may open the door to misuse and may compromise the effectiveness of the guidelines for careful budgeting.

Furthermore, there seems to be some inconsistency between the stated desired outcomes of the project and the criteria for allocating resources. The formula includes performance indicators based only on the amount of people trained and the number of trainees who gain employment after training, neither of which measure the quality of the job attained –or the value added by the program.

While we did not find evidence that the states request, or otherwise directly determine, the amounts of transfers they receive for P/S, we found that by 2001 some deputies have officially complained about the unequal amounts received by the states they represented, but even more so about the fact that the process of money transference was “not transparent” (Cámara de Diputados, 2001). In April of 2001, during a meeting of a special Chamber of Deputies commission for employment and social protection issues, the Minister of Labor indicated that the distribution of resources for P/S to the states had, up to that point, some discretionary element that resulted in the fact that some comparatively richer states with low rates of unemployment were receiving higher resources than their less advantaged counterparts. At the same time it is mentioned that the discretion from the federal government was supported by the actions of some states. An unwritten budgeting rule supported this claim: a state that executed 100% of the federal resources received for P/S would receive an increment of 10% in the following

year's transfers, or an increment equal to the inflation rate. Furthermore, poorer states with lower capacity to execute the program would not be able to completely spend the first assignation of resources of the year, which resulted in reassignment of such resources to richer states for the second part of the year, generating even more inequalities. This process resulted in states with higher capacity of executing and the totality of the resources (that is, the richer states) receiving more federal resources in the name of P/S, in the own words of the Minister "...the programs was not focused on its clients...it was focused on executing all its resources..." (Cámara de Diputados, 2001). The April meeting of the special commission ends with a promise from P/S officials in the federal government to add transparency to the program's budgeting process and assignment of resources.

Conclusions

In the completion report of phase II (IADB, 2001), representatives of the Ministry of Labor consider that the program has had fine outcomes and attributes. The report attributes such success to the experience of the Ministry in running the program since the early eighties and the extensive cooperation between this governmental department and the IADB.

This suggests that experience and knowledge of the conditions of the Mexican labor market were put to good use and raises the question of why the decentralization of the program took place. Arguably, the Ministry of Labor's experience with the program

suggested that efficiency gains could be achieved by approximating the executor to the final beneficiary of the service.

Useful techniques are in place to oversee the management of resources at the state level. In fact, the devolution of training responsibilities at the time when the IADB became the program's main financier may have contributed to the establishment of checks and controls to avoid misuse, since rather than trying to fix old problems, those in charge may have been able to draft new processes that could have benefited from previous experience, both in the IADB and at the national level. Although the budgeting procedures include checks and controls, some room exists for more explicit definition in the mechanisms that determine the amounts of the transfers.

Additionally, the publication in 1999, after phase I of the second LMMP was already in place, of the first official manual of rules of operation is a good step towards providing a clear reference framework for the agents involved. It is interesting to note that during Phase I the program operated without a document of this type.

The empirical studies conducted in other parts of this dissertation also provide some support in favor of the PROBECAT/SICAT training programs. However, the results comparing the different types of training provide some indication that more of the courses should consist of training in large firms. This would promote a better match between the training provided by the program and the specific needs of businesses.

Some of these changes have already taken place during the existence of the program: when the second LMMP started [1997], a reduction in the proportion of in-

classroom scholarships with respect to those for mixed training took effect⁴. This was a response to the finding that in previous years, the percentage of individuals finding jobs was higher for participants in the mixed training than for those in the in-classroom training. A next step would consider fine-tuning the kind of mixed training to maximize its effectiveness.

Also, the results regarding outcomes in terms of formality suggest that the inclusion of certain levels of job quality as an abstract objective of the PROBECAT/SICAT may not be enough. Furthermore, since local authorities might not share the same objectives in terms of outcome as the funding agencies, it may be necessary to include explicit objectives in terms of formality among the outcome variables used to evaluate the success of the programs.

Notwithstanding the great reviews given to the program from both sides (the IADB and the Ministry), possibilities for misuse of resources exist and have been documented in the past (such as in the above-mentioned cases of Jalisco, Tabasco and Quintana Roo). These problems may be explained partially by the asymmetry of information and objectives among the different tiers of government involved in the training. Little can be done to alter the objectives of the executing agencies, but it is possible to create mechanisms to minimize the incentives to deviate from the program's stated objectives.

Future work could benefit from looking into the possible effects of the electoral cycle in PROBECAT/SICAT and exploring whether the possibility of loosely

⁴ In particular, the percentage changed to include 80% of the training corresponding to the mixed category, and only 20% to the in-classroom category.

interpreting the funding formulae has been used to funnel resources along party lines across different levels of government. Another channel for future research may propose a detailed incentive structure for the local executors based on a reformulation of the measures of success of the program to include quality and not only quantity of employment.

As we move into chapter II, that deal with the empirical investigation of the effects of training on a series of outcomes, it is important to keep in mind that the program does not operate in isolation from its institutional background. For example, at best, previous studies of P/S only take into consideration the basic requisites for entry into training program, detailed in the rules of operation. However, as our personal interviews showed, these were not the actual rules used to qualify for entry into the program, since discretion at the local level was allowed. By using the formal rules of entry, rather than the de-facto ones, these studies are using the incorrect information, which may affect their results.

An interesting result when taking the institutional framework into consideration in the empirical analysis of the effectiveness of P/S is the fact that I find positive effects for some dimensions of the program, despite its institutional shortcomings.

Chapter 4: Training and job formality: impact evaluation of the training component of the Mexican active labor market policies

Introduction

This chapter analyzes the impact of the training component of one such policy in Mexico: PROBECAT-SICAT (P/S). Specifically, it investigates its effects on their likelihood of formal employment for participants in the program. Poverty levels in developing economies are associated with an important proportion of the population working in unregulated settings, with low productive capacity, which in turn restricts the ability to generate higher incomes. A very desirable characteristic of an anti-poverty program in this background will be its capacity to weaken this poverty circle. I propose the consideration of supplemental outcome variables that capture the ability of the training to update the skills of its trainees, so that their possibilities of better work conditions, equated here with formal employment⁵, increase.

I find evidence that the impact of the program is positive with respect to the number of hours worked and on the probability of employment for men and women, supporting some of the results found in the first evaluations of PROBECAT/SICAT. On the other hand, while the official evaluations⁶ of the program find a positive impact on earnings, I found no impact on the labor income of the trainees. I also show that participation in P/S increases the probability of employment with health benefits, which I propose might be due to the extension of medical benefits obtained during training.

⁵ There is a distinction made by the ILO regarding employment in the formal sector and formal employment (Haussmans, 2004), here I refer to the second concept.

⁶ These are studies made to fulfill the relatively new government requirement to periodically obtain impact evaluations of the program.

Nevertheless, there is also evidence that the program has a positive impact on the probability of employment with informal characteristics for women, such as employment with a verbal contract, self or unpaid employment and work in businesses without a fixed address. For men and women participation in the training program promotes employment in micro enterprises.

In this chapter I estimate the average effects of the program on probability of employment, wages, monthly income, and a set of variables, proposed in the literature, that differentiate formal from informal employment. The estimates are obtained by standard linear regression methods and semi-parametric methods: propensity score matching in two versions, nearest neighbor (for illustrative purposes) and kernel matching. I show that my estimates are unlikely to suffer from contamination biases or general equilibrium effects, and I also discuss future cost-benefit analyses.

The paper contributes to the existing literature along two dimensions. Methodologically, it solves a number of problems in previous evaluations. First, it acknowledges the potential existence of contamination bias in the available comparison groups. Second, it recognizes both the urban and rural character of PROBECAT/SICAT and proposes the use of a more appropriate comparison group in such terms. Third, it acknowledges both the official administrative rules of the program and the de facto rules of program participation. The second dimension in which this chapter complements the earlier literature is by recognizing the necessity of adding “formality” or “job quality” indicators to impact evaluations of training programs.

Literature Review

Evidence of Success of the Training component of ALMP

In their review of impact evaluations, Betcherman, et al, (2004) indicate that, in general, participants of the training components of ALMP benefit from participation in terms of probability of employment but not in terms of higher earnings. They also find that the results for such programs in developing economies are even less favorable. The types of programs that work best are those that include some component of on-the-job training, where potential employers are involved in the training process. Finally, they find that women benefit more than men.

Betcherman, et al, examine 49 evaluations of training programs from which 35 are for industrialized countries, 10 are from transition economies and finally, 4 are from development economies. Most of these impact evaluations are conducted by using quasi-experimental methods.

The authors find that especially for the long-term unemployed, training did not have any positive impact in industrialized economies and that the results for these countries seem to be positively correlated with the business cycle. It was also found that the programs that showed positive effects were those conducted in small-scale, on-the-job programs that were focused on specific labor market needs. The success of training programs on probabilities of employment in industrialized countries seems to vary significantly according with the type of training being offered. Betcherman et al, find that on-the-job training has some positive effects while programs with only an in-classroom training component did not have any effect.

The evaluations conducted in transition countries always present positive effects of training for the unemployed. This result contrasts with the mixed evidence found in developing economies, where the evaluations are mostly concentrated on Latin American training programs. Betcherman, et al, find that while the effects of the program found in the overall population vary from country to country and from study to study. A common factor is that on-the-job training implies better results than in-classroom training and that positive effects are mostly confined to women.

Training and Retraining programs in Latin America

Programs with similar characteristics to those of PROBECAT-SICAT in other Latin American countries also constitute central components of their strategies against poverty. Most of such programs are directed to the youngest segment of the population in the labor force, including: Peru's and Uruguay's "ProJoven", Chile's "Chile Joven" and Argentina's "Programa Joven". Colombia and Argentina additionally have training courses for the unemployed, which are not restricted to any age group, named SENA and Proempleo respectively.

All evaluations of these programs consider outcomes, such as: the probability of employment, earnings or hourly wages, search time after training, and in the case of the Peru's evaluation (GRADE, 2001), probability of employment in large firms.

Galasso, Ravallion and Salvia (2001), evaluate Promempleo, an experiment designed to measure the relative efficacy of receiving training, receiving a voucher for a wage subsidy for employers, or not receiving either of the two. The authors find that training has no effect on employment, while obtaining a voucher has a positive effect on

employment, but not on wages. They also found that these results are mainly confined to women and young participants. Similarly, in the case of SENA in Colombia, a non-experimental econometric technique is used to measure participation impacts (Medina and Nunez, 2001), specifically propensity score matching estimators. The authors, Medina and Nunez, find no evidence of positive impacts of the program either on probability of employment or on wages.

While training programs for the general population seem to have no positive effects according to these two pieces of research, the evidence from youth programs is definitely more hopeful. Three evaluations study the Projoven (Uruguay) and Chile Joven experiments (For Chile: Santiago Consultores Asociados, 1998. For Uruguay: Naranjo, 2002, and Fawcett, 2002) and find that the impacts of training courses increase the probability of employment, as well as hourly wages. The positive results from these evaluations are in line with those found by Aedo and Nunez (2001), and GRADE (2001) for Argentina and Peru, respectively; both evaluations estimate the impacts of the programs by semi-parametric evaluation techniques.

Training and Retraining Programs in Mexico

In brief, evaluations of training programs in Latin America show positive effects of policies whose population of interest is young; nevertheless, there is no evidence of success when such policies are directed to the general unemployed or unemployed population.

In the case of PROBECAT-SICAT there are just a handful of evaluations on its performance, mainly due to the inexistence of appropriate data. Table 3 presents a summary of the results of previous P/S evaluations. The evidence on the performance of

P/S provided by these studies seems sometimes contradictory. This can be explained by the fact that some studies (like the official evaluations of the program) might not be taking into full consideration some important aspects, such as the possibility of selection bias, . In the cases where the studies have considered all these aspects, the differences can be explained by the parameters used in the evaluation, such as marginal effects in the case of Navarro-Lozano (2003). In what follows I describe and analyze these previous studies in detail.

The first evaluation of what was then called PROBECAT responded to the desire of the Mexican government and the World Bank to obtain information on the results of the program at a time when a sizeable augmentation of it was being proposed. This first evaluation was performed by World Bank staff; in particular, Revenga, Riboud and Tan (1992) evaluate the impact of training on a very complete set of outcome or “success” measurements that include employment at 3, 9, and 12 months after completion of the program, length of unemployment at time of first job, monthly labor income, hourly wages and hours worked weekly. Additionally they perform a cost-benefit analysis using administrative data. In this study the two available training options are considered: school-based and on-the job training.

Table 3. Summary of results, previous P/S evaluations

| | reduces unemployment | increases probability of employment | increases hours worked | increases wages | increases earnings |
|---|--|--|-----------------------------------|--|--|
| Revenga, Riboud and Tan (1992) | men: yes women: no evidence | | men: yes women: yes | men: no evidence women: no evidence | men: yes women: no evidence |
| Wodon and Minowa (1999) | men: no evidence women: no evidence | | | men: no (reduces) women: no (reduces) | |
| Aportela (1999) | | men: no evidence women: yes | | | |
| Calderón-Madrid and Trejo (2001), Calderón-Madrid (2003) and Calderón-Madrid (2006) | | men: no evidence women: yes | | men: no (reduces) women: yes | |
| GEA (2002) | | men in 2001: yes men in 2002: yes women in 2001: yes, women in 2002: yes | | | men in 2001: yes, men in 2002: yes women in 2001: yes, women in 2002: yes |
| Navarro-Lozano (2003) | | | | men: no (reduces) | |
| ANALITICA (2004) | | men in 2003: yes men in 2004: no (reduces) women in 2003: yes women in 2004: no (reduces) | | | men in 2003: yes, men in 2004: yes women in 2003: yes, women in 2004: yes |

Source: Individual studies listed in references

To evaluate the impact of the program the authors use a retrospective survey of a random sample of trainees and compare it to a group of non-participants. As a source of information on the trainees the authors use a follow-up survey obtained in early 1992 of the trainee cohort of 1990. The comparison group is obtained from the National Urban Employment Survey (ENEU), a quarterly panel survey that included information on individuals living in 16 urban communities of 100,000 or more inhabitants. The survey instruments applied to both groups contain the same questions on labor outcomes; in addition the calendar quarters used to extract individuals from the ENEU were made to match the timing of the information from the treated group. During this time PROBECAT was only available in urban areas, so the fact that ENEU does not include individuals living in rural areas does not affect the analysis.

One issue that might arise is the fact that in ENEU there is no information on the participation of the interviewees in the training program, hence the authors could be including participants in the comparison group, which would lead to contamination bias. Nevertheless, the fact that the magnitude of PROBECAT until 1993 was very small in comparison with the eligible population indicates this is not a major problem.

The authors use two different approaches for the estimation of impacts on rates out of unemployment, and their continuous outcomes: income, hours and wages.

As a first step they calculate the probability of participation using the pooled sample of treated and ENEU, the set of explanatory variables in this calculation follows strictly the official eligibility criterion for participation in the program set by the Ministry of Labor. Then individuals from the ENEU sample with a low probability of participation (where the cut point is less than 0.6) are eliminated from the comparison group. Incorporating the probability of participation calculated in step 1 (from the reduced pooled sample), the authors calculate Cox proportional hazard rates out of unemployment. Their results show that for men the average duration of unemployment for the comparison group is 30% higher than that for the trainee group; they find no effect on female trainees.

For earnings, hours and wages, Revenga, Riboud and Tan use Heckman's (1979) two-step estimator for sample selection models; for this purpose they recalculate the probability of participation for the restricted pooled sample, adding a few explanatory variables. With this technique they find that male trainees earn 17.7 % more than non-trainees, and work 7.8 hours more than non-participants; however, they find no difference in hourly wages. On average, women who participated in the program also worked more

(6 hours per week), although the coefficients on earnings and wages were not statistically significant. Finally, for men the probabilities of employment in a large firm are, on average, higher than those for the untrained.

A number of critiques can be made of Revenga, Riboud and Tan's study. The authors are correct in being cautious and calculating the probability of participation to correct for potential selection bias. However, their choice of explanatory variables is very limited and includes only those indicators determined by PROBECAT officials for eligibility criteria; in the case of the estimation of their continuous variables it is not clear there is an exclusion restriction, necessary for accurate estimations. It is very likely that selection is not being accounted for given that other very important factors are being left out, such as variables that capture the labor market history of the individual, the labor market in which he is immersed, etc.

Another matter to take into consideration is the calculation of the rates out of unemployment. The problem in the authors' calculation consists in the potential existence, and non-correction, of dynamic selection bias (Eberwein, Ham and Lalonde, 1997, Dolton, Azevedo and Smith, 2006). PROBECAT ends unemployment spells by not allowing individuals to keep looking for jobs (or working) while in training, in this paper the exit rate from unemployment is calculated from a "fresh unemployment spell" (Eberwein, Ham and Lalonde, 1997), that is, the unemployment spell that initiates at the time training is over. The selection bias would result from differential sorting by trained and untrained individuals into different unemployment spells, the estimation of exit rates out of unemployment would be misleading if the duration of the first job is not the same for treatment and comparison units.

Finally, on the estimation of the program impact on wages, hours worked and labor income, even when the authors do take into consideration self-selection into program participation, they do not recognize and take care of another selection process, and hence another potential bias: the selection into participating in the job market.

This last critique is also recognized in a reevaluation of PROBECAT conducted by Wodon and Minowa (1999). In this study they question the effectiveness of the methods of Revenga, Riboud and Tan (1994) and of a recent study conducted by the Ministry of Labor in 1995, which uses the same methods and obtain the same results as Revenga, Riboud and Tan. Wodon and Minowa (1999) propose alternative ways to deal with potential selection bias; specifically, they suggest an estimation procedure for unemployment exit rates that incorporates a calculated index of participation in which selection bias is eliminated by the use of an instrumental variable, namely the availability of training per state. With this method, the authors find no evidence that participation in the training program reduces the length of unemployment for either men or women. Wodon and Minowa (1999) also calculate the impact of the training on wages in a bivariate normal selection model, employing a Heckman two-step estimator. As part of the first stage they determine the participation of the individual in the labor market. The results of their analysis suggest negative impacts of the training on wages.

Their work advanced the literature in two main ways: first, they recognized the necessity of including a behavioral model when estimating participation in the program, which is necessary if selection biases are to be properly corrected; secondly, they recognized the potential existence of contamination bias due to the fact that we do not know for certain whether any of the individuals in the comparison group (ENEU) are

non-participants. However, a critique is still in order: the authors' idea of using an instrumental variable (IV) to eliminate selection bias is an appropriate one, but their chosen variable is not completely appropriate. Local labor market indicators, like their proposed IV, will have an impact on both potential outcomes (in the case of non-participation) and probabilities of participation (Smith & Todd, 2005). Additionally, even when they show that the availability of the training positively influences the probability of participation, its marginal effect is small (0.107), which casts even more doubt on the appropriateness of this variable as a valid IV (Bound, Jaeger & Baker, 1995).

An important proportion of the scholarly research on PROBECAT/SICAT that followed the aforementioned works used the same source of information on the trainees and to construct a comparison group (Aportela 1999; Calderón-Madrid and Trejo, 2001; Calderón-Madrid, 2003; Calderón-Madrid, 2006; and Navarro Lozano, 2003). In particular, the source used was the Encuesta de Seguimiento de Egresados del Probecat (ESEP), which covers individual labor information on unemployment and employment spells, wages and benefits of the trainees of 1993, for the treatment group; following slightly different criteria for each study, the comparison group was taken from the sample of individuals included in ENEU.

Aportela (1999) studies the impact of program participation on the probability of leaving unemployment. The author analyzes the problem with two different methods, hazard models⁷, and propensity score matching: in both cases a comparison group of ENEU is constructed considering only unemployed individuals with unemployment spells censored at 64 weeks at the most. For both the estimation techniques presented in Aportela (1999), participation in the program increases the probability of leaving

⁷ Weibull, exponential and Cox.

unemployment by 20% for the mixed training type, and by 60% for the school-based type. An important contribution of Aportela (1999) to the literature is the recognition of the potentially different effects of training by gender; when the analysis is performed separately for male and female participants, we note that while for the former group the estimated benefit of participation is not significant, for women is substantial.

Nevertheless it needs to be noted that this carefully conducted work does not expose the misleading interpretations that might result from the comparison of a propensity score matching estimations and a hazard rate model estimations. While the first method gives us, on average, the differential in the probabilities of employment at certain point in time, a level, the second method will give us a rate. A related consideration is the fact that the length of the first employment is not necessarily equal for individuals in the comparison and in the treatment group, that is, there is a possibility of dynamic selection bias if the treated and comparison groups are not sorted similarly into unemployment spells (Dolton, Azevedo and Smith, 2006).

These previous research efforts, as the first contributions to the practice of impact evaluation of social programs in Mexico, constitute the stepping stones to a new and especially relevant branch in the literature. The following works are not only concerned with the estimation of impacts over the typically considered outcome variables in developing countries, they propose the inclusion of additional variables that would reflect the impacts of the program on the special characteristics of a labor market in a developing country.

In Calderón-Madrid and Trejo (2001), Calderón-Madrid (2003) and Calderón-Madrid (2006), the authors investigate the impact of participation in the program on re-

employment dynamics, understood as two different stages in the employment history after training: the estimated number of weeks necessary to find a job and number of weeks of employment in that job. The two estimates are obtained using multi-spell mixed proportional hazard techniques. Restricting the sample of trainees and comparisons to those with work experience, they find evidence that given participation in the program women find jobs more quickly, while men do not; nevertheless, for both men and women, the spell of duration of first employment spell is higher than for the non-participants. In addition, Calderón-Madrid and Trejo (2001) and Calderón-Madrid (2003) present estimates of the impact of the program on post-training hourly wages obtained using propensity score matching, and find that the impact is negative for men and positive for women. While the set of independent variables used in their analysis is very complete, including terms of employment formality before training such as access to health benefits, it is not economically explained or justified. The implicit assumption of selection on observables, even when not justified, is suspected to be valid in this context: the surveys from where the treated and comparison groups are taken from (retrospective survey 1994 and ENEU, respectively) provide enough information to model participation decisions and potential outcomes. Nevertheless, the fact that the comparison group is extremely limited in size is worrisome, it is not clear if the matching is done with or without replacement, and the authors do not provide any discussion on the comparability of the treatment and the comparison groups before or after the matching (e.g. balancing tests).

The discussion of what constitutes a policy relevant parameter is the central topic in Navarro-Lozano (2003). As aforesaid, one of the main objectives of the first

evaluations of PROBECAT was to obtain information to support the growth of the program; the positive report of Revenga, Riboud and Tan (1992) and STPS (1995) served this purpose. However, while these two studies obtain information on the average effects of the treatment on the treated, they do not consider marginal treatment effect on individuals who would participate in the program if it grew, which is the main interest of Navarro-Lozano (2003). The author uses the sample of male trainees cohort of 1993, and the unemployed men in ENEU 1993 as a comparison group, to estimate the impact of the training in hourly wages using two methods: matching and a selection model where treatment parameters can be expressed as different weighed averages of the marginal treatment effect (MTE), called the local instrumental variable estimator (LIVE) by Heckman and Vytlačil (2001). Using these two methods, the author estimates the average treatment effect; the result produced by the matching estimator is negative, while the impact of treatment using the LIVE estimator is positive. As a second stage, the marginal treatment effect of a simulated increment in the availability of the program is estimated using LIVE, which gives as a result a negative impact on wages for those individuals at the margin of participating.

Navarro-Lozano (2003) contributes to the literature by expanding the scope of what the author calls “policy relevant” parameters, at the same time it is relevant to consider that the calculation of the MTE in this paper is obtained over simulated data that assumes an equally distributed increase in the provision of the training, which is not necessarily the case. Given that more information is available now and that the program in fact grew it would be desirable and possible to recalculate the parameter. Another important issue to point out is that the comparison group is restricted to those individuals

with work experience who were unemployed at the beginning of 1993, and had a paid job five quarters later. This is very restrictive considering PROBECAT did not ensure employment for all its trainees, and that the service was also offered for underemployed individuals.

Since 1998, the National Survey on Job Matching and Continuance (ENCOPE) is applied to a random sample (1% sample) of graduates each year. The information obtained from ENCOPE has been the main source of information for two of the impact evaluations that private consulting firms have performed on P/S, GEA (2002) that evaluates the impacts of the program on the trainee cohorts of 2001 and 2002, and ANALITICA (2004) that presents estimation results on impacts over the cohorts of 2003 and 2004. These two evaluations were done to cover the government requirement of evaluation of the program and are not available to the public. The parameters of interest in both reports are the probability of employment and monthly income. Although they mention using a propensity score matching technique, the estimates presented in the reports are those obtained by a Heckman two-step estimation of the bivariate selection model; it is not clear from their reports what exclusion restriction is used. The results for the cohorts of 2001, 2002 and 2003 are positive for men and women in terms of the probability of employment and monthly income; on the other hand, the impact of the training on the cohort of 2004 appears to be negative in terms of probability of employment, and positive in terms of income. A common and very serious problem in the reports is that the first step of their estimation considers just a handful of important variables, gender, education and age which, very probably, would not be enough to solve the selection bias problem; additionally, the calculation of the second step considers also

a just a few independent variables. These problems suggest that the results of these reports should be interpreted with caution.

Contribution to the Literature

This chapter solves a number of the problems in the previous literature: first, as noted before, only one of these previous studies (Wodon and Minowa, 1999) acknowledges the potential existence of contamination bias. If in fact an important proportion of the comparison groups used consists of trained individuals, the estimation of any of the parameters will be biased and provide misleading policy implications. The presence of this bias is examined in this work, and I provide the first empirical application of the technique proposed by Smith (2006), that solves this problem for matching estimation techniques.

I add to the present literature by recognizing both the urban and rural character of PROBECAT/SICAT, and by proposing the use of a more appropriate comparison group, the National Employment Survey (ENE), to conduct an evaluation that does not uniquely include or give higher weights to the population trained in urban areas⁸.

Third, to estimate the relevant parameters, this research investigates and takes into consideration not only the official administrative rules of program participation but also the *de facto* rules that govern eligibility at the street level. For the first time in the literature on P/S., I recognize the importance of the *de facto* rules that play an important role in the restrictions that the researcher should impose when defining a correct comparison group. The principles followed for acceptance in the program are of great

⁸ The available data of former trainees is representative at two levels: national and by training type. Given that the sampling framework did not considered a rural/urban division, differentiated estimates by these zones will not be representative.

importance, because they can significantly change the characteristics of the participants and hence alter the outcomes provided by the training. If the actual practices differ significantly from the official guidelines, studies based on the latter ones may be missing an important piece of information that could impact their results.

Finally, at the core of this chapter is the evaluation of the program in its ability to promote the employment of its trainees in more formal, higher quality, jobs. Following their methodological and conceptual predecessors, the relatively new evaluations in developing countries have considered outcome indicators pertinent to developed countries. Nevertheless, there are several additional measurements of a programs' success that are relevant for developing economies.

Poverty levels in developing economies are associated with an important proportion of the population working in unregulated settings, with low productive capacity, and with the production and distribution of goods and services in a small scale, which in turn restricts the ability to generate higher incomes (Sethuraman, 1998). A desirable, more so, imperative characteristic of an anti-poverty program in this background will be its capacity to weaken this poverty circle. This chapter advances the analysis of what works and what does not, when it comes to designing and implementing policies directed at improving the chances of formal employment.

Participants in PROBECAT-SICAT

Until 2004 the official requirements to participate in any of the training components of SICAT-PROBECAT did not change significantly. The first stage in the application process consisted of the interested individuals interviewing with an SES agent who determined, based on individual characteristics and interests, whether they should

apply for any of the SICAT programs. Once it was decided that an individual should apply for SICAT, the application consisted of a personal registration form, which was filled in with verifiable information. From this information it would be determined whether the individual met the requirements to be offered training.

For SICAT/PROBECAT, the general requirements of participation are the following:

- 1) Applying directly for one of the programs in the employment office in her state (i.e. register in a SES);
- 2) Being 16 years old or older;
- 3) Being unemployed, underemployed or not working due to firm inactivity;
- 4) Covering the education level requirements specific to the course/training of interest.

The SES works on a “first come, first served” system, conditional on the basic requirements being satisfied, although it gives preference to individuals who are the sole source of income for their families. The SES considers applicants who might have participated previously in a SICAT program, as long as the total time in a SICAT/PROBECAT program does not exceed 6 months over the lifetime of the individual. Nevertheless, is not clear whether this limitation is enforced or not.

Once selected, the trainees are informed about the details of the program. The trainees receive a stipend, health insurance (in some cases this includes only accident insurance) and the necessary tools for the course. In the case of the health benefits and accident insurance, their quality, type or coverage is not specified. The provision of these services is not determined at the national level, but by the state offices and, in some cases, by the participating firms. The providers of health insurance could be of a private

or public nature. In the case of the latter, the trainees would have to be affiliated to the Mexican Institute of Social Security (IMSS) or similar institutions. Alternatively, individuals could receive health insurance from the private sector, which, in general, provides higher quality services and has better facilities. However, private providers will charge market prices for basic health insurance, while access to IMSS will be jointly financed by the federal government and the firm (in cases where the insurance during training is to be covered by the firm). For this reason it would be reasonable to believe that a great proportion of the health insurance will be provided by IMSS or similar public institutions. Nevertheless, the quality and type of medical services that the trainees would have access to might still be very heterogeneous. Unfortunately, I do not have information on the providers of such benefits.

Additionally, while in the program, trainees are not allowed to work and might be suspended if they do not comply with attendance requirements. Also, for each day the trainees do not attend there is a deduction in their stipend. The maximum length of the training period varies between 1 and 3 months. Table 4 shows each modality's official requirements, trainee rights, duration and supplier of the service for the modalities I evaluate in 2002.

Finally, even when the requirements for each modality of the program are specified, in practice, individuals are not necessarily asked to provide evidence of coverage of each of them. Interviews with program officials conducted during the second quarter of 2005 revealed that the selection process is not rigid, (Flores Lima, 2005) and that the service is provided as long as the individual assures program staff that she is subject to difficult labor conditions, i.e., that she is unemployed or underemployed. This

de facto selection process, relative to the official requirements of the program, needs to be taken into detailed consideration when defining the first part of the estimation process; the individuals that request the service do not necessarily fulfill the official requirements.

Table 4. Modalities of SICAT Offered in 2002

| Program | Additional -formal- Requirements for participation | Trainee rights | Length of training/ provider |
|---|--|--|--|
| Mixed On-the-job and in classroom training, medium and large firms. Priority to those fired due to the adoption of new technologies. | -Unemployed , actively searching for job. -Education level requirement , specific for the particular course offered. | Trainees receive a stipend, accident insurance and health insurance from firm. -Firm agrees to hire 70% of the trainees. | -1 to 3 months. -Medium, large firms (by firm's application). |
| Mixed On-the-job and in classroom training, small firms. Priority to young individuals, with low education levels, and little or no work experience. | -Unemployed. -Education level requirement , specific for the particular course offered. | Trainees receive stipend, travel expenses, accident insurance, health insurance. | -1 to 3 months -Small firms (agreement between entrepreneur/labor offices). |
| Training for self- employment. The applicant must show interest and potential to start a small business | -Unemployed or underemployed. - Focuses mainly on population in less urban zones | Stipend, travel expenses, accident insurance, tools, health insurance. | -1 to 3 months -Schools, training centers. |

Source: STPS, Manual de Procedimientos del Programa de Apoyo al Empleo 2002.

Evaluation of PROBECA-T-SICAT

Outcome Variables

In addition to the estimation of the impact of the participation in the training program on monthly income, hours worked and probability of employment, I propose the use of additional variables that will measure the impact of the program on the probability of formal employment, or a job in the formal sector. A question that immediately arises is: how to define what differentiates formal from informal work?

Although there is no consensus on what informal employment means, traditionally, informal workers have been defined as those who obtain jobs in the less advantaged sector of a dualistic labor market (Harris and Todaro, 1970; Chandra, 1992; Loayza, 1994). More recent studies such as Maloney (2004), equate the informal sector with the unregulated, developing country analogue of the voluntary entrepreneurial small firm sector in developed countries. Under this definition we would consider the selfemployed and the owners and employers of small businesses as informal workers.

It was during the 15th International Conference of Labor Statisticians in 1993, when the first attempt to design a standardized definition of informality took place (Daza, 2005). Informality was defined in terms of the characteristics of the “units of production”: the businesses and enterprises. The proposed definition for statistical purposes had as a base the size of the production unit, in terms of the number of individuals working in the business. The logic behind this definition was that the size of the company was correlated with its compliance with legal requirements. Nevertheless, this definition, by itself, is not very informative since the majority of employment in developing countries takes place in small scale enterprises (Daza, 2005).

In Mexico the National Institute for Statistics, Geography and Informatics (INEGI) defines informal work as “all those economic activities that operate using the resources of the households, but without becoming or constituting enterprises with a separated legal personality from those households” (INEGI, 2002).

In 2002 the International Labour Organization suggested a change in the base concept of informal employment: from enterprise based to job based. The definition of informal employment was then: “[employment]...not subject to national labor legislation, income taxation, social protection, or entitlement to certain employment benefits for reasons such as: non-declaration of the jobs or the employees...” (Husmanns, 2004).

Given the lack of agreement among definitions, I propose a collection of variables that cover the most commonly considered definitions of formal jobs in the literature. Along with the aforementioned outcome variables (income, hours and employment), I will evaluate the impact of the training on the following:

- a) Employment and Health benefits: The social insurance law (Ley del Seguro Social (2002), Article 12) establishes that all paid employees, members of cooperatives and other persons determined by the executive power should receive access to medical benefits, provided by IMSS⁹ (Article 11 of the Ley del Seguro Social). Article 11 of the same law establishes that these employees are to receive: work related risk insurance, health and maternity insurance, life and handicap insurance, old age lay off insurance, daycare and other social benefits. All health services provided by clinics and hospitals from the Mexican Institute of Social Security (IMSS).

⁹ The health insurance offered by IMSS includes outpatient and inpatient care in its own hospitals and clinics, prenatal care, childbirth, specialists and supply of prescription drugs.

- b) Employment with housing credit: The Constitution (Constitución Política de los Estados Unidos Mexicanos, Article 123) establishes that all individuals under a labor contract, irrespective of whether this contract is written or verbal, should receive a low rate credit that could be applied to buying, building or repairing a dwelling. The employer and the federal governments provide the funds for these credits.
- c) Employment with other cash benefits: Includes end of the year bonuses and others.
- d) Employed in a micro business: Following the original definition of informal sector by size, I examine the possibility of being employed in what in Mexico is defined as a micro enterprise. The official definition of a micro enterprise, in 2002, was a firm that consists of at most 10 individuals including the employer (Martínez-Kasten, 2005).
- e) Employed as self-employed or without payment: The group of individuals working without payment is usually differentiated as working for a family member or not. In this case I aggregate these two classifications.
- f) Employed with a verbal contract: The survey instruments only consider two possibilities: a written contract or a verbal one. The possibility of the inexistence of a contract is not recognized, although it is reasonable to believe that individuals without a contract would classify themselves as having a verbal one.
- g) Employed in businesses without a specific residence (businesses without residence, hereafter): The businesses included in this group are those that do

not have a specific building or permanent structure exclusively used to conduct their activities. These include street vendors, and individuals that conduct their businesses from their own dwellings, using household resources as inputs.

Appendix A presents a detailed description of the variables included as outcomes in my analysis.

