

An Earned Income Tax Credit Proposal for Chile¹

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Abstract

In recent decades, we have seen in Latin America an increase in the use of conditional cash transfer programs to fight poverty. Although these programs can be effective to improve the welfare of the poor in the short term and to guarantee a certain basic health care and education, they can also discourage employment, thus creating a poverty trap and a dependence on the social welfare system. In other regions of the world, the tax system has been used not only to redistribute income, but also to implement social policies. A good example is the Earned Income Tax Credit (EITC) in the United States, which offers to lower-income individuals a reimbursable credit conditioned on working. This policy has simultaneously increased employment, reduced inequality and reduced poverty particularly among single mothers. This paper estimates, through simulation using household survey data, the effect that a system like the EITC would have in Chile. The results show that a tax credit could increase employment and at the same time reduce poverty and inequality. Additionally, a comparison of the results to a simulation of the cash transfer program called Ethical Family Income Program allows concluding that the EITC is more effective in increasing the income of individuals below the poverty line and it has a lower transfer cost per family.

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1. Introduction

Reducing poverty is an important goal of any government in general, and especially in developing countries like Chile. There are monetary subsidies created for this purpose that directly increase available resources in the household, thus alleviating poverty in the short term. However, there are also longer-term policies that aim to increase household capacity for independent income generation. Employment policies play this role through programs to improve individuals' employability and increase their likelihood of finding a stable and well-paid job.

Unfortunately, some of these short-term policies may have negative effects on long-term policies. For example, Conditional Cash Transfer Programs have proven effective in reducing poverty and inequality in the short term, while also increasing children's school enrollment and use of health facilities (Fiszbein and Schady, 2009, Bouillon and Tejerina 2007). However, these programs have at least two negative effects that make for a major dilemma in their design and implementation. The first is that they discourage employment, which creates a trade-off between efficiency and equity, often called the poverty trap. The second is that by not including components aimed at creating stable jobs they encourage dependence on the welfare system. The results are worse in the case of unconditional transfer programs, which do not even produce positive effects on schooling and health.

The use of Conditional Cash Transfer Programs has increased significantly over the last two decades in Latin America. Chile, not differently from this trend, implemented the Chile Solidario program in 2002, and more recently, in May 2012, the Ethical Family Income Program (IEF – *Ingreso Ético Familiar*), which is based on conditional and unconditional income transfers and an employment subsidy for women. As a first step towards the full implementation of the Ethical Family Income Program, the Social Allowance Program (*Programa Asignación Social*), or Bonus to the Ethical Family Income Program, went into effect in March 2011.

The Social Allowance Program consists of an unconditional monthly subsidy per individual, and five transfers that are conditional on the preventive health activities and school enrollment, attendance, and performance of the children in the household, and on the incorporation into the labor market of women over 18 years old. While it has an incentive for working component, this program, like the Chile Solidario Program, is primarily based on a direct non-labor income subsidy for families. This reduces incentives to work and could undermine the primary purpose of the program, which is to reduce extreme poverty and improve the welfare of the country's poorest households.

Other regions of the world, such as North America, Europe, and Oceania,⁵ have used a different strategy and created programs that encourage employment at the same time as they

⁵ Specifically Canada, the United States, Austria, Belgium, Finland, France, Germany, Ireland, Greece, Italy, the Netherlands, England, New Zealand, and Australia.

alleviate poverty. To accomplish this, the tax system is used as a mechanism for implementing social policies as well as redistributing income. Under this approach, many of the social benefits are conferred in the form of a credit in the annual tax return, tax rates are reduced for low-income groups, and some tax privileges for transfers to unemployed and inactive individuals are eliminated (out-of-work benefits).

The United States pioneered this type of policies in 1975 when it established a refundable tax credit system targeted at families with low or moderate income, called the Earned Income Tax Credit (EITC).⁶ The credit is conditional upon employment, and if the amount of the credit is greater than what a family owes in taxes, then the family receives a monetary transfer. In practice, for low-income families this is equivalent to a negative income tax.

The income tax credit has some clear advantages as a redistribution mechanism. First of all, this policy reduces poverty while also encouraging employment in the poorest segment, reducing the stigma associated with being a social program beneficiary. Additionally, it has reduced administrative costs, because it uses the pre-existing infrastructure and institutional framework of the country, and it is efficient as a tax policy, because when there are preferences for redistribution, optimal income taxation includes a negative income tax (Mirrlees 1971, 1976).

This type of tax credit system is a viable option for significantly reducing the trade-off between the short term and the long term that conditional transfer programs create. Given the notable absence of social programs using tax incentives in Latin America and the launch of the Ethical Family Income Program, we believe it is important to evaluate the implementation of an income tax credit scheme in Chile.

The paper continues as follows. Section 2 explains the incentives generated by an income tax credit and the empirical evidence in the literature regarding the extent of its effect. Section 3 details the simulation conducted and the data it uses. Section 4 presents the results of the simulations, with a special focus on its effects on poverty and inequality. Section 5 compares this study's EITC proposal with the Ethical Family Income Program. Lastly, section 6 presents the conclusions.

2. Incentives of the Income Tax Credit Mechanism

An income tax credit program encourages employment and helps reduce poverty and inequality. This is done by expanding people's budget constraints, changing the relative prices of the choice between leisure and consumption, and varying the marginal tax rate for taxpayers. In the EITC, the credit amount is calculated based on the largest of the following incomes: work income and, provided that the person works, total taxable income.⁷ If the credit exceeds the

⁶ This model expanded to more countries and more areas of the social protection system. In addition to a credit for employment-generated income (Work Income Tax Credit), there is also a credit for family expenses (Family Tax Credit) and for costs associated with early childhood (Child Care Tax Credit). Some examples of countries that adopted programs similar to the EITC are New Zealand (Working for Families Tax Credit, in 1984) and England (Working Tax Credit, in 1999).

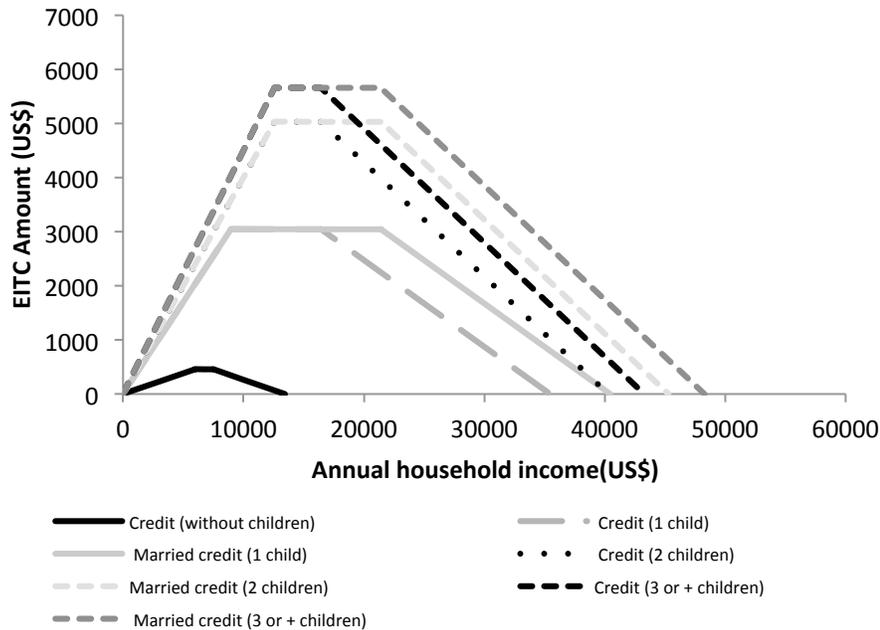
⁷ There is also a maximum permitted amount of income from investment.

taxes owed, then the family receives a transfer through the annual tax return. There also exists the option to receive a monthly payment, but this is used by a very small fraction of the beneficiaries.

The amounts and limits of the tax credit that the family or individual receives ultimately depends on income level, the number of eligible children, and whether the head of household is single parent or not. Eligible children include those less than 18 years old, between 19 and 23 years old if studying, and disabled children living with the taxpayer for more than half the year.

Figure 1 shows the EITC scheme with the amounts established for the year 2009 in the United States. As can be seen in the figure, for each type of household, there are three income segments in the EITC benefit structure: the phase-in region, the flat region, and the phase-out region. In the first, the EITC is proportional to salary, in the second, it is a fixed amount, and in the third, it is inversely proportional to income, decreasing until it disappears. Married taxpayers have access to higher income limits in the second and third segments.