Evaluation questions and causality

The following econometric analysis tries to answer the general question: what is the average gain for the participants of PROBECAT-SICAT with respect to the scenario in which no participation occurs? That is, the average treatment effect on the treated (ATT), defined as:

$$E(Y_1 - Y_0 \mid D = 1),$$

To determine the effect of the training on the outcome variables, I will use the *potential outcome approach to causality* proposed by Roy (1951) and Rubin (1974), in which the evaluation can be reduced to a comparison between two general treatments: the treatment of interest (treatment 1), in this case participating in any training modality, and the absence of training (treatment 0) on the outcome or response variable, Y . Define also a vector X , which includes the attributes or characteristics of the individual that are not affected by exposure to either of the two treatments. Additionally, define the outcome variable as Y_1 if the individual is exposed to treatment 1 and Y_0 if the individual is exposed to treatment 0. Finally, define an indicator of participation as $D \in \{0,1\}$, where $D = 1$ if the individual is exposed to treatment 1 and $D = 0$ if exposed to treatment 0; then for an individual i the observed outcome is $Y_i = Y_{0i} + D(Y_{1i} - Y_{0i})$. The causal

effect of the training on outcomes, defined as the difference between the outcomes Y_{1i} and Y_{0i} , can never be obtained given that for each i we cannot observe both, Y_{1i} and Y_{0i} .

To obtain the ATT we need to estimate $E(Y_0 | D = 1)$, which we do not observe, using $E(Y_0 | D = 0)$, the average outcome of non-participants, which we do observe. The problem with using $E(Y_1 | D = 1) - E(Y_0 | D = 0)$ to estimate the impacts of the treatment instead of $E(Y_1 | D = 1) - E(Y_0 | D = 1)$ is that this will generally yield a biased result.

This is a problem of selection bias: the sample of trainees is not random; it might be the case that people receive training based on characteristics that also influence their outcome variables (employment status, wages, etc).

Unfortunately, there exists no experimental data from PROBECAT-SICAT. The alternative non-experimental method I use is a semi-parametric matching technique. Matching reweights a group of untreated individuals so that the distribution of their observable characteristics is similar to that of the group of individuals that participated in the treatment. After the matching, it compares the outcomes of the two groups.

The basic underlying assumption for matching estimation is the Conditional Independence Assumption (CIA). When the variables that influence both outcomes in the untreated case and participation are observable (captured in X), matching techniques can yield an unbiased estimate of the treatment on the treated. To rightfully invoke the CIA it is necessary to make the case that I have a set of observed variables X , such that the group does not differ from the treatment group in any variable that links the participation in the training systematically to the non-participation outcome.

The matching estimation procedure additionally requires that $P(D = 1 | X) < 1$ over the values of X , i.e., the estimation has to be performed over a common support region. This guarantees that all individuals in the treatment group would have an analogue in the comparison group.

Specifically, for this analysis I will use propensity score matching, which implies the calculation of the conditional probability of participation over the vector of observed characteristics X , $P(X) \equiv P(D = 1 | X = x)$. Rosenbaum and Rubin (1983) show that if it is possible to match on X , then it is possible to match on $P(X)$, the propensity score; that is to say, if the CIA holds for X , it also holds for $P(X)$.

Description of Variables

Before calculating the average impact of the program on its trainees, I sketch the behavioral model behind the decision to participate in the program. I start by assuming that a potential participant is rational and in order to maximize his expected utility, he will decide to participate given the set of costs and expected benefits posed by the program. Below I discuss in more detail the elements that play a role in the magnitude and direction of the potential benefits of the program, which are in turn elements in the determination of the participation decision.

In a world of asymmetric information, where the prospective employee has more and more accurate information on his productivity than the prospective employer, participation in the training program might increase the probability of employment and possibly lead to higher employment quality (better work conditions), if having participated in SICAT serves as a signal of higher productivity with respect to non-participants (Spence, 1973).

Nevertheless, the training program itself is designed to actually increase the stock of human capital of the trainees, so that there is a real upgrade of the workers' abilities, and hence a potentially higher probability of employment, pay and other benefits. Accumulated human capital stock at the time of the training provides a measure of average unobserved ability, which has implications for potential benefits and probability of participation in the program: higher ability persons get on average more schooling. Formal education is also associated with a higher average labor income (Ashenfelter and Krueger, 1994), which in turn implies higher forgone wages during the time of training. Finally, there are other social and non-market benefits of education, such as schooling as an input in the production of more human capital (Schultz, 1961) and a potential reduction in the costs of job search as schooling increases (Metcalf, 1973), etc.¹⁰

Even when the data are limited in providing measurements of ability, they include measurements of formal education that would partly account for it, and that in turn relates to both participation in the program and potential outcomes. I include a set of categorical variables that capture the highest degree of education attained. Following the nationally standardized Mexican school system, these include: no formal degree, elementary school, junior high school, high school, technical degree, undergraduate degree, and graduate degree.¹¹

Standard human capital theory implies that an individual should acquire his stock of human capital while at a young age so that he will have more time during his natural life to enjoy the returns of it (Mincer, 1997) and (Becker, 1964). All else constant, the expected benefits of an individual obtaining training at a younger age are on average

¹⁰ For a comprehensive survey of these studies see Wolfe and Haveman (2003).

¹¹ A detailed description of these variables can be found in Appendix 1.

higher than those if the person is older. Including age as an explanatory variable allows accounts for this difference.

Gender will also make a difference on the expected net benefits of participation in the program. In his study of one of the first versions of PROBECAT-SICAT, Aportela (1999) finds that while the training does not impact the probability of finding employment for men, it does for the participant women. This result is consistent with most evaluations of training programs in developing countries, where positive impacts of participation in such programs are mostly confined to women (Betcherman, Olivas and Dar, 2004). In the empirical section I present separate estimates for men and women.

Demographic variables will furthermore capture additional differences in the overall likelihood of obtaining a net benefit by participation in the program. Differences in the relative position in the household (i.e. head of household, spouse of head, etc.) and marital status, in addition to the demographic variables aforementioned, capture relevant and otherwise unobserved factors, such as stability and other psychological aspects that influence participation and potential outcomes.

A rich set of variables that capture the past labor market experience of the individual, in opposition to just the inclusion of the income history or profile, is necessary to obtain accurate estimate of the impacts of such programs as shown by Card and Sullivan (1988), Heckman et al. (1997) and Heckman et al. (1998).

An individual's labor market history is formed by a series of decisions and outcomes of those decisions that will have an effect on the direction and magnitude in which the training experience will affect him. Differences in participation and attachment to the labor market, labor earnings, full time and part time statuses, etc, have a part in the

reservation wage at which the individual is indifferent between accepting a particular job or not. On the same line, these past experiences will determine the actual average labor income received by an individual. Previous employment variables will function as summary statistics of these characteristics, and account for the quantity, efficiency, transferability, obsolesce, etc. of accumulated human capital obtained while in the labor market (Sianesi, 2002).

The official requirements for participation in SICAT include an occupational status of unemployed (and looking for a job) or underemployed (looking or not for a job). Nevertheless, information obtained from officials of the program and directly from ENCOPE suggests employment status is not a rigid determinant for eligibility. An additional shortcoming of the data at hand is that it only captures information on the last job that an individual had prior to training. This then restricts the set of variables that capture each individual's labor market history to a categorical variable that indicates if the individual has ever worked, and variables that capture the number of weekly hours worked and monthly labor income in the last job. Additionally, I include a variable that captures duration of inactivity up to the time when training started, which will serve as a proxy for optimal search effort or marginal utility of leisure (Vishwanath, 1989). For the comparison group, I construct the duration of inactivity based on a question posed at what I call the "pre-training" period, which corresponds to the first half of 2002. This variable captures, for those that have ever held a job, the date in which the individual left her last job. For those who had never held a job by that time, the duration of inactivity was coded as "less than one month". Duration of inactivity will also account for

unobservables such as the discouraged worker effect, and expected deterioration of human capital skills previously acquired.

Even when the set of variables that describes the labor history is limited in number, it is reasonable to assume that these variables capture, although not optimally, past labor market experience, if the characteristics of past jobs are determined by previous sets of labor choices and the decisions over them.

Finally, given that the program is offered at the national level, it is necessary to include variables that will account for differences in local labor markets, as the characteristics of the labor market and the institutional framework might imply differences across individuals living in different regions (Heckman, Ichimura, Smith and Todd, 1998). I included two sets of variables, the first of which is a socio-economic index created by the INEGI, which divides the country into 7 brackets, zones placing each of the 32 states in a bracket, where 1 is the lower bracket, and 7 is the highest one and corresponds to Mexico City. The index is based on characteristics obtained from the census and includes indicators of dwelling quality and infrastructure, dwelling overcrowding, health, education and employment (INEGI, 2006). The second set of variables includes a set of dummies by municipality population size, the lowest bracket includes municipalities with less than 2,500 habitants, and the highest includes cities with 100,000 or more habitants. These two sets of variables serve as summary statistics for local characteristics, and will also capture unobserved differences at the regional level in the availability and selection process of the trainees.

Appendix B presents a detailed description of the variables included in the calculation of the propensity score.

Data

ENCOPE

Since 1998 the National Survey on Job Matching and Continuance (ENCOPE) is applied to a 1% random sample of program graduates; it is representative at the national level and by modality of program. The response rate is approximately 85% (STPS, 2006).

For SICAT, the survey is conducted during the fourth quarter of each year, during the months of November and December, which means that the time elapsed between the end date of the program and the time the survey is conducted is heterogeneous.¹²

The survey is a retrospective personal interview survey, and the trainees are questioned on variables before, during and after training. It provides information on socio-demographic variables: age, marital status, if the individual is a head of household, gender, education level and economic dependants; program/classes attended, dates of participation, reasons for participating in the training and opinion on courses taken; and, finally, a set of labor market variables pre- and post-training that include wages, benefits, duration of employment, position, sector, and activity, hours worked, form of payment, reasons for leaving job, etc. The questionnaires utilized for the surveys under PROBECAT and SICAT are basically the same so that the outcome variables can reasonably be compared.

In this chapter I focus on the ENCOPE applied to the 2002 cohort. The modalities offered that period were mixed in medium and large firms, mixed in small and micro firms and training for self-employment (see table 2). The original sample contains 2,710

¹² All the trainees in the 2002 ENCOPE sample started the program between the beginning of January and the end of May.

individual records (35.46% of them are male), from this sample 6.9% of the trainees did not finish their classes and were excluded from the analysis. Finally, I eliminated 0.7% of the observations from the final sample due to non-response to particular labor income variables.

Encuesta Nacional de Empleo (ENE)

As a general first criterion for choosing a survey from which to obtain a comparison group, I would like to choose one that has a similar-as-possible target population; that collects information on the same variables as the information at hand for the treatment group; and where the probability of participation in the training program for each value of X does not equal one (that is, common support).

I use the National Employment Survey (ENE), which is a joint effort of the Ministry of Labor (STPS) and the INEGI. It is representative at the national level and like ENCOPE is a personal interview survey. Unlike the survey most commonly used in previous studies of PROBECAT/SICAT (ENEU), the ENE survey covers urban and rural communities (where urban is defined by population equal or higher to 100,000). Starting in the second quarter of 2000, ENE is available on a quarterly basis and can be constructed as a panel. One fifth of the selected households is replaced each quarter, and each household stays in the sample one year and three months (5 quarters), so that labor market outcomes are measured every three months. ENE's units of observation are the individuals in the selected households, who are 12 years old and older.

The ENE includes information on demographic, socio-economic, and labor market characteristics, including information on employment status, wages, benefits, occupation, industry, unemployment spells, unionization, etc. Heckman, Ichimura, Smith

and Todd, (1998), and Smith and Todd (2005a) show the importance of measuring outcome variables in the same way for the treated and comparison groups. The questionnaire used for national employment surveys has served as base for the ENCOPE questionnaire, so that the questions from which the dependent variables and the covariates are obtained are very similar. Given the closeness in scope and contents of ENCOPE and ENE, I consider ENE to be an appropriate source for the comparison group.

The non-response rate for both ENCOPE and ENE is approximately 15% (INEGI, 2006).

To temporally align the comparison group with the treatment group, I construct the comparison sample by including those individuals who have records in either the first or second quarter of ENE 2002 (from which I constructed the pre-treatment variables), and in the final quarter of that same year (where I obtained the post-treatment variables). Given the rotation characteristics of the ENE sample, this implies that the individuals included in our final sample entered ENE either in the last quarter of 2001 (group A), the first quarter of 2002 (group B), or the second quarter of 2002 (group C). I call the first and second quarters of 2002 the “pre-treatment period”, given that the retrospective questions asked to the trainees in ENCOPE refer to the time just before they started training. Nevertheless, it is important to remember that all trainees received training at some point during this period.

Table 5 presents summary statistics and t-tests of differences in means for the treated and comparison groups in 2002. With the exception of a few variables, the null hypothesis of the difference in means being equal to zero is rejected; that is to say, the

mean value for each of the variables is different between the two groups being compared, which mean that before the matching the treated and the comparison groups do not look “alike” on these characteristics.

Table 5. Mean Values and T-tests for the Treated and Comparison Groups

SICAT-2002 Cohort, retrospective survey Nov-Dec 2002 for Treated Group
ENE-2002, first half of 2002, for Comparison Group

| | MEN | | | | WOMEN | | | |
|---|----------|---------------------|------------|------|----------|---------------------|------------|------|
| | Treated | Means Comparison | Ttest t | p> t | Treated | Means Comparison | Ttest t | p> t |
| Age | 25.48 | 36.28 | -21.50 | 0.00 | 28.16 | 35.44 | -20.39 | 0.00 |
| Age squared | 729.05 | 1537.60 | -19.27 | 0.00 | 902.59 | 1457.30 | -18.81 | 0.00 |
| Married | 0.43 | 0.63 | -11.92 | 0.00 | 0.49 | 0.37 | 9.32 | 0.00 |
| Divorced, widow, separated | 0.02 | 0.04 | -3.34 | 0.00 | 0.05 | 0.18 | -13.64 | 0.00 |
| Head of household | 0.39 | 0.59 | -12.21 | 0.00 | 0.08 | 0.24 | -15.02 | 0.00 |
| Has never been employed | 0.19 | 0.01 | 54.56 | 0.00 | 0.39 | 0.03 | 69.53 | 0.00 |
| Total number of hours worked weekly | 18.83 | 40.63 | -32.32 | 0.00 | 9.80 | 33.63 | 49.54 | 0.00 |
| Total number of hours worked weekly squared | 941.05 | 2026.00 | -21.07 | 0.00 | 469.49 | 1472.00 | -31.46 | 0.00 |
| Pre monthly labor income | 934.14 | 2346.30 | -22.45 | 0.00 | 359.56 | 1923.80 | -37.01 | 0.00 |
| Pre monthly labor income squared | 3.10E+06 | 8.80E+06 | -22.40 | 0.00 | 8.10E+05 | 6.40E+06 | -13.32 | 0.00 |
| Highest degree obtained | | | | | | | | |
| Elementary School | 0.18 | 0.28 | -7.17 | 0.00 | 0.26 | 0.23 | 2.42 | 0.02 |
| Junior High school | 0.43 | 0.30 | 8.46 | 0.00 | 0.38 | 0.25 | 12.20 | 0.00 |
| High school | 0.22 | 0.11 | 10.82 | 0.00 | 0.13 | 0.11 | 2.69 | 0.01 |
| Technical degree | 0.02 | 0.07 | -6.18 | 0.00 | 0.02 | 0.11 | -11.80 | 0.00 |
| College | 0.08 | 0.00 | 30.33 | 0.00 | 0.09 | 0.02 | 21.09 | 0.00 |
| Length of inactivity | | | | | | | | |
| Less than one month | 0.60 | 0.91 | -32.41 | 0.00 | 0.63 | 0.93 | -41.48 | 0.00 |
| Between one month and six months | 0.25 | 0.02 | 43.06 | 0.00 | 0.16 | 0.01 | 38.98 | 0.00 |
| Between six months and one year | 0.06 | 0.00 | 22.01 | 0.00 | 0.05 | 0.00 | 19.75 | 0.00 |
| Development Regions | | | | | | | | |
| Development region1 | 0.12 | 0.07 | 5.56 | 0.00 | 0.10 | 0.08 | 2.77 | 0.01 |
| Development region2 | 0.17 | 0.25 | -5.66 | 0.00 | 0.17 | 0.18 | -0.69 | 0.49 |
| Development region3 | 0.16 | 0.10 | 6.76 | 0.00 | 0.19 | 0.21 | -1.72 | 0.09 |
| Development region4 | 0.20 | 0.20 | 0.37 | 0.71 | 0.21 | 0.18 | 2.47 | 0.01 |
| Development region5 | 0.11 | 0.23 | -8.57 | 0.00 | 0.15 | 0.17 | -2.33 | 0.02 |
| Development region6 | 0.19 | 0.15 | 2.73 | 0.01 | 0.16 | 0.15 | 0.20 | 0.84 |
| Size of Municipality (Population) | | | | | | | | |
| Town size<=2,499 | 0.01 | 0.00 | 4.48 | 0.00 | 0.00 | 0.00 | -0.58 | 0.56 |
| 2,500=<municipality size<15,000 | 0.06 | 0.05 | 1.18 | 0.24 | 0.08 | 0.03 | 11.37 | 0.00 |
| 15,000=<municipality size<50,000 | 0.09 | 0.10 | -0.82 | 0.41 | 0.18 | 0.07 | 15.78 | 0.00 |
| 50,000=<municipality size<100,000 | 0.18 | 0.11 | 7.28 | 0.00 | 0.12 | 0.08 | 5.95 | 0.00 |

Source: Author's calculations from ENCOPE and ENE surveys

Selection of the Comparison Group

The ENE sample was first restricted to those individuals who had records during the first half of the year 2002 and the last quarter of the same year. I obtained the pre-treatment variables of the ENE group from the records of the first half of the year, and the post-treatment variables from the last quarter.

Secondly, I further restrict the ENE sample to form a comparison group of eligible individuals following these three criteria:

1) Age between 16 and 75 years old

The lower age limit is established as an official criterion, In practice, this inferior limit is enforced. Additionally, no trainee in the ENCOPE sample is older than 75 years old.

2) Unemployed or underemployed.

Unemployed: has actively been looking for a job in the past 4 weeks, or has not been looking for a job in the past 4 weeks but satisfies at least one of the following:

- a) Is waiting to hear back from an employment application;
- b) Looked actively for a job but could not find one (discouraged worker);
- c) Individual considers that she does not have the education/skills to qualify for a job.

With this criterion, I excluded from the unemployed category those individuals that reported not being interested in participating in the labor force.

Underemployed: the individual reports being employed and satisfies at least one of the following:

a) Works less than 35 hours involuntarily. In this context I defined “involuntarily” as the following reasons as to why the workweek is restricted:

- 1) Work specifications;
- 2) Low sales or production;
- 3) Lack of clients or financial resources for production or sales;
- 4) Deficiency of inputs, necessary vehicles and/or machinery for production or transportation.

b) An optional –and official - criterion for maximum number of hours in the case of underemployment was that the potential participant received a monthly labor income of less than two minimum wages. However, only half of the trainees in the ENCOPE sample that stated ever holding a job reported they received no more than two minimum wages in their last job previous to training. This information is obtained from a question in the retrospective survey that requires all interviewees to discretize their monthly labor income in brackets of multiples of the minimum wage. The report of monthly income for the ENE sample does not require all individuals to perform such discretization, but only to report total monthly labor income. To avoid measurement error I did not impose the minimum wage criterion on the ENE or the ENCOPE samples.

Monthly labor income was restricted to a maximum of 5 minimum wages, 4800 Mexican pesos (527.785 US dollars¹³). This to conform to the fact that 97.22% of the monthly labor income reported in ENCOPE was at or below this limit. The high income reported for the 3% left in the sample is high enough to led one to suspect some measurement error might be present. I impose the upper limit to avoid the inclusion of

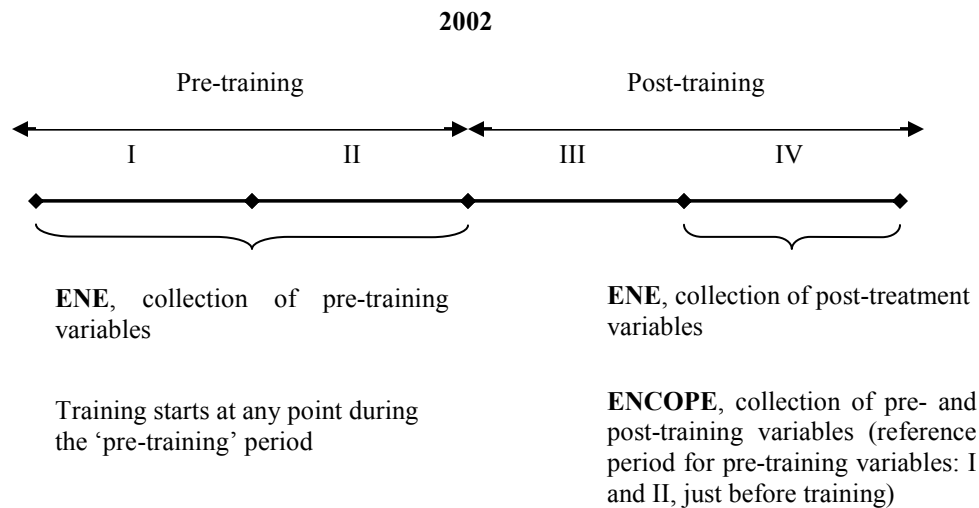
¹³ Exchange rate on March 1st 2002: 9.0946 Mexican pesos per US dollar.

observations with potential measurement error and to deal with potential sensitivity to outliers.

3) Minimum education.

Each training course specifies a minimum education level to be eligible to attend. Given that this information is only accessible by state administrators and varies substantially from SES to SES, I imposed a *de facto* minimum requirement for formal education. All trainees in the sample have at least one year of elementary school, following this fact, I require this limit for the comparison group.

Figure 3. Timing of data gathering



Appendix C presents a description of sample construction.

Empirical Specification and Results

Propensity Score

Table 6 presents the results of the estimation of the expected probability of participation in the training program for men and women, the propensity score, during the first two quarters of 2002. The expected probability was calculated with a maximum likelihood probit model; I report the average derivatives of the conditional probabilities.

The dependent variable is a dummy variable that takes the value of one if individual, i , participated in the training program during the first two quarters of 2002 and zero otherwise.

Table 6 makes evident the differences in the roles that the set of explanatory variables play in the probability of participation for men and for women. For one, the probability of participation for men decreases with age, while for women increases, although the impact of this variable is modest in both cases. Additionally, the importance of never having held a job before training is only statistically significant when interacted with age for women, i.e, the probability of participation in SICAT for women who have never worked increases with age. While for men, the estimate of the coefficient of weekly hours worked is not statistically significant, it is for women. The sign is negative, reflecting the fact that women who, before training, worked longer hours would participate less in a training program like SICAT. For both groups the probability of participation increases if the individual is married relative to being single. For men, being the head of the household also increases the probability.

An interesting result is the sign of the coefficients on the dummies for the highest educational degree attained. They indicate that having an educational degree, in

comparison with not having any, increases the conditional probability of participation. Residing in any socio-economic region different from region 7, Mexico City, decreases the conditional participation probability in the program. Nevertheless, living in any city or town with less than 100,000 residents implies an increase in the probability of participation relative to living in a city with 100,000 or more inhabitants.

Inspecting the influence of the duration of inactivity on the probability of participation, I note that if this elapsed time is less than one month, the probabilities are lower. On the other hand, the sign is positive if the individual has been out of work for more than a month and up to a year. These should be interpreted relative to being inactive for more than a year (the base category).

Figure 4 shows the propensity scores for men and women; Table 7 presents summary statistics for the propensity scores. These show that there is some evidence that the support condition (which guarantees that all individuals in the treatment group would have an analogue in the comparison group) holds in this dataset. Therefore, in principle, the chosen control group is appropriate to conduct the evaluation. Moreover, the fact that more than half of the observations in both comparison groups have probabilities of participation below the 10th percentile of the distribution of probabilities of their respective treated groups, supports the choice of estimation using matching methods rather than linear regression. In linear regression, the untreated individuals with very low probabilities will be assigned a relatively large weight in the evaluation. Matching overcomes this issue by assigning lower weights to untreated units with low probabilities in the sample.

Table 6. Propensity Score

PROBIT, Mean Derivatives reported, standard errors in parentheses
 SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| Dependent variable: Treated (1 if participated, 0 otherwise) | Mean derivatives and standard errors (in parentheses)* | |
|---|--|---------------------------------|
| | Men | Women |
| | no. obs= 44,347 | no. obs= 30,301 |
| Age | -0.85 (0.32) | 2.01 (0.57) |
| Age squared | -0.01 (0.00) | -0.05 (0.01) |
| Married | 3.86 (1.94) | 23.38 (2.88) |
| Divorced, widow, separated | 7.43 (5.84) | -3.27 (4.25) |
| Head of household | 12.11 (2.24) | -3.19 (3.58) |
| Has never been employed | 57.37 (67.73) | 34.06 (27.43) |
| Age*has never worked | 1.59 (1.38) | 5.44 (1.00) |
| Age squared*has never worked | -0.01 (0.02) | -0.06 (0.01) |
| Pre total number of hours worked weekly | -0.04 (0.15) | -0.71 (0.24) |
| Pre total number of hours worked weekly squared | 0.000 (0.002) | 0.012 (0.003) |
| Pre monthly labor income | -0.001 (0.001) | -0.006 (0.002) |
| Pre monthly labor income squared | 0.00000004 (0.00000002) | 0.00000016 (0.00000028) |
| Highest degree obtained | | |
| Elementary School | 5.30 (2.44) | 19.77 (3.82) |
| Junior High school | 11.62 (2.40) | 28.00 (3.79) |
| High school | 23.14 (4.08) | 18.97 (4.81) |
| Technical degree | -10.79 (2.00) | -31.04 (3.35) |
| College | 272.04 (32.75) | 187.44 (18.67) |

Notes: All estimates in bold are significant at a 95% level.

Source: Author's calculations from ENCOPE and ENE surveys

*Coefficients have been rescaled by a factor of 1000

Table 6 Cont'. Propensity Score

PROBIT, Mean Derivatives reported, standard errors in parentheses
 SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| Dependent variable: Treated (1 if participated, 0 otherwise) | Mean derivatives and standard errors (in parentheses)* | |
|---|--|----------------------------------|
| | Men | Women |
| | no. obs= 44,347 | no. obs= 30,301 |
| Length of inactivity before training | | |
| Less than one month | -56.82 (13.84) | -136.07 (16.59) |
| Between one month and six months | 24.98 (6.25) | 28.80 (6.75) |
| Between six months and one year | 44.90 (12.06) | 37.87 (11.22) |
| Development Regions | | |
| Development region1 | -21.35 (2.24) | -3.45 (6.24) |
| Development region2 | -43.49 (5.36) | -12.28 (5.40) |
| Development region3 | -26.48 (2.78) | -21.35 (4.93) |
| Development region4 | -36.69 (4.58) | -5.10 (5.80) |
| Development region5 | -41.47 (4.76) | -12.83 (5.31) |
| Development region6 | -31.00 (3.60) | -14.01 (5.26) |
| Size of Municipality (Population) | | |
| Town size<=2,499 | 47.05 (18.81) | 5.84 (28.11) |
| 2,500=<municipality size<15,000 | 9.79 (3.42) | 46.82 (7.40) |
| 15,000=<municipality size<50,000 | 5.88 (2.42) | 38.86 (4.70) |
| 50,000=<municipality size<100,000 | 15.47 (2.45) | 19.56 (4.15) |

Notes: All estimates in bold are significant at a 95% level.

Source: Author's calculations from ENCOPE and ENE surveys

*Coefficients have been rescaled by a factor of 1000

Finally, I estimated additional specifications of the propensity score, which included further variables' interactions and higher degree polynomials. The magnitude and sign of the estimated coefficients discussed above were not responsive to the different specifications.

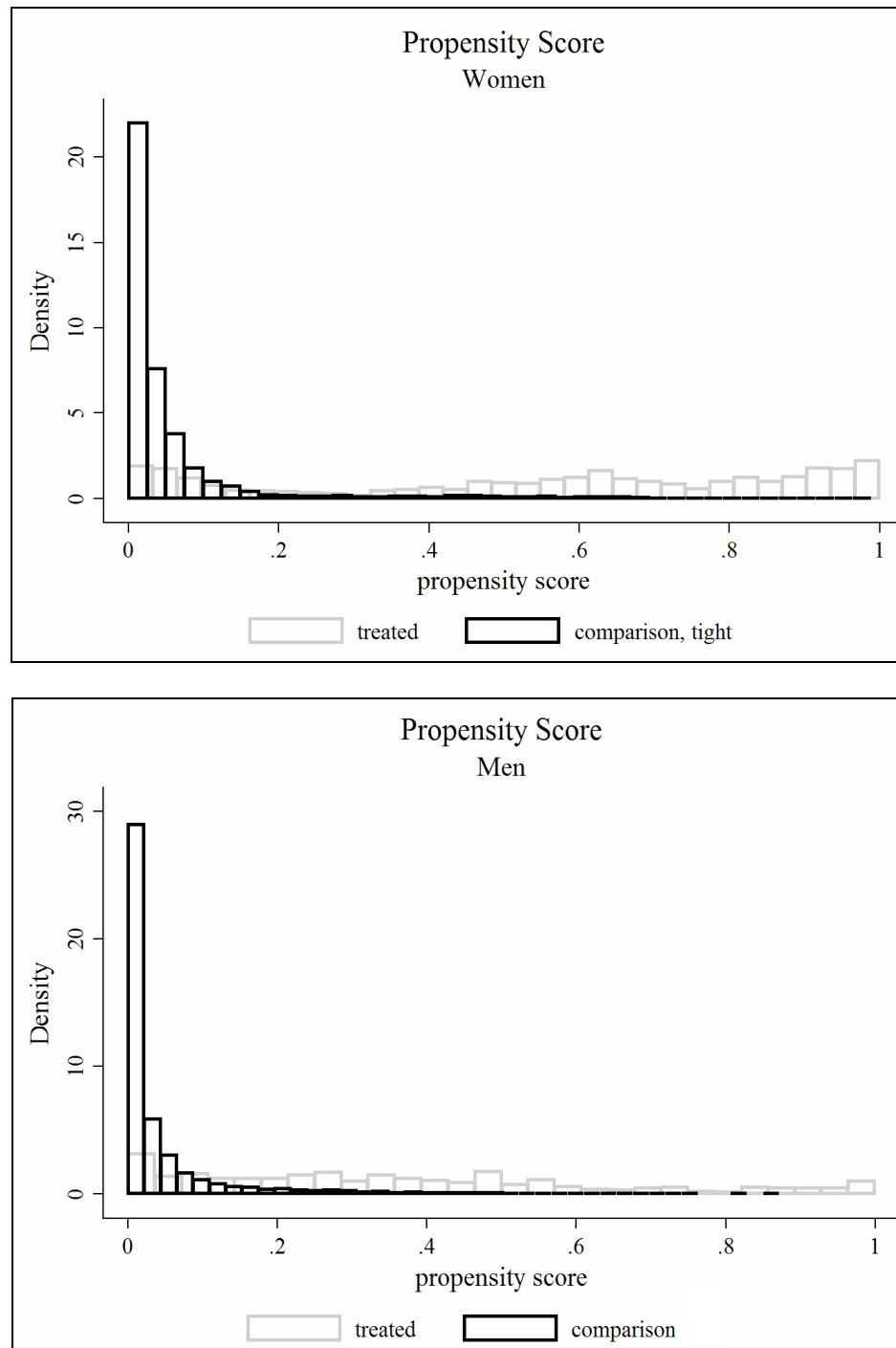
Table 7. Summary Statistics Propensity Score for Treated and Comparison Groups

SICAT-2002 Cohort, retrospective survey Nov-Dec 2002 for Treated
ENE-2002 for Comparison Group

| MEN | | | | | WOMEN | | | | |
|------------------|----------|----------|-------------|--------|------------------|----------|----------|-------------|--------|
| Comparison Group | | | | | Comparison Group | | | | |
| Percentiles | Smallest | | | | Percentiles | Smallest | | | |
| 1% | 7.00E-06 | 3.72E-08 | Obs | 43508 | 1% | 4.43E-06 | 4.12E-10 | | |
| 5% | 0.000 | 5.60E-08 | Sum of Wgt. | 43508 | 5% | 0.000 | 1.88E-09 | | |
| 10% | 0.000 | 6.70E-08 | | | 10% | 0.000 | 4.49E-09 | Obs | 28750 |
| 25% | 0.001 | 8.45E-08 | Mean | 0.015 | 25% | 0.002 | 9.99E-09 | Sum of Wgt. | 28750 |
| | | | Std. Dev. | 0.043 | | | | | |
| 50% | 0.004 | | | | 50% | 0.009 | | Mean | 0.032 |
| | | Largest | Variance | 0.002 | | | Largest | Std. Dev. | 0.084 |
| 75% | 0.012 | 0.747 | Skewness | 7.195 | 75% | 0.023 | 0.830 | | |
| 90% | 0.026 | 0.776 | Kurtosis | 68.574 | 90% | 0.056 | 0.837 | Variance | 0.007 |
| 95% | 0.045 | 0.805 | | | 95% | 0.122 | 0.871 | Skewness | 5.083 |
| 99% | 0.247 | 0.876 | | | 99% | 0.497 | 0.894 | Kurtosis | 31.575 |
| Treatment Group | | | | | Treatment Group | | | | |
| Percentiles | Smallest | | | | Percentiles | Smallest | | | |
| 1% | 4.12E-04 | 5.16E-06 | Obs | 839 | 1% | 0.002 | 1.24E-05 | | |
| 5% | 0.004 | 2.39E-05 | Sum of Wgt. | 839 | 5% | 0.009 | 4.55E-05 | | |
| 10% | 0.008 | 3.94E-05 | | | 10% | 0.018 | 1.19E-04 | Obs | 1551 |
| 25% | 0.020 | 6.66E-05 | Mean | 0.245 | 25% | 0.141 | 2.15E-04 | Sum of Wgt. | 1551 |
| | | | Std. Dev. | 0.244 | | | | | |
| 50% | 0.204 | | | | 50% | 0.447 | | Mean | 0.424 |
| | | Largest | Variance | 0.060 | | | Largest | Std. Dev. | 0.285 |
| 75% | 0.377 | 0.971 | Skewness | 1.038 | 75% | 0.663 | 0.972 | | |
| 90% | 0.590 | 0.972 | Kurtosis | | 90% | 0.790 | 0.975 | Variance | 0.081 |
| 95% | 0.782 | 0.972 | | | 95% | 0.861 | 0.986 | Skewness | -0.063 |
| 99% | 0.942 | 0.994 | | | 99% | 0.953 | 0.988 | Kurtosis | 1.804 |

Source: Author's calculations from ENCOPE and ENE surveys

Figure 4. Propensity Scores for men and women



Source: Author's calculations based on ENCOPE and ENE 2002

Balancing Tests

While economic theory determines the variables to include in the estimation of the propensity score, X , a balancing test (Rosenbaum and Rubin, 1983; Smith and Todd, 2005b) would serve as a specification test for a given X . After the estimation of the propensity score, it is necessary to perform balancing tests to obtain evidence on the validity of the chosen form to estimate this probability. That is, that the balance between the two samples -- treated and untreated -- is achieved.

The balancing test for the propensity score used in this chapter (see table 8), is usually called standardized differences (Rosenbaum and Rubin, 1985). For each variable X_k , the standardized difference is the difference in means between the treated sample and the matched comparison group sample, divided by the square root of the average of the variances of X_k in the two sub-samples. The common practice is to compute this difference for all the variables included in the matching. There is no formal criterion to define if the difference -- or “bias” -- has an appropriate size, but it is usual to follow the suggestion in Rosenbaum and Rubin (1985) that 20 is “large”. Under this criterion, Table 8 shows that for each variable in both matched samples, the standardized differences are all, in absolute terms, smaller than 13. Then, the specification of the propensity score is “passing” the balancing test. As Smith and Zhang (2004) state, there is a wide variety of balancing tests that would give a different “passing grade” to the same propensity score specification. As of now, the conditions required by the better tests are so stringent that it is very likely that several forms would need to be tested, and even then it might be the case that the model would not pass. Nevertheless it would be appropriate to present the

results of more than one balancing test to support the propensity score specification. I leave for future work the use of more stringent balancing tests such as OLS regressions.