FIGURE 1: EFFECT OF THE EITC ON THE BUDGET CONSTRAINT



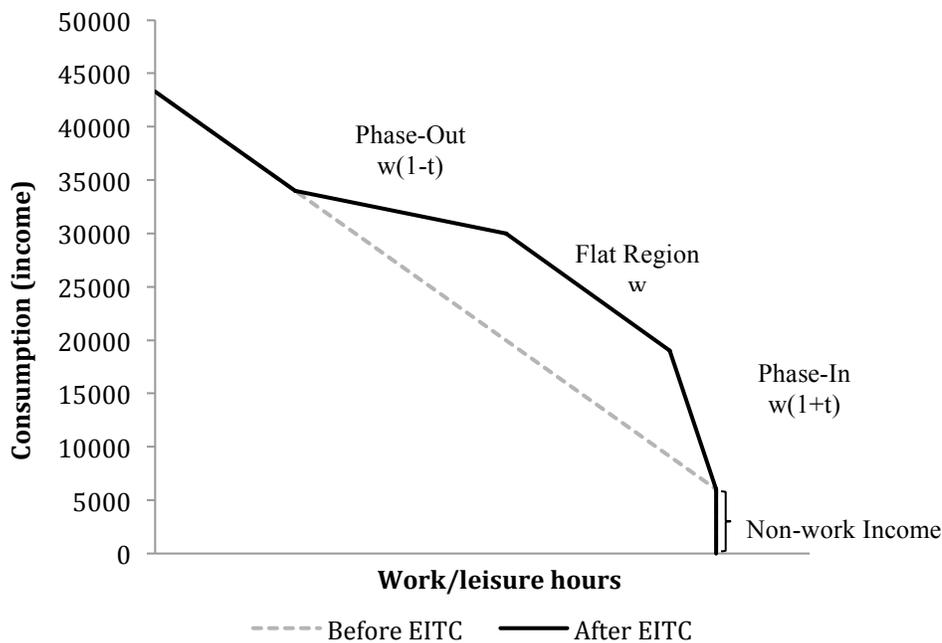
Source: Prepared by the authors based on 2009 U.S. EITC amounts.

The incentives generated by the application of a scheme like the EITC can be analyzed by looking at the change that occurs in the budget constraint of an individual or family. Figure N° 2 shows the effects of the EITC on the budget constraint of a single-parent family (or a family with a single worker). The X-axis measures the hours spent on

work/leisure⁸ and the Y-axis measures consumption or income.⁹ The budget constraint before the EITC reflects the situation of a person who is exempt from paying taxes.

With the tax credit, the budget constraint increases sharply in the first segment, where wages are subsidized. Then, in the second segment, the budget constraint is parallel to the initial constraint since a fixed-sum subsidy is applied. Finally, in the last phase, the budget constraint approaches the initial constraint as a decreasing subsidy to income is applied. The important point is that, as seen in the figure, the EITC guarantees that income is always greater than or equal to what it was prior to the program, thus helping to reduce poverty and inequality.

FIGURE 2: EFFECT OF THE EITC ON BUDGET CONSTRAINT



Source: Prepared by the authors

As a comparison, a Conditional Cash Transfer Program (CCT) expands only non-work related income, and the displacement occurs in parallel with the initial budget constraint, which allows an individual who does not work to obtain a higher income level with the same zero hours of work. If the individual was already working, the budget constraint expansion will have a pure income effect¹⁰ that will increase his leisure hours and level of consumption, i.e. he may

⁸ Leisure time grows from the origin to the right. When there is maximum leisure, there are zero hours of work. Therefore, the closer to the origin, the more working hours spent by the individual or family.

⁹ Strictly speaking, once the EITC is applied the income after taxes is observed.

¹⁰ The change in total income that occurs when the relative price between leisure and consumption changes can be divided into an income effect and a substitution effect. The income effect means that due to an increased in income people can simultaneously consume more leisure and more consumer goods, reducing working hours. The

access the same consumption with less hours worked.

If an EITC is used instead, the expansion of the budget constraint is nonlinear which creates different labor supply incentives depending on the income segment of each individual. A person who does not work before and after the EITC will remain in the initial situation. However, a person who was not working before and enters the labor market will have a higher level of welfare, which generates incentives to work. Therefore, the effect on labor force participation is always positive for single fathers/mothers or members of low-income families where no one works.

For a person who is already working when the EITC is implemented, the incentives are ambiguous with respect to hours worked. In the phase-in region, the impact depends on the magnitude of the income effect (negative) and the substitution effect (positive). In the flat phase there is only the income effect (negative) and in the third segment both effects are negative. Additionally, those who are above but still close to the limit of the third segment may want to reduce hours worked in order to be eligible (Eissa and Liebman 1996).

In summary, it appears that both measures can improve people's welfare. However, for the same level of resulting welfare gains, the EITC encourages work, while a Conditional Cash Transfer program discourages it.¹¹

The magnitude of the EITC's effect on labor force participation depends on participation elasticity and labor demand. In turn, the effect on hours worked depends on the possibility of adjusting the number of hours working and the labor supply elasticity. Thus, the final effect of the EITC depends on the number of beneficiaries in each segment and the responsiveness of individuals to these incentives (labor flexibility, labor demand characteristics, minimum wage, etc.).¹² Theoretically one would expect an increase in the labor participation of beneficiaries who were not in the labor market and an ambiguous or negative effect on the number of hours worked by those who were already working. The magnitude of these effects is an empirical question and the existing evidence for the EITC program in the United States can shed light on the expected effects for Chile.

There is consensus in the empirical literature that the EITC has a positive impact on income and has been successful in reducing poverty. In the United States, for example, in 1999 the aggregate poverty gap would have been 20% higher if the tax credit had not existed, and in 2003 about 4.4 million people from families with at least one worker were no longer in poverty, and half of these were children (Holt 2006).

The EITC, beyond reducing poverty, also decreases dependence on the social welfare system. In 1994, 5 million people in the United States were affiliated with a social program; by

substitution effect is that for the higher price of leisure more people will prefer to consume less leisure and therefore increase working hours.

¹¹ Figure N° A1 in the Appendix illustrates the comparison between these two types of policies.

¹² A program like the EITC does not cover individuals who are working informally, i.e. who do not report any income to the National Tax Agency, the SII (*Servicio de Impuestos Internos*), but it is a program that, in the medium and long term, makes formal work more attractive. However, in the transition from short to long term, it is necessary to maintain traditional social assistance programs for highly vulnerable families, which could be accompanied by incentives for formalization and could serve as the gateway to the EITC.

1999, this figure had dropped 48%. Empirical studies indicate that EITC expansions since 1986 reduced the lists of beneficiaries of social programs by 10% (Grogger 2003), which also means a significant reduction in public spending.¹³

Regarding the effects on labor supply, there is an extensive literature that has evaluated the effects of the EITC on both labor participation and hours worked. In the United States, while the tax credit expanded (between 1986 and 2001), the employment rate of single mothers, who have traditionally been the main beneficiaries of the EITC, went up nearly 12% (between 1984 and 2003). The greatest change occurred between 1992 and 1999, with an increase of 16%. During the same period there were very small variations in the employment rate of single women without children and married women with or without children (Eissa and Hoynes 2006). The challenge in the literature has been to identify to what extent the EITC expansion could have generated this strong increase in the labor participation rate.

Regardless of the estimation strategy in each study, the accumulated evidence in the economic literature robustly concludes that the tax credit has indeed been the main determinant of the aforementioned increase in the employment rate of single women. Good examples of this are the studies by Meyer and Rosenbaum (1999). Through quasi-experimental techniques, they found that the EITC explains one third of the increase in the employment rate observed between 1992 and 1996. Another example is Keane and Moffit (1998), who, by estimating a structural model, conclude that between 1984 and 1996 the EITC increased the labor force participation of single mothers by 10.7%. There is no robust evidence, however, regarding the impact of the tax credit on hours worked; only null effects or very small positive effects have been found.¹⁴

For married women, the evidence shows that both labor force participation and hours worked are reduced as a result of the EITC. Eissa and Hoynes (2004), for example, found that the 1993 EITC expansion reduced the participation rate of married women by 1%. In 2006, the same authors, using an estimation with instrumental variables, showed that the expansions in the 1986-1996 period resulted in a drop of 1 to 4 percentage points in hours worked in this group. The explanation for these results is consistent with the explanation of the incentives generated by the EITC by nonlinearly shifting the budget constraint, and is related to the initial location of the beneficiaries in different sections of the EITC. Single women are mainly in the initial phase-in region, where the substitution effect dominates, and the number of hours worked increase. Married women, however, are initially located in the phase-out region, where the income effect prevails; being negative, this effect reduces hours worked and labor force participation.

The systematic evidence of significant effects on labor participation and little or no effect on hours worked is consistent with the existing estimations of labor supply elasticity,

¹³ Considering only EITC transfers, 250,000 families who stop participating in social programs is equivalent to a saving of one billion dollars (Dickert, Hauser, and Scholz 1995).

¹⁴ Eissa and Liebman (1995), using quasi-experimental techniques, found an increase in the hours worked of single mothers in general and a null effect for those with low levels of education; Keane and Moffit (1998), using a structural model, conclude that there is a 1.4% increase in aggregate hours, but they do not differentiate between the effect on new participants and those who were working. Similar results are found in Meyer and Rosenbaum (1999) and Rothstein (2005).

which show an hour-wage elasticity that is greater for women (especially married women) than for men, and considerably less than the participation elasticity.¹⁵

This has important implications for welfare analysis. Sáez (2002) shows that if participation elasticity is high, the optimal transfer program¹⁶ resembles the EITC, with negative marginal rates in the lower section of income distribution. However, if people's decisions were made based mainly on the number of hours offered, an optimal tax system would be closer to a Negative Income Tax (NIT), which unlike the EITC is an unconditioned negative tax.

The application of a tax credit also modifies the marginal tax rate paid by taxpayers. This effect varies depending on the individual's credit segment: in the phase-in region the marginal rate falls, and is even negative for lower-income people; in the flat region, it remains constant; and finally, in the phase-out region it increases.¹⁷ These effects are important in determining the impact on inequality. Wu, Perloff, and Golan (2006) study the effect of different public programs on income distribution and show that interventions that alter the marginal tax rate are effective in reducing inequality of income after taxes. In this sense, the EITC plays an important role as a redistributive mechanism among the existing programs in the United States, since the evidence shows that Conditional Cash Transfer programs and the minimum wage do not have much impact on inequality and may even have a negative effect, since they do not create the right incentives and have targeting problems.

Finally, the implementation of the EITC could impact the equilibrium wage in the economy. There are two reasons for this. First, new workers expand the labor supply, causing a downward pressure. Second, a subsidy on labor income could cause employers to lower wages, being able to pay less for the same work. In practice, the occurrence in relevant magnitudes of these two effects depends on wage flexibility and the minimum wage policy, which reduces the downward pressure and limits the benefits that the employers can obtain from a scheme like the EITC (Eissa and Nichols 2005).

Evidence for the United States, at least, shows that the EITC expansions in the 1990s have had a positive or null effect on earnings.¹⁸ In recent years, however, there have been studies that directly assess the effect of the policy on the equilibrium wage, calling into question previous studies that did not consider the impact of the tax on the employer. Rothstein (2009), in particular, shows that a dollar of EITC results in a transfer of US\$0.70 to the beneficiaries and US\$0.73 to the employers of low-skilled human capital. This difference is explained by the non-beneficiaries, with whom the beneficiaries compete upon entry into the labor market.

Meanwhile, Leigh (2010) estimates that a 10% increase in the EITC is associated with a 2% drop in wages for those who have completed secondary education, 5% for people with

¹⁵ See Triest (1990); Evers, De Mooij and Van Vuuren (2005); and Hotz and Scholz (2003).

¹⁶ Optimality refers to the marginal rate scheme that minimizes the excess tax burden (i.e. the inefficiency in resource allocation produced by using distortionary taxes).

¹⁷ For example, a taxpayer with two children in the phase-out region who makes one more dollar stops receiving 21.06 cents in credit, so his or her marginal rate increases by 21.06% (Congressional Budget Office 2005).

¹⁸ Neumark and Wascher (2001) and Meyer (2007) found that the EITC increased the wages of the poorest people. See also Eissa and Nichols (2005).

incomplete secondary education, and no effect for those who reach higher education. However, the author points out that in general the studies show that the total income of the poorest individuals increases, demonstrating that the drop in wages is compensated and a higher family income is achieved from the EITC.

3. Simulation method

Following the methodology used by Eissa and Hoynes (2008) and Eissa, Kleven and Kreiner (2008), the implementation of an income tax credit for Chile is simulated using four consecutive stages. In the first step, the taxable income and the income tax to be paid by each individual is calculated. To predict the labor income of those not working when the EITC is applied, an equation of the logarithm of the hourly wage for the entire population is estimated using a Heckman regression model. The results of these regressions are shown in Tables N° A1 and N° A2 in the Appendix.

In the second stage, the annual tax credit amount is calculated for all eligible persons, that is, all those who meet the age, children, and income requirements, regardless of whether they initially work or not. Since the database used, which is described below, has monthly income information, it is assumed that people will maintain the same income for the next twelve months. For those who do not work before the EITC implementation, but who enter the labor market afterwards, two alternative scenarios are simulated: people enter the labor market working either 20 or 45 hours a week (either half-time or full-time).

In the third stage, with the estimated final income¹⁹ and the percent change with respect to initial income that comes from receiving the EITC for eligible individuals, the program beneficiaries are identified. All initially working eligible women will be beneficiaries. The change in the probability of labor participation after the EITC is calculated for eligible women who were not working initially, according to the level of income variation and labor participation elasticity.²⁰ If the new probability is greater than 0.5, then it is assumed that a person chooses to work and becomes a recipient. An additional assumption is that all women who choose to work are able to find employment. If this occurs, it is not known what will happen to wages, although a significant fraction will probably earn the minimum wage, which would slow the downward pressure that could occur from the increase in the labor supply.

Because there are no estimates of labor participation elasticity in Chile, following Eissa and Hoynes (2008), four values are used for this parameter: 0, 0.1, 0.2, and 0.3.²¹ These are low values of participation elasticity, so the results of the simulations are conservative with respect to the

¹⁹ This is the sum of after-tax income, the amount of EITC, and state transfers (unemployment benefits for those inserted the labor market with the simulated EITC are discounted).

²⁰ Where the change in labor income is the sum of the predicted amount of monthly salary and the amount received from the EITC, minus unemployment benefits no longer received after entering the labor market.

²¹ It is important to note that the values assumed here are independent of the wage model with selection bias estimated in the first stage. The purpose of the estimation of the selection equation is to consistently estimate predicted labor income of those not working at the time of introducing the EITC. Additionally, from this first stage the probability of initial participation in the labor market is obtained for those not working before the EITC.

potential impact an EITC could have in Chile.²²

Certainly, in the beginning of its implementation, the EITC could alter the hours worked of those who are initially working. If the labor supply elasticity is \mathcal{E}_k , the number of hours worked for each individual after implementing the EITC is determined by

$$Hours_{EITC} = Hours_0(1 + \mathcal{E}_k \cdot \% \text{ change in labor income})$$

While this is an effect that potentially should be taken into account in the simulation, there are authors like Triest (1990) and Meyer (2002) who indicate that labor supply, subject to participation, is quite inelastic and that the EITC affects only labor participation. Meyer (2002) finds no evidence that this program will affect the hours worked by single mothers, and also notes that assuming the existence of a positive and uniform elasticity throughout the distribution may overestimate the results of simulation.²³ For this reason, and due to the fact that correctly identifying the effect on hours worked requires different assumptions of labor supply elasticity in the different regions of the EITC, the simulation assumes an uncompensated labor supply elasticity equal to zero ($\mathcal{E}_k = 0$). Subsequently, to analyze the robustness of the results of the simulations, the assumption of $\mathcal{E}_k = 0.1$ is considered.

Finally, in the fourth stage of the simulation, the new distribution of income after taxes is created to identify the effect of the EITC on labor force participation, poverty, and inequality.

Data

The data used in the simulations come from the 2009 Casen Survey (*Encuesta Casen*), household and individual survey, nationally and regionally representative, which utilizes multistage random sampling with regional stratification and clustering. In the first stage, the country is divided between rural and urban areas for each of the 13 regions, and the primary sampling units are selected according to a probability sample based on the 2002 census. Within each sampling unit, households are selected with equal probability.

The survey includes detailed income data for individuals and households, and also data on demographic characteristics of household members, living conditions, ownership of durable goods, access to sanitation, and health and education characteristics. The 2009 wave of Casen contains data for 71,460 households and 246,924 individuals. From the initial set of observations, families or family nuclei in domestic service were discarded (since they do not live with their children), as were nuclei in which there are individuals who work but do not declare earnings and/or have no reported worked hours. The distinction is made between household and nucleus (or family) because a household with more than one nucleus can have more than one EITC recipient. After this process, 232,772 observations remain, which are

²² Rafael de Hoyos (2006) estimates labor participation for Mexico ranging from 0.33 (with 1998 data) to 0.39 (2000 data).

²³ One explanation is the difficulty beneficiaries may have understanding the EITC structure. See Holt (2006) and Chetty and Sáez (2009).

the ones used for the simulation.

Table N° A3 in the Appendix contains descriptive statistics of the subsample used in the simulation and of the complete Casen 2009 sample. There are no major differences between the two: 20% of the data corresponds to people living in the metropolitan area and 64% to urban residents. 60% of the sample is between 25 and 60 years old, half of the respondents are single, and the sample has on average nine years of education. The average family income per capita before taxes is nearly Ch\$125,500 and, among those who work, labor income per hour is Ch\$2,300 on average.

The potential beneficiaries of an EITC in Chile are women from 18 to 60 years of age, from the first six income deciles, who report that they are not married or living with a partner, and have 0, 1, or 2 or more eligible children. Eligible children can be under 18 years old, between 19 and 23 years old if they are studying, or disabled children living with the beneficiary.

There are two types of beneficiaries among the women who meet these requirements: single women who are heads of families where there is at least one eligible child, and single women in families where there are no eligible children. This latter category includes women over 18 who do not have a partner, are not studying, are not disabled, and are not eligible through another family member. In these cases, there could be more than one program beneficiary per family nucleus.

The selection of the income limits, rates, and amounts of the tax scheme is directly related to the impact the policy could have, and program targeting will change based on these values. The proposed parameters for Chile were defined based on those used in the United States in 1996,²⁴ adjusted by the ratio between the GDP per capita of the U.S. in 1996 and the GDP per capita of Chile in 2009, which was close to 3. Table 1 shows the parameters used in the simulation.