Table 8. Bias calculated by Standardized Differences, matched and unmatched samples, kernel matching

SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| Variable | Sample | MEN | | | WOMEN | | |
|---|-----------|----------|-----------------|------------|----------|-----------------|------------|
| | | Treated | Mean Comparison | Difference | Treated | Mean Comparison | Difference |
| Age | Unmatched | 25.48 | 36.28 | -88 | 28.16 | 35.44 | -58.3 |
| | Matched | 25.91 | 26.67 | -6.2 | 27.68 | 28.69 | -8.1 |
| Age squared | Unmatched | 729.05 | 1537.60 | -82.4 | 902.59 | 1457.30 | -56.3 |
| | Matched | 761.55 | 828.38 | -6.8 | 892.57 | 966.11 | -7.5 |
| Married | Unmatched | 0.43 | 0.63 | -40 | 0.49 | 0.37 | 23.3 |
| | Matched | 0.43 | 0.39 | 6.5 | 0.40 | 0.38 | 4.4 |
| Divorced, widow, separated | Unmatched | 0.02 | 0.04 | -13.2 | 0.05 | 0.18 | -41.8 |
| | Matched | 0.02 | 0.02 | 1.2 | 0.06 | 0.07 | -2.5 |
| Head of household | Unmatched | 0.39 | 0.59 | -41.6 | 0.08 | 0.24 | -45.1 |
| | Matched | 0.38 | 0.36 | 4.9 | 0.09 | 0.11 | -6.6 |
| Has never been employed | Unmatched | 0.19 | 0.01 | 64.2 | 0.39 | 0.03 | 97.5 |
| | Matched | 0.13 | 0.17 | -12.5 | 0.26 | 0.30 | -9.8 |
| Age*has never worked | Unmatched | 4.15 | 0.15 | 61 | 10.87 | 1.38 | 75.2 |
| | Matched | 2.67 | 3.46 | -12.1 | 6.56 | 7.64 | -8.6 |
| Age squared*has never worked | Unmatched | 99.47 | 3.81 | 49.8 | 358.59 | 79.13 | 43.5 |
| | Matched | 57.74 | 77.37 | -10.2 | 212.45 | 246.37 | -5.3 |
| Total number of hours worked weekly | Unmatched | 18.83 | 40.63 | -99.4 | 9.80 | 33.63 | -126.1 |
| | Matched | 24.11 | 23.05 | 4.8 | 15.19 | 14.53 | 3.5 |
| Total number of hours worked weekly squared | Unmatched | 941.05 | 2026.00 | -73.2 | 469.49 | 1472.00 | -83.9 |
| | Matched | 1204.00 | 1152.70 | 3.5 | 729.13 | 674.96 | 4.5 |
| Monthly labor income | Unmatched | 934.14 | 2346.30 | -84.5 | 359.56 | 1923.80 | -119.4 |
| | Matched | 1200.90 | 1167.40 | 2 | 560.17 | 605.31 | -3.4 |
| Monthly labor income squared | Unmatched | 3.10E+06 | 8.80E+06 | -22.4 | 8.10E+05 | 6.40E+06 | -46.6 |
| | Matched | 4.10E+06 | 3.90E+06 | 0.6 | 1.30E+06 | 1.60E+06 | -2.4 |
| Highest degree obtained | | | | | | | |
| Elementary School | Unmatched | 0.18 | 0.28 | -26.2 | 0.26 | 0.23 | 6.1 |
| | Matched | 0.19 | 0.20 | -2.1 | 0.24 | 0.26 | -3.7 |
| Junior High school | Unmatched | 0.43 | 0.30 | 27.6 | 0.38 | 0.25 | 29.3 |
| | Matched | 0.46 | 0.43 | 6.2 | 0.40 | 0.36 | 9.5 |
| High school | Unmatched | 0.22 | 0.11 | 31.3 | 0.13 | 0.11 | 6.6 |
| | Matched | 0.21 | 0.22 | -1.6 | 0.17 | 0.17 | -1.7 |
| Technical degree | Unmatched | 0.02 | 0.07 | -26.1 | 0.02 | 0.11 | -38.3 |
| | Matched | 0.03 | 0.03 | -3.8 | 0.03 | 0.02 | 1 |
| College | Unmatched | 0.08 | 0.00 | 39.5 | 0.09 | 0.02 | 33.8 |
| | Matched | 0.03 | 0.03 | 0 | 0.04 | 0.06 | -10 |

Source: Author's calculations from ENCOPE and ENE surveys

Table 8 Cont'. Bias calculated by Standardized Differences, matched and unmatched samples, kernel matching.

SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| Variable | Sample | MEN | | | WOMEN | | |
|---|-----------|---------|------------|------------|---------|------------|------------|
| | | | Mean | Difference | | Mean | Difference |
| | | Treated | Comparison | | Treated | Comparison | |
| Length of inactivity before training | | | | | | | |
| Less than one month | Unmatched | 0.60 | 0.91 | -78.8 | 0.63 | 0.93 | -75.8 |
| | Matched | 0.68 | 0.69 | -1.6 | 0.66 | 0.68 | -5.2 |
| Between one month and six months | Unmatched | 0.25 | 0.02 | 70.2 | 0.16 | 0.01 | 52.8 |
| | Matched | 0.21 | 0.22 | -1.5 | 0.15 | 0.14 | 3.2 |
| Between six months and one year | Unmatched | 0.06 | 0.00 | 31.8 | 0.05 | 0.00 | 26.6 |
| | Matched | 0.04 | 0.04 | -0.1 | 0.05 | 0.04 | 3.5 |
| Development Regions | | | | | | | |
| Development region1 | Unmatched | 0.12 | 0.07 | 16.6 | 0.10 | 0.08 | 6.7 |
| | Matched | 0.10 | 0.09 | 3.1 | 0.09 | 0.07 | 5.7 |
| Development region2 | Unmatched | 0.17 | 0.25 | -20.6 | 0.17 | 0.18 | -1.8 |
| | Matched | 0.17 | 0.18 | -2.1 | 0.16 | 0.15 | 1.8 |
| Development region3 | Unmatched | 0.16 | 0.10 | 20.3 | 0.19 | 0.21 | -4.4 |
| | Matched | 0.15 | 0.14 | 3.8 | 0.21 | 0.23 | -5.6 |
| Development region4 | Unmatched | 0.20 | 0.20 | 1.2 | 0.21 | 0.18 | 6.1 |
| | Matched | 0.21 | 0.23 | -4.2 | 0.21 | 0.20 | 3 |
| Development region5 | Unmatched | 0.11 | 0.23 | -32.9 | 0.15 | 0.17 | -6.1 |
| | Matched | 0.13 | 0.13 | 0.4 | 0.15 | 0.16 | -4.2 |
| Development region6 | Unmatched | 0.19 | 0.15 | 8.9 | 0.16 | 0.15 | 0.5 |
| | Matched | 0.20 | 0.20 | 0.6 | 0.16 | 0.16 | 1.9 |
| Size of Municipality (Population) | | | | | | | |
| Town size<=2,499 | Unmatched | 0.01 | 0.00 | 10.3 | 0.00 | 0.00 | -1.6 |
| | Matched | 0.01 | 0.01 | 1.3 | 0.00 | 0.00 | 1.3 |
| 2,500=<municipality size<15,000 | Unmatched | 0.06 | 0.05 | 3.9 | 0.08 | 0.03 | 22.6 |
| | Matched | 0.05 | 0.05 | 1.5 | 0.07 | 0.06 | 1.4 |
| 15,000=<municipality size<50,000 | Unmatched | 0.09 | 0.10 | -2.8 | 0.18 | 0.07 | 32.7 |
| | Matched | 0.08 | 0.09 | -2.7 | 0.15 | 0.13 | 7.7 |
| 50,000=<municipality size<100,000 | Unmatched | 0.18 | 0.11 | 22 | 0.12 | 0.08 | 13.9 |
| | Matched | 0.17 | 0.16 | 3.6 | 0.11 | 0.10 | 3.7 |

Source: Author's calculations from ENCOPE and ENE surveys

Matching

To estimate the average effect of the training on the trainees I will use propensity score matching. Propensity score matching is a semi-parametric alternative to linear regression, also based on the assumption that the selection into a treatment, in this case

the participation in the training program, is done over observable characteristics of the individuals.

Matching reweighs the distribution of observables of an untreated population, the comparison group, to make it similar to that of the treated population, the treatment group. Finally, it compares the outcomes of these two groups.

I first use nearest neighbor matching with replacement. Even when the size of the comparison group sample is big enough to reasonably expect to find unique close matches for each treated observation, Dehejia and Wahba (1999) find that matching without replacement performs poorly when the sample is not infinite, so that there are not sufficient comparison observations similar to the treated ones.

In his Monte Carlo analysis, Frölich (2004) shows that kernel matching outperforms nearest neighbor matching. I then re-estimate using kernel matching. In this case, for each dependent variable, I obtained appropriate bandwidths¹⁴ employing leave-one-out cross validation (Black and Smith, 2004).

For both matching types, the specification is the same, and all the covariates used to obtain the propensity score are used in the matching protocol. The average treatment effects on the treated are reported in Table 9, with standard errors reported in parentheses. The standard errors are obtained by bootstrapping¹⁵. The use of bootstrapping is appropriate in this context since it is necessary to include the added variance produced by the estimation of the propensity score to the variance from the matching estimation procedure. While for kernel matching, bootstrapping is a valid procedure, Abadie and Imbens (2005) find that bootstrap is not valid for nearest neighbor due to the lack of

¹⁴ The estimates' signs and magnitudes are not substantially different when the bandwidth is slightly bigger or smaller than the optimal bandwidth.

¹⁵ 500 repetitions.

smoothness. Up to today, there is no good alternative to obtain standard errors for nearest neighbor. Consequently the results of columns 3 and 4 in table 9 should be taken only as an approximation.

As noted above, an individual can lawfully participate in the training program more than once¹⁶. On the same lines, the population of those who have not yet participated in the training might do so in the future. Then, the interpretation of these results should take into consideration this dynamic treatment assignment (Sianesi, 2004), where the real treatment is the participation of the individual in the program at a certain time. This does not preclude her from participating later, while the default non-participation state is not obtaining training at that specific time and instead continuing to search for a job.

Results

Table 9 presents the labor market impact estimates of participating in a SICAT training program obtained first from standard linear regression methods and secondly by propensity score matching: using nearest neighbor and kernel matching. I show the first four columns for informative purposes. The interpretation of the results is based on the last two columns, which displays the coefficients obtained by kernel matching on the propensity score.

¹⁶ With the current information provided by the retrospective survey it is impossible to know if an individual had previously participated in the program, or if he plans on participating again.

I divide the analysis in two: first I present the typical or traditional impact estimates, which include probability of employment, monthly labor income and weekly hours worked; secondly I present my estimates using measures of job formality.

Table 9. Average Treatment Effect - Treatment on the Treated (TT)

Linear Regression, Nearest Neighbor Matching and Kernel Matching, standard errors in parentheses
SICAT-2002 Cohort, retrospective survey collected in Nov-Dec 2002

| | Linear Regression ^{1/2/} | | Nearest Neighbor | | Kernel | | | |
|--|-----------------------------------|---------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------|------------------------------|--------------------------|
| | Men | Women | Men | Women | Men | Women | Men | Women |
| | | | | | ATT | outcome comparison ** | ATT | outcome comparison ** |
| Post monthly labor income* (in Mexican pesos) | 19.05 (111.06) | 182.93 (60.48) | 117.62 (131.76) | -10.35 (61.07) | -3.81 (103.81) | 1918.06 | 50.15 (39.64) | 791.09 |
| Post weekly hours worked* | 5.28 (0.63) | 9.48 (0.58) | 5.12 (1.47) | 7.51 (1.35) | 5.10 (0.99) | 35.07 | 9.27 (0.94) | 19.54 |
| Employed | 0.10 (0.01) | 0.22 (0.01) | 0.20 (0.03) | 0.24 (0.03) | 0.20 (0.02) | 0.66 | 0.27 (0.02) | 0.41 |
| Self employed or unpaid worker | -0.04 (0.02) | 0.04 (0.01) | -0.02 (0.02) | 0.01 (0.02) | -0.03 (0.01) | 0.10 | 0.03 (0.01) | 0.07 |
| Verbal contract | 0.01 (0.02) | 0.10 (0.01) | -0.01 (0.03) | 0.06 (0.02) | 0.02 (0.02) | 0.22 | 0.07 (0.02) | 0.13 |
| Health Benefits | 0.26 (0.02) | 0.23 (0.01) | 0.29 (0.03) | 0.22 (0.02) | 0.27 (0.02) | 0.28 | 0.22 (0.01) | 0.14 |
| Housing Credits | 0.17 (0.02) | 0.14 (0.01) | 0.20 (0.03) | 0.10 (0.02) | 0.16 (0.02) | 0.19 | 0.11 (0.01) | 0.09 |
| In-cash Benefits | 0.24 (0.02) | 0.18 (0.01) | 0.28 (0.03) | 0.17 (0.02) | 0.26 (0.02) | 0.27 | 0.18 (0.01) | 0.14 |
| Other Benefits | 0.12 (0.02) | 0.09 (0.01) | 0.16 (0.03) | 0.09 (0.02) | 0.13 (0.02) | 0.26 | 0.09 (0.01) | 0.13 |
| In micro business | 0.08 (0.02) | 0.21 (0.02) | 0.07 (0.02) | 0.16 (0.02) | 0.08 (0.02) | 0.20 | 0.16 (0.02) | 0.12 |
| In business without local | -0.11 (0.02) | 0.04 (0.01) | -0.09 (0.02) | 0.00 (0.02) | -0.09 (0.01) | 0.20 | 0.03 (0.02) | 0.09 |

Source: Author's calculations from ENCOPE and ENE surveys

Notes: All estimates are significant at a 95% level except for those in gray

*This variable does include zeros

**Mean outcome in the reweighted comparison group

^{1/} Coefficients for monthly labor income and weekly total hours by using OLS regression.

^{2/} Coefficients of the rest of variables not in ^{1/} estimated using a PROBIT model. I report average derivatives.

Traditional Impact estimates

My estimates of the average treatment effect show that participation in a SICAT training program increased the probability of employment by 20 percentage points for men. This estimate is considerably higher for women, who, on average, report an increment of 27 percentage points in the probability of employment. These results are consistent with previous findings in the literature (Revenga, Riboud and Tan, 1994; GEA, 2002; Analitica, 2004), where the program is reported to have positive and statistically significant results on the probability of employment.

Differences of the impacts on men and women are also evident in the estimated coefficients for the weekly number of hours worked. Females work, on average, 9 more hours due to the training, while men show an effect of half of that of the female participants. The sign of the estimated coefficient for women is analogous to that found by Revenga, Riboud and Tan (1994), who report reporting an impact of 4 work hours for women, and a non-statistically significant estimate for men.

My results for the number of hours worked and the probability of employment suggest the program was moderately successful in 2002. Nevertheless, these estimates do not allow me to draw any inferences about the working conditions of ex-trainees. I shed some light on quality of employment promoted by PROBECAT in the following section.

Estimated impacts on measures of job formality

In the case of the estimates of the impact on the probability of employment with health benefits, for both men and women the average treatment effect is positive, registering an increment in the probability of obtaining a job with access to any kind of health care of slightly above 20 percentage points. This unexpectedly high number can partially be explained by the fact that one of benefits the trainees obtained during their

participation in the SICAT programs was basic health benefits funded by state governments and it is possible that an important proportion of the alumni are reporting this affiliation as access to health benefits. To obtain this benefit individuals would have to be affiliated (sponsored by the State Employment Offices) to the Mexican Institute of Social Security (IMSS) or similar institutions, or alternatively to a private health insurance provider. Nevertheless, given that publicly provided services are more cost effective and that, among them, IMSS is the main provider of publicly funded health services¹⁷, it is reasonable to believe it was the main provider for SICAT participants.

A provision for IMSS beneficiaries (article no. 109 of the Ley del Instituto Mexicano del Seguro Social, *Mexican Institute of Social Security Law*), states that they can access the health services provided by IMSS for at least eight more weeks after they end the work relationship with their sponsor (in this case when the individual finishes training). This period can be extended by a petition from the sponsor¹⁸.

In conjunction with the facts discussed in the previous paragraphs, I found there are additional indicators that provide some evidence of the training program updating the skills of trainees so that they obtain formal jobs. That is, the estimated treatment effects on the probability of obtaining a position with housing benefits and other in-cash benefits are positive for men and women.

It is relevant to note that for all the indicators of formality, on average, male trainees benefit more than their female counterparts.

¹⁷ In 2000 78% of all users of publicly funded health services were affiliated to IMSS (Source: Author's calculations with information Encuesta Nacional Ingreso-Gasto de los Hogares, *National Household Survey of Income and Expenditure*)

¹⁸ The agreements between IMSS and PROBECAT/SICAT, like the overall operation of the program, are done at the state level, so that the specific proof of the contract and sponsorship of health services should be found in State Employment Offices, from the retrospective survey we could not verify this information.

On the other hand, I could also find some evidence of *informality*, especially for women. For the female trainees, the treatment effect on the probability of self-employment or employment without payment is positive and statistically significant, although very modest (3 percentage points). I also find that the probability of having a verbal contract –opposed to having a written contract- is 7 percentage points higher given training, with respect to not participating in the program at this point in time.

Men and women experience a higher probability of finding employment in a micro business, that is 10 workers or less, if they have received training from SICAT than if they have not. Nevertheless, the impact is now higher for the female trainees than for men.

Finally, our results show that by participating in the program, women will increase their probability of employment in a business/activity, where the specific work place, only for this activity, is not determined. Conversely, for men, the estimate is negative, and of higher absolute value.

In summary, I found evidence that the SICAT training programs do have some positive effects on the probabilities of employment for men and women. On the same lines, participation improves the probability of finding employment as well as health benefits. Without any consideration of costs, these results suggest that the program has the capability to update and improve the skills of its participants. Nonetheless, I also find evidence that the program increases the probability of employment with so called informal characteristics for women. By examining the sector of activity in which ex-trainees work, (see table 10) I observe that part of this could be explained due to the fact

that the proportion of women employed in sectors with informal characteristics (street vendors, non-professional services) is higher than for men.

Table 10. Sector of activity, employed ex-trainees

SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| | Percentage | |
|---|------------|-------|
| | Men | Women |
| Agriculture | 4.01 | 1.71 |
| Livestock | 0.55 | 0.1 |
| Other farming activities | 0.97 | 1.52 |
| Mining | 2.9 | 0.1 |
| Manufacturing industry | 47.51 | 44.48 |
| Construction industry | 4.14 | 0.57 |
| Electricity, energy and water | 0.97 | 0.1 |
| Retail | 9.94 | 14 |
| Wholesale | 2.9 | 5.24 |
| Informal Retail | 0.14 | 1.05 |
| Food and drink industry | 3.59 | 2.76 |
| Street food vendors | 0.14 | 1.24 |
| Hotels | 3.73 | 3.33 |
| Transportation | 3.18 | 0.29 |
| Communications | 0.14 | 0.1 |
| Financial services, real state and insurance | 0.55 | 0.76 |
| Specialized professional and technical services | 10.22 | 7.52 |
| Education and health services | 0.55 | 4.48 |
| Entertainment and recreation services | 0.41 | 0.19 |
| Government and public administration | 0.97 | 0.95 |
| Other services | 1.66 | 9.24 |
| Other activities | 0.83 | 0.29 |

Source: Author's calculations from ENCOPE 2002

General Equilibrium Effects and Misclassification of Treatment

A central assumption made throughout this analysis is the absence of general equilibrium effects. The specific assumption is called the stable-unit-treatment-value assumption (SUTVA) and it implies that an individual's potential outcome depends only on his participation, and not on the treatment status of other members of the same

population (Rubin 1980). This eliminates the possibility of general equilibrium effects or cross-effects (Sianesi, 2002).

A situation where the trainees will compete with other workers for employment and this competition will change the wage structure, or any other important characteristics of that specific labor market (which would not occur in the absence of the training program), will mean that there actually are general equilibrium effects and that I cannot credibly assume SUTVA. To investigate the existence of potential equilibrium effects, I inspected the relative size of the program with respect to the total active population. In this case, for 2002, the Ministry of Labor reports that 230,185 individuals participated in SICAT which corresponds to a 0.56% of the total labor force, which constitutes a small number of participants with respect to the rest of the population in the labor market. This small national percentage level allows me to credibly argue that the magnitude of the program is such that it would not have meaningful general equilibrium effects.

Another consideration mostly ignored by the previous literature on PROBECAT/SICAT is the fact that the treatment variable might be misclassified. Misclassification occurs when actually the treated (comparison) groups did not (did) receive treatment. In the particular case of PROBECAT/SICAT, the surveys where the comparison groups were drawn from, in this and in previous studies, do not contain any information that would help me to determine if a particular individual had or not participated in any training program. The source of the misclassification is then the fact that it might be the case that some individuals in the comparison group are in fact treated. Combining the data obtained from the group of trainees - the treatment group - with any

of the comparison groups at hand might introduce contamination bias (Heckman and Robb, 1985) because the training status of some persons in the aggregated group is not known.

Lewbel (2006) and Mahajan (2006) propose to employ an “instrument like” variable to obtain point estimates of outcomes when a regressor is misclassified, which in this case is the treatment condition. Lewbel (2006) establishes identification by a two valued instrument or a "second treatment measure" (he defines it as a variable V). Two conditions must be satisfied: a) V should only affect the true treatment probabilities, and b) the conditional, real outcomes (with or without treatment), should not depend on V . Inspecting the survey information at hand it was not possible to single out a variable that met these requirements. As a result I then examined an alternative proposed by Smith (2006).

To ease the analysis I refer to the case in which all X are discrete, i.e., I restrict the analysis to a subgroup of relevant independent variables, all of them discrete. Nevertheless, the method proposed by Smith (2006) can be applied when this is not the case.

There are four basic steps: First, I obtained $Pr(D = 1 | X = x)$ for all values of X , where:

$$Pr(D = 1 | X = x) = Pr(X = x | D = 1) Pr(D = 1) / Pr(X = x) \quad (*)$$

All the elements in (*) are known or can be calculated. In particular, to obtain the probability of participation, I used the National Employment Survey and the official list

of requirements to calculate the total eligible population, and from the Ministry of Labor's administrative records I obtained the exact number of participants.

In a second step I calculated the mean differences between treatment and comparison units for each value of X . Then I adjusted the mean differences for the fraction of the comparison group that received treatment (obtained in the first step).

Finally, I took the weighted average of the adjusted differences by the distribution of X .

In my first exercise I found that the difference between adjusted and unadjusted estimates of the average impact of training on weekly hours worked is minimum (9.2 minutes for men and 25.8 for women). This small difference can be mainly explained by the fact that for eligible men and women, the probability of participation is relatively small: 0.008 for men, and 0.02 for women.

Given this preliminary exercise, and since the probabilities of participation do not change while extending the analysis to include the rest of the independent variables, I can conclude that in this case my estimates do not include important contamination biases. It is important to note that even when we do not calculate the contamination bias for the results presented in this research, it is possible to "sign it": in this case eliminating the bias will make the calculated average treatments effects bigger. In this particular instance, the problem with misclassification comes from the fact that some individuals that are not trained are included in the treatment group, removing them from the sample would increase the treatment effect.

This result does not extend to previous analyses of PROBECAT/SICAT, and a similar approach is recommended in order to obtain more reliable results.

Comments on Cost-Benefit Analyses

Analítica Consultores (2004) reports that the total assigned funds for the SICAT program at the national level for 2002 were 898, 600, 000 pesos. Using this information and administrative records of the number of trainees that year, I can obtain a proxy for the average cost per trainee, i.e., 3,903.81 pesos, which corresponds roughly to 404.3619 US dollars. The estimation of impacts presented above shows no effect on the labor income that trainees receive, suggesting that it might be the case that PROBECAT/SICAT is not cost effective. Nevertheless, the training does increase the probabilities of receiving other benefits, such as housing credits and medical insurance. It is not a trivial task to conduct a cost-benefit analysis using outcomes that are not originally measured in monetary units, mostly because such goods and services are not valued the same by the individual receiving them and by society. For example, it could be argued that is in the society's interest that workers receive medical benefits, so they will be more productive, will pay more taxes, etc., while others might argue that these benefits are trivial for the country as a whole. In any case, a thorough analysis of how to appropriately introduce such benefits is necessary before conducting a serious cost-benefit analysis of PROBECAT-SICAT. Such analysis will be the object of future work.

Conclusions

Using semi-parametric estimation methods I evaluated the average treatment effect of the training component of the Mexican ALMP on its 2002 cohort. I analyzed the

¹⁹ Exchange rate obtained from Mexico's Central Bank.

impact of the program on commonly evaluated parameters for similar programs in developed economies, such as labor income, hours worked and employment.

If I had solely applied the same traditional criteria used to analyze such programs in developed countries, my analysis may have lead to results that would portray the program's effects inadequately by missing out some aspects. Additionally, the analysis and report of only "traditional" success variables could also misrepresent the program's positive impacts on recipients, leading to policy changes that would be considered ill-advised if policy makers and international donors considered a wider perspective. Following this logic, I additionally study the impact of the program on the probabilities of obtaining a position with the characteristics of what is consider formal employment, I use several definitions of formality that include benefits, type of contract and residence of business. This analysis, including variables largely ignored by the existing literature on evaluation of training programs in developing countries, is relevant given the prevalence in developing economies of employment with low productive capacity and poor working conditions, which are both associated with poverty. Using a retrospective survey of the trainees of 2002 (ENCOPE) and the National Employment Survey (ENE), I obtained propensity score matching estimates using nearest neighbor matching and kernel matching. I build on previous research by recognizing the limitations of the datasets used as sources of comparison samples (for example, the widespread use of a source limited to individuals living in urban centers) and propose a more adequate survey to build a comparison group.

The main results suggest that the trainees, on average, work more hours per week and have an increased probability of employment with health benefits due to participation

in SICAT, which indicates some success for the program. It should be noted that the access to health benefits might be due to the legal characteristics of the welfare system in Mexico, which includes extension of benefits offered as part of the training program²⁰. Additionally, for both men and women, the training promotes employment in micro businesses, enterprises with less than 10 workers, including the owner.

With respect to women, an important finding is that the probabilities of employment with informal characteristics show a similar increase to that of the probabilities of employment in micro-firms. This finding suggests that more women participate in self-employment or unpaid employment, verbal contracts, and businesses without specific locations than their male counterparts. These results demonstrate the importance of carefully considering the range of relevant outcomes in the evaluation of ALMPs in developing countries, at the risk of overlooking some of their effects due to their intrinsic multidimensional nature.

As previously discussed, the results for women show both: strong positive effects in terms of probability of employment with benefits and positive impacts in chances of employment with informal characteristics. A plausible explanation for this evidence is that women that participate in the program, as the results also show, increase their probabilities of employment in general, regardless of the characteristics of such employment. A proportion of participants could be employed in jobs with formal characteristics, while others enter employment with informal traits. Secondly, it is

²⁰ Note that these results measure the direct impact of participation in the program on employment with health benefits. For example, in the case of women, it would not be accurate to suggest that the relatively high impact found on employment with health benefits might be due to access to health insurance through their husbands. This interpretation would imply that the fact that women participate in the training increments the probabilities of them getting medical insurance through their husbands' health benefits, which has no empirical evidence.

possible that a job has characteristics that might be considered formal and at the same time characteristics that could be considered of informal employment, an example is individuals that receive in-cash bonuses at the end of the year but work selling goods door to door. In this circumstances it would be useful to study the impact of the training program over an “index of informality” of potential jobs, where the traits of the employment that ex-trainees access are considered in full. Given the multiple definitions of what constitutes informality, it would be challenging for the construction of such index determining the variables that conform it, nevertheless it is not impossible, this task is left for future work.

Methodologically the contribution of this chapter is the consideration of an appropriate comparison group; taking into account and analyzing the presence of contamination bias and general equilibrium effects; and taking into consideration the de facto rules for offering training. I show that, given the proportion of the population participating in the program, my results are not likely to be biased by misclassification of the training variable and that the existence of important general equilibrium effects is doubtful. Finally, I comment on future cost-benefit analyses.

Chapter 5: Differential effects of training categories for the unemployed and underemployed in the Mexican active labor market policies

Motivation and Literature Review

Over the history of PROBECAT/SICAT (P/S), the training component of the Active Labor Market Policies (ALMP) in Mexico, the training categories offered have been continuously modified based on claims of their differential ability to improve the employment prospects of the trainees. As a consequence of these changes, the modality consisting exclusively of in-classroom training has completely disappeared in recent years, while modalities based on mixed –or a combination between in-classroom and on-the-job training- have expanded.

However, there is little evidence in the literature to support or deny the superiority of any one training modality over the rest, since the literature on the evaluation of PROBECAT/SICAT and other Latin American programs has not consistently distinguished between training types. Notwithstanding its importance for policy changes, the literature has largely ignored the issue and as a result solid basis for policy changes of this nature are missing.

In what follows, I present an overview of the small literature that acknowledges the existence of different types of training, detailing the empirical methodology used in each case and pointing out, where appropriate, its shortcomings.

In their review of all of the impact evaluations of active labor market policies in developed, developing and transition economies, Betcherman et al. (2004) conclude that for all analyzed studies the training programs that perform better are those that involve on-the-job training with active employer involvement. In the specific case of Latin America, there is evidence of positive results for programs that target younger populations and offer a combination of on-the-job and in-classroom training. As Betcherman et al. indicate, programs that do not have age restrictions do not seem to have positive results for either training for self employment or in-classroom training.

Wodon and Minowa (1999) separately study the impacts of the training of the only two training categories offered in 1992: in-classroom-only (ICO) and mixed training (*i.e.*, in-classroom plus on-the job training). They estimate unemployment exit rates incorporating a calculated index of participation in which selection bias is eliminated by the use of an instrumental variable. The authors also obtain estimates of the effect of training on wages, by employing a Heckman two-step estimator. Wodon and Minowa (1999) separately calculate the probabilities of participating in each specific training category, where the counterfactual for a participant in any specific type would then be: either not participating in any program; or participating in the mixed-training (for those participating in the in-classroom-only), or in the in-classroom only (for those participating in the mixed training). Evidence is presented that suggests that participation in any of the training types does not reduce the length of unemployment. Moreover, both training categories have negative effects on the earnings of their participants. Wodon and Minowa (1999) set a precedent in the literature of impact evaluation in developing countries by offering the first available study that investigates the effects of different

types of training separately for PROBECAT. However, it is relevant to note that the authors do not intend to show the relative effects, or effectiveness, of a type of training with respect to the other, a question of capital importance in the configuration decision of the training programs. Finally, it is important to realize that their chosen instrumental variable, local labor market indicators, can lead to misleading results since this variable will have an impact both on potential outcomes (in the case of non-participation) and probabilities of participation, and in consequence, selection bias might still be present in the estimated coefficients.

In Aportela (1999), the author studies the impact of program participation on the probabilities of leaving unemployment using two different methods: hazard models²¹, and propensity score matching. In both cases, a comparison group is constructed considering only of unemployed individuals with unemployment spells censored at 64 weeks at the most. The comparison group is obtained from the National Urban Employment Survey (ENEU), a quarterly panel survey that included information about individuals living in 16 urban communities of 100,000 or more inhabitants. An important contribution of Aportela (1999) to the literature is the recognition of the potentially different effects of the training by gender and by training category. The results of the analysis suggest that there are important differences on the average impact by training category and by the gender of the participant. When the sample to estimate the impacts includes men and women, the author shows evidence that participation in the program increases the probability of leaving unemployment by 20% for the mixed training type, and by 60% for the in-classroom-only type. These results are interpreted as average impacts of the participation in the program with relative to not participating in any program. On the

²¹ Weibull, exponential and Cox

other hand, when the analysis is performed separately for male and female participants, his results show that for men, participation in the in-classroom-only program does not have any effect on the probability of leaving unemployment and mixed training has only a modest impact. For women, the two effects are positive and statistically significant, although the difference in magnitude appears to be important: mixed training increases the probability of leaving unemployment by slightly more than 100%; while in-classroom increases this probability by 59%. It needs to be noted that this carefully conducted work does not expose the misleading interpretations that might result from the comparison of propensity score matching estimations and hazard rate model estimations. While the first method gives us, on average, the differential in the probabilities of employment at a certain point in time, which is a level, the second method gives us a difference in rates. A related consideration is the fact that the length of the first employment is not necessarily equal for individuals in the comparison and in the treatment group, there is a possibility of dynamic selection bias [the treated and comparison groups are not sorted similarly into unemployment spells] (Dolton et al. 2006). Lastly, Aportela considers as a counterfactual to receiving a specific type of training: the total absence of training, which obscures the effects of one kind of training compared to the rest and prevents us from drawing conclusions for use in the mix of ALMPs.

On the same lines, in terms of subgroup analysis by gender and training category, in Calderón-Madrid and Trejo (2001) and Calderón-Madrid (2002), the authors investigate the average effect of participation in the program on re-employment dynamics, which are understood in this context as: the estimated number of weeks necessary to find a job and number of weeks in that job. The two estimates are obtained

using multi-spell mixed proportional hazard techniques, restricting the sample of trainees and comparisons to those with some work experience. Calderón-Madrid & Trejo and Calderón-Madrid further divide the sample into country regions and by the type of institution that provides the in-classroom only training. In the case of in-classroom training, the study shows that for both men and women, participation in the training positively affects the probability of leaving unemployment in certain zones of the country. Additionally, the study shows some evidence that participation in the mixed category improves re-employment dynamics of men. In the case of women, the positive effects on re-employment dynamics were restricted to the western and northern regions of the country. However, the authors find no evidence of positive influences on re-employment dynamics given participation in in-classroom training. Furthermore, Calderón-Madrid & Trejo (2001) and Calderón-Madrid (2003) present estimates of the impact of the program on post-training hourly wages obtained from a propensity score matching estimation, finding that the impact is negative for men and positive for women. The importance of this study goes further than a finer subgroup analysis, since Calderón-Madrid & Trejo was the first study not only concerned with the estimation of impacts on probabilities of employment and income, but also on long-term variables. Finally, the results of these two studies need to be cautiously interpreted, since while the set of independent variables used in their analysis is very complete, including measures of employment formality before training (such as access to health benefits), it is not economically explained or justified. The implicit assumption of selection on observables, even when not justified, is suspected to be valid in this context: the surveys from which the treated and comparison groups are taken from (retrospective survey 1994 and ENEU,

respectively) provide enough information to model participation decisions and potential outcomes. Nevertheless, the multilevel divisions of the sample means that each of the analysis samples is extremely limited in size. The fact that the comparison group is extremely limited in size is also worrisome. In addition, it is not clear whether the matching is done with or without replacement, and the authors do not provide any discussion on the comparability of the treatment and the comparison groups before or after the matching (e.g. balancing tests).

I also had access to two evaluations done to cover the government requirements for evaluation of the program, which are not available to the public. Following internal regulations, these official evaluations of P/S were entrusted to private consulting firms that performed impact evaluations at a general and subgroup levels. GEA (2002) evaluates the impacts of the program on the trainee cohorts of 2001 and 2002, and Analitica Consultores (2004) presents estimation results on impacts over the cohorts of 2003 and 2004. The parameters of interest in both reports are the probability of employment and monthly earnings, and although they mention using a propensity score matching technique, the estimates presented in the reports are those obtained by a Heckman two-step estimation of the bivariate selection model. Also, it is not clear from their reports what exclusion restriction is used to identify the model. The results for the cohorts of 2001, 2002 and 2003 are positive for men and women in terms of the probability of employment and monthly income. On the other hand, the impact of the training on the cohort of 2004 appears to be negative in terms of the probability of employment and positive in terms of income. Additionally, for the 2001 trainee cohort, GEA finds evidence to support the view that on-the-job training or a mixed combination

of on-the-job and in-classroom training outperforms the option of providing trainees only with in-classroom training, both in terms of probability of employment and monthly earnings. Analitica Consultores (2004), comparing the outcomes of the different types of training with receiving no training, finds no evidence of differential impacts on the probability of employment across training types. Furthermore, the study finds indications of a positive effect on labor income in all of the categories; however, the magnitudes are very close, with no difference between training modalities.