TABLE 1: INCOME SEGMENTS, RATES, AND AMOUNTS OF CREDIT PROPOSED FOR CHILE

<i>Annual Household Income (x)</i>			<i>Segment</i>	<i>Credit (2 Children)</i>
Ch\$0	-	Ch\$1,658,311	Phase-in	40% * x
Ch\$1,658,311	-	Ch\$2,165,691	Flat region	Ch\$663,324
Ch\$2,165,691	-	Ch\$5,315,379	Phase-out	Ch\$663,324 - 21,06% * (x - Ch\$2,165,691)
<i>Annual Household Income (x)</i>			<i>Segment</i>	<i>Credit (1 Child)</i>
Ch\$0	-	Ch\$1,180,777	Phase-in	34% * x
Ch\$1,180,777	-	Ch\$2,165,691	Flat region	Ch\$401,464
Ch\$2,165,691	-	Ch\$4,677,982	Phase-out	Ch\$401,464 - 15,98% * (x - Ch\$2,165,691)
<i>Annual Household Income (x)</i>			<i>Segment</i>	<i>Credit (Without Children)</i>
Ch\$0	-	Ch\$787,185	Phase-in	7,65% * x
Ch\$787,185	-	Ch\$984,914	Flat region	Ch\$60,220
Ch\$984,914	-	Ch\$1,772,098	Phase-out	Ch\$60,220 - 7,65% * (x - Ch\$5,280)

Source: Prepared by the authors

The increasing and then decreasing structure of the proposed tax scheme must be taken into

²⁴ Tables N° A4 and N° A5 in the Appendix show the EITC parameters in 1996 and 2009 in the United States.

account, because if a very small portion of the distribution is covered, it could produce a resistance to an increase in income in order to keep the benefit. In the extreme case, it would not be beneficial to rise out of poverty to receive the credit. Therefore, in this proposal the subsidy is given to families in the first six income deciles. Additionally, the benefits differ by type of beneficiary family. The maximum after-tax income, that is, the upper limit of the phase-out region for those who do not have children, is on average Ch\$147,675 per month, and Ch\$389,832 and Ch\$442,948, when families have one or two or more children, respectively. Thus, a single mother with two children and a monthly salary between Ch\$138,193 and Ch\$180,474 (the minimum wage in 2009 was Ch\$165,000) would receive a tax refund cash transfer for the maximum subsidy amount, which is Ch\$663,324 per year, equivalent to Ch\$55,277 monthly. This implies that this family has a per capita income between Ch\$64,490 and Ch\$78,583, placing it above the poverty line in 2009 (Ch\$64,134).

4. Results

Because of the different assumptions on the number of hours worked by those who enter the labor market (20 or 45 hours) and the values of participation elasticity (0; 0.1; 0.2; 0.3), seven different simulations are implemented, which combine these assumptions as shown in Table 2. The baseline scenario (Scenario A) is that participation elasticity is zero. This means that people do not change their behavior in reaction to changes in labor income, so only those who are working initially access the benefit. In the remaining cases positive working hours for those not participating in the labor market are considered.

The results are relatively insensitive to changes in the participation elasticity. For this reason, and to simplify the presentation of the results, the analysis focuses on three main scenarios. The baseline scenario (A), in which labor participation remains constant, is a good benchmark since it approaches the minimum expected effect of implementing the EITC. Scenarios B and C, corresponding to labor insertion of 20 and 45 hours, respectively, assume a participation elasticity of 0.3 and that all women who are seeking employment find employment, representing the maximum effect between different assumed values.²⁵

TABLE 2: ANALYSIS OF SCENARIOS

Scenario	Assumptions (hours/participation elasticity)
Scenario A	0 hours/ $\gamma_k = 0$
Scenario B	20 hours/ $\gamma_k = 0.3$
Scenario C	45 hours/ $\gamma_k = 0.3$
Scenario D	20 hours/ $\gamma_k = 0.2$
Scenario E	45 hours/ $\gamma_k = 0.2$
Scenario F	20 hours/ $\gamma_k = 0.1$
Scenario G	45 hours/ $\gamma_k = 0.1$

Source: Prepared by the authors

²⁵ All estimations for the rest of the scenarios can be requested directly from the authors.

Targeting

In the baseline scenario the program potentially benefits 370,249 families. When including labor market insertion in the following scenarios the number of beneficiaries increases. If the elasticity is 0.3 and women go to work part-time (scenario B), families receiving the EITC increase to 510,886, while if they work full time (scenario C) they increase to 456,489. The greater participation observed when women work part-time is explained by the lower level of monthly income they earn from working fewer hours, and thus people who would not be eligible if they were working 45 hours have access.

Tables 3 and 4 show the distribution by type of beneficiary, both direct and indirect. The direct beneficiaries are women who work and receive the EITC. The indirect beneficiaries are men and women who do not receive the EITC but are part of the same nucleus as the direct beneficiaries. Over 90% of the direct beneficiaries are female heads of households and the indirect beneficiaries are predominantly minors under the age of 18. The minimum coverage occurs in the baseline scenario with 371,139 direct beneficiaries and the highest in scenario B with 457,502.²⁶

Based on Table 5, beneficiaries are compared with non-beneficiaries based on some social and demographic characteristics such as age, education, number of children, and income. The beneficiaries are women with low levels of education, hourly wages, and per capita income, they are primarily single or divorced, they have less financial support from other household members, and they are older and have more children than non-beneficiaries. On the other hand, two thirds of the non-beneficiaries are married and come from families with higher incomes, and 85% live in households where other adults work. Among women from the first six income deciles, non-beneficiaries have higher hourly wages, fewer eligible children, are married, and more often live in rural areas, live outside the metropolitan area, and have a disability.

Table 6 shows the distribution of beneficiaries and the benefit amount received by income decile. Labor market insertion substantially improves the program's targeting, especially when women work full time (Scenario C), since they are from lower-income families, have more eligible children, have less years of education, and earn lower hourly wages.;

²⁶ The number of direct beneficiaries may exceed that of the beneficiary families due to the existence of the second type of beneficiary, described above, which allows more than one EITC recipient per family.

TABLE 3: NUMBER AND TYPE OF BENEFICIARIES (N)

Assumptions (hours/elasticity)	Direct beneficiaries			Indirect beneficiaries			
	Head of (1)	Others (2)	Total (3)=(1)+(2)	< 18 years (4)	>18 years (5)	Total (6)=(4)+(5)	Total (7)=(3)+(6)
Scenario A: 0 hours/ $\gamma_k = 0$	350,114	21,025	371,139	519,502	157,346	676,848	1.047.987
Scenario B: 20 hours/ $\gamma_k = 0.3$	470,041	43,237	513,278	718,388	254,527	972,915	1.486.193
Scenario C: 45 hours/ $\gamma_k = 0.3$	427,801	29,701	457,502	658,225	209,434	867,659	1.325.161
Scenario D: 20 hours/ $\gamma_k = 0.2$	467,958	42,921	510,879	714,242	253,256	967,498	1.478.377
Scenario E: 45 hours/ $\gamma_k = 0.2$	426,474	29,514	455,988	654,991	208,591	863,582	1.319.570
Scenario F: 20 hours/ $\gamma_k = 0.1$	466,489	42,446	508,935	712,600	251,644	964,244	1.473.179
Scenario G: 45 hours/ $\gamma_k = 0.1$	425,158	29,301	454,459	653,458	207,267	860,725	1.315.184

Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE 4: NUMBER AND TYPE OF BENEFICIARIES (%)

Assumptions (hours/elasticity)	Direct beneficiaries			Indirect beneficiaries		
	Head of (1)	Others (2)	Total (3)=(1)+(2)	< 18 years (4)	>18 years (5)	Total (6)=(4)+(5)
Scenario A: 0 hours/ $\gamma_k = 0$	94%	6%	100%	77%	23%	100%
Scenario B: 20 hours/ $\gamma_k = 0.3$	92%	8%	100%	74%	26%	100%
Scenario C: 45 hours/ $\gamma_k = 0.3$	94%	6%	100%	76%	24%	100%
Scenario D: 20 hours/ $\gamma_k = 0.2$	92%	8%	100%	74%	26%	100%
Scenario E: 45 hours/ $\gamma_k = 0.2$	94%	6%	100%	76%	24%	100%
Scenario F: 20 hours/ $\gamma_k = 0.1$	92%	8%	100%	74%	26%	100%
Scenario G: 45 hours/ $\gamma_k = 0.1$	94%	6%	100%	76%	24%	100%

Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE 5: CHARACTERISTICS OF BENEFICIARIES AND NON-BENEFICIARIES

	Non-beneficiaries		Initial beneficiaries				Additional beneficiaries			
	All		Decile 1 to 6		(Baseline scenario - A) 0 hours/ $\gamma_k = 0$		(Scenario B) 20 hours/ $\gamma_k = 0,3$		(Scenario C) 45 hours/ $\gamma_k = 0,3$	
	(1) Mean	Std. dev.	(2) Mean	Std. dev.	(3) Mean	Std. dev.	(4) Mean	Std. dev.	(5) Mean	Std. dev.
Between 18 and 24	24%	42%	28%	45%	9%	29%	1%	8%	1%	10%
Between 25 and 34	20%	40%	19%	39%	26%	44%	22%	42%	25%	43%
Between 35 and 44	23%	42%	23%	42%	36%	48%	40%	49%	41%	49%
Between 45 and 60	33%	47%	30%	46%	28%	45%	37%	48%	33%	47%
Years of education	11.3	3.9	10	3.7	10.3	3.2	10.3	3.1	9.9	3.1
No education	2%	14%	3%	17%	2%	13%	1%	9%	1%	8%
Incomplete primary-secondary education	35%	48%	46%	50%	43%	50%	48%	50%	55%	50%
Complete secondary education	34%	47%	35%	48%	44%	50%	40%	49%	35%	48%
Higher education	29%	45%	16%	36%	11%	31%	11%	31%	9%	29%
Marital status (1: Single)	32%	47%	33%	47%	57%	50%	44%	50%	42%	49%
Marital status (1: Married)	61%	49%	62%	48%	4%	20%	4%	20%	5%	22%
Marital status (1: Widowed)	2%	13%	2%	13%	4%	20%	7%	25%	6%	24%
Marital status (1: Divorced)	5%	22%	3%	17%	35%	48%	45%	50%	46%	50%
Number of eligible children	0.2	0.6	0.3	0.7	1.4	0.9	1.4	1.2	1.6	1.2
Children between 0 and 2 years in the household	18%	38%	23%	42%	21%	41%	22%	41%	25%	43%
Children between 3 and 5 years in the household	17%	37%	21%	40%	25%	43%	22%	41%	24%	43%
Children between 6 and 12 years in the household	35%	48%	42%	49%	53%	50%	45%	50%	49%	50%
Taxable income per capita	204,295	348,168	59,603	35,937	63,833	29,960	26,388	32,108	21,352	28,531
Hourly wage (observed and predicted)	2,667	13,239	1,797	3,494	1,295	1,500	1,436	907	1,020	483
1st decile of initial taxable income	8%	28%	16%	37%	6%	24%	53%	50%	59%	49%
2nd decile of initial taxable income	7%	26%	14%	35%	19%	40%	19%	39%	20%	40%
3rd decile of initial taxable income	9%	28%	16%	37%	18%	38%	10%	29%	8%	28%
4th decile of initial taxable income	9%	28%	17%	38%	19%	39%	7%	26%	6%	23%
5th decile of initial taxable income	9%	29%	17%	38%	22%	42%	6%	23%	4%	20%
6th decile of initial taxable income	10%	30%	19%	39%	16%	36%	5%	21%	3%	17%
Zone (1: Urban)	88%	32%	83%	37%	90%	30%	89%	31%	88%	32%
Metropolitan Region	42%	49%	34%	47%	37%	48%	40%	49%	40%	49%
Other > 18 who are employed in the household	85%	35%	83%	38%	51%	50%	46%	50%	47%	50%
Other > 18 who neither work nor study in the household	33%	47%	39%	49%	39%	49%	40%	49%	39%	49%
Disabled	7%	25%	9%	28%	6%	23%	1%	10%	0%	6%
Other disabled in the household	15%	36%	20%	40%	19%	39%	21%	40%	22%	42%

Note: Beneficiaries are older than 18, younger than 60 years, and belong to the first six income deciles. Initial beneficiaries are women working at the time of EITC implementation. Additional beneficiaries are women entering the labor market as a result of the EITC, and not the total beneficiaries in scenarios B and C. *Source:* Authors' calculations based on data from the 2009 Casen Survey

TABLE 6: DISTRIBUTION % OF BENEFICIARIES (N) AND BENEFITS (\$) BY INCOME DECILE

Income decile	(Scenario A) 0 hours/ $\gamma_k = 0$		(Scenario B) 20 hours/ $\gamma_k = 0.3$		(Scenario C) 45 hours/ $\gamma_k = 0.3$	
	(N)	(\$)	(N)	(\$)	(N)	(\$)
1	6%	4.2%	19%	17.3%	16%	14.8%
2	19%	21.6%	19%	21.5%	19%	21.1%
3	18%	21.1%	15%	17.9%	16%	18.6%
4	19%	21.1%	16%	17.5%	16%	18.2%
5	22%	21.0%	18%	16.8%	19%	17.7%
6	16%	11.1%	13%	9.0%	13%	9.5%

Source: Authors' calculations based on data from the 2009 Casen Survey.

A similar analysis can be done on the number of children. Table 7 shows that 85% of beneficiaries have at least one eligible child. The average benefit in the baseline scenario is Ch\$360,453 per year, equivalent to Ch\$30,038 monthly. A single mother with two or more children receives 45% more than a single mother with one child, who in turn receives eight times more than a woman without children. Labor participation of the most vulnerable women is reflected in the drop in the average amount of the transfers in scenarios B and C.

Finally, from the point of view of targeting, it is important to consider the distribution of beneficiaries and transfer received per EITC segment (see Table 8). The simulations show that the amount of resources and recipients is increasing in the benefit regions, both concentrated in the phase-out segment. The phase-in region and the flat region cover a similar proportion of beneficiaries, although in the flat region the amount of resources required is greater, since it is there where the maximum EITC is granted. Women with two or more children use more than half of the budget, and recipients without children represent 1% of the resources and are located mostly in the phase-out region.

TABLE 7: DISTRIBUTION OF BENEFICIARIES (N) AND BENEFITS (\$) BY NUMBER OF CHILDREN

Assumptions (hours/elasticity)	Number of eligible children			
	None	One	Two or more	Total
Scenario A: 0 hours / $\gamma_k = 0$				
Beneficiaries (N)	50,818	170,378	149,943	371,139
Beneficiaries (%)	14%	46%	40%	100%
Average EITC (\$)	37,680	340,655	492,343	360,453
Std. dev. (\$)	18,117	80,606	164,634	188,284
Min.	314	3,497	2,396	314
Max.	60,220	401,464	663,324	663,324
Scenario B: 20 hours / $\gamma_k = 0.3$				
Beneficiaries (N)	86,932	218,584	207,762	513,278
Beneficiaries (%)	17%	43%	40%	100%
Average EITC (\$)	37,951	332,946	480,465	342,695
Std. dev. (\$)	18,004	87,868	165,753	194,720
Min.	3,497	3,497	2,396	314
Max.	60,220	401,464	663,324	663,324
Scenario C: 45 hours / $\gamma_k = 0.3$				
Beneficiaries (N)	62,786	203,422	191,294	457,502
Beneficiaries (%)	14%	44%	42%	100%
Average EITC (\$)	36,464	330,858	479,598	352,649
Std. dev. (\$)	18,305	90,917	171,397	191,504
Min.	224	3,387	1,267	224
Max.	60,220	401,464	663,324	663,324

Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE 8: DISTRIBUTION % OF BENEFICIARIES (N) AND BENEFITS (\$) BY EITC SEGMENT

Assumptions (hours/elasticity)		Phase-in		Flat region		Phase-out		Total	
		(N)	(\$)	(N)	(\$)	(N)	(\$)	(N)	(\$)
Scenario A: 0 hours / $\gamma k = 0$									
N° children	None	3%	0.30%	2%	0.30%	9%	1%	14%	1%
	One	7%	5%	16%	18%	22%	20%	46%	43%
	Two or more	9%	12%	7%	13%	24%	30%	40%	55%
	Total	20%	18%	25%	32%	55%	50%	100%	100%
Scenario B: 20 hours/ $\gamma k = 0.3$									
N° children	None	5%	1%	2%	0,4%	10%	1%	17%	2%
	One	8%	7%	15%	18%	19%	17%	43%	41%
	Two or more	12%	15%	7%	13%	22%	29%	40%	57%
	Total	25%	23%	24%	31%	51%	47%	100%	100%
Scenario C: 45 hours/ $\gamma k = 0.3$									
N° children	None	3%	0.30%	2%	0.30%	9%	1%	14%	1%
	One	6%	5%	15%	17%	23%	19%	44%	42%
	Two or more	9%	12%	7%	13%	25%	31%	42%	57%
	Total	19%	17%	24%	31%	57%	52%	100%	100%

Source: Authors' calculations based on data from the 2009 Casen Survey.

Labor Market Participation

The main expected effect of the EITC is to increase labor market participation, and indeed, the simulations cause a shift to the right of the participation probability distribution of those not working initially (see Figure A2 in the Appendix). After the EITC is implemented, depending on the assumptions of elasticity and hours, the probability increases between 0.4 and 1.2 percentage points, which implies the incorporation of 142,139 women working part time and 86,363 working women full time into the labor market. This represents 5.4% and 3.3% of total women aged 18 to 60 who do not work initially, and 7.8% and 4.7% when considering only the first six income deciles.

The change in the probability of participation and subsequent labor market insertion is reflected in the rate of female employment. Table 9 shows the employment rate before and after the EITC for different groups of women 18 to 60 years old. First, the aggregate result is presented, then the results for women in the first six deciles, and lastly the results for eligible women within the first six income deciles (the standard deviation is shown in parentheses).

The results indicate that the employment rate increases in all groups, but the most significant impact occurs among eligible women, whose labor force participation increases by almost 20 percentage points in Scenario B (20 hours) and 12 percentage points in Scenario C (45 hours). The effect is greater when women work part time, due to the greater number of beneficiaries who are in Scenario B. It is important to note that these magnitudes are relevant in terms of their impact on the ability to generate permanent independent income, which enables many families to rise out of poverty.

TABLE 9: FEMALE EMPLOYMENT RATE

	Before EITC	After EITC	After EITC
		20 hours/ $y_k = 0.3$	45 hours/ $y_k = 0.3$
Women 18 to 60	45.4% (49.8%)	48.4% (50.0%)	47.2% (49.9%)
Women 18 to 60 in deciles 1 to 6	33.3% (47.1%)	38.5% (48.7%)	36.5% (48.1%)
Eligible women	51.7% (50.0%)	71.5% (45.2%)	63.7% (48.1%)

Source: Authors' calculations based on data from the 2009 Casen Survey.

Poverty

The effects of the EITC on poverty are measured using three indicators: (i) the poverty rate, which measures the proportion of the total population under the poverty line (PL); (ii) the poverty gap, which indicates the difference between income and the PL of those who are considered poor; and (iii) the squared poverty gap, which introduces a measure of income distribution within the poor group, giving greater weight to those with higher poverty gaps (Foster, Greer, and Thorbecke 1984).

Tables 10 and 11 report the results for the total population and for families where the head of household is a single mother, respectively. The first row describes the initial level of the index and the following rows describe the change in each analyzed scenario, calculated as the difference between the estimated value after the EITC and the value prior to the tax credit's implementation. The calculations are based on family after-tax income per capita, which is why the figures do not match the official poverty figures for 2009.

After the simulated EITC, the aggregate poverty rate decreases between 1 and 2 percentage points, and with it the severity of poverty and the amount of resources needed to eradicate it also decrease. Again, labor market insertion significantly improves the aggregate results, regardless of whether women work 20 or 45 hours, lowering poverty more than double with respect to the scenario in which it is assumed that there are no effects on labor participation (Scenario A).

TABLE 10: POVERTY INDICES BEFORE AND AFTER EITC: TOTAL POPULATION

	Poverty rate	Poverty gap	Poverty gap ²
Before EITC	0.225	0.101	0.069
	(0.004)	(0.002)	(0.002)
Change after EITC			
Scenario A: 0 hours/ $\gamma_k = 0$	-0.010*** (0.001)	-0.004*** (0.000)	-0.002*** (0.000)
Scenario B: 20 hours/ $\gamma_k = 0.3$	-0.022*** (0.001)	-0.014*** (0.001)	-0.011*** (0.000)
Scenario C: 45 hours/ $\gamma_k = 0.3$	-0.021*** (0.001)	-0.012*** (0.001)	-0.009*** (0.000)

Note: Standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE 11: POVERTY RATES BEFORE AND AFTER EITC: FAMILIES WITH A SINGLE MOTHER AS HEAD OF HOUSEHOLD

	Poverty rate	Poverty gap	Poverty gap ²
Before EITC	0.402	0.224	0.169
	(0.007)	(0.005)	(0.004)
Change after EITC			
Scenario A: 0 hours/ $\gamma_k = 0$	-0.049*** (0.003)	-0.018*** (0.001)	-0.010*** (0.001)
Scenario B: 20 hours/ $\gamma_k = 0.3$	-0.110*** (0.005)	-0.070*** (0.003)	-0.054*** (0.002)
Scenario C: 45 hours/ $\gamma_k = 0.3$	-0.107*** (0.005)	-0.061*** (0.003)	-0.045*** (0.002)

Note: Standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' calculations based on data from the 2009 Casen Survey.

The results are much higher in the case of families with single mothers as head of household: poverty falls between 5 and 11 percentage points, and if initially 22% more income was required to rise out of poverty, with the EITC this requirement falls to 16%.

Table 12 shows the calculated poverty rates for those participating in the EITC. For each case analyzed, the initial situation is presented together with the change in poverty rates, expressed as the difference in each scenario before and after the EITC. In line with the targeting results, beneficiaries in scenarios B and C are from more vulnerable families than in the baseline scenario. However, after applying the EITC, these differences are reduced between the three analyzed scenarios, with a poverty rate of around 23%, a poverty gap of 0.07, and a squared poverty gap of 0.035.

TABLE 12: POVERTY RATES BEFORE AND AFTER EITC: GROUP OF BENEFICIARIES

Beneficiaries		Poverty rate	Poverty gap	Poverty gap ²
Scenario A: 0 hours/ $\gamma_k = 0$	Before EITC	0.378 (0.011)	0.125 (0.005)	0.064 (0.004)
	Change after EITC	-0.140*** (0.008)	-0.051*** (0.002)	-0.028*** (0.002)
Scenario B: 20 hours/ $\gamma_k = 0.3$	Before EITC	0.483 (0.009)	0.227 (0.006)	0.155 (0.005)
	Change after EITC	-0.236*** (0.008)	-0.151*** (0.005)	-0.119*** (0.005)
Scenario C: 45 hours/ $\gamma_k = 0.3$	Before EITC	0.462 (0.009)	0.204 (0.005)	0.134 (0.005)
	Change after EITC	-0.243*** (0.008)	-0.138*** (0.005)	-0.102*** (0.005)

Note: Standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculations based on data from the 2009 Casen Survey.

In summary, the evidence from these simulations shows that income mobility exists after the EITC is implemented and that labor market insertion generates greater changes in poverty rates as compared with the baseline case.

Inequality

By design, the transfers from the EITC implemented in these simulations are received by people from the first six income deciles. Therefore, it would be expected to have an effect on reducing the income gaps between the rich and the poor, improving income distribution. Table 13 shows the initial level and the change in inequality indicators, calculated as the difference between the estimated value after the EITC and the value prior to the tax credit's

implementation. A significant reduction, of about 0.01 points, is observed in the Gini coefficient, which is initially 0.51. Income gaps between different percentiles of the population are also reduced, improving the relative position of the poorest segment in the income distribution.

Based on the change that occurs in the fraction of total income received by each income decile of the population after applying the EITC, it can be seen that poor families obtain a larger share of total income. On the other hand, this fraction is reduced for the richest 40% of the population, all of which is consistent with the structure of the EITC scheme. In addition, the results show that in the baseline scenario, those most favored by the proposed tax credit are in deciles 3 and 4, whereas if there is labor market insertion, the biggest beneficiaries are the members of families belonging to the first three income deciles. This is again consistent with the effect of labor participation on the targeting of resources.

TABLE 13: INDICATORS OF INEQUALITY BEFORE AND AFTER EITC

	p10/p50	p75/p25	p90/p10	Gini Coef.
Before EITC	0.357 (0.004)	2.987 (0.041)	9.264 (0.293)	0.512 (0.006)
Change after EITC				
Scenario A: 0 hours/ $\gamma_k = 0$	0.007*** (0.001)	-0.077*** (0.006)	-0.237*** (0.033)	-0.003*** (0.000)
Scenario B: 20 hours/ $\gamma_k = 0.3$	0.026*** (0.002)	-0.138*** (0.010)	-0.765*** (0.056)	-0.008*** (0.000)
Scenario C: 45 hours/ $\gamma_k = 0.3$	0.022*** (0.002)	-0.141*** (0.010)	-0.695*** (0.055)	-0.008*** (0.000)

Note: Standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Source: Authors' calculations based on data from the 2009 Casen Survey.

Finally, to fully assess the implementation of the income tax credit, one must also consider the program's funding policy (Mirrlees et al. 2010). Although an EITC tax system is progressive, for the effects on income distribution to materialize, the program's source of funding cannot be regressive—for example, an increase in the VAT²⁷—as this could reduce the positive effects of the program on equity and worsen the relative position of the most vulnerable individuals. Financing an EITC with an increase in tax revenues from VAT lowers the disposable income of the poorest individuals, so the net effect of the EITC on poverty becomes ambiguous. This does not happen if the program is funded by an income tax, because the poorest segment is exempt. Therefore, among the available financing

²⁷ The evidence in the economic literature is robust in showing that the VAT is a regressive tax (Caspersen and Metcalf 1994, Decoster et al., 2010, Leahy et al., 2011), including Chile (Cantalalops et al. 2007).

alternatives, those that should be favored are progressive taxation, which would even further improve inequality indicators, or replacement of social programs with bad impact evaluation or only achieving short-term changes without affecting families' permanent capacity to generate higher independent income.

Robustness of the results

One of the key assumptions of the model used in the simulations is that the labor supply elasticity is null with respect to hours worked. It is important then to evaluate how sensitive the simulations are to this assumption to determine how robust the results are.

In the analysis of an alternative scenario (Scenario D) in which women enter the labor market to work 45 hours, with a participation elasticity of 0.3 and an elasticity of hours of 0.1, the simulations show that the total number of beneficiaries does not change because the new income does not exceed the upper limit of the phase-out region. However, the distribution of hours worked shifts to the right, which increases the beneficiaries and the resources available in the third section, mainly due to the transfer of women with children from the flat region. Additionally, there is a reduction in the program costs (0.2% less), because with the increase of beneficiaries in the phase-out section, where credit is decreasing, the average amount of EITC benefits drops.

The variation in the effects on poverty and inequality, the latter measured as the change in the ratio of average income of the different percentiles, is very small compared to Scenario C.²⁸ However, the Gini coefficient increases, since those receiving the most money are the least poor among the beneficiaries (the breakdown is found in Tables A6 and A7 in the Appendix). In the second year of implementation, hours worked would also shift for those who entered the labor market with the EITC, and so inequality would be expected to drop even more and the targeting of resources would be expected to improve.

The robustness of the results was also analyzed on the assumption that women with a labor force participation probability of more than 0.5 are those that are entered into the labor market. For this purpose, the possibility that this occurred for women with an *ex post* probability of participation equal to or greater than 0.6 was considered. Under this rule, women who choose to participate are relatively more educated, not as young, more frequently divorced, with less financial support in the household, and from more vulnerable families but with higher hourly wages.