In Delajara *et al.* (2006), the authors obtain the average treatment effect and the average treatment effect on the treated on the probability of employment and wages, for the trainees of each year from 1999 to 2004. An attractive characteristic of this study is the recognition of the possibilities of formal and informal employment. In this study, an individual is considered to have informal employment when he/she is not affiliated to the Mexican Institute of Social Security (IMSS). An additional interesting feature of this study is the division of the trainees into two groups: those that received ICO and mixed training, and those that receive any other type of training (training for self employment, vouchers for professionals, etc). This division, the authors state, corresponds to their interpretation of the success of the program with respect to the expectations of the trainees. While for the first group (called the “salaried”) a formal job is a success, for the second group (called the “self-employed”), a job either in the formal or informal sector after training would be interpreted as a success.

Delajara *et al.* employ two estimation methods: propensity score matching and the selection on unobservables method proposed by Heckman *et al.* (2003), which requires an exclusion restriction. The researchers find that while the effect of the training on the

probability of employment for the “salaried” group is positive during the years under analysis, this is not always the case for the “self-employed” group that presents positive but also negative effects between 1999 and 2004. While this result is valid for both methods, in the case of propensity score, the estimated effects are smaller. The results of the estimation of the effects of treatment on wages are puzzling: while for the first method all the effects are negative and statistically significant, for the second method all are positive and statistically significant. The explanation offered by the authors is that the selection bias present in the evaluation problem of P/S is partly a “hidden bias”, *i.e.*, the econometrician would need to control for unobservable variables in his analysis to fully explain participation in the program. Under this argument, the authors conclude that “...assuming selection on observables can be misleading...”²² and hence, the authors argue, the methods based on such assumptions, such as matching, would not lead to correct estimates in a serious impact evaluation of this program. Finally, findings from Delajara et al. (2006), using data from the last year in which all modalities existed, provide support for the elimination of the in-classroom-only training by showing that this category had negative effects on the probability of employment; while the mixed training type (on-the-job and in-classroom) in medium and large firms registered the largest positive effect on employment over their period of analysis (1999-2004).

However, several objections to their work can be made: As a first critique, it is worthwhile to mention that while the authors regard their second method as “selection correction”, it is erroneous not to recognize that all methods for impact evaluation aim to correct for selection bias. Hence, matching should also be regarded as a selection correction method.

²² Delajara et al. (2006), p. 25.

Secondly, to construct a comparison group, the authors make use of ENEU, which restricts this group to individuals that inhabit only urban centers. This limitation could be due to the fact that in an effort to eliminate contamination bias, a special module of ENEU on schooling and training is used to calculate the probability of participation in a P/S program. If this probability is higher than 0.5, the individual is eliminated from the comparison group. While the idea to correcting for contamination bias is a good one, the method used does not appear to be optimal, since the elimination of all individuals with a high probability of participation might well be eliminating an important proportion of non-participants that do actually “look” much like participants, making them good comparisons.

Thirdly, despite the fact that the employment status of the trainee is not specifically recorded, Delajara *et al.* indicate that they restrict their investigation to individuals that at the time of the survey are unemployed, a relatively small proportion of all individuals served by P/S, which includes individuals who have never worked and are not considered unemployed and the underemployed. Consequently, they restrict the comparison group further by limiting it to those individuals who have been unemployed for at least two weeks. Finally, while the authors assume that “...the labor market experience of individuals in the treatment group before starting the program is the same as the control group...”, there is no evidence of the use of variables that would capture the labor market history of the treated and comparison groups in their estimation.

In terms of the methodology, an essential assumption of matching is the conditional independence assumption (CIA), under which the econometrician should include in his analysis all the variables that at the same time determine participation in

the program and potential outcomes in the case of non-participation. This assumption needs to be justified in the context of the data available. Unfortunately this is not the case in Delajara *et al.* The ENCOPE, a retrospective survey from which relevant information on the trainees is obtained, is a very rich dataset from which is possible to obtain detailed information on length of unemployment, reasons to take the training, etc. Nevertheless the study considers only a very limited set of variables, which makes the satisfaction of the CIA in their analysis doubtful.

Continuing with methodology, this research piece employs nearest neighbor matching for their estimations. Once the most popular and widely used matching estimator, its application has diminished in the literature given that the use of bootstrap to calculate standard errors is not valid for it due to the lack of smoothness (Abadie and Imbens, 2005). As of today, there is no good alternative to obtain standard errors for nearest neighbor matching. The lack of accurate standard errors casts doubt on the statistical significance of the results presented in the study.

Finally, their second method, a parametric estimation method based on Heckman et al. (2003) requires an exclusion restriction for which the authors propose the “number of scholarships per state per unemployed and quarter.” Unfortunately, the necessary discussion of the validity of the restriction is non-existent. Moreover, this variable, as stated in the text of the study²³, might be directly related to the probability of employment of the trainees and not only indirectly related to it through accessibility to the program, which may render it inappropriate as an instrumental variable for the analysis.

²³ “...the resources allocated to Servicios Estatales de Empleo (SEE) in each state should be in principle higher the worse the situation of the labor markets there...”, p. 9.

Despite some differences in their conclusions, two common features are present in the few studies that discuss the success of the different training categories that compose the ALMP in Mexico and that in general undermine their usefulness as a basis for policy recommendations. Firstly, the authors limit the variables that measure the impact of the program to probability of employment, wages, and length of job search. Secondly, these analyses only take as a comparison for each type of training, the absence of training, *i.e.*, they estimate the impacts of participation in a specific type of training relative to the non-participation in any training category.

On the empirical investigation of the effects of different types of training, I propose, firstly, that for developing countries, it is relevant to study additional variables of success, such as variables that capture the impact of the program on the probability of obtaining formal employment. With this, I aim to tackle the multidimensional nature of the impacts of a training program in a developing economy, where an important proportion of employment is in the informal sector, a situation that is highly correlated with poverty. Leaving these potential effects out of the analysis is likely to provide an incomplete or worse, misleading picture of the actual effect of these policies.

Additionally, this chapter makes a relevant addition to the knowledge of the P/S program by studying of the differential effects of various training types. I improve on the small existing literature by providing a rigorous study of the impact of the in-class-only modality not only relative to the absence of training, but relative to other available training categories. This is an important improvement because the participants in P/S are, by definition, exposed to training and comparing their outcomes to individuals who do

not receive training does not provide adequate information for policymakers who may be deciding between different compositions of modalities for the ALMP.

Regarding the more general contribution, the necessity of an evolution of the Active Labor Market Policies' training components to better address the real necessities of their clients, the unemployed and underemployed, makes it indispensable to obtain a deeper understanding of the categories of training that achieve enhanced results. This statement is not only true for the Mexican training component but for Latin American and the Caribbean programs that resemble the content and background of P/S. This section of the dissertation attempts to shed more light on this matter.

Types or modalities of training and assignment

Types of training in P/S

As already mentioned, four main types of training were offered as part of PROBECAT/SICAT in 2001. The official description of each of them follows (STPS, 2000).

In-classroom training

This category was offered by educational institutions registered in the Ministry of Public Education (Secretaría de Educación Pública) and/or the Ministry of Labor (Secretara del Trabajo y Prevision Social). Each group includes between 20 and 30 trainees. While on training, the participants receive a stipend, funds for transportation and accident insurance. Additionally, the program covers the instructors' salaries, materials and basic health services for the trainees. For example, for the state of Tamaulipas, in-

classroom training included electric installation, basic computational skills, general carpentry and air conditioner technician, among others (Gobierno del Estado de Tamaulipas, 2000).

Mixed training in medium and big businesses

The courses in this training type are offered following the specific request of enterprises that look to satisfy their labor demand, where most of the participant enterprises have at least 30 employers. The “mixed” label comes from the fact that these categories may combine on-the-job with in-classroom training, both provided by the host enterprise. The host businesses are in charge of designing the contents of the courses according to the necessities of the enterprise, instructing or covering the expenses of an instructor, providing proportionate health insurance and the necessary course materials to the trainees. PROBECAT/SICAT covers the stipend and arranges for 70% of the trainees to join the enterprise as employees once the training is over. All these listed conditions would be verified and evaluated by the State Employment Office.

In 2001, in the state of Tamaulipas, mixed courses in medium and big enterprises included industrial sewing, cashier training, furniture design and manufacture, among others (Gobierno del Estado de Tamaulipas, 2002).

Mixed training in micro and small businesses

This category focuses on training and on generating actual labor market experience with courses directed to young individuals in search for employment. It uses the productive infrastructure of the micro and small enterprises. For the purposes of PROBECAT/SICAT, these have a maximum of 30 workers. This type of program promotes the insertion of the trainees in the businesses during the length of the training as

well as their continued employment after the instruction is completed. Nevertheless, the business owner is not under any obligation to hire them.

The businesses can provide the trainees with extra stipends or other kind of ‘payments’. PROBECAT/SICAT covers the basic stipend, accident insurance and payments to the instructor/supervisor, who is selected and hired by the State Employment Office. Additionally, the program covers transportation costs if the sum of the stipend and these costs are not higher than the salary received by a worker of the host business who occupies a similar position.

Among some examples of the courses offered in this category are administrative assistant/receptionist, accountant’s assistant, automotive mechanic, beautician, etc., (Gobierno del Estado de Tamaulipas, 2002).

Self-employment

The program for self-employment focuses on populations, whose interests and abilities are oriented to the development of a productive activity on their own, but who requires upgrading their technical and administrative knowledge and skills. The training follows a ‘hands-on’ approach and takes place in educational institutions. With the purpose of promoting the fast employment of the participants after training, in addition to the stipend, health insurance and coverage of transportation costs are provided by the Ministry of Labor, and the qualifying trainees receive a tool kit once the instruction is completed.

Participants in P/S, assignment into training types

In the Procedures Manual of P/S (STPS, 2001), the Ministry of Labor states that there are two ways in which an individual can participate as P/S trainees –in any category-:

- 1) Responding directly to a call for participants for specific classes, courses, or mixed training;
- 2) Being sent directly to the training by an employment advisor from the SEE offices.

In both cases the interested individual would have to pass through an interview and a screening process at the local SEE offices to determine if she belongs to the population of interest, and if she has covered all of the specific prerequisites.

While the potential trainee can state her preferences in terms of the training modality to attend, the SEE agents play an important role in determining two factors that will decide the participation of the applicant in any of the offered training alternatives: 1) If the petitioner would benefit by participating in P/S training²⁴, and 2) The training type that is the best alternative.

Although the general population of interest in P/S includes individuals who are unemployed or underemployed, each training type has slightly different targets:

²⁴ Participation in any other services offered by the Ministry of Labor do not limit the simultaneous or sequential participation in P/S.

- Mixed training in medium and big enterprises focuses on active job seekers who require certification to access employment, or who have been displaced from the productive sector due to technological changes, the closing of their place of employment, etc.
- Mixed training in micro and small businesses has as its target population, the unemployed with characteristics that place them in the population group with the most disadvantages in the market (youth with no labor market experience, among others).
- Training for self-employment focuses on active job seekers or individuals in underemployment with an interest in starting a small business.
- In-classroom training aims at the unemployed who are interested in updating their knowledge and labor market skills in a specific occupational group.

In what follows, when we refer to an individual “choosing” to participate in a specific training type, we are considering not only personal preference, but also the rest of the structures and processes that lead different applicants to different training types.

Evaluation

Outcome Variables

As in the previous chapter, in addition to the estimation of the impact of participation in the training program on monthly income, hours worked and probability of

employment, I use additional variables that will measure the impact of the program on the probability of formal employment, or a job in the formal sector.

Along with the aforementioned outcome variables (income, hours and employment), I will evaluate the impact of the training on the following:

- a) Employment and Health benefits: The social insurance law (Ley del Seguro Social (2002), Article 12) establishes that all paid employees, members of cooperatives and other persons determined by the executive power should receive access to medical benefits, provided by IMSS²⁵ (Article 11 of the Ley del Seguro Social). Article 11 of the same law establishes that these employees are to receive: work related risk insurance, health and maternity insurance, life and handicap insurance, old age layoff insurance, daycare and other social benefits. All health services provided by clinics and hospitals from the Mexican Institute of Social Security (IMSS).
- b) Employment with housing credit: The Mexican Constitution (Constitución Política de los Estados Unidos Mexicanos, Article 123) establishes that all individuals under a labor contract, irrespective of whether this contract is written or verbal, should receive a low rate credit that could be applied to buying, building or repairing a dwelling. The employer and the federal government provide the funds for these credits.
- c) Employment with other cash benefits: Includes end of the year bonuses and others.

²⁵ The health insurance offered by IMSS includes outpatient and inpatient care in its own hospitals and clinics, prenatal care, childbirth, specialists and supply of prescription drugs.

- d) Employed in a micro business: Following the original definition of informal sector by size, I examine the possibility of being employed in what in Mexico is defined as a micro enterprise. The official definition of a micro enterprise, in 2002, was a firm that consists of at most 10 individuals including the employer (Martínez-Kasten, 2005).
- e) Employed as self-employed or without payment: The group of individuals working without payment is usually differentiated as working for a family member or not. In this case I aggregate these two classifications.
- f) Employed with a verbal contract: The survey instruments only consider two possibilities: a written contract or a verbal one. The possibility of the inexistence of a contract is not classified, although it is reasonable to believe that individuals without a contract would classify themselves as having a verbal one.
- g) Employed in businesses without a specific address (businesses without residence, hereafter): The businesses included in this group are those that do not have a specific building or permanent structure exclusively used to conduct their activities. These include street vendors and individuals who conduct their businesses from their own dwellings, using household resources as inputs.

Appendix A presents a detailed description of the variables included as outcomes of the participation in the training program.

Identification strategy

In this chapter I investigate the differential performance of each training modality within a multi-treatment setting (Imbens, 2000; Lechner 2001; Gerfin and Lechner, 2002; Sianesi, 2004), where each type will be evaluated by contrasting it with each other type, as well as to the option of not participating in any of the offered treatments.

In the *potential outcome approach to causality* proposed by Roy (1951) and Rubin (1974), the evaluation can be reduced to a comparison between two general treatments: i) the treatment of interest (treatment 1), in this case participating in any training modality, and ii) the absence of training (treatment 0) on the outcome or response variable, Y . This is the classical model used in the microeconomic evaluation literature. It was applied in the previous chapter of the dissertation to obtain the average treatment effects of any kind of training (compared to no training) over an array of outcome variables of success.

For this chapter, I propose to study the differential impacts by training category using Lechner's (2001) generalization of the aforementioned classical approach to a multi-treatment situation. In Lechner's approach, there are $(M+1)$ different mutually exclusive states (or treatments), and the outcomes of such are denoted: $\{Y^0, Y^1, \dots, Y^M\}$. Each of the individuals receives only one treatment and hence only one component of $\{Y^0, Y^1, \dots, Y^M\}$ is observed, while the remaining outcomes are counterfactuals. We denote participation in a particular treatment m by the variable $S \in \{0, 1, \dots, M\}$

The average treatment effects for a pair-wise comparison of treatments m and l can be defined by:

$$\gamma_0^{m,l} = E(Y^m - Y^l) = EY^m - EY^l,$$

$$\theta_0^{m,l} = E(Y^m - Y^l | S=m) = E(Y^m | S=m) - E(Y^l | S=m),$$

where $\gamma_0^{m,l}$ is the expected impact of treatment m relative to treatment l for a participant drawn randomly from the general population and $\theta_0^{m,l}$ is the expected effect on an individual randomly drawn from the population of participants in treatment m only.

In this chapter, I propose to estimate $\theta_0^{m,l}$ for all pairs of types of treatments offered to the cohort of 2001, distinguishing by gender. The cohort of 2001 is interesting because they were offered in-classroom only training, mixed (in-classroom and on-the-job) training in small and medium businesses, mixed training in big businesses, and training for self-employment. The estimation technique proposed is propensity score matching; specifically kernel matching with the application of a cross validation technique to select optimal bandwidths. In this case, the counterfactual for those individuals in the treatment group would be obtained directly from individuals that participated in other training categories. The standard errors will be calculated by bootstrap.

I chose matching methods because, unlike other selection on observables methods such as least squares regression, matching highlights the common support problem and compares only those observations that are comparable. Another good reason is that matching permits more flexible conditioning on the variables used. Finally, matching is relatively easy to understand and explain, a very desirable characteristic if we would like to provide policy recommendations based on the estimation results.

Matching estimation is based on the assumption of selection on observables, *i.e.*, conditional on characteristics observable to the econometrician, the treatment status is

independent of the untreated outcomes ($Y_0 \perp D \mid X$, where “ \perp ” denotes independence). This assumption is known formally as the Conditional Independence Assumption (CIA). In this multi treatment setting, we invoke CIA separately for each pair of training types and include in the estimation all the necessary variables that we believe would determine both participation and outcomes simultaneously. Matching is known for being a “data hungry” method, and this is related to the discussion on the CIA. In our case, the data at hand has enough detailed information including variables that capture the labor market history of the individual, that we are confident about invoking CIA for the multi-treatment analysis.

I also require the following common support condition: $P(X) < 1$, for all X . This guarantees that all individuals in the treatment group will have an analogue in the comparison group. In this specific case, I impose pair-wise common support using the simple mix-max rule used in Dehejia & Wahba (1999, 2002), *i.e.*, for each pair of training types, we restrict the propensity scores to the highest of the two minimums and to the lowest of the two maximums. By restricting the propensity scores in this way, we have the advantage of maximizing the sample size with respect to the sample size resulting from imposing a general common support.

As in the first estimation, we use propensity score matching, which implies the calculation of the conditional probability of participation of one training type with respect to another, over the vector of observed characteristics X , $E(D \mid P(X)) = E(D \mid P(X))$. Rosenbaum & Rubin (1983) show that if it is possible to match on X , then it is possible to match on $P(X)$, the propensity score; that is to say, if the CIA holds for X , it also holds for $P(X)$.

Description of variables and behavioral model

The behavioral model behind the decision to participate in any training category rather than not participating in the program at all, described in section 4.3 of chapter IV, is slightly different from the one I present in this section. Here I describe the variables that enter the decision to participate in one specific training category rather than another. The underlying assumption is that a participant is rational and in order to maximize his expected utility, he will decide to participate in one or another training category given the set of costs and expected benefits posed by the program. It is important to remember that we are not considering the non-participation in this part of the dissertation.

All categories of the training program are designed to increase the stock of human capital of the trainees so that there is a real upgrade of the workers' abilities and hence, a potentially higher probability of employment, labor income and other benefits. Accumulated human capital stock at the time of the training provides a measure of average unobserved ability, which has implications for the potential benefits and probability of participation in one type of training or another. Individuals with different levels of education could self-select into specific types of training; for example, in-classroom training seems to attract individuals with higher education levels. With this motive, I include as an explanatory variable the number of years of formal education the individual has acquired before training. This variable will provide a measure of ability, which in turn relates to both participation in the program and potential outcomes. Having completed specific levels of education could also determine if a potential trainee decides to take one type of training or other; at the same time completed levels of formal

education clearly determines likely labor market outcomes. For this reason, we are also including dummy variables that capture the highest level of education achieved.

Standard human capital theory implies that an individual should acquire his stock of human capital at a young age, so that he will have more time during his natural life to enjoy the returns of it (Mincer, 1997) and (Becker, 1964). All else constant, the expected benefits of an individual obtaining training at a younger age are on average higher than those if the person is older. At the same time, age might also affect income, probability of employment, etc. In the Procedures Manual of P/S (STPS, 2001), it is stated that some forms of training such as mixed in micro and small enterprises are designed to attract younger and more inexperienced workers, than mixed in big companies, for example. We include age and the square of age to control for the fact that it is likely to affect both participation in particular training types and outcomes.

Gender will also make a difference on the expected net benefits of participation in particular training types. Most evaluations of training programs in developing countries show that positive impacts of participation in such programs are mostly confined to women (Betcherman, Olivas and Dar, 2004). It seems also to be the case that men and women prefer, on average, different training types. For example, in the case of P/S, the great majority of women (almost 40%) choose self-employment over any other training type, while for men this is the least popular type. As in the previous chapter, I present separate estimates for men and women.

Demographic variables will furthermore capture additional differences on the overall likelihood of obtaining a net benefit by participation in the program. Differences in the relative position in the household (i.e. head of household, spouse of head, etc.) and

marital status, and in this chapter only, number of economic dependents, in addition to the demographic variables already mentioned, capture relevant and otherwise unobserved factors, such as stability and other psychological factors that influence participation and potential outcomes.

A rich set of variables that capture the past labor market experience of the individual, is necessary to obtain accurate estimate of the impacts of such program as showed by Card and Sullivan (1988), Heckman et al. (1997) and Heckman et al. (1998). An individual's labor market history is formed by a series of decisions and outcomes to those decisions that will have an effect on the direction and magnitude in which the training experience will affect him. Differences in participation and attachment to the labor market, labor earnings, full time and part time status, etc, play a role in the reservation wage at which the individual is indifferent between accepting a particular job or not. At the same time, these past experiences will help determine the labor income received by an individual. Previous employment variables will function as summary statistics of those characteristics, and account for the quantity, efficiency, transferability, obsolescence, etc. of accumulated human capital obtained while in the labor market (Sianesi, 2002).

The official requirements for participation in P/S include an employment status of unemployed (and looking for a job) or underemployed (looking or not for a job). Nevertheless, as stated in the preceding chapter, information obtained from officials of the program and directly from ENCOPE suggests employment status is not a rigid determinant of eligibility. A shortcoming of the data at hand is that it only captures information on the last job that an individual had prior to training. This then restricts the

set of variables that capture the labor individual history to a categorical variable that indicates if the individual has ever worked and variables that capture the number of weekly hours worked and monthly labor income in the last job. Additionally, I include a variable that captures the duration of inactivity up to the time when training started, which will serve as a proxy for optimal search effort or the marginal utility of leisure (Vishwanath, 1989). In this case, I include a variable that is a continuous number of days, and the square of this variable. This variable captures, for those who ever hold a job, the date in which the individual left her last job. For those who had never hold a job by that time, the duration of inactivity was coded as zero. Duration of inactivity will also account for unobservables such as the discouraged worker effect and the expected deterioration of human capital skills previously acquired.

Along the same lines, ENCOPE 2001 obtained information on the reasons why an individual decided to participate in the training program. The survey instrument presents the respondent with a set of (not necessarily mutually exclusive) reasons for desiring training but then asks him to select only one (such as “to obtain experience” or “because it was recommended to me”). For our purposes, we assume that the trainees record the most important reason. It is reasonable to believe that the reason for participation in the program will contain information that affects both participation in a particular training category and the potential outcome associated with participation in each training category.

Finally, given that the program is offered at the national level, it is necessary to include variables that will account for differences in local labor markets, as the characteristics of the labor market and the institutional framework might imply

differences across individuals living in different regions (Heckman, Ichimura, Smith & Todd, 1998). I included two sets of variables, the first of which is a socio-economic index created by the INEGI, which divides the country in 7 zones placing each of the 32 states in a zone, where 1 is the lowest zone and 7 is the highest one and corresponds to Mexico City. The index is based on characteristics obtained from the census and includes indicators of dwelling quality and infrastructure, dwelling overcrowding, health, education and employment (INEGI, 2006). The second set of variables includes a set of dummies by municipality population size, where the lowest category includes municipalities with less than 25,000 habitants, and the highest includes cities with 350,000 or more habitants. These two sets of variables serve as summary statistics for local characteristics, and will also capture unobserved differences at the regional level in the availability of each training type and the selection process of the trainees.

As a summary for the reader of the two empirical chapters, in chapter V, the few changes in the explanatory variables include: formal schooling and length of inactivity variables are continuous and the limit values of the dummy variables for size of municipality are slightly different. Finally, a variable that captures the number of economic dependents is added, as well as dummy variables that capture the main reason for participation in the training.

Appendix D presents a detailed description of the variables included in the calculation of the propensity scores.

Data

As stated in the first analytic chapter of the dissertation, since 1998 the National Survey on Job Matching and Continuance (ENCOPE), a retrospective survey, is applied to a 1% random sample of P/S graduates. It is representative at the national level and by modality of program and the response rate is approximately 85% (STPS, 2006).

The survey is a retrospective personal interview survey and the trainees are questioned on variables that capture information on the time before, during and after training. It provides information on socio-demographic variables: age, marital status, if the individual is head of household, gender, education level and economic dependents; program/classes attended, dates of participation, reasons to participate in the training and opinion on courses taken; and, finally, a set of labor market variables pre- and post-training that include wages, benefits, duration of employment, position, sector, and activity, hours worked, form of payment, reasons for leaving job, etc.

In this chapter, we focus on the 2001 ENCOPE, because there were four training types offered during that period: in-classroom training, mixed in medium and large firms, mixed in small and micro firms, and training for self-employment. Unlike other years, in 2001, two cohorts of trainees are distinguished; named the third and fourth quarter cohorts. In this study, we group them together. The original sample contains 4,866 individual records (33% of them are male) of trainees who finished their classes. Table 11 presents the distribution of the relevant variables by gender and type of training. Several things come to mind when analyzing this table: for women the proportion who have never worked is overwhelmingly high for those trained for self-employment. This group has also the highest proportion of married individuals and, on average, has older

participants than the rest of the groups. The youngest are those trained for employment in micro and small businesses. With respect to development zone and municipality size, no major differences appear between the training types. The same pattern occurs when we analyze the reasons for participation in the program: the highest percentage in all groups report “wanted to get training” as the most important reason to participate, with “required for employment” as the least important reason in all cases. For men, the highest proportion of individuals who have never worked is found in the mixed training in small firms. Unlike the women, this group is on average the youngest of the four, and the one with the smallest number of dependents under their care. Although most of the trainees live in municipalities with more than 10,000 inhabitants, this proportion is noticeably higher for trainees in both the mixed types compared to those in in-classroom training and self-employment. These differences will be formally analyzed as all the variables in Table 11 will be used to estimate probability of participation in each training type. A detailed description of the variables is included in Appendix D.

The outcome variables are measured between December of 2001 and January of 2002 (after all training classes are completed); the elapsed time between the end date of the program and the time the survey is conducted is heterogeneous. No participants in a specific training type are scheduled to be interviewed first, so that the date the survey is applied is independent of the type of training.

Table 11.1 Number of Observations and Selected Characteristics of Different Groups by Training Type

| | Women | | | |
|--|--------------|-------------------------------------|--------------------------------------|-----------------|
| | In-classroom | Mixed in medium and big enterprises | Mixed in micro and small enterprises | Self employment |
| Number of observations | 604 | 487 | 933 | 1,236 |
| Age | 27.88 | 26.36 | 24.56 | 35.04 |
| Years of formal education | 10.22 | 8.67 | 10.25 | 7.03 |
| Single (%) | 45.03 | 53.80 | 61.95 | 23.06 |
| Married (%) | 48.01 | 39.83 | 33.76 | 69.83 |
| Divorced, widow, separated (%) | 6.95 | 6.36 | 4.29 | 7.11 |
| Economic dependents | 1.01 | 1.33 | 0.86 | 1.35 |
| Head of household (%) | 8.11 | 10.68 | 6.65 | 9.87 |
| Has never been employed (%) | 30.79 | 35.93 | 41.05 | 52.83 |
| Total number of hours worked weekly* | 42.61 | 46.27 | 42.35 | 35.76 |
| Pre monthly labor income* | 1,741.87 | 1,850.07 | 1,584.10 | 1,194.89 |
| Length of inactivity in days | 228.91 | 125.74 | 115.64 | 138.64 |
| Highest degree obtained | | | | |
| No degree | 2.65 | 8.23 | 3.54 | 23.08 |
| Elementary School | 10.76 | 28.19 | 11.70 | 32.06 |
| Junior High school | 45.70 | 45.47 | 40.88 | 33.68 |
| High school | 19.87 | 8.64 | 26.18 | 5.75 |
| Technical degree | 2.32 | 2.88 | 2.58 | 0.32 |
| College | 18.71 | 6.58 | 15.13 | 5.1 |
| Development Regions | | | | |
| Development region1 | 10.60 | 3.90 | 6.22 | 9.95 |
| Development region2 | 16.39 | 16.43 | 18.01 | 17.56 |
| Development region3 | 21.03 | 20.33 | 16.18 | 14.97 |
| Development region4 | 25.83 | 20.12 | 30.44 | 23.79 |
| Development region5 | 12.25 | 16.22 | 12.75 | 14.08 |
| Development region6 | 9.44 | 21.56 | 12.22 | 16.18 |
| Development region7 | 4.47 | 1.44 | 4.18 | 3.48 |
| Size of Municipality (Population) | | | | |
| Town size<=2,499 | 0.66 | 0.00 | 0.21 | 0.40 |
| 2,500=<municipality size<15,000 | 5.63 | 9.24 | 3.43 | 17.72 |
| 15,000=<municipality size<50,000 | 30.46 | 18.89 | 12.65 | 27.51 |
| 50,000=<municipality size<100,000 | 18.05 | 12.94 | 15.11 | 18.93 |
| municipality size>100,000 | 45.20 | 58.93 | 68.60 | 35.44 |
| Reasons to take training | | | | |
| To obtain experience | 20.03 | 14.17 | 22.08 | 22.33 |
| To obtain employment | 9.27 | 16.43 | 16.51 | 7.44 |
| Wanted to get training | 35.43 | 32.44 | 28.08 | 34.55 |
| Was recommended to take it | 25.66 | 11.70 | 17.68 | 20.63 |
| Required for employment | 1.66 | 6.98 | 1.93 | 0.57 |
| To obtain the stipend | 5.46 | 12.32 | 7.07 | 6.31 |
| Other | 2.48 | 5.95 | 6.65 | 8.17 |

*Does not include zeros

Source: Author's calculations from ENCOPE 2001 survey

Table 11.2 Number of Observations and Selected Characteristics of Different Groups by Training Type

| | Men | | | |
|--|--------------|-------------------------------------|--------------------------------------|-----------------|
| | In-classroom | Mixed in medium and big enterprises | Mixed in micro and small enterprises | Self employment |
| Number of observations | 422 | 383 | 490 | 311 |
| Age | 27.36 | 27.00 | 22.93 | 30.08 |
| Years of formal education | 10.43 | 9.61 | 10.27 | 8.71 |
| Single (%) | 58.77 | 47.52 | 73.67 | 51.13 |
| Married (%) | 39.57 | 48.30 | 26.13 | 46.30 |
| Divorced, widow, separated (%) | 6.95 | 6.36 | 4.29 | 7.11 |
| Economic dependents | 1.53 | 1.96 | 1.11 | 1.83 |
| Head of household (%) | 37.91 | 47.26 | 24.90 | 43.09 |
| Has never been employed (%) | 19.67 | 12.53 | 34.08 | 24.44 |
| Total number of hours worked weekly* | 46.19 | 51.91 | 43.56 | 44.49 |
| Pre monthly labor income* | 2,503.35 | 2,749.60 | 1,780.02 | 1,912.61 |
| Length of inactivity in days | 126.05 | 61.31 | 81.10 | 94.51 |
| Highest degree obtained | | | | |
| No degree | 3.55 | 5.22 | 4.29 | 13.18 |
| Elementary School | 11.85 | 16.97 | 14.90 | 22.19 |
| Junior High school | 43.13 | 47.52 | 40.61 | 39.55 |
| High school | 24.17 | 18.02 | 29.39 | 17.36 |
| Technical degree | 4.74 | 2.35 | 3.27 | 1.29 |
| College | 12.56 | 9.92 | 7.55 | 6.43 |
| Development Regions | | | | |
| Development region1 | 8.53 | 2.87 | 13.88 | 17.68 |
| Development region2 | 19.19 | 15.40 | 15.51 | 22.19 |
| Development region3 | 19.19 | 15.93 | 14.49 | 13.18 |
| Development region4 | 23.93 | 24.28 | 34.08 | 23.79 |
| Development region5 | 9.95 | 17.49 | 12.86 | 14.15 |
| Development region6 | 14.69 | 22.45 | 6.94 | 2.89 |
| Development region7 | 4.50 | 1.31 | 2.24 | 6.11 |
| Size of Municipality (Population) | | | | |
| Town size<=2,499 | 0.00 | 0.00 | 0.61 | 0.00 |
| 2,500=<municipality size<15,000 | 8.77 | 7.05 | 2.24 | 12.86 |
| 15,000=<municipality size<50,000 | 16.59 | 14.10 | 10.82 | 27.33 |
| 50,000=<municipality size<100,000 | 15.88 | 7.57 | 14.69 | 13.50 |
| municipality size>100,000 | 58.77 | 71.28 | 71.63 | 46.30 |
| Reasons to take training | | | | |
| To obtain experience | 19.91 | 21.67 | 24.69 | 17.04 |
| To obtain employment | 11.85 | 19.84 | 13.47 | 13.83 |
| Wanted to get training | 37.68 | 29.77 | 31.63 | 39.87 |
| Was recommended to take it | 19.91 | 11.75 | 14.90 | 15.76 |
| Required for employment | 1.42 | 3.92 | 1.22 | 1.61 |
| To obtain the stipend | 4.74 | 9.92 | 7.35 | 6.43 |
| Other | 4.03 | 3.13 | 6.73 | 5.47 |

*Does not include zeros

Source: Author's calculations from ENCOPE 2001 survey

Empirical specification

Propensity Score

As a first step of the empirical analysis, I calculate the probabilities of participating in each training category compared to each other training category, that is, I estimate for training type l with respect to training type m : $Pr(S = l | S = l \cup S = m, X)$.

Where $l = 1, \dots, 4$ and $m = 1, \dots, 4$, $l \neq m$, and:

1=In-classroom

2=Mixed-in medium and big enterprises

3=Mixed-in micro and small enterprises

4=For self employment

Tables 12.1 and 12.2 present the results of this estimation of the expected probabilities, by gender. Figures 5.1 to 5.6 for women and 6.1 to 6.6 for men correspond to the calculated propensity scores.

The expected probability was estimated using a maximum likelihood probit model; I report the average derivatives of the conditional probabilities. The dependent variable is a dummy variable that takes the value of 1 if an individual participated in a training program category, and 0 if he participated in the other category in a different pair. The results of the remainder of the probit analyses (2 with respect to 1, 3 with respect to 1, etc) are not shown since the coefficients obtained are symmetric to those presented in the table so that, for example, all the coefficients under the label “1 with respect to 2” are simply the negative of those of “2 with respect to 1”.

Table 12.1 A Propensity Score, Women

PROBIT, Mean Derivatives reported*, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey

| | In-classroom with respect to mixed in medium and big | In-classroom with respect to mixed in micro and small | In-classroom with respect to self- employment |
|--|--|---|---|
| Age | 0.59 (0.01) | 3.58 (0.01) | -0.50 (0.01) |
| Age squared | 0.00 (0.00) | -0.03 (0.00) | 0.00 (0.00) |
| Married | 8.37 (0.04) | 2.97 (0.03) | -2.61 (0.03) |
| Divorced, widow, separated | 9.30 (0.07) | 5.70 (0.08) | 11.30 (0.06) |
| Number of economic dependents | -4.19 (0.01) | -1.72 (0.01) | -1.12 (0.01) |
| Head of household | -8.66 (0.06) | -3.28 (0.06) | -4.78 (0.05) |
| Has never been employed | -29.09 (0.12) | -4.54 (0.12) | 4.56 (0.08) |
| Age * Has never been employed | -0.15 (0.00) | -0.07 (0.00) | -0.10 (0.00) |
| Pre total number of hours worked weekly | -0.97 (0.00) | -0.25 (0.00) | 0.00 (0.00) |
| Pre total number of hours worked weekly square | 0.01 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Pre monthly labor income | -0.01 (0.00) | 0.00 (0.00) | 0.38 (0.00) |
| Pre monthly labor income squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Years of formal education | 0.62 (0.01) | 0.34 (0.01) | 5.16 (0.01) |
| Highest degree obtained | | | |
| Elementary School | 11.91 (0.07) | 14.78 (0.10) | -5.63 (0.05) |
| Junior High school | 26.28 (0.09) | 20.85 (0.10) | -5.18 (0.07) |
| High school | 35.71 (0.09) | 14.53 (0.13) | -10.70 (0.09) |
| Technical degree | 5.24 (0.22) | -(4.14) 0.19 | -15.98 (0.13) |
| College | 36.98 (0.09) | 19.56 (0.14) | -3.17 (0.10) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100.