The results indicate that in this case the number of beneficiaries decreases and the distribution by number of children and benefit region changes, with the proportion of women with children and the number of beneficiaries in the flat and phase-out segments increasing. The lower number of recipients gives rise to a drop of program costs of about 7%, even though the average amount each participant receives increases. The effects on participation, poverty, and inequality are similar to those in scenarios B and C, but to a lesser degree (see Table A8 in the Appendix). The scenarios analyzed are called B-1 and C-1 since they are variations of

²⁸ With the exception of the p10/p50 indicator, all the differences between scenarios C and D are statistically different from zero.

cases B and C.

Finally, as another robustness analysis, different specifications of the estimated Heckman selection model equation were used, and there were not large variations in the results.

5. Comparison between the EITC and the Ethical Family Income Program (IEF)

The EITC proposal for Chile simulated in this paper was motivated, among other things, by the launch in March 2011 of the Social Allowance Program (*Programa Asignación Social*), considered to be the first step toward the Ethical Family Income Program (IEF) that started in 2013 with the goal of eradicating extreme poverty in the country in 2014. The IEF replaced a social program called Chile Solidario, which included several unconditional cash transfers to poor families.

The IEF targets the 170,000 poorest families in the country. The potential beneficiaries are people who are 65 years old, or who live on the streets or children whose parents are in prison. The IEF establishes that beneficiaries will participate in the program for a minimum of 12 and a maximum of 24 months, and the benefits will include: a base transfer, a ‘dignity allowance,’²⁹ transfers conditional upon health and education activities, and bonuses for achievements. These achievement bonuses include a bonus for formalization and a bonus for secondary school graduation, awarded only once. There is also a bonus for effort, awarded once a year to those who belong to the most vulnerable 30% of the population and demonstrate outstanding performance or major improvement in the areas of education, health, employment, savings, and drug rehabilitation.

The program also includes the Working Women Subsidy (*Subsidio a la Mujer Trabajadora*), which is offered to women between 25 and 60 years old who belong to the most vulnerable 40% of the population. Enrollment for this wage subsidy began in July 2012. It will be distributed among the beneficiaries (20%) for a four-year period and among their employers (10%) for a total of 24 months. The subsidy will provide a monthly maximum of Ch\$34,079, equivalent to Ch\$408,948 a year.

The Social Allowance Program distributes an unconditional bonus on a monthly basis per individual, five conditional transfers for preventive health activities and educational activities, and an incentive for women to enter the labor force. This consists of a wage subsidy for women over 18 years old who had not worked during the two years prior to enrollment, and who have at least three consecutive contributions to the social security system in the ten months following enrollment. Table A10 of Annex details the program amounts and requirements.

Given the resources already spent on the original Chile Solidario Program, the Social Allowance Program, and the Working Women Subsidy (*Subsidio a la Mujer Trabajadora*), it seems relevant, and also informative, to compare the effectiveness and costs of these two types

²⁹ Includes consumer subsidies for drinking water, sewage services, pro student retention educational subsidy, and protection bonus. All these features were part of Chile Solidario. Program.

of public policies. The comparison uses secondary information from a microsimulation by Acero and Cabezas (2011), which estimates the effects on poverty, inequality, and employment, and information from the 2012 national budget for costs data.

Through a microsimulation, Acero and Cabezas (2011) assess the effect the implementation of the Social Allowance Program and an employment subsidy for men and women would have on Chile Solidario program beneficiaries.³⁰ If beneficiaries also receive dignity subsidies from the Chile Solidario program, the simulated program is very similar to the Ethical Family Income, but with greater coverage. This is because, in addition to including men in the employment subsidy, the authors consider as beneficiaries all families in the 2009 Casen Survey that declare participation in the Chile Solidario program (273,732 families) and not just the 170,000 that the government officially announced for the Social Allowance Program.

The microsimulation results show that the IEF reduces the Gini coefficient by 0.001 points and the poverty rate drops 0.6 percentage points (from 15.1% to 14.5%), although the authors do not report the standard error of their estimates, so it is unknown if these differences are statistically significant. However, the effects are less than those obtained by simulating an income tax credit, which reduces the Gini coefficient by 0.008 points and poverty by two percentage points. Furthermore, while the EITC has the ability to reduce poverty and encourage work simultaneously, Acero and Cabezas (2011) show that the employment subsidy, which encourages labor participation, is canceled out by the increase in non-labor income, thus generating a disincentive to employment, especially in the group of women and non-heads of households. Additionally, it reduces the number of aggregate hours worked, although among those who remain in the labor market there is a small increase.

With the available data, it is also possible to compare the percent change in the average per capita income of each decile after the implementation of the two programs. This comparison is shown in Figure 3. The EITC has better targeting, especially when there is labor insertion. With the exception of the effect on the first decile in the baseline scenario (Scenario A), which is the minimum potential effect, it is clear that the EITC dominates the simulated IEF in the first six income deciles; in scenarios where labor market insertion occurs, the effect of the EITC for the first two deciles is more than seven times than the estimated for the IEF.

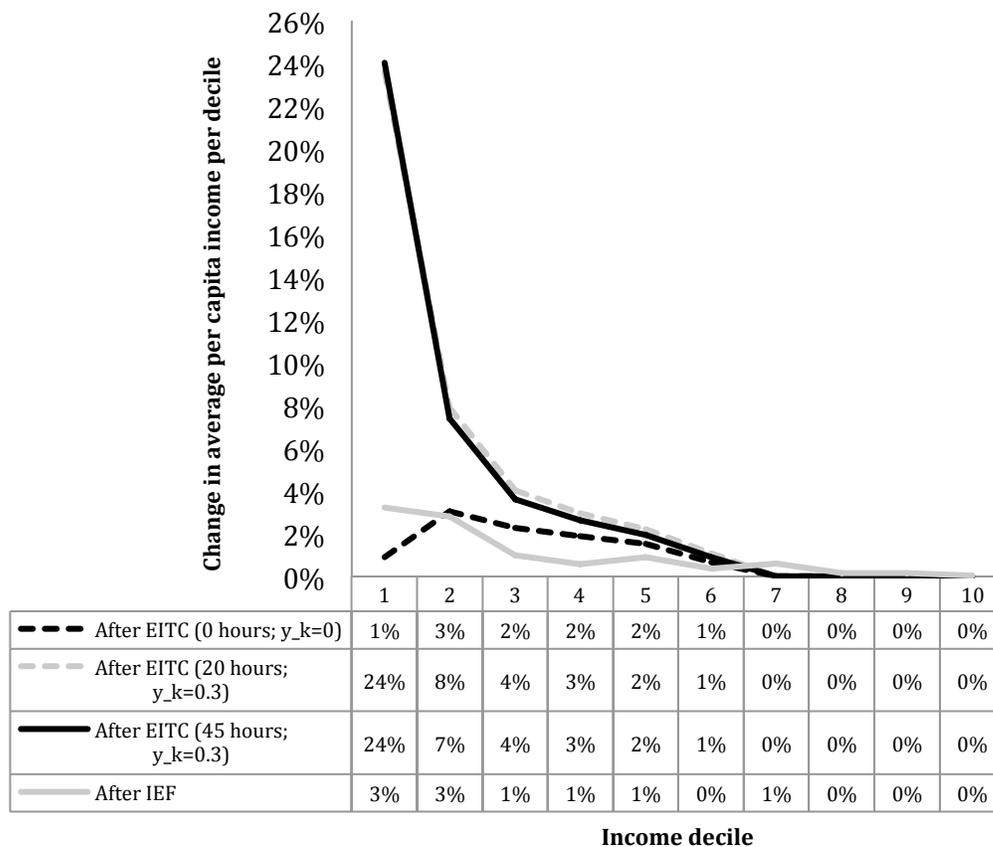
It is important to note that the simulated IEF has a much greater magnitude than the actual Social Allowance Program implemented by the government, but despite this, its coverage is less than the coverage of the income tax credit proposed in this paper. In fact, while the IEF was conceived as a program to combat extreme poverty, the EITC is designed to improve the welfare of families and generate higher labor participation in both the most vulnerable population and in the middle income families (quintile 5). The differences in the size of the target groups and the types of beneficiary (the EITC on average would have higher-income beneficiaries) makes it

³⁰ The authors simulate a subsidy 30% of the salary, distributed between the employer (10%) and the beneficiary (20%), which peaks at a monthly income of Ch\$167,000 and decreases to zero for incomes over Ch\$334,000. This means a maximum bonus of Ch\$33,400 monthly. The simulation of the Social Allowance Program does not include a school performance bonus, as this was not one of the components in 2011.

difficult to compare the two alternatives, since the observations could potentially be related to the size and type of beneficiary and not to the type of policy implemented.

However, if the benefits of the tax credit are restricted to the 170,000 poorest families among those receiving the EITC with the simulation, and the assumptions of Scenario C are used, the results show that the drop in poverty and inequality remains significant and greater than that found by Acero and Cabezas (2011): poverty falls 1.5% and the Gini coefficient falls 0.006 points. Moreover, with an exclusive focus on the first three income deciles, this restricted EITC increases income among the most vulnerable people almost four times more than the simulated Ethical Family Income does.

FIGURE 3: CHANGE IN AVERAGE PER CAPITA INCOME BY DECILE



Sources: Authors' calculations based on Casen 2009 data. Data obtained from IEF microsimulation by Acero and Cabezas (2011).