** In this case not-divorced predicted participation perfectly, and so was excluded from the estimation.

Source: Author's calculations from ENCOPE 2001 survey.

Table 12.1 B Propensity Score, Women

PROBIT, Mean Derivatives reported*, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey

| | Mixed in medium and big with respect to mixed in micro and small | Mixed in medium and big with respect to self- employment | Mixed in micro and small with respect to self-employment |
|---|--|--|--|
| Age | 3.13 (0.01) | -4.37 (0.03) | -3.19 (0.00) |
| Age squared | -0.04 (0.00) | 0.00 (0.00) | 0.03 (0.00) |
| Married | -6.99 (0.03) | -37.52 (0.11) | -3.26 (0.02) |
| Divorced, widow, separated | -4.92 (0.06) | 22.78 (0.24) | 6.89 (0.05) |
| Number of economic dependents | 1.92 (0.01) | 8.28 (0.03) | 0.87 (0.01) |
| Head of household | 6.53 (0.06) | 15.45 (0.19) | 2.59 (0.04) |
| Has never been employed | 24.07 (0.11) | 132.11 (0.43) | 12.49 (0.07) |
| Age * Has never been employed | (0.04) 0.00 | (0.24) 0.01 | 0.02 (0.00) |
| Pre total number of hours worked weekly | 0.55 (0.00) | 5.87 (0.02) | 0.99 (0.00) |
| Pre total number of hours worked weekly squared | 0.00 (0.00) | -0.05 (0.00) | -0.01 (0.00) |
| Pre monthly labor income | 0.01 (0.00) | 0.05 (0.00) | 0.01 (0.00) |
| Pre monthly labor income squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Years of formal education | 1.05 (0.01) | 18.12 (0.05) | 2.94 (0.01) |
| Highest degree obtained | | | |
| Elementary School | -3.20 (0.07) | -30.70 (0.21) | -6.79 (0.05) |
| Junior High school | -19.93 (0.08) | -72.33 (0.32) | -5.89 (0.06) |
| High school | -(34.82) 0.07 | -(154.37) 0.48 | -2.49 (0.09) |
| Technical degree | -25.76 (0.08) | -49.90 (0.86) | 14.03 (0.16) |
| College | -(31.25) 0.06 | -125.05 (0.50) | 1.21 (0.09) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100.

** In this case not-divorced predicted participation perfectly, and so was excluded from the estimation.

Source: Author's calculations from ENCOPE 2001 survey.

Table 12.1 A Cont'. Propensity Score, Women

PROBIT, Mean Derivatives reported*, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey

| | In-classroom with respect to mixed in medium and big | In-classroom with respect to mixed in micro and small | In-classroom with respect to self- employment |
|--|--|---|---|
| Length of inactivity | 0.02 (0.00) | 0.01 (0.00) | 0.01 (0.00) |
| Length of inactivity squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Reasons to take training | | | |
| To obtain experience | 18.69 (0.05) | 9.90 (0.05) | -8.50 (0.04) |
| Wanted to get training | 16.79 (0.04) | 17.17 (0.04) | -2.91 (0.04) |
| Was recommended to take it | 28.85 (0.04) | 23.03 (0.05) | -1.09 (0.04) |
| Required for employment | -0.92 (0.08) | 19.30 (0.11) | 13.93 (0.11) |
| To obtain the stipend | -5.00 (0.06) | 5.80 (0.07) | -3.47 (0.05) |
| Other | 0.22 (0.08) | -7.49 (0.07) | -19.28 (0.04) |
| Development Regions | | | |
| Development region 1 | 15.83 (0.11) | 11.40 (0.09) | 19.53 (0.07) |
| Development region 2 | -16.28 (0.10) | -6.05 (0.07) | 8.07 (0.06) |
| Development region 3 | -16.35 (0.10) | 0.81 (0.07) | 14.66 (0.06) |
| Development region 4 | -8.94 (0.10) | 2.19 (0.07) | 9.92 (0.06) |
| Development region 5 | -18.95 (0.10) | 3.90 (0.08) | 2.27 (0.06) |
| Development region 6 | -31.27199 (0.09) | -4.06 (0.08) | -3.19 (0.06) |
| Size of Municipality (Population) | | | |
| Municipality size<25,000 | -6.89 (0.05) | 22.19 (0.05) | -21.01 (0.03) |
| 25,000=<Municipality size<125,000 | 12.90 (0.04) | 19.68 (0.03) | -9.25 (0.03) |
| 125,000=<Municipality size<225,000 | -27.51483 (0.05) | -8.03 (0.05) | -23.61 (0.03) |
| 225,000=<Municipality size<325,000 | -2.00 (0.06) | -4.20 (0.04) | 5.56 (0.05) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100.

** In this case not-divorced predicted participation perfectly, and was excluded from the estimation.

Source: Author's calculations from ENCOPE 2001 survey.

Table 12.1 B Cont'. Propensity Score, Women

PROBIT, Mean Derivatives reported*, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey

| | Mixed in medium and big with respect to mixed in micro and small | Mixed in medium and big with respect to self- employment | Mixed in micro and small with respect to self-employment |
|--|--|--|--|
| Length of inactivity | 0.00 (0.00) | -0.03 (0.00) | -0.01 (0.00) |
| Length of inactivity squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Reasons to take training | | | |
| To obtain experience | -13.86 (0.04) | -86.46 (0.16) | -11.28 (0.03) |
| Wanted to get training | -0.31 (0.04) | -62.36 (0.15) | -14.49 (0.03) |
| Was recommended to take it | -8.83 (0.04) | -102.77 (0.17) | -15.20 (0.03) |
| Required for employment | 25.85 (0.08) | 70.73 (0.34) | -3.99 (0.10) |
| To obtain the stipend | 8.79 (0.05) | 3.27 (0.19) | -5.11 (0.04) |
| Other | -6.44 (0.05) | -56.26 (0.21) | -11.26 (0.04) |
| Development Regions | | | |
| Development region 1 | 3.90 (0.11) | 28.50 (0.40) | 7.18 (0.06) |
| Development region 2 | 11.93 (0.09) | 109.09 (0.34) | 14.66 (0.05) |
| Development region 3 | 18.26 (0.09) | 126.88 (0.34) | 14.90 (0.05) |
| Development region 4 | 11.76 (0.08) | 83.73 (0.33) | 10.73 (0.05) |
| Development region 5 | 22.88 (0.09) | 88.08 (0.34) | 2.70 (0.05) |
| Development region 6 | 32.58 (0.09) | 114.44 (0.33) | 0.93 (0.05) |
| Size of Municipality (Population) | | | |
| Municipality size<25,000 | 22.23 (0.05) | -87.20 (0.15) | -32.36 (0.02) |
| 25,000=<Municipality size<125,000 | 5.24 (0.03) | -65.08 (0.13) | -20.83 (0.02) |
| 125,000=<Municipality size<225,000 | 17.12 (0.04) | -24.07 (0.15) | -18.76 (0.02) |
| 225,000=<Municipality size<325,000 | -0.54 (0.04) | 16.88 (0.22) | 6.89 (0.04) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100.

** In this case not-divorced predicted participation perfectly, and so was excluded from the estimation.

Source: Author's calculations from ENCOPE 2001 survey.

Table 12.2 A Propensity Score, Men

PROBIT, Average Derivatives reported*, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey

| | In-classroom with respect to mixed in medium and big | In-classroom with respect to mixed in micro and small | In-classroom with respect to self- employment |
|--|--|---|---|
| Age | 0.23 (0.01) | 1.72 (0.01) | 1.16 (0.04) |
| Age squared | 0.01 (0.00) | -0.01 (0.00) | -0.03 (0.00) |
| Married | -3.09 (0.06) | 8.10 (0.06) | -28.14 (0.22) |
| Divorced, widow, separated | -24.60 (0.11) | ** | 27.27 (0.62) |
| Number of economic dependents | -2.68 (0.02) | -1.42 (0.02) | -5.28 (0.06) |
| Head of household | -9.22 (0.07) | -6.67 (0.06) | 37.79 (0.24) |
| Has never been employed | -22.63 (0.16) | -7.66 (0.18) | -52.69 (0.57) |
| Age * Has never been employed | 0.36 (0.01) | 0.51 (0.01) | 0.64 (0.02) |
| Pre total number of hours worked weekly | -1.05 (0.00) | -0.06 (0.00) | -3.44 (0.02) |
| Pre total number of hours worked weekly sq | 0.01 (0.00) | 0.00 (0.00) | 0.03 (0.00) |
| Pre monthly labor income | 0.00 (0.00) | 0.01 (0.00) | 0.05 (0.00) |
| Pre monthly labor income squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Years of formal education | 2.63 (0.02) | -0.04 (0.02) | 4.30 (0.06) |
| Highest degree obtained | | | |
| Elementary School | 9.96 (0.14) | 28.78 (0.12) | 22.06 (0.44) |
| Junior High school | (11.79) 0.16 | 38.83 (0.09) | (59.51) 0.51 |
| High school | 5.42 (0.21) | 34.14 (0.12) | 71.53 (0.65) |
| Technical degree | (16.50) 0.27 | 41.73 (0.16) | (63.57) 0.92 |
| College | 8.33 (0.22) | 49.95 (0.09) | 73.20 (0.72) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100.

** In this case not-divorced predicted participation perfectly, and so was excluded from the estimation.

Source: Author's calculations from ENCOPE 2001 survey.

Table 12.2 B Propensity Score, Men

PROBIT, Average Derivatives reported*, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey

| | Mixed in medium and big with respect to mixed in micro and small | Mixed in medium and big with respect to self- employment | Mixed in micro and small with respect to self-employment |
|---|---|--|--|
| Age | 0.88 (0.01) | -0.99 (0.01) | -2.78 (0.01) |
| Age squared | -0.01 (0.00) | 0.00 (0.00) | 0.02 (0.00) |
| Married | 0.06 (3.13) | -7.90 (0.06) | -8.31 (0.06) |
| Divorced, widow, separated | ** | 25.60 (0.10) | ** |
| Number of economic dependents | (2.07) 0.01 | (2.69) 0.01 | (0.39) 0.01 |
| Head of household | (1.42) 0.06 | 13.75 (0.06) | 8.87 (0.05) |
| Has never been employed | 20.74 (0.13) | 25.22 (0.09) | -5.55 (0.17) |
| Age * Has never been employed | 0.14 (0.01) | -0.34 (0.01) | -0.46 (0.01) |
| Pre total number of hours worked weekly | 0.97 (0.00) | 0.59 (0.00) | -0.93 (0.00) |
| Pre total number of hours worked weekly squar | -0.01 (0.00) | 0.00 (0.00) | 0.01 (0.00) |
| Pre monthly labor income | 0.01 (0.00) | 0.01 (0.00) | 0.01 (0.00) |
| Pre monthly labor income squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Years of formal education | -2.79 (0.02) | -1.51 (0.02) | 0.94 (0.02) |
| Highest degree obtained | | | |
| Elementary School | 7.40 (0.11) | -2.07 (0.11) | -6.54 (0.12) |
| Junior High school | 23.93 (0.12) | 7.87 (0.14) | -12.20 (0.13) |
| High school | 22.02 (0.15) | 14.52 (0.17) | -6.80 (0.18) |
| Technical degree | (32.80) 0.23 | 7.54 (0.28) | -6.21 (0.28) |
| College | 38.29 (0.15) | 16.49 (0.19) | -18.72 (0.22) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100

** In this case not-divorced predicted participation perfectly, and was excluded from the estimation

Source: Author's calculations from ENCOPE 2001 survey

Table 12.2 A Cont'. Propensity Score, Men

PROBIT, Average Derivatives reported*, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey

| | In-classroom with respect to mixed in medium and big | In-classroom with respect to mixed in micro and small | In-classroom with respect to self- employment |
|--|--|---|---|
| Length of inactivity | 0.01 (0.00) | -0.02 (0.00) | 0.02 (0.00) |
| Length of inactivity squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Reasons to take training | | | |
| To obtain experience | 14.35 (0.06) | 2.62 (0.06) | -6.65 (0.23) |
| Wanted to get training | 12.97 (0.05) | 6.90 (0.06) | -1.80 (0.21) |
| Was recommended to take it | 23.94 (0.06) | 7.37 (0.06) | 23.96 (0.23) |
| Required for employment | 0.87 (0.12) | 18.51 (0.13) | 7.84 (0.44) |
| To obtain the stipend | -19.97 (0.09) | -10.96 (0.09) | -59.90 (0.36) |
| Other | 15.99 (0.10) | -3.28 (0.08) | -27.43 (0.32) |
| Development Regions | | | |
| Development region 1 | 1.73 (0.15) | -23.85 (0.09) | -8.44 (0.33) |
| Development region 2 | -18.14 (0.11) | -10.44 (0.10) | 39.78 (0.31) |
| Development region 3 | -23.50 (0.10) | -15.66 (0.09) | 88.55 (0.33) |
| Development region 4 | -22.13 (0.10) | -22.09 (0.09) | 30.98 (0.30) |
| Development region 5 | -33.83 (0.09) | -26.25 (0.08) | -10.95 (0.32) |
| Development region 6 | -30.68 (0.10) | -6.94 (0.10) | 103.29 (0.35) |
| Size of Municipality (Population) | | | |
| Municipality size<25,000 | 10.76 (0.07) | 22.97 (0.07) | -78.04 (0.21) |
| 25,000=<Municipality size<125,000 | 4.90 (0.05) | 3.95 (0.05) | -19.51 (0.17) |
| 125,000=<Municipality size<225,000 | -2.13 (0.06) | -9.14 (0.05) | 34.19 (0.23) |
| 225,000=<Municipality size<325,000 | 6.00 (0.07) | -12.53 (0.06) | 17.49 (0.28) |

Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100.

** In this case not-divorced predicted participation perfectly, and so was excluded from the estimation.

Source: Author's calculations from ENCOPE 2001 survey.

Table 10.2 B Cont'. Propensity Score, Men

PROBIT, Average Derivatives reported*, standard errors in parenthesis
 SICAT-2001 Cohort, retrospective survey

| | Mixed in medium and big with respect to mixed in micro and small | Mixed in medium and big with respect to self- employment | Mixed in micro and small with respect to self-employment |
|--|---|--|--|
| Length of inactivity | -0.01 (0.00) | 0.00 (0.00) | 0.01 (0.00) |
| Length of inactivity squared | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Reasons to take training | | | |
| To obtain experience | -8.84 (0.05) | -16.63 (0.06) | -0.65 (0.06) |
| Wanted to get training | -6.93 (0.05) | -16.71 (0.05) | -4.04 (0.06) |
| Was recommended to take it | -14.41 (0.05) | -20.30 (0.06) | -1.30 (0.07) |
| Required for employment | 6.35 (0.11) | -6.18 (0.12) | -5.77 (0.14) |
| To obtain the stipend | 7.07 (0.07) | -4.05 (0.08) | -2.20 (0.09) |
| Other | -21.52 (0.07) | -33.03 (0.08) | 0.42 (0.08) |
| Development Regions | | | |
| Development region 1 | -17.19 (0.12) | -0.24 (0.12) | 19.03 (0.07) |
| Development region 2 | 7.99 (0.13) | 25.19 (0.07) | 14.69 (0.08) |
| Development region 3 | 7.55 (0.14) | 36.14 (0.05) | 23.74 (0.06) |
| Development region 4 | -2.34 (0.13) | 26.51 (0.07) | 26.43 (0.07) |
| Development region 5 | 11.31 (0.13) | 30.01 (0.07) | 19.79 (0.07) |
| Development region 6 | 23.76 (0.14) | 42.98 (0.05) | 23.85 (0.06) |
| Size of Municipality (Population) | | | |
| Municipality size<25,000 | 18.55 (0.07) | -24.93 (0.06) | -37.65 (0.07) |
| 25,000=<Municipality size<125,000 | -3.05 (0.04) | -7.68 (0.05) | -6.31 (0.05) |
| 125,000=<Municipality size<225,000 | -5.94 (0.05) | 9.22 (0.06) | 10.12 (0.05) |
| 225,000=<Municipality size<325,000 | -15.08 (0.05) | -9.26 (0.08) | 14.11 (0.06) |

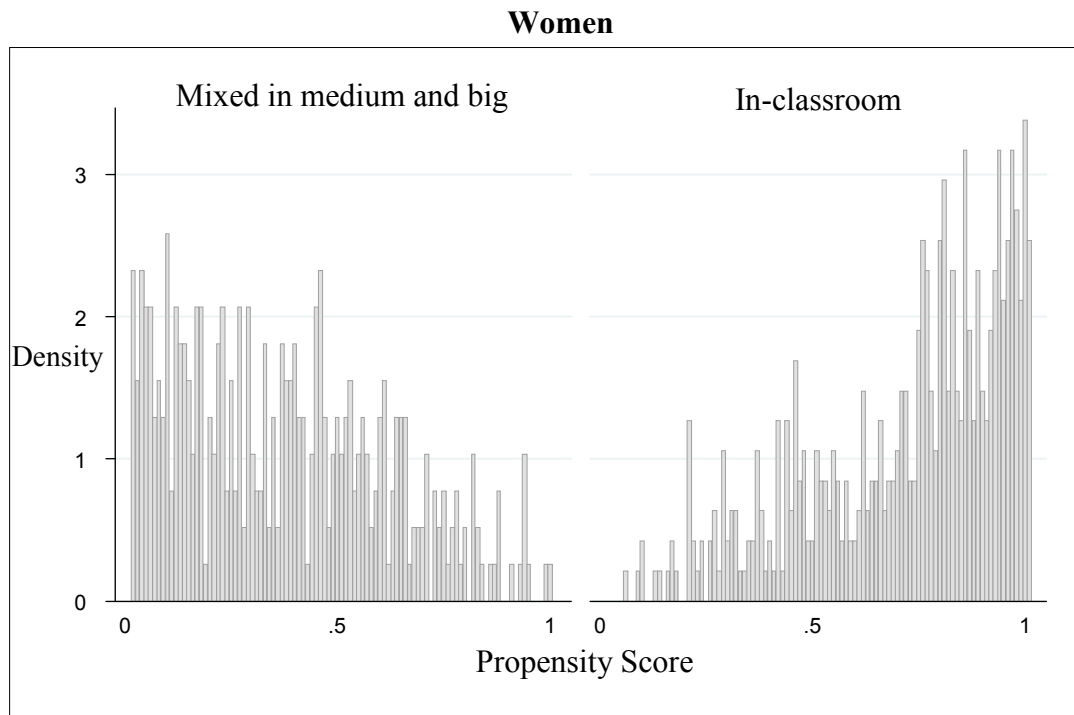
Notes:

* All estimates in bold are significant at a 95% level, All average derivatives have been rescaled by a factor of 100

** In this case not-divorced predicted participation perfectly, and was excluded from the estimation

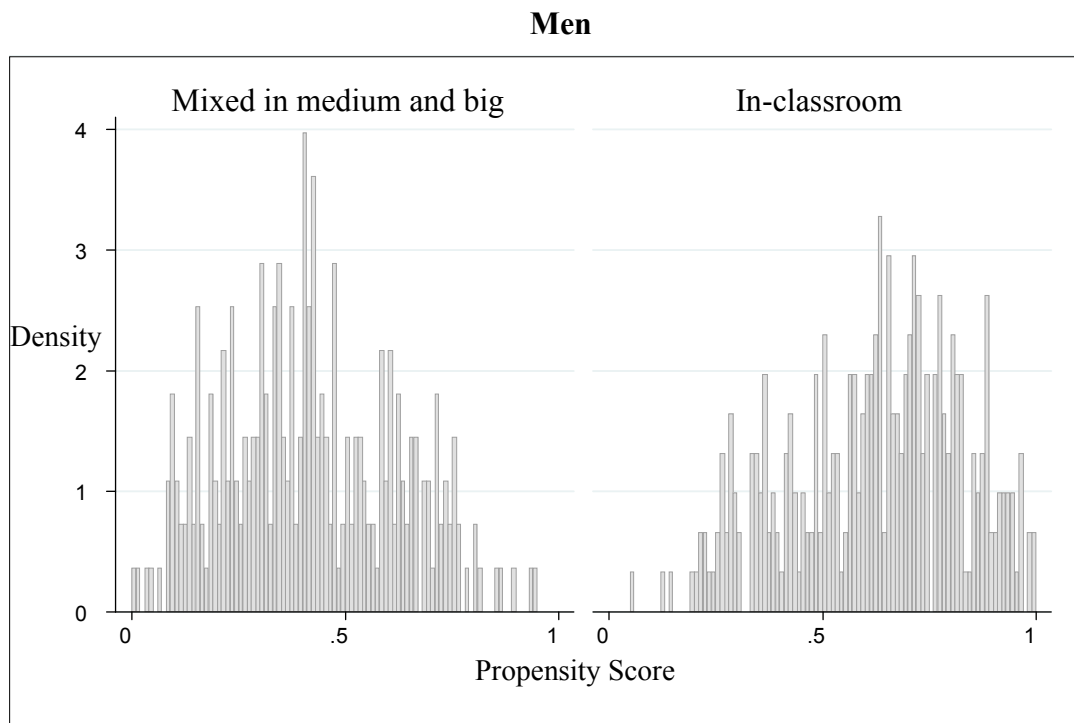
Source: Author's calculations from ENCOPE 2001 survey

Figure 5.1 Propensity Score: In-classroom vs. Mixed in medium and big enterprises



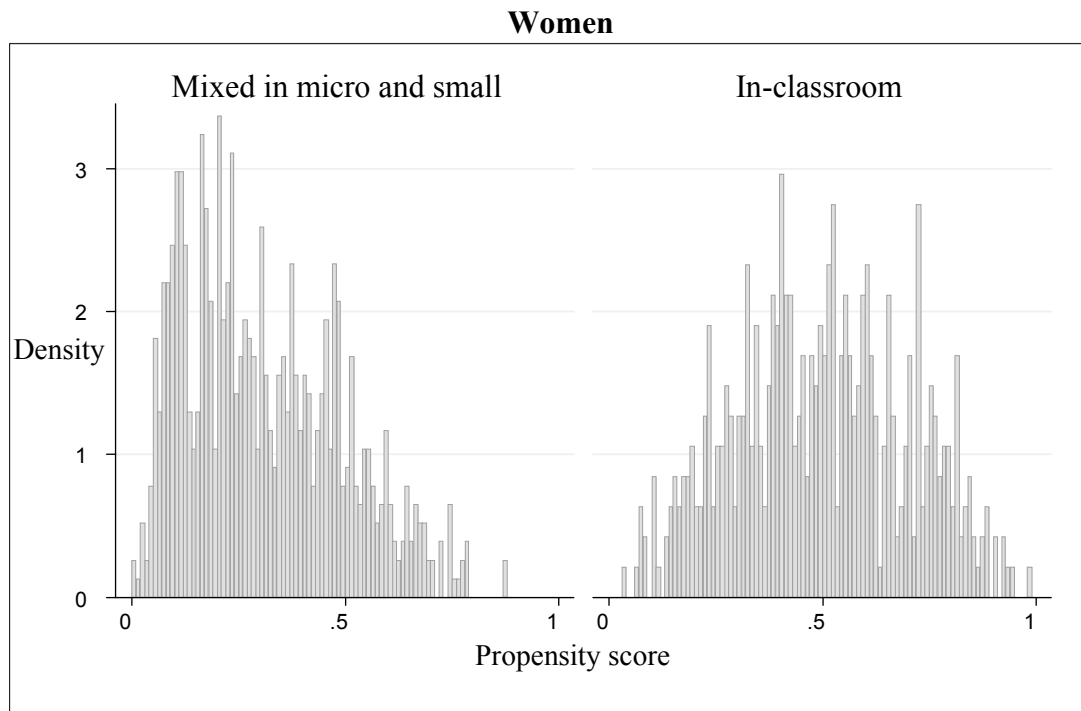
Source: Author's calculations with Encope 2001

Figure 6.1 Propensity Score: In-classroom vs. Mixed in medium and big enterprises



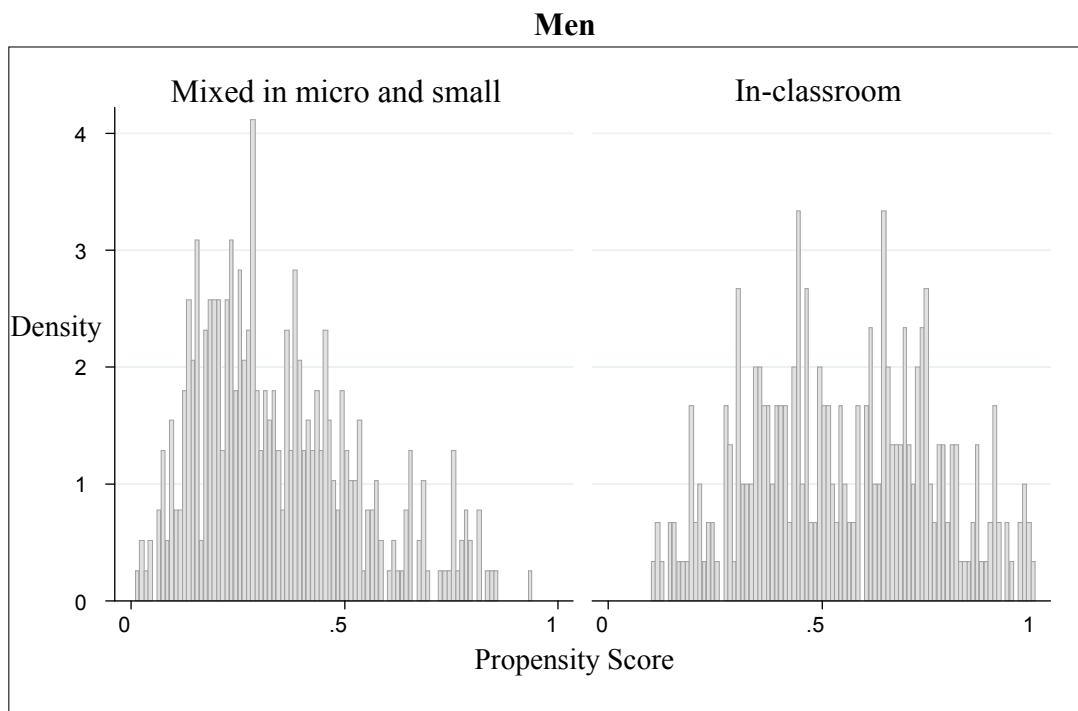
Source: Author's calculations with Encope 2001

Figure 5.2 Propensity Score: In-classroom vs. Mixed in micro and small enterprises



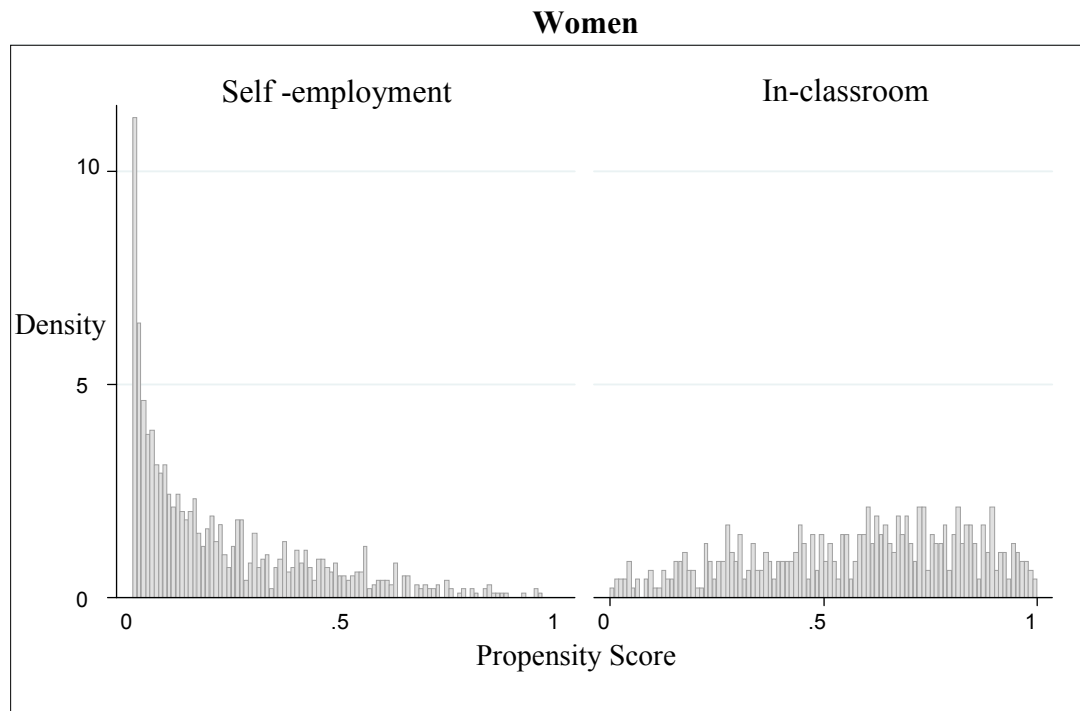
Source: Author's calculations with Encope 2001

Figure 6.2 Propensity Score: In-classroom vs. Mixed in micro and small enterprises



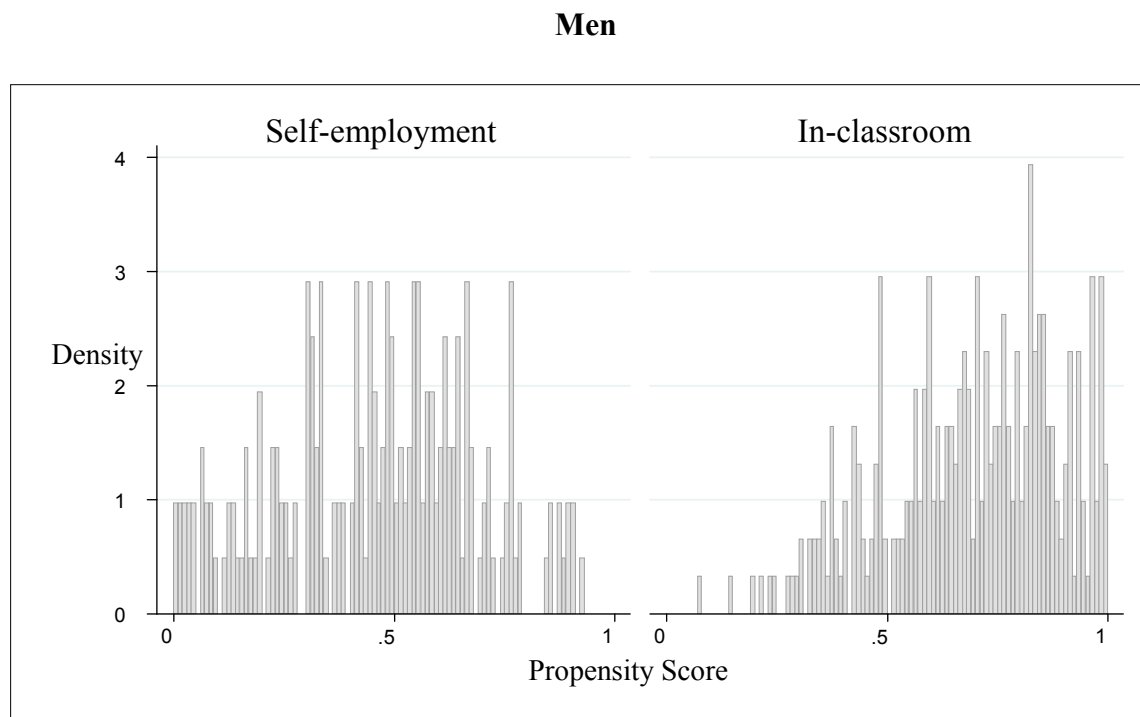
Source: Author's calculations with Encope 2001

Figure 5.3 Propensity Score: In-classroom vs. Self-employment



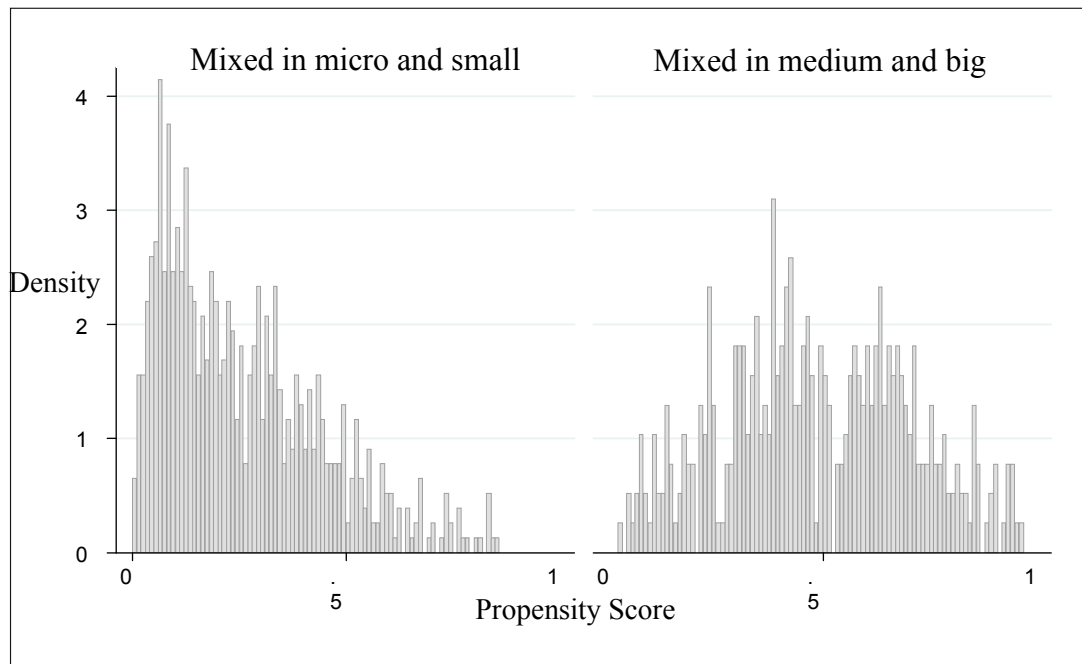
Source: Author's calculations with Encope 2001

Figure 6.3 Propensity Score: In-classroom vs. Self-employment



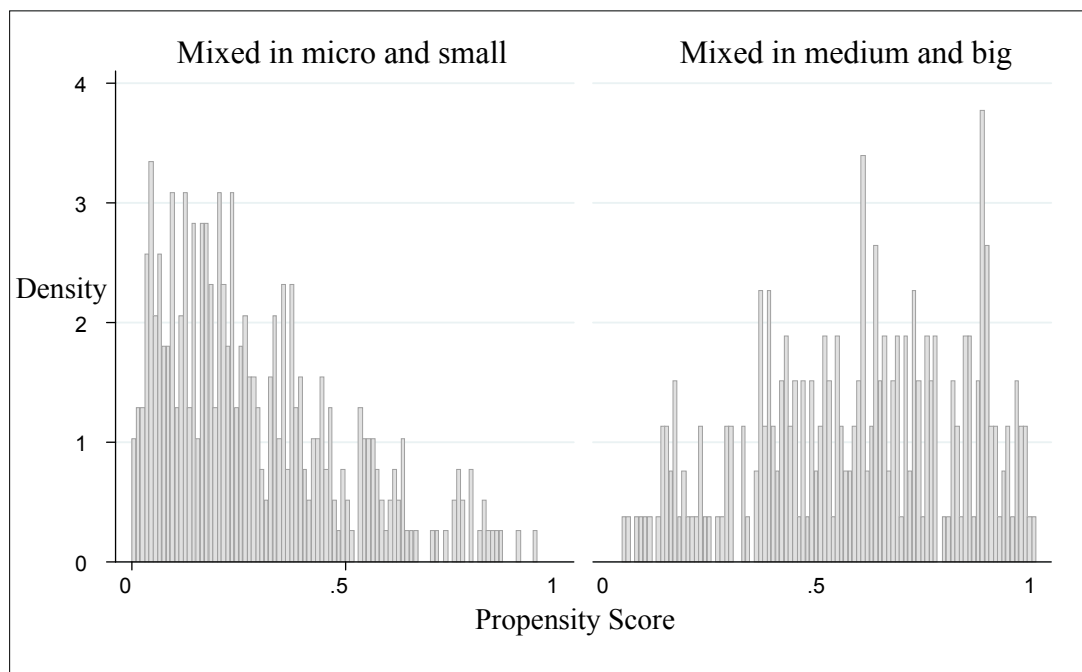
Source: Author's calculations with Encope 2001

**Figure 5.4 Propensity Score: Mixed in medium and big vs. Mixed in micro and small
Women**



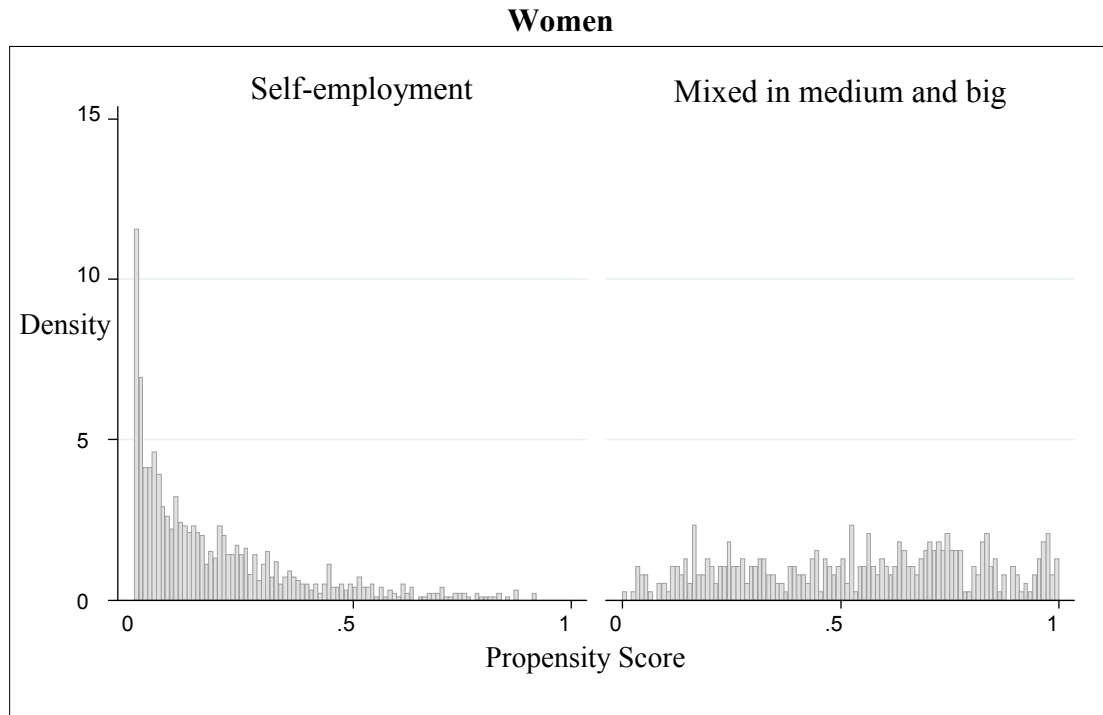
Source: Author's calculations with Encope 2001

**Figure 6.4 Propensity Score: Mixed in medium and big vs. Mixed in micro and small
Men**



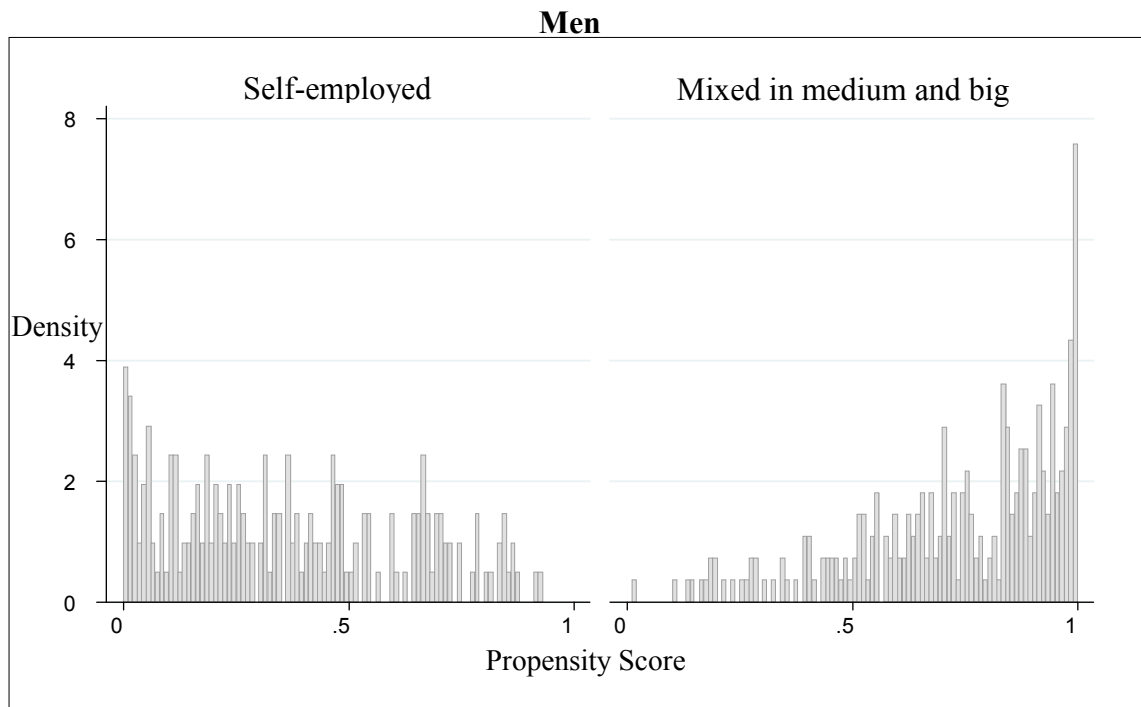
Source: Author's calculations with Encope 2001

Figure 5.5 Propensity Score: Mixed in medium and big vs. Self-employment



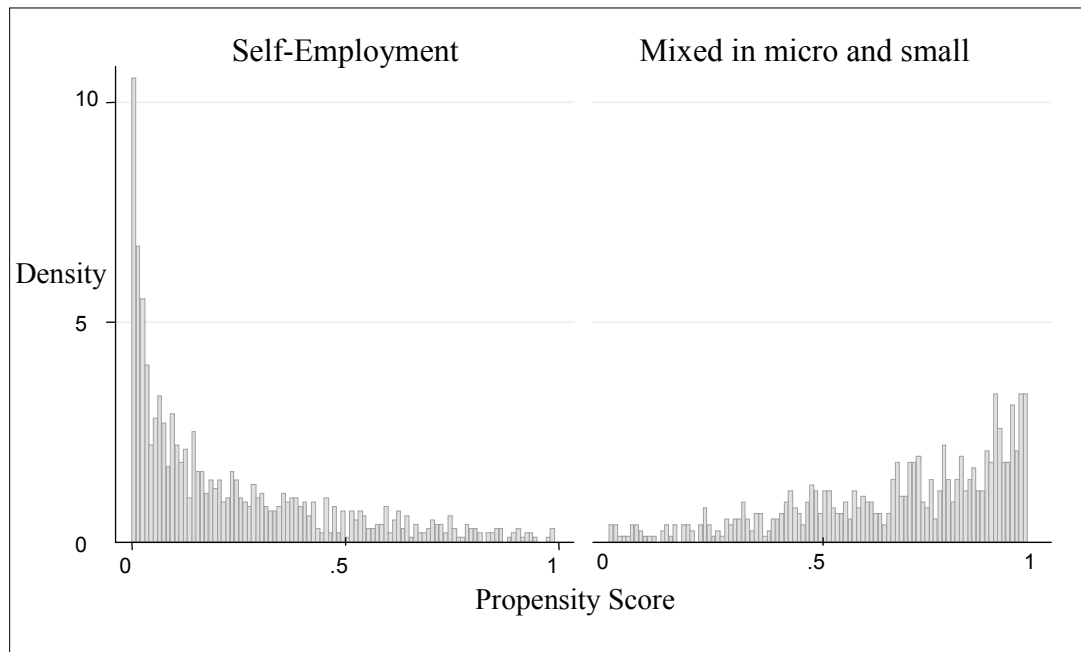
Source: Author's calculations with Encope 2001

Figure 6.5 Propensity Score: Mixed in medium and big vs. Self-employed



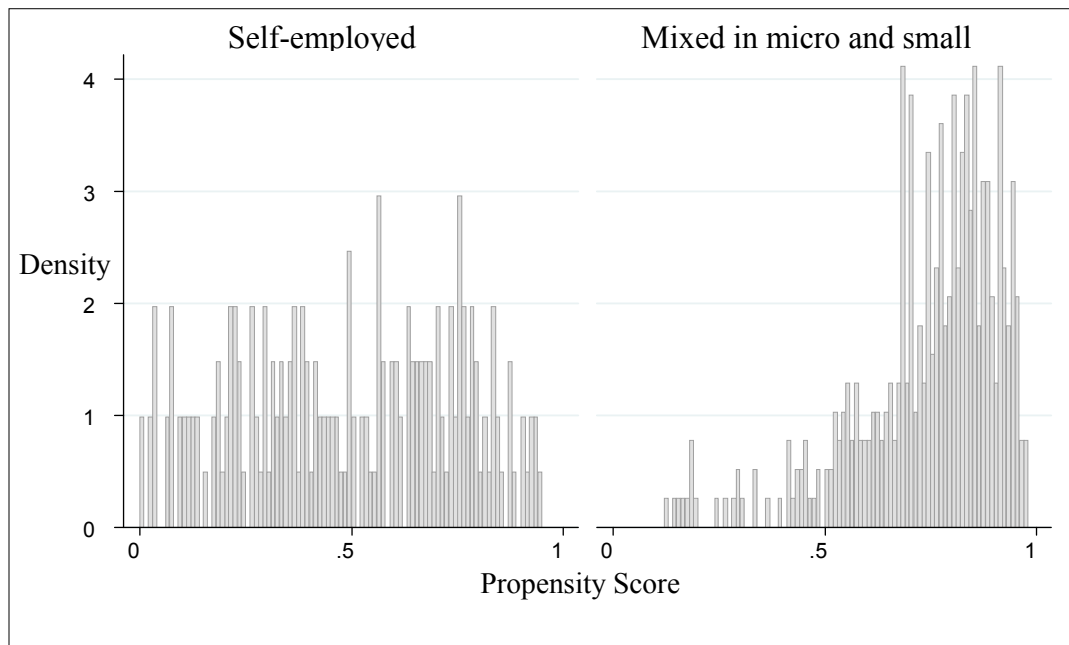
Source: Author's calculations with Encope 2001

**Figure 5.6 Propensity Score: Mixed in micro and small and vs. Self-employment
Women**



Source: Author's calculations with Encope 2001

**Figure 6.6 Propensity Score: Mixed in micro and small and vs. Self-employment
Men**



Source: Author's calculations with Encope 2001

Table 12.2 shows that for men age is only statistically significant when comparing mixed training in micro and small businesses and training for self-employment. As the applicant gets older, his probability of choosing to train to start his own business rather than updating his skills in a small business increases. This result is consistent with the rules established for participation in the two training types, where the mixed training is mostly targeted to younger individuals. For women, this is also the case. Moreover, my results suggest that the younger the applicant, the higher the probabilities of mixed training in small firms relative to any other type of training.

For the two mixed training types, as well as for the in-classroom training category, the official rules of the program establish that, in addition to the general requirements to all applicants, there are minimum education level requirements, which are specific for the particular course offered. There is no similar formal education restriction for self-employment training; the only comparable prerequisite is that the applicant needs to show enough interest and entrepreneurial potential. On these same lines, my results show that, for women, more education reduces the probabilities of self-employment training relative to any other training type. This result could also reflect individuals with lower formal education perceiving self-employment to be a more accessible way to enter or to stay in the job market, than their more educated counterparts.

Additionally, I find evidence that at each formal educational degree, with respect to no degree (the lowest being elementary school), men are more prone to enroll in in-classroom training over mixed training in small businesses. This is also true when comparing having a junior-high diploma or a college degree with respect to no degree on

the probabilities of participating in mixed training in big firms compared to training in small firms, which is again consistent with what is stated by the Ministry about the population of interest for each category. Nevertheless, I do not observe the same pattern when I examine the results for women. At each formal educational level attained, with respect to no degree, women are more prone to enroll for training in smaller firms with respect to bigger ones. The results could be reflecting a preference of women who have attained higher levels of formal education for apprenticeships in small places over the work in a big company.

I show that married women are more prone to participate in any training type over training in big firms, compared to their single counterparts. I can theorize that if marriage increases the opportunity cost of employment, these women might find that the most effective alternative is the sort of jobs that they can attain by training in-classroom, for self-employment or in small firms. These jobs might be more flexible in terms of schedules, work loads, etc. On the other hand, I also find evidence that the more economic dependents a woman has, the higher her probability of enrolling in training in big firms. In this case, we can sensibly consider that the higher the number of economic dependants, the greater is the necessity of a stable source of resources. The fact that at least 70% of the trainees in the mixed category in big businesses is hired could be very attractive for applicants with more responsibilities of this kind. The same line of thought could be applied to explain the result that shows that being a head of household increases the odds of joining a big business for training over any other training type.

In terms of labor market history, although the program promotes mixed training in small firms for individuals with little or no labor market experience, my results show that

the fact that an individual has never had a job increases their chances of enrollment for training in big firms compared to either training in small firms or training to become self-employed. A possible explanation is that applicants perceive the training in a big firm as a potential door to secure a job, once the training is completed. As we have pointed out elsewhere, mixed categories not only provide training but also labor market experience, which in this case may attract the most inexperienced applicants.

The average derivatives obtained for monthly labor income in the last job the person held before training show that, for men, the higher the pay, the higher the probability of choosing in-classroom training or mixed training in medium and large enterprises, relative to mixed in small businesses or training for self-employment. For women, higher earnings before the training started increase the chances of training in a big firm, relative to self-employment classes. In terms of number of hours worked, the more hours on the job, the higher the probability that the applicant will participate in training at a big firm, relative to in-classroom training for both men and women, and relative to mixed training in small firms for men and for self-employment training for women.

As stated previously, the base group for the reasons to participate in the training is “to obtain employment”. I show that for men, the probability of deciding to participate in any other training category with respect to obtaining mixed training in big firms is higher if the individual has as his main reason to gather experience because of the training itself, or because someone recommended it as compared to ‘obtain employment’ as main reason. For women, the probability of deciding to participate in the in-classroom training category, compared to that of obtaining mixed training is higher if the individual has as

her main reason to gather experience because of the training itself, or because someone recommended it as compared to ‘obtain employment’ as the main reason. It is interesting to note the fact that when I compare the ‘big’ mixed category to self-employment preparation and the ‘small’ mixed category, my results show that ‘required for employment’ promotes the first kind of training, while all the other reasons are either not statistically significant or have negative signs. Individuals might perceive the training as a required pre-step to obtaining employment in medium and big businesses.

In regard to the development regions and municipality size, the base groups are the most developed region and a population bigger than 350,000 inhabitants, respectively. The Ministry of Labor states in its operation rules that training for self-employment is focused in less urban communities²⁶, which is consistent with our results, as the probability of participating in this kind of training is higher in small municipalities with respect to any other training type. The same pattern is found when comparing ‘small’ mixed with ‘big’ mixed and in-classroom training.

The results for development regions are more difficult to interpret. Less developed regions imply a higher probability of training in a small firm, compared to self-employment and in-classroom training. On the other hand, I also find evidence that with respect to the most developed region, being exposed to the labor market of a less developed region implies a higher probability of participation in medium and large firms. For future work it would be advisable to study each of the elements that enter the development index, as well as the model behind the index, to be able to better understand its role in promoting certain types of training and not others.

²⁶ The concepts of urban and rural are defined by population size: if less than 2,500 inhabit a community, the community is considered rural, above 2,500 inhabitants is considered urban. (INEGI, 2007)

Balancing Tests

Balancing tests are used to examine if the specification of the parametric propensity score satisfies the property that, conditional on $P(X)$, the distribution of X is the same for the treated and the comparison groups. That is, these tests serve the purpose of informing the researcher if the specification chosen for the propensity score is such that the method succeeds in balancing the distribution of covariates in the matched comparison group and the treatment group. Again, the objective of this balance is that matching succeeds in mimicking a random experiment. Failure of these tests implies that the matched groups are not fully comparable, which might lead to unreliable results.

As stated in the previous chapter, there is a wide variety of balancing tests. Nonetheless, for comparability with the results presented in the preceding chapter the balancing test conducted for the analysis by training type relies on standardized differences (Rosenbaum and Rubin, 1985). For each variable X , the standardized difference is the difference in means between the treated sample and the matched comparison group sample, divided by the square root of the average of the variances of X in the two sub-samples. I computed this difference for all the variables included in each of the matching estimations.²⁷ I find that for each variable in the matched samples, the standardized differences are all, in absolute terms, smaller than 20. Then, the specification of the propensity score “passes” the balancing test.

²⁷ An appendix containing all balancing tests results is available from the author upon request.

Results

Tables 13.1 to 13.11 for women, and 14.1 to 14.11 for men, present the labor market impact estimates of participating in a P/S training program obtained by kernel matching on the propensity score. Here, it is important to consider that if the individuals in treatment m and l differ in the distribution of X , and if the treatment effect varies with X , then:

$$\theta_0^{m,l} \neq -\theta_0^{l,m}$$

i.e., the treatment effects on the treated are not symmetric (Gerfin & Lechner, 2002). For example, if the distribution of years of education is different for individuals that participate in in-classroom training and in training for the self-employed, and the probability of participation in one rather than the other changes with years of education, then the mean effect of receiving in-classroom training relative to receiving training for the self-employed for those individuals who receive in-classroom training will differ from the mean effect of receiving training for self-employment relative to receiving in-classroom training for individuals who receive training for self-employment.

For each dependent variable I obtained optimal bandwidths²⁸ employing leave-one-out cross validation (Racine & Li, 2003; Black & Smith, 2004). The optimal bandwidth minimizes the squared error of the estimates. A full account of the bandwidths used in the estimation can be found in Appendix E.

²⁸ The estimates' signs and magnitudes are not sensitive to using a bandwidth slightly bigger or smaller than the optimal bandwidth.

Table 13.1 Average treatment effect on the treated
Women, Variable: Employed

Kernel Matching, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-----------------------|------------------------|------------------------|-----------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In-classroom | | -0.41 (0.05) | -0.19 (0.04) | -0.02 (0.04) |
| | Mixed medium/big | 0.48 (0.05) | | 0.24 (0.04) | 0.38 (0.04) |
| | Mixed micro/small | 0.19 (0.04) | -0.24 (0.04) | | 0.18 (0.04) |
| | Self- employment | 0.13 (0.04) | -0.44 (0.05) | -0.11 (0.05) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

Table 14.1 Average treatment effect on the treated
Men, Variable: Employed

Kernel Matching, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-----------------------|------------------------|------------------------|-----------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In-classroom | | -0.29 (0.05) | -0.18 (0.05) | -0.04 (0.06) |
| | Mixed medium/big | 0.23 (0.05) | | 0.09 (0.04) | 0.18 (0.07) |
| | Mixed micro/small | 0.16 (0.05) | -0.03 (0.06) | | 0.12 (0.06) |
| | Self- employment | 0.11 (0.08) | -0.11 (0.06) | -0.02 (0.06) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Table 13.2 Average treatment effect on the treated

Women, Variable: Post weekly hours worked

Kernel Maching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|-------------------------|-------------------------|------------------------|------------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | In-classroom | | -21.50 (2.57) | -8.36 (1.78) | 1.78 (1.95) |
| | Mixed medium/big | 25.03 (2.06) | | 13.12 (1.95) | 23.26 (2.10) |
| | Mixed micro/small | 8.57 (1.59) | -14.26 (1.88) | | 9.31 (2.04) |
| | Self-employment | 1.20 (1.56) | -26.89 (2.28) | -9.27 (2.48) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

*This variable does include zeros

Table 14.2 Average treatment effect on the treated

Men, Variable: Post weekly hours worked

Kernel Maching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|-------------------------|-------------------------|------------------------|------------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | In-classroom | | -18.35 (3.23) | -8.58 (2.36) | -0.72 (3.18) |
| | Mixed medium/big | 15.16 (2.88) | | 6.25 (2.58) | 13.23 (3.41) |
| | Mixed micro/small | 7.07 (2.58) | -5.84 (3.29) | | 6.02 (2.88) |
| | Self-employment | 4.37 (3.16) | -11.71 (4.55) | -1.82 (2.95) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

*This variable does include zeros

Table 13.3 Average treatment effect on the treated
Women, Variable: Post monthly labor income* (In Mexican Pesos)

Kernel Maching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|--------------------------|---------------------------|---------------------------|--------------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | In-classroom | | -278.92 (90.74) | -193.21 (64.28) | -40.64 (96.14) |
| | Mixed medium/big | 426.88 (78.26) | | 160.97 (60.33) | 280.01 (73.52) |
| | Mixed micro/small | 166.64 (47.44) | -164.74 (60.26) | | 120.02 (71.66) |
| | Self-employment | 110.46 (27.07) | -192.94 (49.81) | -25.48 (42.02) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

*This variable does include zeros (individuals that did not receive any payment).

Table 14.3 Average treatment effect on the treated
Men, Variable: Post monthly labor income* (In Mexican Pesos)

Kernel Maching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|---------------------------|----------------------------|----------------------------|--------------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | In-classroom | | -487.30 (156.46) | -292.79 (129.99) | -280.48 (168.86) |
| | Mixed medium/big | 511.21 (162.29) | | 18.64 (138.42) | 334.85 (199.41) |
| | Mixed micro/small | 110.76 (74.16) | -116.40 (93.69) | | 214.73 (94.99) |
| | Self-employment | -212.02 (181.17) | -101.78 (164.66) | 61.11 (102.69) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Table 13.4 Average treatment effect on the treated
Women, Variable: Health Benefits

Kernel Matching, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|------------------------|------------------------|------------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in-classroom | | -0.48 (0.06) | -0.09 (0.03) | 0.09 (0.03) |
| | Mixed medium/big | 0.49 (0.05) | | 0.41 (0.04) | 0.58 (0.04) |
| | Mixed micro/small | 0.09 (0.03) | -0.42 (0.04) | | 0.17 (0.03) |
| | Self- employment | -0.07 (0.03) | -0.55 (0.05) | -0.12 (0.03) | |

Source: Author's calculations from ENCOPE survey.
 All estimates are significant at a 95% level except for those in gray.

Table 14.4 Average treatment effect on the treated
Men, Variable: Health Benefits

Kernel Matching, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-----------------------|------------------------|------------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in- classroom | | -0.41 (0.05) | -0.12 (0.05) | 0.04 (0.06) |
| | Mixed medium/big | 0.45 (0.05) | | 0.39 (0.06) | 0.50 (0.06) |
| | Mixed micro/small | 0.06 (0.05) | -0.32 (0.06) | | 0.08 (0.05) |
| | Self- employment | -0.03 (0.05) | -0.33 (0.08) | -0.08 (0.05) | |

Source: Author's calculations from ENCOPE survey
 All estimates are significant at a 95% level except for those in gray

Table 13.5 Average treatment effect on the treated

Women, Variable: Housing Credits

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|-------------------------|------------------------|------------------------|-----------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | In-classroom | | -0.20 (0.05) | 0.00 (0.02) | 0.04 (0.02) |
| | Mixed medium/big | 0.10 (0.04) | | 0.17 (0.03) | 0.20 (0.03) |
| | Mixed micro/small | -0.01 (0.02) | -0.18 (0.04) | | 0.04 (0.02) |
| | Self-employment | -0.07 (0.03) | -0.19 (0.04) | -0.02 (0.01) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

Table 14.5 Average treatment effect on the treated

Men, Variable: Housing Credits

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|-------------------------|------------------------|-----------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | in-classroom | | -0.20 (0.05) | -0.04 (0.04) | 0.04 (0.04) |
| | Mixed medium/big | 0.27 (0.05) | | 0.24 (0.05) | 0.25 (0.05) |
| | Mixed micro/small | 0.00 (0.03) | -0.20 (0.05) | | 0.00 (0.04) |
| | Self-employment | -0.03 (0.03) | -0.13 (0.05) | 0.00 (0.03) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Table 13.6 Average treatment effect on the treated
Women, Variable: In-cash Benefits

Kernel Matching, standard errors in parentheses
SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|------------------------|------------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in- classroom | | -0.44 (0.06) | -0.07 (0.03) | 0.08 (0.03) |
| | Mixed medium/big | 0.42 (0.04) | | 0.37 (0.04) | 0.49 (0.04) |
| | Mixed micro/small | 0.08 (0.03) | -0.34 (0.04) | | 0.14 (0.03) |
| | Self- employment | -0.04 (0.02) | -0.45 (0.05) | -0.10 (0.03) | |

Source: Author's calculations from ENCOPE survey.
All estimates are significant at a 95% level except for those in gray.

Table 14.6 Average treatment effect on the treated
Men, Variable: In-cash Benefits

Kernel Matching, standard errors in parentheses
SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|------------------------|-----------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in- classroom | | -0.35 (0.05) | -0.12 (0.05) | 0.07 (0.05) |
| | Mixed medium/big | 0.41 (0.05) | | 0.34 (0.06) | 0.48 (0.06) |
| | Mixed micro/small | 0.05 (0.05) | -0.28 (0.06) | | 0.11 (0.05) |
| | Self- employment | -0.06 (0.05) | -0.29 (0.07) | -0.07 (0.04) | |

Source: Author's calculations from ENCOPE survey
All estimates are significant at a 95% level except for those in gray

Table 13.7 Average treatment effect on the treated**Women, Variable: Other Benefits**

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|------------------------|-----------------------|-----------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In- classroom | | -0.27 (0.05) | 0.01 (0.02) | 0.05 (0.02) |
| | Mixed medium/big | 0.22 (0.04) | | 0.24 (0.03) | 0.26 (0.03) |
| | Mixed micro/small | -0.01 (0.02) | -0.21 (0.04) | | 0.04 (0.02) |
| | Self- employment | -0.07 (0.03) | -0.24 (0.04) | -0.02 (0.02) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

Table 14.7 Average treatment effect on the treated**Men, Variable: Other Benefits**

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|------------------------|------------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in-classroom | | -0.28 (0.05) | -0.09 (0.04) | 0.00 (0.05) |
| | Mixed medium/big | 0.33 (0.05) | | 0.21 (0.05) | 0.25 (0.06) |
| | Mixed micro/small | 0.02 (0.03) | -0.17 (0.05) | | -0.01 (0.04) |
| | Self- employment | 0.01 (0.04) | -0.17 (0.06) | -0.02 (0.03) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Table 13.8 Average treatment effect on the treated
Women, Variable: Verbal contract

Kernel Matching, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|---------------------|----------------------|---------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In-classroom | | 0.00 (0.05) | -0.19 (0.03) | -0.01 (0.04) |
| | Mixed medium/big | 0.02 (0.03) | | -0.21 (0.04) | -0.02 (0.04) |
| | Mixed micro/small | 0.22 (0.03) | 0.21 (0.03) | | 0.17 (0.04) |
| | Self- employment | 0.05 (0.02) | -0.10 (0.04) | -0.24 (0.05) | |

Source: Author's calculations from ENCOPE survey.
 All estimates are significant at a 95% level except for those in gray.

Table 14.8 Average treatment effect on the treated
Men, Variable: Verbal contract

Kernel Matching, standard errors in parentheses
 SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|---------------------|----------------------|---------------------|
| | | n-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In- classroom | | 0.13 (0.04) | -0.17 (0.05) | 0.06 (0.05) |
| | Mixed medium/big | -0.15 (0.05) | | -0.30 (0.06) | -0.14 (0.06) |
| | Mixed micro/small | 0.21 (0.05) | 0.34 (0.04) | | 0.24 (0.05) |
| | Self- employment | 0.08 (0.05) | 0.14 (0.07) | -0.09 (0.06) | |

Source: Author's calculations from ENCOPE survey.
 All estimates are significant at a 95% level except for those in gray.

Table 13.9 Average treatment effect on the treated
Women, Variable: Self employed or unpaid worker

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|-------------------------|-----------------------|-----------------------|------------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | In-classroom | | 0.03 (0.01) | 0.00 (0.01) | -0.10 (0.02) |
| | Mixed medium/big | -0.01 (0.01) | | -0.02 (0.01) | -0.14 (0.02) |
| | Mixed micro/small | 0.00 (0.01) | 0.01 (0.01) | | -0.11 (0.02) |
| | Self-employment | 0.14 (0.02) | 0.13 (0.03) | 0.11 (0.03) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

Table 14.9 Average treatment effect on the treated

Men, Variable: Self employed or unpaid worker

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|------------------------|-------------------|-------------------------|-----------------------|-------------------|------------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self-employment |
| Treatment Group | in-classroom | | 0.03 (0.02) | 0.03 (0.02) | -0.05 (0.04) |
| | Mixed medium/big | -0.07 (0.03) | | 0.00 (0.01) | -0.09 (0.04) |
| | Mixed micro/small | -0.03 (0.02) | 0.01 (0.01) | | -0.03 (0.02) |
| | Self-employment | -0.01 (0.04) | 0.08 (0.03) | 0.05 (0.03) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Table 13.10 Average treatment effect on the treated**Women, Variable: In micro business**

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|------------------------|------------------------|-----------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In-classroom | | -0.25 (0.05) | -0.19 (0.03) | 0.00 (0.04) |
| | Mixed medium/big | 0.25 (0.04) | | 0.03 (0.04) | 0.21 (0.04) |
| | Mixed micro/small | 0.18 (0.03) | -0.06 (0.05) | | 0.20 (0.04) |
| | Self- employment | 0.10 (0.02) | -0.30 (0.05) | -0.12 (0.05) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

Table 14.10 Average treatment effect on the treated**Men, Variable: In micro business**

Kernel Matching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|------------------------|------------------------|-----------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in- classroom | | -0.15 (0.06) | -0.26 (0.05) | -0.04 (0.06) |
| | Mixed medium/big | 0.12 (0.06) | | -0.19 (0.06) | 0.11 (0.07) |
| | Mixed micro/small | 0.27 (0.05) | 0.12 (0.06) | | 0.28 (0.05) |
| | Self- employment | 0.06 (0.06) | -0.02 (0.08) | -0.18 (0.06) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Table 13.11 Average treatment effect on the treated**Women, Variable: In business without local**

Kernel Maching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|-----------------------|------------------------|------------------------|
| | | In-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | In-classroom | | 0.04 (0.01) | 0.01 (0.01) | -0.11 (0.03) |
| | Mixed medium/big | -0.03 (0.04) | | -0.03 (0.01) | -0.19 (0.03) |
| | Mixed micro/small | -0.01 (0.02) | -0.06 (0.05) | | -0.09 (0.02) |
| | Self- employment | 0.19 (0.02) | 0.18 (0.03) | 0.17 (0.02) | |

Source: Author's calculations from ENCOPE survey.

All estimates are significant at a 95% level except for those in gray.

Table 14.11 Average treatment effect on the treated**Men, Variable: In business without local**

Kernel Maching, standard errors in parentheses

SICAT-2001 Cohort, retrospective survey collected in Nov-Dec 2001

| | | Comparison Group | | | |
|----------------------------|----------------------|-------------------------|-----------------------|------------------------|------------------------|
| | | in-classroom | Mixed medium/big | Mixed micro/small | Self- employment |
| Treatment Group | in-classroom | | 0.07 (0.03) | 0.08 (0.02) | -0.12 (0.05) |
| | Mixed medium/big | -0.07 (0.03) | | -0.01 (0.03) | -0.23 (0.06) |
| | Mixed micro/small | -0.07 (0.03) | 0.01 (0.01) | | -0.14 (0.04) |
| | Self- employment | 0.15 (0.05) | 0.24 (0.04) | -0.18 (0.06) | |

Source: Author's calculations from ENCOPE survey

All estimates are significant at a 95% level except for those in gray

Traditional outcome variables

Employment. The decision to participate in any mixed category rather than in-classroom training results, on average, in a higher probability of employment. These results, for men and women, are consistent with the arguments offered by some program officials against the relative efficiency of the in-classroom type to increase the probabilities of employment of its participants, which in turn contributed to the elimination of the category since 2002.

While the impacts of participation in the mixed categories with respect to participation in the in-classroom training are higher for women than for men, the potential explanation for these results might go in the same direction for the two groups. Mixed training is mostly tailored to the demands of the productive sector, where the entrepreneurs have an important level of decision in the length and specific kind of instruction that the participants will get. It is possible that the training that the participants of PROBECAT/SICAT acquire in the mixed categories is a mobile skill in demand in a particular industry, *i.e.*, these individuals have acquired a set of skills that is in demand when they go back to their job search. Additionally, the enterprises where the training takes place are being partly subsidized to train potential employees; furthermore, the States' employment services reduce the businesses' costs of search to fill vacancies by recruiting and screening trainees. The reduction of these costs provides an incentive for the firm to hire individuals who took a PROBECAT/SICAT training class on their premises and under their monitoring.

Contrary to the demand-driven mixed training courses, the syllabi of the in-classroom training classes are not designed to fulfill any specific demand of the productive sector. Instead, they are based on program officials' knowledge of the skills

and abilities that would make a trainee a more attractive candidate for employment.

Nevertheless, potential employers will bear not only the costs of search, but the costs of additional business-specific training required for the job.

My results show that, similarly, the participation in the mixed training programs rather than the self-employment program increased the probability of being employed. The self-employment category seeks to aid its participants by providing them with skills that would help them start their own business. It is reasonable to believe that the length of time necessary to launch such an enterprise, find the capital, find the input providers, etc., could be naturally higher than that of finding employment as a salaried worker that has been trained specifically according to what the market is demanding.

Differences in demographic and educational characteristics could be a factor that explains the higher probability of employment for a woman if she takes a self-employment class rather than an in-classroom course. The first group is older and has fewer years of education, which, in general, could imply more years in the labor force in comparison with their younger counterparts. This attachment could have given the self-employment group important information about the market that a person with less experience would lack.

As a final point, the star program in terms of probability of employment is the mixed category in medium and big businesses. This is not a surprise since, as aforementioned, this category of training is set so that a minimum of 70% of the trainees get to be employed by the sponsoring enterprise. It is also the case that the capacity of the big firms to hire new employees might be in general higher than that of a small business. An additional point to take into consideration is that it is probable that the skills learned

in big firms are more mobile than those obtained in smaller places. All these factors will contribute to the differences in the probability of employment once the training is done.

Weekly number of hours worked. The estimated impacts for the weekly number of hours worked post-training show a somewhat similar pattern to those for the employment. The number of hours worked is, on average, higher for workers that participated in any mixed category than in-classroom training or self-employment. The largest impact is between training in big businesses in comparison with in-classroom training, being more than 10 hours a week for women. Finally, in comparison with mixed training in smaller businesses, mixed training in bigger enterprises increases the total number of hours worked per week by 6 hours for men and 13 hours for women. A good reason for these differences might be found in the work requirements of the jobs that the trainees find. For individuals that fill a salaried job more easily (ex-trainees in mixed categories), a week of work would imply a full time, 40 hours a week, schedule. This is due to the fact that employers are more willing to hire a full time employee that has already worked in the business or industry and is known to do a good job. On the other hand, for those who did not obtain training in a specific business thereby, acquiring skills relevant for that industry, it might be harder to find full time work just after the training is done. Employers might prefer to hire them for less than full time before they have any knowledge of the real ability of the employee. An additional possibility for the differences in hours worked is that, as we will later discuss, in-classroom and self-employed trainees are more prone to participate in self-employment and unpaid work which will give them the flexibility of working fewer hours.

Monthly labor income. The differentiated analysis by type of training goes a step further from previous studies in finding that, once again, in-classroom training fares worse than the mixed alternatives for men and women with respect to post-training labor income. The ‘loss’ due to participation in the former type of training ranges from 193 to 487 pesos, which roughly corresponds to 20.65 to 52.12 dollars per month.²⁹ Now, if we study the different impacts by types of mixed training we find that while the estimated impact is not statistically significant for male ex-trainees, their female counterparts receive, on average, approximately 160.97 pesos more if they obtain training in a medium or big enterprise in comparison to training in a smaller firm: an expected result that logically follows the estimates for hours worked. These results might spring from the demand-driven nature of the mixed training; people who attend these programs are more likely to enter a productive sector in which there is a high demand for that specific type of labor, resulting in higher remuneration.

Another interesting result is that for women, participating in training for self-employment is still better than choosing in-classroom preparation in terms of income. By picking the former the participants receive on average 11.82 dollars per month more - which corresponds to approximately 3 daily minimum wages³⁰ - than choosing the latter.

Outcome variables measuring job formality

For those men and women who chose to participate in a mixed training program in a medium or big enterprise, this decision entailed, on average, an increment in the probability of employment with health benefits, with respect to this probability if they had participated in any other type of program. The difference in the probability is close to

²⁹ We use the simple average of monthly exchange rates over 2001 as provided by the Banco de México (Mexico’s Central Bank).

³⁰ Average of monthly general minimum wage, (STPS, 2007)

50 percentage points if we consider, as an alternative to the mixed training in medium and big companies, in-classroom training. The increase in the probability is somewhat around 40 percentage points with respect to training in smaller firms, and finally, 50 or more points if contrasted with training for self-employment. These results can be somehow explained by two facts: 1) 70% of the individuals who participate in mixed training in a firm that has at least 30 workers stays employed in this same firm; and 2) one of the benefits that the participants obtain when entering the training program is full health insurance, which can be extended if they later are hired. Moreover, as the size of a firm increases, the proportion of individuals who receive any kind of medical insurance also increases.³¹ If the trainees in a big enterprise remain in such after the training is finished (or get employed in a firm with similar size), their probabilities of employment with health benefits are higher than those individuals that find employment in smaller firms.

Contrary to previous results in which self-employment training was *superior* to in-classroom training, on average, obtaining a job that had medical benefits was more likely if an in-classroom course was taken. Whereas in many developed economies, an important proportion of the population has access to medical insurance independent of the kind of employment they are involved in, in developing economies this proportion is smaller, especially if a person is self-employed. It is sensible to think that if an individual participates in self-employment preparation classes, her objective is to develop as an entrepreneur and as such, she is under no obligation to acquire medical insurance for herself.

³¹ Encuesta Nacional de Empleo, primer trimestre de 2002, INEGI.

The same pattern of results is found with respect to the probabilities of obtaining a job with housing benefits, obtaining a job with cash benefits (such as bonuses at the end of the year, dividends, etc), or employment with other benefits. Nevertheless, the magnitudes of the first and last parameter mentioned, when choosing mixed training in big firms with respect to any other type of training, are significantly lower than those of the probability of employment with health benefits. This is not the case for cash benefits: in addition to this estimated impact being very similar between men and women, the estimated impacts are similar in magnitude to the impact of choosing training in a big firm on the probability of health benefits.

As with the previously discussed impact estimates, the probability of attaining all of the benefits under consideration is higher when the individual chooses to be trained in a small to medium firm rather than in-classroom or self-employment training. Conversely, when studying the impacts on employment with health benefits, housing, in cash benefits, and other benefits, I find that women benefit more from participating in in-classroom training than in self-employment instruction. Nevertheless, in all cases the impacts are rather small, *i.e.*, below 10 percentage points.

Up to this point, I have discussed parameters whose **presence** captures the formality of the employment obtained by the trainees. For example, getting employment with health benefits makes a particular job *formal* (at least under some definitions). From the next paragraph onwards, I will be discussing parameters whose **absence** signals the formality of the job. For example, the non-existence of a verbal contract (and hence the existence of a written one), indicates to us that this specific job is *formal*.

When men and women participate in training in a big firm rather than obtaining that instruction in a micro or small enterprise, on average, they decrease the probabilities of being employed with a verbal contract by 21 percentage points for females and by 30 percentage points for males.

On average, men increase the odds of self-employment or employment without payment when they decide to participate in in-classroom training versus participating in mixed training. As expected, this is also true when men decide to obtain self-employment instruction. Nevertheless, the calculated impacts are not considerably different in magnitude, and there is evidence showing that the impacts on the likelihood of self-employment after training are similar for in-classroom alumni and for self-employment instruction alumni. Unfortunately, the estimates that directly compare these two categories are not statistically significant enough to discuss them. On the other hand, for women, it is possible to make the direct comparison, which results in evidence that individuals who choose self-employment instruction instead of in-classroom training do in fact increase their probability of this type of employment by 14 percentage points.

The tables also show the calculated impact of participating in a certain program, with respect to the other three types, on the probability of being employed in a micro business, defined as an enterprise that has at most 10 workers including the employer. Participation in in-classroom training decreases the probability of finding employment in a micro business with respect to participation in any of the mixed training categories. This initially counterintuitive result does seem sensible when we take into consideration that 1) the variable studied is having found a job and this job is housed in a micro business and the probability of employment with respect to any other training type is, in

general, higher for the mixed categories; and 2) the vast majority of businesses in Mexico are classified as micro enterprises (i.e. it is calculated that more than 90% of all establishments are micro (Guaipatin, 2003)). Finally, it is reasonable to suppose that an important proportion of the individuals who participated in training in small and micro firms would stay in the same industry and type of business (after training, the majority of men in this category work on specialized professional and technical services, while the majority of women work in retail)³², which at the same time offers some explanation as to why the men in this specific type of training increase their probability of staying in a small business, relative to mixed training participants in bigger companies.

Finally, as expected, for men, participation in mixed training, compared to the other two training alternatives, decreases the chances of being employed without a uniquely specified residence for work endeavors, a designation that includes street vendors and further activities carried on places designated for additional uses and purposes, such as private dwellings. As expected, for both gender groups, participation in mixed or in-classroom training reduces such probabilities when compared to obtaining self-employment instruction, making this last training category one that promotes the highest probability of employment without specific work residence.

Lastly, two considerations are in order. First, the possible existence of lock-in effects and second, the potentially different time paths of impacts for different training types.

In the Operation Rules (STPS 2000, page3), the Ministry of Labor establishes that for all categories of training, the class/course duration is between 1 and 3 months. The specific duration would be determined as a function of the classes/training agreed upon

³² See tables 15.1 and 15.2.

by the National Employment Service, the State Employment Offices and, when pertinent, with the participating businesses. At the same time, participants in all training types are required not to work while training. All these support the belief that the “lock in” period, *i.e.*, when individuals are not looking for a job but are only training, would be, on average, roughly the same for all training types.

One caveat comes from the fact that with the information available, it is not possible to determine if different training paths have different time paths of impacts, because the outcome variables are measured only once after training. It is possible that given that the mixed categories, specifically in medium and big enterprises, might also function as a way to match job seekers with employers, the impacts of these training types are more immediate than for the other categories. More information, more data points, are needed to be able to determine what type of program has the best results in the long run.

Conclusions

In summary, in this section I estimate the average impacts of participation in different kinds of training relative to other training types. The parameters of interest include the probability of employment, weekly hours worked and monthly income, which are the usual or ‘traditional’ parameters estimated in impact evaluations of training programs. In addition, this analysis goes beyond these traditional outcomes by studying additional measures that describe the formality or informality of the employment obtained after the participants have concluded their training program. This is important because jobs in the unprotected or informal sector are highly correlated with poverty and

low productivity. In this context it is then relevant to analyze not only the quantity but the quality of employment that P/S promotes.

I find evidence that the most successful training type both in terms of traditional and non-traditional outcomes is the mixed training in medium and big businesses. This result is not unexpected given the fact that the 'host' business agrees to employ at least 70% of the trainees. Additionally, big enterprises usually have characteristics associated with the formal sector, such as providing health insurance for their employees. Second in achieving highest probabilities of success is the mixed training program in small and medium businesses. For men and women, this category fares better for all outcomes (except one: verbal contracts) that are statistically significant, when compared to in-classroom and self-employment training. A plausible interpretation for this result is the fact that the period of training itself serves not only to provide the individual with skills and experience demanded in formal sector industries (such as those used in small assembly plants), but also facilitates continued employment in the sector once the training is completed. The vast majority of individuals who participate in the smaller mixed training type are employed in the manufacturing industry. The majority of male ex-trainees in this category report working in specialized professional and technical services, while their female counterparts work primarily in the retail sector.

The last two of the training types considered do not incorporate the double purpose of the mixed instruction: training plus on-the-job experience. Unfortunately, for this comparison only one of the estimated effects are statistically significant for men, which is the difference between the probability of employment without a specific place for business for individuals who partake in self-employment training rather than in-

classroom training. This probability is smaller in the later training category, which in this case makes the in-classroom preparation superior.

In the rest of this subsection, I only refer to the results for women's. When in-classroom and self-employment training are compared side by side, I find the first type is superior in all the additional outcomes that capture desirable "formal" characteristics (benefits, unique job residence, written contracts, etc). Similarly, it is superior in all but one of the traditional parameters: individuals who participate in self-employment receive, on average, higher monthly incomes than those who received in-classroom instruction. The main objective of the self-employment training category is to provide the individuals with skills that would facilitate the starting of a small business. So, unlike the in-classroom training, the self-employment program does not center on skills specific to an industry/sector. As self-employed individuals with no employer or other workers, it is highly possible that these ex-trainees do not consider it necessary to provide themselves with employment benefits. This fact could partially explain why the self-employment trainees would on average obtain higher monthly payments than the in-classroom ex-trainees, but their job conditions might not necessarily have characteristics that would include them in what the current literature considers formal employment. In short, when comparing these two categories, I find that those who receive in-classroom training are more likely to receive benefits than participants who receive self-employment training, but the increase in earnings is larger for the latter group.

An important piece of information to reflect on is the differences in impacts between men and women. It is well known that labor market variables (participation, attachment, wages, etc) take, on average, different values for males and females, all else

constant (for a survey see Altonji and Blank, 1999). It is then highly probable that the impacts of the participation in one type of training with respect to another present some differences too. As shown in tables 15.1 and 15.2, the distribution of male and female participants among the different training types is unquestionably different. The modal training type for women is self-employment, 38% of female participants prefer to prepare themselves for self-employment, while the greater part of the male participants (30%) get trained in a mixed mode in micro and small enterprises. Behind the decision of many women who opt for self-employment training could very well be the high value that many women assign to the flexibility of not working for a boss but rather for themselves. Women who are primary care givers of children and/or elderly members of the family, or who are in charge of an important proportion of the domestic activities of their households, might find the possibility of having their own business attractive, especially if the enterprise could function in the same dwelling that she and her family inhabit. These same considerations would enter the decision of the kind of job that a woman is willing and capable of performing once the training is finished.

While the signs of the estimated effects have the same pattern for men and women, the magnitudes differ. For an average female participant the decision to train in a big firm increased her probability of employment much more than for her male counterpart. An analogous situation is observed for hours worked, relative to any other training form. Nevertheless, the differences in gains in monthly income are higher for men than for women, which might reflect the possibility of a higher inequality in the labor market in terms of remuneration for males than for females.

Access to health benefits when comparing mixed in micro/small or self-employment to mixed in medium/big is worse for women, *i.e.*, if a woman decides on either of the two former categories rather than the latter, her probability of receiving medical insurance are worse than for a man who takes the same decision. A similar situation is found for housing and other benefits when comparing in-class training with mixed training in smaller companies.

An important proportion of women who obtained training in small businesses found jobs in wholesale and retail and, although this proportion is also important for in-classroom alumni, it is smaller. Also, higher percentages of this last group of women work in non-specialized services such as the food and drink industry and as street food vendors, while their counterparts in micro and small businesses work more in specialized professional and technical services.

A potential explanation for these differences is the disparity in the distribution of ex-trainees among productive sectors and specific activities. For example, if we aggregate the sectors of activity, we find that the majority of the male trainees, for all training types, work in either agriculture, livestock, mining, manufacture, construction, electricity, energy or water (Tables 15.1 and 15.2). On the other hand, the distribution of female participants is less homogeneous (in proportions in a sector and differences in those proportions). The majority of in-classroom alumni are equally distributed between retail/wholesale and specialized services. The graduates from the mixed training in medium and small firms are concentrated on agriculture, livestock, mining, manufacture, construction, electricity, energy or water of activities, as well as those who participated in

self-employment. Finally, a third of the trainees in mixed training in micro and small firms, participate in specialized services.

Table 15.1 Sector of activity by percentage of total, employed female ex-trainees
SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| | in- classroom | Mixed medium/big | Mixed micro/small | Self- employment |
|---|------------------|---------------------|----------------------|---------------------|
| Agriculture | 1.61 | 0.49 | 1.41 | 3.94 |
| Livestock | 0.40 | 0.00 | 0.35 | 0.44 |
| Other farming activities | 0.00 | 0.00 | 0.35 | 0.88 |
| Mining | 0.40 | 0.00 | 0.00 | 0.00 |
| Manufacture industry | 15.32 | 73.90 | 12.83 | 36.54 |
| Construction industry | 0.81 | 0.24 | 1.41 | 0.66 |
| Electricity, energy and water | 0.40 | 0.00 | 0.18 | 0.22 |
| Retail | 21.77 | 6.83 | 24.25 | 11.38 |
| Wholesale | 2.82 | 1.71 | 5.62 | 1.31 |
| Informal Retail | 0.81 | 0.73 | 0.53 | 5.25 |
| Food and drink industry | 6.45 | 1.46 | 5.10 | 1.09 |
| Street food vendors | 4.84 | 0.24 | 1.41 | 4.38 |
| Hotels | 4.44 | 6.10 | 1.93 | 0.00 |
| Transportation | 1.21 | 0.24 | 0.70 | 0.00 |
| Communications | 0.40 | 0.00 | 1.05 | 0.00 |
| Financial services, real state and insurance | 2.02 | 0.49 | 2.46 | 0.22 |
| Specialized professional and technical services | 13.31 | 1.95 | 18.63 | 3.50 |
| Education and health services | 8.87 | 1.95 | 8.61 | 3.06 |
| Entertainment and recreation services | 0.40 | 0.00 | 0.88 | 0.00 |
| Government and public administration | 6.05 | 0.98 | 2.11 | 1.31 |
| Other services | 7.66 | 1.95 | 9.84 | 23.85 |
| Other activities | 0.00 | 0.73 | 0.35 | 1.97 |

Source: Author's calculations from ENCOPE 2001

Table 15.2 Sector of activity by percentage of total, employed male ex-trainees
SICAT-2002 Cohort, retrospective survey Nov-Dec 2002

| | in- classroom | Mixed medium/big | Mixed micro/small | Self- employment |
|---|------------------|---------------------|----------------------|---------------------|
| Agriculture | 5.79 | 0.58 | 1.64 | 18.06 |
| Livestock | 0.77 | 0.29 | 0.55 | 0.93 |
| Other farming activities | 0.77 | 4.37 | 0.00 | 4.63 |
| Mining | 0.00 | 0.00 | 0.00 | 0.00 |
| Manufacture industry | 21.62 | 59.18 | 22.19 | 18.52 |
| Construction industry | 7.34 | 1.17 | 2.47 | 13.43 |
| Electricity, energy and water | 3.09 | 0.29 | 1.10 | 3.24 |
| Retail | 10.42 | 6.12 | 20.55 | 6.94 |
| Wholesale | 1.93 | 2.04 | 4.38 | 2.78 |
| Informal Retail | 0.77 | 0.29 | 0.00 | 0.46 |
| Food and drink industry | 5.41 | 1.46 | 8.49 | 1.85 |
| Street food vendors | 1.16 | 0.00 | 0.55 | 0.46 |
| Hotels | 2.70 | 9.04 | 0.55 | 0.93 |
| Transportation | 7.72 | 5.54 | 5.21 | 2.78 |
| Communications | 0.77 | 0.00 | 0.00 | 0.00 |
| Financial services, real state and insurance | 0.77 | 1.75 | 1.37 | 0.00 |
| Specialized professional and technical services | 16.99 | 2.62 | 23.56 | 14.35 |
| Education and health services | 2.70 | 0.00 | 2.19 | 2.78 |
| Entertainment and recreation services | 1.54 | 0.58 | 0.55 | 0.93 |
| Government and public administration | 3.86 | 2.92 | 1.10 | 2.78 |
| Other services | 3.09 | 1.46 | 2.47 | 3.24 |
| Other activities | 0.77 | 0.29 | 1.10 | 0.93 |

Source: Author's calculations from ENCOPE 2001

In sum, the evidence presented by this study suggests that different types of training translate into different outcomes for the trainees, not only in magnitude but also in the variables affected by participation in the program. My results indicate that training programs in big and medium enterprises may be the most effective, but it is hard to clearly single out the “worst” type of training. Women who receive self-employment training may not fare better in terms of job formality than their in-the-classroom counterparts, but without an estimate of the monetary value of such formality it is impossible to know whether this difference is compensated for by the larger increase in post-training income.

The policy implications of this study for training programs in general are double. On the one hand, it is obvious that decisions about future programs need to consider the effect of training not only in contrast with the lack thereof, but also the disparate results of the various types of training. It is also relevant that policy makers make clear decisions about the types of outcomes they pursue with their actions to better tailor the programs to the desired outcomes.

A few final considerations regarding this analysis are in order. Firstly, in this study I am only considering the average treatment effect of the program for people who actually participated in the program, *i.e.*, the average treatment effect on the treated and not on the total population (participants and non-participants). Secondly, the estimation is restricted to those who completed the training, although the non-completion rates are small and somewhat comparable across of training types. Further analysis on the reasons for dropping out and if, and how, this decision varies with X is advisable.

Finally, a fundamental assumption made throughout the analysis presented in this chapter is the absence of general equilibrium effects, sometimes called the stable-unit-treatment-value assumption (SUTVA). This assumption needs special consideration given the potential displacement effect of some but not all the training types. In particular, in the case of mixed training in medium and large firms, at least 70% of the trainees end up staying in the job. This very important issue is mostly ignored in previous research on P/S. In the presence of displacement effects, this would mean that the probability of employment for individuals in the same labor market who are also unemployed or underemployed become worse. Nevertheless, as discussed in chapter IV, the size of the program with respect to the total active population in the labor market is

relatively small, so that we can credibly claim that the SUTVA assumption is used correctly.

Chapter 6: Conclusions

The training component of the active labor market policies in Mexico, PROBECAT-SICAT (P/S), was one of the first in its kind in Latin America. As such, it has served as model for the subsequent versions of programs that aim to aid the unemployed and underemployed by updating or enhancing their skills.

In this work I examine the implementation of PROBECAT-SICAT from a quantitative and qualitative perspective. The main objective of this dissertation is twofold: first, to shed light on the elements that play a part in the success of the program and second, to show the importance of analyzing and evaluating social policies in their institutional and economic context.

The Ministry of Labor (Secretaría del Trabajo y Previsión Social) is the main agency that designs and manages the unemployment reduction policies in Mexico. The SICAT (Sistema de Capacitación para el Trabajo or Labor Training System), is a decentralized training program for the unemployed and underemployed, and is one of the most important active labor market policies in Mexico. Originally under the name of PROBECAT (Programa de Becas de Capacitacion para Desempleados), it was created in the early 80's to reduce the perverse impact of the debt crisis on the labor market. PROBECAT existed as such for 17 years, from 1984 to 2001, financed first by the Mexican government (until 1986), next by the World Bank (1987-1996), and presently by the IADB (since 1997). Starting in 2002, PROBECAT was renamed SICAT, and several modifications of its original scheme were implemented – one of the most relevant being the elimination of in-classroom training.

This dissertation can be broadly divided into two parts. First I present an analysis of the institutional context in which the program operates, in order to understand the

relationship between the circumstances in which the program has developed and the implications these circumstances have had for the program's performance. In the second part I conduct an impact evaluation, demonstrating that it is relevant to include outcome measures related to quality of employment. Lastly, I summarize the main findings.

P/S is a decentralized program, administered by the State Employment Services (SEE), financed by the Ministry of Labor (part of the federal government) and the Inter-American Development Bank (IADB). After some years of the P/S functioning as a centralized program, just before the Ministry started collaborating with the IADB, the Mexican government decided to give some decision power to the SEE.

Following Oates' theorem of decentralization (1972), the fact that the SEE have the most information about their regional labor markets and the needs of their population, gives some support to the decision of the federal government to have these offices directly administer and decide the particulars of the program. Nevertheless, under this decentralized scheme there are a few aspects of P/S that might have a negative impact on its functions: different objectives of agents at the local, national, or supra-national levels, and incomplete information that might result in informational rents. An example that illustrates these problems is the case of state officials who used funds assigned to P/S to promote political parties and to buy votes.

To reduce opportunities to misuse P/S resources, the Ministry of Labor along with the IADB implemented checks and monitoring measures, consisting mainly of periodical audits of the states' governments. However, there seems to be a lack of clarity about the particulars of these checks, since their specific form and schedule are not clearly defined in the official documents.

The same lack of clarity exists in the procedures used for budgeting. The formula used to determine the amount of resources to be transferred to the states every year is contained in the Rules of Operation (STPS, 2001). Although the elements that play a part in the formula are listed in the STPS (include measures of the past achievements of the program, the state's unemployment rate, etc.), the formula does not specify how each particular element is to be included. As a consequence, the actual budget is determined in negotiations between the states and the federal government. Under this design there is a need for more explicit rules of operation with respect to the amount of resources that the states receive, and a need for more specific details with respect to the methods in which the IADB and the Ministry will administer the audits and the consequences of such audits.

The internal reviews of both the Ministry and the IADB (2001) emphasize the superior results obtained by P/S, where all the objectives set to achieve by the end of the exercise not only were fully achieved and exceeded. For the IADB the objectives are measured in terms of scholarships given and the proportion of ex-trainees that found employment. The Ministry adds to the list subjective measures of quality drawn directly from the opinion of the participants. Nevertheless, one objective of the Ministry and the IADB that, until now, has not been expressly measured is the promotion of formal employment, which is unprotected, does not imply low skills labor and remuneration, and is not highly correlated with poverty, etc. Although both agencies recognize the importance of facilitating, with P/S, the insertion of unemployed and underemployed individuals into jobs in the formal sector, no attempts to measure the success in achieving this goal exist to date.

Nevertheless, some of the original objectives of P/S are being achieved, even though in various direct communications with former directors of P/S and in the transcripts from appearances of past Ministers and Vice Ministers the training program is depicted more as a direct transfer than an instrument to enhance employment prospectuses. The evidence that the resources of the program have been used for political purposes, directly or by channeling them to specific sub-groups, makes the findings of substantial impacts of participation in the program even more striking.

In the second part of the dissertation, I evaluate the program with respect to its ability to increase the probability of employment with characteristics recognized as desirable and generally interpreted as elements that identify the formal sector. Due to the large amount of definitions for formal sector, or formality, I have chosen a collection of variables meant to represent the most widely used definitions found in the literature.

Using a semi-parametric technique, I first study the effect of participation in the program by gender, independently of the type of training in which the trainees participate. Two important results suggest that ex-trainees work, on average, more hours per week than non-participants, and that their chances of obtaining a job with access to health benefits are higher. One interpretation I offer for this last result suggests that once the trainees have gained access to the medical benefits provided, by law, to them during the training, their status in the health system could be extended beyond the end of the training program. Due to data limitations, at the time this dissertation was completed it was not possible to verify which proportion of ex-trainees had the same health insurance provider before and after the training; as a result, this question remains for future work.

These first positive results indicate, along with the reports from the Ministry of Labor and the IADB, positive support for the way in which P/S was being conducted. However, I also provide evidence that for female participants the probability of employment in a job with informal characteristics increases relative to women that do not participate. After the training women participate –on average- more in self-employment or unpaid work, more in jobs with to verbal contracts, and more in activities that lack a venue that is devoted exclusively to the economic activity. Finally, I find that men, like women, increase their probabilities of filling a vacancy in a micro-firm, that is, in an enterprise that employs fewer than 10 persons.

I recognize that different types of training might have dissimilar effects on the outcomes that I study in the first estimation exercise. To complete the empirical research, I conducted an impact evaluation of the performance of the different types of training with respect to each other. For this task I used information from a retrospective survey of the trainees of 2001. The 2001 results are of interest because that is the last year in which the in-classroom training was offered. The other three training categories offered were mixed training in medium and big enterprises, mixed training in micro and small enterprises and training for the self-employment. As in the first estimation exercise I conducted the study for men and women separately.

I find evidence that the champion type of training is mixed training in medium and big enterprises. On average, men and women who participate in this training type, increase their probability of employment per se and employment with desirable ‘formal’ characteristics, such as health and housing benefits, a written contract, etc., relative to what they would have experienced with other training types. This result is not surprising,

since the businesses that participate in this program are committed to hire at least 70% of the trainees. The second best training type is the mixed training in micro and small enterprises, which increases the probability of employment, as well as hours worked, income, and access to quality jobs, to training for self-employment and in-classroom training. Although the differences between the different training types go in the same direction for men and women, they appear to be larger for men than for women. Even though the specific reasons for the disparities should be considered as a separate research question, we could theorize that the disparities correspond to gender-specific explanations: for example, women may be more inclined to obtain jobs which do not require specialized skills; whereas men may be less inclined to obtain such jobs.

As we have seen, there is evidence that P/S has had some success in increasing the probability of employment and of employment with some benefits. Additionally I show that the mixed training types have a superior performance in terms of putting participants in jobs with desirable characteristics. I also found that, in general, female participants increase their chances of obtaining jobs with informal characteristics, such as unpaid or self-employment work, work without specific residence, verbal contracts, etc. My study shows that while mixed training promotes what is recognized as formal employment, self-employment promotes employment with informal characteristics, more so than in-classroom training, which has disappeared.

The success of the mixed category, especially in its version in medium and big firms, might be attributed to a number of factors discussed in chapter V. Among those are that this training type functions as a response to specific demands of potential employers, and that it provides valuable job-experience to the trainees. In addition, the program's

success found in this research might reflect the possibility that P/S works also as an employment intermediation program. That is, P/S serves to match job seekers with potential employers. This aspect of the training program varies in intensity across categories, with the mixed types being the most likely to operate as intermediation programs, and the in-classroom and training for self-employment varieties being less likely to operate as intermediaries.

The interpretation of results from the impact evaluation should take into consideration the alternatives to employment that are promoted by P/S. For example, I show that participation in the program increases the probabilities of employment in general, but even more specifically the probability of employment with health benefits. To propose an adequate policy change it is necessary to reflect not only on different forms of underemployment or employment with certain less-than-desirable characteristics, but also on the possibility of unemployment. Finally, researchers and policy makers should be aware that the information used for this study derives from a one-time-only retrospective interview, and that more data will be needed to determine the time paths of the impacts of the program in general, and of each training type in particular.

In the estimation chapters I also discuss two issues that have largely been ignored in the literature on P/S. These are the issue of potential contamination bias and general equilibrium effects. To conduct my estimations I used information from a national employment survey to construct comparison groups; unfortunately from this survey it is impossible to identify individuals who have participated in P/S. This situation could potentially bias the results given that I might not have included all of the participants who

have received training. To verify the extent of potential bias, I applied the method proposed by Smith (2006) for matching in the presence of contamination bias. This method employs administrative information on the eligibility rules, to then estimate the total eligible population. The bottom line is to calculate the mean differences between treatment and comparison units for each value of X , to then adjust the mean differences for the fraction of the comparison group that received treatment. I developed an application of the method for the estimation of the impact of participation in P/S on hours worked post training. With this example I show that differences between the adjusted and unadjusted estimates of the average impact on hours worked is very modest. I explain that the small difference can be traced to the small probability of participation for eligible individuals, and that we can confidently say that our estimates are most likely not strongly affected by contamination bias.

When participation in a program such as P/S has an impact on the wage structure, or on the distribution of any other outcome variable, it is not possible to claim SUTVA, an important assumption on which my results are based. SUTVA states that an individual's potential outcome depends only on his participation, and not on the treatment status of other members of the same population. When this assumption holds there are no general equilibrium effects. For P/S there seems to exist a very possible risk of displacement, which is to say that with some men and women updating their skills and occupying vacancies, the non participants would face more difficulties in finding employment, their wages will be lower, etc. If this were the case I would need to incorporate the losses of non-participants to obtain a net effect of the program, and, accordingly, propose policy changes. Yet, in previous chapters I discuss that when the

proportion of participants with respect to the total active population in their labor market is relatively small, the possibility of its behavior having any effect to the whole market is likewise small. Then, it is reasonable to accept as true that the probabilities of displacement effect and/or general equilibrium effects for P/S are nonexistent.

Policy Recommendations

Overall, the empirical studies presented in this dissertation provide some limited support in favor of the PROBECAT/SICAT training programs. However, the results from comparing the different types of training indicate that more training courses should be conducted in large firms, which would promote a better match between the training provided by the program and the specific needs of businesses.

Some of these changes have already taken place during the existence of the program: When the second LMMP started [1997], a reduction in the proportion of in-classroom scholarships with respect to those for mixed training took effect.³³ This was a response to the finding that in previous years the percentage of individuals finding jobs was higher for participants in the mixed training than for those in the in-classroom training. A next step would consider fine-tuning the kind of mixed training to maximize its effectiveness.

Also, the results regarding outcomes in terms of formality suggest that the inclusion of certain levels of job quality as an abstract objective of PROBECAT/SICAT may not be enough. Furthermore, since local authorities might not share the same

³³ In particular, the percentage changed to 80% in the mixed training category, and only 20% in the in-classroom category.

objectives in terms of outcomes as the funding agencies, policymakers should consider including explicit objectives in terms of formality among the outcome variables used to evaluate the success of the programs. This recommendation can be extended to other developing economies in which there are no alternatives to unemployment such as unemployment insurance and temporary work funded by the government.

I believe that the deeper knowledge of local labor markets by local authorities justifies the decentralization of the program. Nevertheless, the checks in place should be strengthened to ensure that the program continues to function in line with its goals. A detailed schedule of audits, as well as a better description of their form should be crafted and published; all along with an official list of the measures to be taken when an audit fails. I make the same suggestion for the budgeting process; a more precise formula would promote a clearer assignment of resources, which in turn can help to reduce the deviation of funds from the proper functioning of the program.

Finally, all government programs can greatly benefit from objective and well conducted impact evaluations; the results of such evaluations serve as one of the most important inputs to design adjustments of current policies. The basic, and hence most central, ingredient for evaluations is data. The benefits of good data can well overcompensate the costs of producing it, considering the economic, social and even political implications of government programs. I finish this chapter by recommending that better, and when possible, more data is produced.

Appendices

Appendix A. Description of outcome variables

1. **Post monthly labor income**, continuous variable. Captures information about the job the interviewee has at the time of the interview. This variable is zero if the interviewee does not have a job or did not work for payment.

Similarly, for the comparison group this variable captures the income received at the time of the second interview (in the “post-training” period), recorded during the quarter of ENE 2002. For individuals who did not receive any payment for their work or were not working, the variable is coded as zero.
2. **Post weekly total hours worked**, continuous variable. Captures information on the number of hours worked the last week prior to the interview. Calculated as days per week times hours per day. This variable is zero if the interviewee is not working.
3. **Employed**, 1 if individual is employed at the time of the interview, 0 otherwise.
4. **Self employed or unpaid worker**, 1 if the individual is self-employed or has an employer but does not receive any payment in exchange for the work, 0 otherwise.
5. **Verbal contract**, 1 if the individual reports having a verbal contract that establishes an employment agreement, 0 otherwise.
6. **Health benefits**, 1 if the individual reports having medical benefits, either provided by the private or public sector (IMSS or ISSSTE), 0 otherwise.

7. **Housing credits**, 1 when the interviewee has access to credits to be used to buy or renovate a dwelling (INFONAVIT or others), 0 otherwise.
8. **In-cash benefits**, 1 if the interviewee receives benefits, such as bonuses at the end of the fiscal year, productivity prizes, etc., 0 otherwise.
9. **Other benefits**, 1 if the individual, as part of his/her job benefits receives other benefits that are not in-cash, housing credits or health insurance (vacations, for example). The variable is 0 otherwise.
10. **In micro businesses**, 1 if the person is employed in a firm that employs at most 10 people, including the employer, manager, etc. The variable takes the value of 0 otherwise.
11. **In business without local**, 1 if the person works in a firm/business that does not have a specific residence, exclusively devoted to its economic activities. This variable takes the value of 0 otherwise.

Appendix B. Description of the variables used to calculate the propensity score and matching estimates in Chapter 4

All the variables were obtained from the retrospective survey carried out over the second half of 2002 for trainees; this is the reference period.

1. **Age**, continuous, restricted both samples to individuals between 16 and 78 years old.

2. **Age Squared**, continuous, square of Age.

3. Highest educational degree attained, 6 dummy variables.

No degree, (base category).

Elementary school.

Junior high school.

High school.

College degree.

Technical degree, it includes technical degrees with different levels of formal education prerequisites (elementary, junior or completed high school).

4. Length of time in inactivity (not working, i.e. without a job) before started training, for trainees. As for the treated sample, for the comparison group I construct the variable based on a question that captures the date at which the individual left her last job, for those that ever held a job.

For those individuals who had never held a job by the time of the interview, for ENCOPE and ENE, the duration of inactivity was coded as “less than one month”

Duration of inactivity consists of 4 dummy variables:

Less than one month. Less than 31 days of inactivity.

Between one and six months. Between 31 and 180 days of inactivity, it includes both limits of the bracket.

Between six months and one year. Between 180 and 365 days of inactivity, it includes superior limit of the bracket.

More than one year. More than 365 days of inactivity, (base category).

5. **Never employed, dummy variable,** 1 if the individual was never employed, 0 otherwise.
6. **Age*never_employed,** continuous, interaction between age and dummy for never employed. Zero for people who were ever employed.
7. **Age_squared*never_employed,** continuous, interaction between the square on age and dummy for never employed. Zero for people who were ever employed.
8. **Pre monthly labor income,** continuous variable. Captures information of the last job the interviewee had before she started the training. This variable is zero if the interviewee had never worked before the training or did not work for payment. For the comparison group this variable captures the income received during the last job the individual had, recorded either in the first or second quarter or ENE. For individuals who had never worked by the time of the interview, or did not receive any payment for their work, the variable is coded as zero.
9. **Pre monthly labor income squared,** continuous variable, square of monthly labor income.
10. **Pre weekly hours worked,** continuous variable. Captures information on hours worked per week in the last job the interviewee had before she started training.

Calculated as days per week times hours per day. This variable is zero if the interviewee had never worked before the training.

11. **Pre weekly hours worked squared**, continuous, square of weekly hours worked.

12. **Marital status**, 3 dummies.

Single, never married, (base category).

Married, includes married or cohabitating.

Other, includes divorced, separated or widowed.

13. **Head of the household**, dummy variable, 1 if the interviewee is head of her household, 0 otherwise.

14. Development zones, 7 dummy variables. Each state is assigned with a level of development. Higher numbers represent higher levels of economic development, so region 1 is the least developed and region 7 is the most developed.

Region 1, region 2, region 3, region 4, region 5, region 6, region 7, (base category).

15. Town size, 5 population dummy variables.

townsize1, if population of municipio $\leq 2,499$

townsize2, if population of municipio $> 2,499$ & $\leq 14,999$

townsize3, if population of municipio $\geq 15,000$ & $\text{pop} < 50,000$

townsize4, if population of municipio $\geq 50,000$ & $\text{pop} < 100,000$

townsize5, if population of municipio $\geq 100,000$ (base category).

Appendix C. Data annex, steps for data construction

A. Treatment Group

The starting sample is the National Survey on Job Matching and Continuance (ENCOPE) of 2002.

1. Restrict to those that reported having finished the SICAT training program.
2. Exclude the trainees who claimed to have started training during 2000, 2001, 2003 or 2004.
3. Construct dependent and independent variables.
4. Generate a variable that identifies all members of this group as treated individuals

B. Comparison Group

Starting samples are the first, second and fourth quarters of the National Employment Survey (ENE-I, ENE-II and ENE-IV)

5. By individual identification number merge ENE-I with ENE-IV and ENE-II with ENE-IV, for each merged sample (merged1 and merged2) keep those individuals that have records in the master and slave samples.
6. Verify that no individual is in both merged samples.
7. Construct dependent and independent variables, use exact same names and units as in 3.
8. Append merged samples to have one database for the comparison group.
9. Generate a variable that identifies all members of this group as comparison individuals.
10. Impose restrictions of age, unemployment and underemployment, income maximums and education (see section 5.2.)

C. Final Sample

11. Append treated and comparison sample.
12. Divide the treated and comparison sample in one sample of males and one of females.
13. Start estimation process.

Appendix D. Description of the variables used to calculate the propensity score and matching estimates, Chapter 5

All of the variables were obtained from the retrospective survey carried over the second half of 2001 for trainees; this is the reference period.

16. **Age**, continuous, restricted both samples between 16 and 78 years old.

17. **Years of formal education**, continuous, number of years the individual obtained education in an accredited institution.

18. Highest educational degree attained, 6 dummy variables.

No degree, (base category).

Elementary school.

Junior high school.

High school.

College degree.

Technical degree, it includes technical degrees with different levels of formal education prerequisites (elementary, junior or completed high school).

19. **Length of time in inactivity** (not working, i.e. without a job) before started training, for trainees. Continuous variable in days. The duration of inactivity was coded as zero for individuals that have never worked.

20. **Length of time in inactivity squared**.

21. **Marital status**, 3 dummies.

Single, never married, (base category).

Married, includes married or cohabitating.

Other, includes divorced, separated or widowed.

22. **Economic dependents**. Continuous, number of individuals that economically depend on the trainee.
23. **Never employed, dummy variable**, 1 if individual was never employed, 0 otherwise.
24. **Pre monthly labor income**, continuous variable. Captures information of the last job the interviewee had before she started the training. This variable is zero if the interviewee had never worked before the training or did not work for payment.
25. **Pre monthly labor income squared**
26. **Pre weekly hours worked**, continuous variable. Captures information of the last week worked in the last job the interviewee had before she started the training. Calculated as days per week times hours per day. This variable is zero if the interviewee had never worked before the training.
27. **Pre weekly hours worked squared**, continuous, square of weekly hours worked.
28. **Head of the household**, dummy variable, 1 if the interviewee is head of her household, 0 otherwise.
29. **Development zones**, 7 dummy variables. Each state is assigned with a level of development. Higher numbers represent higher levels of economic development, so region 1 is the least developed and region 7 is the most developed.
- Region 1, region 2, region 3, region 4, region 5, region 6, region 7**, (base category).
30. Town size, 5 population dummy variables.
- townsize1**, if population of municipio $\leq 2,499$

townsize2, if population of municipio $>2,499$ & $\leq 14,999$

townsize3, if population of municipio $\geq 15,000$ & $\text{pop} < 50,000$

townsize4, if population of municipio $\geq 50,000$ & $\text{pop} < 100,000$

townsize5, if population of municipio $\geq 100,000$ (base category).

31. Reasons to participate in the training program, 7 dummy variables.

Reason1, to obtain experience

Reason2, to obtain employment (base)

Reason3, wanted to get training

Reason4, recommended to take it

Reason5, required for employment

Reason6, to obtain the stipend

Reason7, other

Appendix E. Cross-validation analysis, optimal bandwidth

In-classroom with respect to mixed in medium and big enterprises

| | men, n= 325 | | women, n=412 | |
|------------------------------------|----------------------|------------|----------------------|------------|
| | Optimal bandwidth | RMSE | Optimal bandwidth | RMSE |
| Employed | 0.30 | 60.22 | 0.30 | 113.02 |
| Health benefits | 0.05 | 110.32 | 0.01 | 171.58 |
| Housing Credits | 0.05 | 149.95 | 0.30 | 163.81 |
| In-cash Benefits | 0.05 | 132.16 | 0.30 | 198.06 |
| Other benefits | 0.10 | 155.04 | 0.30 | 187.67 |
| In micro business | 0.10 | 159.99 | 0.30 | 205.39 |
| In business without local | 0.10 | 26.91 | 0.01 | 10.14 |
| Self employed or unpaid worker | 0.05 | 11.68 | 0.30 | 13.91 |
| Verbal contract | 0.30 | 74.08 | 0.30 | 100.11 |
| Post training monthly labor income | 0.05 | 431,061.30 | 0.30 | 398,056.50 |
| Post training weekly hours worked | 0.03 | 4,255.35 | 0.10 | 5,858.38 |

In-classroom with respect to mixed in micro and small enterprises

| | men, n= 429 | | women, n=854 | |
|------------------------------------|----------------------|------------|----------------------|------------|
| | Optimal bandwidth | RMSE | Optimal bandwidth | RMSE |
| Employed | 0.30 | 166.79 | 0.30 | 409.33 |
| Health benefits | 0.10 | 178.80 | 0.30 | 342.27 |
| Housing Credits | 0.10 | 79.98 | 0.30 | 139.34 |
| In-cash Benefits | 0.10 | 166.25 | 0.30 | 313.58 |
| Other benefits | 0.10 | 97.88 | 0.30 | 154.05 |
| In micro business | 0.30 | 206.75 | 0.30 | 424.76 |
| In business without local | 0.10 | 36.26 | 0.10 | 75.35 |
| Self employed or unpaid worker | 0.30 | 29.22 | 0.30 | 49.78 |
| Verbal contract | 0.30 | 213.46 | 0.10 | 399.15 |
| Post training monthly labor income | 0.10 | 366,680.20 | 0.10 | 645,930.70 |
| Post training weekly hours worked | 0.30 | 8,579.55 | 0.30 | 18,703.34 |

In-classroom with respect to self-employment

| | men, n= 275 | | women, n=1,075 | |
|------------------------------------|----------------------|------------|----------------------|------------|
| | Optimal bandwidth | RMSE | Optimal bandwidth | RMSE |
| Employed | h | RMSE | h | RMSE |
| Employed | 0.05 | 113.93 | 0.10 | 504.75 |
| Health benefits | 0.50 | 75.49 | 0.10 | 81.60 |
| Housing Credits | 0.50 | 30.21 | 0.10 | 33.27 |
| In-cash Benefits | 0.50 | 62.38 | 0.10 | 73.17 |
| Other benefits | 0.50 | 41.37 | 0.10 | 50.98 |
| In micro business | 0.30 | 137.38 | 0.10 | 405.49 |
| In business without local | 0.50 | 121.73 | 0.05 | 396.02 |
| Self employed or unpaid worker | 0.10 | 69.80 | 0.30 | 319.21 |
| Verbal contract | 0.05 | 119.81 | 0.10 | 241.17 |
| Post training monthly labor income | 0.05 | 270,720.00 | 0.10 | 432,980.70 |
| Post training weekly hours worked | 0.05 | 5,881.87 | 0.10 | 15,645.79 |

Mixed in medium and big with respect to in-classroom

| | men, n= 377 | | women, n=522 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.10 | 169.76 | 0.30 | 253.69 |
| Health benefits | 0.10 | 139.53 | 0.05 | 147.49 |
| Housing Credits | 0.10 | 76.02 | 0.10 | 79.07 |
| In-cash Benefits | 0.10 | 123.48 | 0.30 | 142.00 |
| Other benefits | 0.10 | 78.68 | 0.05 | 94.09 |
| In micro business | 0.10 | 174.18 | 0.30 | 214.03 |
| In business without local | 0.10 | 108.30 | 0.30 | 54.72 |
| Self employed or unpaid worker | 0.10 | 65.27 | 0.30 | 38.65 |
| Verbal contract | 0.10 | 151.05 | 0.10 | 144.43 |
| Post training monthly labor income | 0.10 | 466,803.60 | 0.10 | 400,313.10 |
| Post training weekly hours worked | 0.10 | 8,388.37 | 0.30 | 10,794.27 |

Mixed in medium and big with respect to mixed in micro and small enterprises

| | men, n= 412 | | women, n=838 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.10 | 154.91 | 0.30 | 398.94 |
| Health benefits | 0.10 | 172.96 | 0.10 | 333.39 |
| Housing Credits | 0.10 | 79.36 | 0.10 | 135.72 |
| In-cash Benefits | 0.10 | 161.22 | 0.30 | 307.37 |
| Other benefits | 0.01 | 101.63 | 0.10 | 151.22 |
| In micro business | 0.10 | 198.24 | 0.30 | 418.02 |
| In business without local | 0.01 | 35.08 | 0.30 | 75.82 |
| Self employed or unpaid worker | 0.05 | 29.16 | 0.30 | 48.26 |
| Verbal contract | 0.10 | 205.67 | 0.30 | 392.99 |
| Post training monthly labor income | 0.10 | 314,444.30 | 0.10 | 638,284.40 |
| Post training weekly hours worked | 0.10 | 8,014.00 | 0.10 | 18,270.45 |

Mixed in medium and big with respect to self-employment

| | men, n= 252 | | women, n=1,050 | |
|------------------------------------|-------------|------------|----------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.30 | 102.03 | 0.10 | 476.77 |
| Health benefits | 0.30 | 74.22 | 0.10 | 76.97 |
| Housing Credits | 0.30 | 29.52 | 0.30 | 32.92 |
| In-cash Benefits | 0.30 | 61.29 | 0.10 | 68.50 |
| Other benefits | 0.30 | 40.93 | 0.10 | 46.32 |
| In micro business | 0.05 | 121.89 | 0.10 | 383.91 |
| In business without local | 0.10 | 109.43 | 0.05 | 376.42 |
| Self employed or unpaid worker | 0.10 | 61.32 | 0.10 | 306.78 |
| Verbal contract | 0.30 | 113.04 | 0.05 | 227.77 |
| Post training monthly labor income | 0.10 | 245,111.10 | 0.05 | 407,229.00 |
| Post training weekly hours worked | 0.10 | 5,225.38 | 0.05 | 14,961.02 |

Mixed in micro and small with in-classroom

| | men, n= 356 | | women, n=513 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.30 | 169.52 | 0.30 | 249.44 |
| Health benefits | 0.30 | 134.75 | 0.10 | 144.89 |
| Housing Credits | 0.10 | 66.54 | 0.30 | 81.04 |
| In-cash Benefits | 0.30 | 118.51 | 0.10 | 140.21 |
| Other benefits | 0.30 | 73.19 | 0.30 | 95.01 |
| In micro business | 0.10 | 166.67 | 0.30 | 211.63 |
| In business without local | 0.10 | 99.19 | 0.10 | 51.64 |
| Self employed or unpaid worker | 0.10 | 61.82 | 0.30 | 34.66 |
| Verbal contract | 0.10 | 141.98 | 0.30 | 145.15 |
| Post training monthly labor income | 0.10 | 369,794.20 | 0.10 | 378,447.70 |
| Post training weekly hours worked | 0.30 | 8,546.08 | 0.30 | 10,530.46 |

Mixed in micro and small with mixed in medium and big

| | men, n= 302 | | women, n=431 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.10 | 55.35 | 0.10 | 114.58 |
| Health benefits | 0.05 | 106.23 | 0.10 | 176.68 |
| Housing Credits | 0.10 | 141.93 | 0.10 | 203.76 |
| In-cash Benefits | 0.05 | 125.86 | 0.05 | 101.31 |
| Other benefits | 0.05 | 141.49 | 0.05 | 191.66 |
| In micro business | 0.10 | 145.66 | 0.05 | 212.48 |
| In business without local | 0.10 | 26.88 | 0.10 | 13.47 |
| Self employed or unpaid worker | 0.05 | 9.79 | 0.05 | 13.68 |
| Verbal contract | 0.05 | 72.77 | 0.30 | 100.90 |
| Post training monthly labor income | 0.01 | 302,044.00 | 0.05 | 398,687.40 |
| Post training weekly hours worked | 0.10 | 3,858.77 | 0.10 | 5,950.99 |

Mixed in micro and small with self-employment

| | men, n= 266 | | women, n=1,106 | |
|------------------------------------|-------------|------------|----------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.10 | 110.21 | 0.05 | 513.58 |
| Health benefits | 0.10 | 72.86 | 0.05 | 80.36 |
| Housing Credits | 0.10 | 30.45 | 0.05 | 32.31 |
| In-cash Benefits | 0.10 | 61.62 | 0.05 | 71.81 |
| Other benefits | 0.07 | 42.33 | 0.05 | 49.80 |
| In micro business | 0.10 | 126.98 | 0.05 | 409.66 |
| In business without local | 0.10 | 114.37 | 0.05 | 404.76 |
| Self employed or unpaid worker | 0.10 | 64.75 | 0.30 | 324.43 |
| Verbal contract | 0.10 | 116.95 | 0.05 | 244.01 |
| Post training monthly labor income | 0.10 | 264,126.20 | 0.05 | 15,907.79 |
| Post training weekly hours worked | 0.30 | 5,846.34 | 0.05 | 395,617.60 |

Self-employment with respect to in-classroom

| | men, n= 350 | | women, n=522 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.05 | 164.04 | 0.05 | 243.89 |
| Health benefits | 0.05 | 130.26 | 0.05 | 144.55 |
| Housing Credits | 0.05 | 66.53 | 0.05 | 79.96 |
| In-cash Benefits | 0.05 | 117.66 | 0.05 | 136.81 |
| Other benefits | 0.05 | 71.93 | 0.05 | 95.54 |
| In micro business | 0.30 | 164.97 | 0.05 | 204.09 |
| In business without local | 0.05 | 100.47 | 0.05 | 54.92 |
| Self employed or unpaid worker | 0.05 | 60.68 | 0.05 | 38.41 |
| Verbal contract | 0.05 | 139.82 | 0.05 | 144.44 |
| Post training monthly labor income | 0.05 | 429,594.50 | 0.05 | 354,853.90 |
| Post training weekly hours worked | 0.10 | 8,266.18 | 0.05 | 10,229.06 |

Self-employment with respect to mixed in medium and big

| | men, n= 280 | | women, n=422 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.30 | 55.71 | 0.10 | 112.83 |
| Health benefits | 0.10 | 99.58 | 0.10 | 166.52 |
| Housing Credits | 0.10 | 121.16 | 0.10 | 160.04 |
| In-cash Benefits | 0.10 | 116.69 | 0.10 | 193.29 |
| Other benefits | 0.10 | 130.38 | 0.10 | 186.27 |
| In micro business | 0.01 | 125.41 | 0.05 | 207.81 |
| In business without local | 0.10 | 26.80 | 0.10 | 13.17 |
| Self employed or unpaid worker | 0.10 | 11.32 | 0.10 | 13.53 |
| Verbal contract | 0.30 | 67.88 | 0.10 | 104.04 |
| Post training monthly labor income | 0.10 | 316,855.20 | 0.10 | 341,506.30 |
| Post training weekly hours worked | 0.30 | 3,785.66 | 0.10 | 5,852.17 |

Self-employment with respect to mixed in micro and small

| | men, n= 446 | | women, n=811 | |
|------------------------------------|-------------|------------|--------------|------------|
| | Optimal | | Optimal | |
| | bandwidth | | bandwidth | |
| | h | RMSE | h | RMSE |
| Employed | 0.30 | 173.10 | 0.05 | 381.79 |
| Health benefits | 0.05 | 185.07 | 0.05 | 316.11 |
| Housing Credits | 0.10 | 83.28 | 0.05 | 130.61 |
| In-cash Benefits | 0.05 | 175.43 | 0.05 | 287.44 |
| Other benefits | 0.30 | 109.34 | 0.05 | 144.31 |
| In micro business | 0.05 | 213.91 | 0.05 | 396.00 |
| In business without local | 0.10 | 37.45 | 0.05 | 74.12 |
| Self employed or unpaid worker | 0.10 | 30.58 | 0.05 | 48.86 |
| Verbal contract | 0.05 | 222.45 | 0.05 | 381.57 |
| Post training monthly labor income | 0.30 | 417,361.50 | 0.05 | 601,320.40 |
| Post training weekly hours worked | 0.05 | 8,831.75 | 0.05 | 17,446.08 |

Bibliography

- Abadie, A., J. Angrist & G. Imbens. 2002. "Instrumental Variables Estimates of the Effect of Subsidized Training on the Quantiles of Trainee Earnings", *Econometrica*, 70(1): 91-117.
- Abadie, A. & G. W. Imbens. 2005. "On the Failure of the Bootstrap for Matching Estimatos", Harvard University, Unpublished manuscript.
- Aedo, C. and S. Nuñez. 2001. "The Impact of Training Policies in Latin America and the Caribbean: The Case of Programa Joven" Research Network Paper, Inter-American Development Bank, Mimeo.
- Agénor, P. 2004. "Unemployment-Poverty Trade-offs," Working Paper, World Bank.
- Analitica Consultores, 2004, "Informe Final: Estudio de Evaluación del Sistema de Capacitación para el Trabajo (SICAT)", Mimeo.
- Aportela, F. 1999. "Effects of a Mexican Training Program on Unemployment Spells Duration," mimeo, MIT.
- Ashenfelter, O. & Krueger, A. 1992. "Estimates of the Economic Returns to Schooling from a New Sample of Twins", *American Economic Review*, 84(5):1157-1173.
- Becker, G., 1964. *Human Capital*. Columbia University Press.
- Betcherman, G., K. Olivas & A. Dar. 2004. "Impacts of Active Labor Markets Programs: New Evidence from Evaluations with Particular Attention to Developing and Transition Countries". Social Protection Discussion Paper Series (No. 0402), World Bank.
- Black, D. & J. Smith. 2004. "How Robust is the Evidence on the Effects of College Quality? Evidence from Matching." *Journal of Econometrics*, 121 (1-2): 99-124.
- Bound, J., D. A. Jaeger & R. M. Baker. 1995. "Problems with Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variable is Weak", *Journal of the American Statistical Association*, 90(430): 443-449.
- Calderón-Madrid, A. & B. Trejo. 2001. "The Impact of the Mexican Training Program for Unemployed Workers on Re-employment Dynamics and on Earnings," Mimeo, El Colegio de México, CIMAT.
- Calderón-Madrid, A. 2002. "Revisiting the Evaluation of the Benefits of Training Programs for Unemployed in Developing Countries," Mimeo, El Colegio de México.

Calderón-Madrid, A. 2006. "Revisiting the Employability Effects of Training Programs for the Unemployed in Developing Countries" Banco Interamericano de Desarrollo, Research Network Working Paper R-522.

Cámara de Diputados, 1999. "Gaceta Parlamentaria, anexo I, martes 7 de diciembre de 1999", <http://www.gaceta.diputados.gob.mx/Gaceta/1999/dic/anexodic07.html>, (accessed May 15th, 2007).

Cámara de Diputados, 2000. "Presupuesto de Egresos de la Federación para el Ejercicio Fiscal 2000. Análisis comparativo del proyecto de presupuesto y el presupuesto autorizado por la H. Cámara de Diputados", <http://www.cddhcu.gob.mx/cronica57/contenido/cont11/presupue.html>, (accessed May 15th, 2007).

Cámara de Diputados, 2001. "Octava Reunión de Trabajo. Comisión del Trabajo y Previsión Social", <http://www.cddhcu.gob.mx/comisiones/traypres/actas/acta8.htm>, (accessed July 18th, 2007).

Card D., & D. Sullivan. 1988. "Measuring the effect of subsidized training programs on movements in and out of employment", *Econometrica*, 56(3): 497-530.

Chandra, V. 1992. "Informal sector in developing countries: A theoretical analysis" Doctoral Dissertation, Johns Hopkins University.

Constitución Política de los Estados Unidos Mexicanos, Fracción XII, Apartado A título Sexto del Trabajo y de la Previsión Social.

Daza, J. 2005. "Informal Economy, Undeclared Work and Labour Administration" International Labour Office, Geneva, Paper No. 9.

Dehejia, R., & S. Wahba. 1999. "Causal Effects in Nonexperimental Studies: Reevaluating the Evaluation of Training Programs" *Journal of the American Statistical Association*. 94(448): 1053-62.

Dehejia, R., & S. Wahba. 2002. "Propensity Score-Matching Methods for Nonexperimental Causal Studies" *Review of Economics and Statistics*. 84(1): 151-161

Delajara, M., S. Freije & I. Soloaga. 2006. "Evaluation of the training for the unemployed in Mexico: learning by comparing methods", Mimeo, Universidad de las Americas.

Dolton, P., J. Azevedo & J. Smith. 2006. "The econometric evaluation of the New Deal for Lone Parents." Research Report, Department of Work and Pensions, UK.

Eberwein, C., J. Ham & R. Lalonde. 1997. "The Impact of Being Offered and Receiving Classroom Training on the Employment Histories of Disadvantaged Women: Evidence from Experimental Data" *Review of Economic Studies*, 64: 655-682.

Eichler, M. & M. Lechner. 2002. "An Evaluation of Public Employment Programmes in the East German State of Sachsen-Anhalt." *Labour Economics*, 9 (2): 143-186.

Fawcett, C. 2001. "Latin American Youth in Transition: A policy paper on youth unemployment in Latin America" Mimeo, Inter-American Development Bank.

Flores Lima, R. 2003. "Diagnóstico de las políticas de mercado laboral nacionales, programas, inversiones y mecanismos institucionales del mercado laboral en México, Honduras, El Salvador, Nicaragua y Panamá, Evolución de las Políticas Activas de Mercado de Trabajo en México", Mimeo.

Flores-Lima, R. 2004. "Estancamientos, crisis económica y deterioro social", *Demos*, 16: 14-15.

Flores Lima, R. 2005 [Personal Interview, tape recording] *On the evolution of the training components of AMLPs in Mexico, with Roberto Flores Lima, General Director of Employment, Ministry of Labor, 1995-1999*.

Frölich, M. 2002. "Finite-Sample Properties of Propensity-Score Matching and Weighting Estimators". *Review of Economics and Statistics*, 86 (1): 77-90.

Galasso, E., M. Ravallion and A. Salvia. 2001. "Assisting the Transition from Workfare to Work: Argentina's Proempleo Experiment" Mimeo, Development Research Group, World Bank.

GEA Consultores. 2002, "Estudio de Evaluacion del Sistema de Capacitacion Para el Trabajo (SICAT) 2001-2002, Reporte final", Mimeo.

Gerfin, M. & M. Lechner. 2002. "A Microeconometric Evaluation of the Active Labour Market Policy in Switzerland" *The Economic Journal*. 112 (October): 854-893.

Gobierno del Estado de Tamaulipas. 1999. "PROBECAT Julio- Septiembre 1999", <http://www.tamaulipas.gob.mx/gobierno/secretarias/sedeem/empleo/revistas/boletin3/formacion.htm>, (accessed July 29, 2007).

Gobierno del Estado de Tamaulipas. 2000. "Tópicos de Empleo", Boletin2000, No 2. http://www.tamaulipas.gob.mx/gobierno/secretarias/sedeem/empleo/revistas/boletin2000/boletin_2/rechump.pdf, (accessed April 15, 2007).

Gobierno del Estado de Tamaulipas. 2002. "Tópicos de Empleo", Boletin2002, No 1. http://www.tamaulipas.gob.mx/gobierno/secretarias/sedeem/empleo/revistas/boletin2002/boletin_1/recuhumanos.pdf, (accessed April 15, 2007).

GRADE, Grupo de Análisis para el Desarrollo. 2001. “Una medición del impacto del Programa de Capacitación Laboral Juvenil PROJoven”, Mimeo.

Guaipatin, C. 2003. “Observatorio MIPYME: Compilación estadística para 12 países de la Región”. IADB. Mimeo.

Harris, J. R. & M. P. Todaro. 1970 “Migration, unemployment, and development: A two sector analysis” *American Economic Review*, 60(1): 126-142.

Heckman, J. & R. Robb Jr. 1985. “Alternative Methods for Evaluating the Impact of Interventions: An Overview.” *Journal of Econometrics*. 30 (1-2): 239-67.

Heckman, J., H. Ichimura & P. Todd. 1997. “Matching as an econometric evaluation estimator: evidence from evaluating a job training programme.” *Review of Economic Studies*. 64:605-654.

Heckman, J., I. Hidehiko, J. Smith & P. Todd. 1998. “Characterizing Selection Bias Using Experimental Data”. *Econometrica*, 66 (5): 1017-1098.

Heckman, J., R. J. LaLonde & J. Smith. 1999. “The Economics and Econometrics of Active Labor Market Programs.” In Ashenfelter, O., Card, D. (Eds.), *Handbook of Labor Economics* 3:1865-2097.

Husmanns, R. 2004. “Statistical definition of informal employment: Guidelines endorsed by the Seventeenth International Conference of Labour Statisticians (2003)”, Mimeo, International Labour Office.

Ibarra, A. 2005. (May 3rd, 2005) [Personal Interview, tape recording] *On the evolution of the training components of AMLPs in Mexico, with Agustin Ibarra, General Director of Employment, Ministry of Labor, 1988-1995*.

Imbens, G. 2000. “The Role of the Propensity Score in Estimating Dose-Response Functions”, *Biometrika*, 87(3): 706-710.

Instituto Nacional de Estadística, Geografía e Informática. 2007. “Población Rural y Urbana” http://cuentame.inegi.gob.mx/poblacion/rur_urb.aspx?tema=P, (accessed June 25, 2007).

International Labour Office, International Labour Organization. 2003. “Report of the Director-General: Working Out of Poverty.” Mimeo, International Labour Conference. 91st Session, Geneva.

Instituto Nacional de Estadística Geografía e Informática. 2002. “Guía de conceptos, uso e interpretación de la estadística sobre la fuerza laboral en México”. Mimeo, Aguascalientes, México.

Instituto Nacional de Estadística Geografía e Informática. 2006. “Regiones Socioeconómicas de México: Antecedentes y Metodología”. Mimeo, Aguascalientes, México.

Instituto Nacional de Estadística Geografía e Informática. 2006. “Aspectos Generales de la Encuesta”,
<http://www.inegi.gob.mx/est/contenidos/espanol/sistemas/ene/consene/archivos/comunes/metodologia.pdf> (accessed October 29, 2006).

Inter-American Development Bank, 1996a. “Programa Multifase de Apoyo a Capacitación y Empleo, Fase I (ME-0233), Propuesta de Préstamo”, Mimeo.

Inter-American Development Bank, 1996b. “Labor Markets Modernization Project II, (ME-0186), Loan Proposal”, Mimeo.

Inter-American Development Bank, 2000. “Informe de Terminación de Operaciones, Programa de Modernización del Mercado Laboral”, Mimeo.

Inter-American Development Bank, 2001. “Programa Multifase de Apoyo a Capacitación y Empleo, Fase I (ME-0233), Resumen Ejecutivo”, Mimeo.

Inter-American Development Bank. 2003. “Good Jobs Wanted: Labor Markets in Latin America,” Report, October 2003.

Inter-American Development Bank. 2005 (1). “Job Training Programs,” thematic review, Mimeo.

Inter-American Development Bank. 2005 (2). “Ex-post Evaluation of Active Labor Markets Programs,” Ex-post Project Report, Mimeo.

Inter-American Development Bank, 2005 (3). “Evaluation of ME-0186 & ME-0118, Labor Market Modernization Project”, Mimeo.

Klassen, T. R. & S. Schneider. 2001. “Federalism and Labour Market Policy in Germany and Canada: Exploring the Path Dependency of Reforms in the 1990s”, Mimeo, Institute of Intergovernmental Relations, Queen's University.

Lechner, M. 2000. “An evaluation of public sector-sponsored continuous vocational training programs in east Germany.” *Journal of Human Resources*. 35(2).

Lechner, M. 2001. “Identification and Estimation of Causal Effects of Multiple Treatments Under the Conditional Independence Assumption”, M. Lechner, P. Feiffer (eds.), *Econometric Evaluation of Labour Market Policies*, Heidelberg: Physica, 43-58.

Levaggi, R. 2002. "Decentralized Budgeting Procedures for Public Expenditure" *Public Finance Review* 30(4): 273-295.

"Ley Del Seguro Social", <http://www.diputados.gob.mx/>, accessed September 20, 2006.

Lewbel, A. 2006 "Estimation of Average Treatment Effects With Misclassification". Mimeo, Boston College.

Loayza, N. V. 1994 "Labor regulations and the informal economy" Policy Research Working Paper 1335, World Bank.

Mahajan, A. 2006. "Identification and Estimation of Regression Models with Misclassification" *Econometrica*. 74(3):631-665.

Maloney, W. F. 2004. "Informality Revisited" *World Development*, 32(7): 1159-1178.

Martínez-Kasten, M. S. 2005. "Micro and Small Businesses in Mexico. Survival Strategy or dynamic enterprising arena?" Conference paper, Conference on Entrepreneurship and Human Rights, Fordham University, August 2005.

Medina, C., and J. Nuñez. 2001. "The Impact of Public and Private Job Training in Colombia" Research Network Paper, Inter-American Development Bank.

Metcalf, D. 1973." Pay Dispersion, Information, and Returns to Search in a Professional Labour Market" *Review of Economic Studies*, 40(4): 491-505.

Mincer, J. 1997. "The Production of Human Capital and the Life Cycle of Earnings: Variations on a Theme" *Journal of Labor Economics*, Part 2, 15(1): S26-47

Minowa, M. & Q. Wodon. 1999. "Training for the Urban Unemployed: A Reevaluation of Mexico's Probecat." Background paper, World Bank.

Musgrave, R. *The theory of public finance; a study in public economy*. New York, McGraw-Hill, 1959.

Naranjo, A. 2002. "Capacitación y formación profesional para jóvenes en Uruguay" , Mimeo, CINTERFOR/PNUD.

Navarro-Lozano, S. 2003. "Matching, Selection and the Propensity Score: Evidence from Training in Mexico", Mimeo, The University of Chicago.

Oates, W. 1972. *Fiscal Federalism*. Harcourt Brace Jovanovich, New York.

Oates, W. 1985. "Searching for Leviathan: An Empirical Study". *American Economic Review* 75(4).

- Oates, W. 1999. "An Essay on Fiscal Federalism". *Journal of Economic Literature* 37(3).
- Oates, W. 2001. "Fiscal Competition or Harmonization? Some Reflections". *National Tax Journal* 53(3).
- Oates, W. 2005. "Towards a Second Generation Theory of Fiscal Federalism". *International Tax and Public Finance* 12(4).
- Racine, J. & Q. Li. 2004. "Nonparametric Estimation of Regression Functions with Both Categorical and Continuous Data". *Journal of Econometrics*, 119(1): 99-130.
- Revenge, A., M. Riboud & H. Tan. 1994. "The Impact of Mexico's Retraining Program on Employment and Wages." *The World Bank Economic Review*. 8 (2): 247-277.
- Rosenbaum, P.R. & D. Rubin. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika*. 70:41-50.
- Roy, A. D. 1951. "Some Thoughts on the Distribution of Earnings", *Oxford Economic Papers*. 3: 135-146.
- Rubin, D. B. 1977. "Assignment to Treatment Group on the Basis of a Covariate", *Journal of Educational Statistics*. 2: 1-26.
- Samaniego, N. 2005 (May 3rd). [Personal Interview, tape recording] *On the evolution of the training components of AMLPs in Mexico, Norma Samaniego, Subminister, Ministry of Labor, 1989-1994*.
- Samaniego, N. 2002. "Las Politicas de Mercado de Trabajo en Mexico y su Evaluacion", *Series: Macroeconomia del Desarrollo*, CEPAL, v.18.
- Santiago Consultores Asociados. 1998. "Evaluacion Ex Post Programa Chile Joven Fase II" Mimeo.
- Schultz, T. W. 1961. "Investment in Human Capital". *The American Economic Review* 51(1): 1-17
- Secretaria del Trabajo y Previsión Social. 1995. "Evaluación del Programa de Becas de Capacitación para Desempleados" Mimeo, México, D. F.
- Secretaría del Trabajo y Previsión Social. 2000 "Reglas de Operación 2001". Mimeo.
- Secretaría del Trabajo y Previsión Social. 2001. "Reglas de operación e indicadores de evaluación y de gestión del programa de apoyo al empleo". Mimeo.
- Secretaria del Trabajo y Previsión Social. 2002. "Manual de Procedimientos del Programa de Apoyo al Empleo" Mimeo.

Secretaria del Trabajo y Previsión Social. 2004. "Encuesta Sobre el Nivel de Colocación y Permanencia en el Empleo (ENCOPE)" Mimeo.

Sethuraman S. V. 1998. *Gender, Informality and Poverty: A Global Review*. Women in Informal Employment Globalizing and Organizing.

Sianesi, B. 2002. "Essays on the Evaluation of Social Programmes and Educational Qualifications", Doctoral Thesis, University College London, the University of London.

Sianesi, B. 2004. "An Evaluation of the Swedish System of Active Labor Market Programs in the 1990's" *Review of Economics and Statistics*. 86(1): 133-155.

Smith, J. 2000. "A Critical Survey of Empirical Methods for Evaluating Active Labor Market Policies." *Swiss Journal of Economics and Statistics*. 136(3):1-22.

Smith, J. 2000. "Evaluating Active Labor Market Policies: Lessons from North America", Department of Economics University of Western Ontario, Mimeo.

Smith, J. 2004. "Matching Lectures," Mimeo, University of Maryland, College Park.

Smith, J. & P. Todd. 2005 (a). "Does Matching Overcome LaLonde's Critique of Nonexperimental Estimators?" *Journal of Econometrics*, March-April 2005, 125(1-2): 305-53.

Smith, J. & P. Todd. 2005 (b). "Does Matching Overcome LaLonde's Critique of Nonexperimental Estimators? Rejoinder" *Journal of Econometrics*, March-April 2005, 125(1-2): 365-75.

Smith, J., A. Whalley & N. Wilcox. 2006. "Are program participants good evaluators?" Mimeo, University of Michigan.

Smith, J. & Y. Zhang. 2004, "The Variety of Balancing Tests" Mimeo, University of Maryland, College Park.

Smith, J. 2006. "A Note on Matching in the Presence of Comparison Group Contamination" Mimeo, University of Michigan.

Spence, M. 1973. "Job Market Signaling" *Quarterly Journal of Economics*, 87(3): 355-374.

Tiebout, C. 1956. "A Pure Theory of Local Expenditures," *Journal of Political Economy* 64.

Vishwanath, T. 1989. "Job Search, Stigma Effect, and Escape Rate from Unemployment" *Journal of Labor Economics*, 7(4): 487-502.

Weingast, B. 1995. "The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development". *Journal of Law and Economic Organization* 11(1).

Wilson, J. 1999. "Theories of Tax Competition". *National Tax Journal* 52(2).

Wodon, Q. & M. Minowa. 1999. "Training for the Urban Unemployed: A Reevaluation of Mexico's Training Program, PROBECAT" Government Programs and Poverty in Mexico, Report No. 19214-ME. The World Bank.

Wolfe, B. & R. Haveman. 2003. "Social and Nonmarket Benefits from Education in an Advanced Economy" Education in the twenty-first century: Meeting the challenges of a changing world, pp. 97-131, Conference Series, no. 47. Federal Reserve Bank of Boston.