Regarding implementation costs, depending on the assumptions used, the application of the EITC in Chile would imply spending on transfers at least Ch\$143.1 billion in the baseline scenario, which would increase to \$188.2 billion in Scenario B and Ch\$172.6 billion in Scenario C when labor market insertion is considered. Meanwhile, according to the National Budget Office (Dipres), Ch\$81.6 billion is allocated for the Ethical Family Income Program for 2012.³¹ This represents 0.3% of the total national budget, while the income tax credit proposed in this study requires between 0.5% and 0.6% of the resources for spending

³¹ With the available information, this budget potentially represents a minimum limit of the cost of the Ethical Family Income Program, since the Ch\$81.6 billion correspond to the budget line of the Family Income Subsidy, and the employment subsidy will be funded by the National Training and Employment Service (*Servicio Nacional de Capacitación y Empleo*). However, the IEF law states that the largest fiscal expenditure stemming from the application of the IEF in 2012 will be financed by the Ministry of Social Development and the Treasury.

on transfers.

The observed difference in the program costs also interferes with the interpretation of the comparison in Figure 3. For this reason, a simulation is conducted to see what the effects of the EITC would be if it had the same available resources as the IEF. The results consistently show that with \$81.6 billion (\$76.2 billion in 2009 currency), poverty would be significantly reduced, by 1.7%, and the Gini coefficient would fall by 0.006 points. Moreover, targeting the first four income deciles, the restricted EITC is associated with income increases of up to four times those observed with the Ethical Family Income Program in the most vulnerable population.

Table 14 shows the cost of each program, the number of recipient families, and the cost per family. For the EITC, the different scenarios analyzed are shown in order to give a range of associated costs. While the total cost of the proposed tax credit doubles the one of the IEF, it must be considered that the EITC not only triples the amount of recipient families, resulting in a 25% lower cost per family than the IEF, but also encourages the labor market insertion of women, and in the long term it should reduce dependence on the social welfare system.

These results are not surprising since they are consistent with the IEF's benefit structure of strong incentives, especially in the case of women, to leave the labor market and receive only conditional transfers and the unconditional base transfer, which represents 47% of the benefit of the Social Allowance Program.³²

TABLE 14: COSTS ASSOCIATED WITH THE EITC AND IEF PROGRAMS

Program	Total cost (\$)	Families benefitted	Cost per family (\$)
Ethical Family Income	81,597,178,000	170,000	479,983
Earned Income Tax Credit			
Scenario A: 0 hours/ $\gamma_k = 0$	143,169,545,222	370,249	361,320
Scenario B: 20 hours/ $\gamma_k = 0.3$	188,246,025,627	510,886	344,300
Scenario C: 45 hours/ $\gamma_k = 0.3$	172,663,264,829	456,489	353,431

Note: Amounts are in pesos of December 2011, the month the national budget is drafted.

Source: Prepared by the authors based on 2009 Casen data and the 2012 National Budget Office (Dipres [2012]).

With respect to costs, one feature of the Ethical Family Income Program that makes it expensive in comparison to the EITC is that the subsidy increases strictly with the number of family members. This further distorts the decision by heads of households to participate in the labor market and does not recognize the economies of scale within the household. In addition, the EITC uses information and infrastructure from the National Tax Office (SII - *Servicio de*

³² Cabezas (2012) studies the effect of just the Social Allowance Program on labor supply. The results indicate that the program reduces the labor supply of women by 15% and 12% for those with and without a partner, respectively, and that the increase from the component that incentivizes women to enter the labor force has no impact.

Impuestos Internos), which significantly reduces its administrative costs, unlike the transfer programs that must generate information in order to award the benefits.³³ As a result, it also promotes the formalization of work activities in the tax system. Finally, the effects of the income tax credit may vary depending on the funding source used. More specifically, to avoid offsetting the positive effects of poverty and inequality reduction, the resources would have to come from progressive or neutral taxation, or alternatively from replacing other existing programs with similar objectives to the EITC.

An example of a program that could be replaced by an EITC is the Family Allowance Program (*Programa Asignación Familiar*), part of the Social Security Institute (*Instituto de Previsión Social*), which provides a monthly benefit for each dependent that a beneficiary claims. Like the IEF, the amount strictly increases with the number of dependents, and, although subject to the condition of employment, it primarily provides benefits to the salaried sector, restricting access for independent workers living in poverty. Other examples are pro-employment programs for beneficiaries of the Chile Solidario system, the Bonus for Hiring of Manpower (*Bonificación a la Contratación de Mano de Obra*) and Community Investment (*Inversión en la Comunidad*), which are direct employment policies that subsidize wages for a limited period of time or create employment in areas of high unemployment. Evaluations of this type of program have been negative, mainly because they are a short-term solution and do not result in improvements in indicators of participants' employment or income level (Betcherman et al. 2004). Meanwhile, the Youth Employment Subsidy (*Subsidio al Empleo Joven*) could be absorbed by a tax credit program, which additionally would reduce the stigma associated with its beneficiaries. All in all, Ch\$88.4 billion are allocated for these programs for 2012 (Dipres 2012).

Also worth mentioning is the Working Women Subsidy (*Subsidio a la Mujer Trabajadora*), which had a budget of Ch\$24.781 billion in 2013, of a total of Ch\$213.886 billion for the IEF for 2013.³⁴ This program, like the Youth Employment Subsidy, could form part of an income tax credit, since in addition to reducing the stigma of its beneficiaries, it would have lower administrative costs as a result of using the existing National Tax Office infrastructure.

6. Conclusions

In recent decades Latin American governments have increasingly used Conditional Cash Transfer Programs as the main policy for reducing poverty. While these programs have been effective in reducing poverty in the short term, they have two major shortcomings: they discourage employment, creating a poverty trap, and they produce dependence on the social

³³ In the United States, it is estimated that EITC administrative costs are 0.5% of the total amount of benefits provided, while for traditional transfer programs administrative costs are 16% (Eissa and Hoynes 2011).

³⁴ <http://www.gob.cl/informa/2012/10/05/ministro-lavin-dio-a-conocer-los-programas-y-montos-del-presupuesto-2013.htm> accessed on October 22, 2012.

welfare system.

In other regions of the world, however, the strategy for addressing high levels of poverty and inequality has been to use the tax system as the main tool. Besides using a progressive income tax, which helps to reduce inequality, tax transfers to lower-income people help reduce both inequality and poverty. However, the mechanism used for these transfers is important to avoid creating dependency or reducing incentives for generating independent income.

To this end, the mechanism used has been the creation of tax credits for earned income (work income tax credit) and for family expenses such as child care (child care tax credit). In countries that have implemented a work income tax credit, like the U.S., New Zealand, and England, these programs have become the most important tool in combating poverty.

This paper simulates the application in Chile of a work income tax credit based on the existing Earned Income Tax Credit (EITC) scheme in the United States. The main objective of this exercise is to present a viable alternative to the Conditional Cash Transfer Programs that have been implemented in the country. The concept is simple: to replicate in Chile the successful experiences of other countries and introduce transfers through tax credits on labor income, which establishes proper incentives for people to participate in the labor market and generate steady income that will allow them to rise out of poverty.

The simulation provides benefits to unmarried women in the first six deciles of income, mostly heads of households, since this category tends to have higher levels of poverty and has been the main beneficiary of the program implemented in the United States. The results show that in Chile the EITC would benefit 500,000 families, one-third headed by women who enter the labor market as a result of the incentives provided by the program.

The increase in labor force participation produced by the EITC significantly improves the targeting of resources, since those who decide to work after the program live in much more precarious conditions than those who were working before the policy's implementation. It is possible that due to low skill levels, these women have been unable to find a job to cover the fixed costs of going to work, such as transportation and childcare. The EITC supplements salaries and makes the labor market more attractive for them.

Besides encouraging labor participation, the program is effective in reducing poverty, which drops from 22.5% to 20.3%. It is also effective in reducing inequality: the Gini coefficient drops from 0.512 to 0.504 points, thus avoiding the poverty trap generally produced by transfer programs.

Additionally, the results of the simulation show that if the hours worked of those participating in the labor market before the implementation of the program increased as a result of the EITC, in the long term, as participants' incomes improve, the program costs would fall. This can also affect other social programs, since EITC beneficiaries may no longer be eligible for them, thus reducing the dependency and costs of the social welfare system.

The employment condition limits the support given to the most vulnerable individuals among the poor and mostly benefits those who have a higher chance of seeking and obtaining employment. Therefore this program must be understood as a complement to direct

unconditional subsidy policies, and in particular, to job placement programs that increase the likelihood of eligible individuals finding employment. It is important to note that the EITC program would not cover individuals who are working informally and do not report income to tax authorities. And although levels of informality in Chile are low compared to other Latin American countries, it is precisely in the first two quintiles where there is a higher level of non-registration of activities, both among salaried workers who are not reporting (31% in the first quintile and 21% in the second quintile) and independent workers who do not report activity (42% in the first quintile and 30% in the second). However, this program should, in the medium and long term, make formalization more attractive. Nonetheless, in the transition from short to long term, it is necessary to maintain traditional social assistance programs for highly vulnerable families. This can be accompanied by formalization incentives, which can constitute a gateway to the EITC.

In addition to the quantified benefits, the EITC, although it does not produce an immediate impact on beneficiaries' health and education related behavior, which a Conditional Cash Transfer Program can do, in the long run can have significant effects on these aspects due to increased family income. In fact, empirical evidence has highlighted the role of the EITC in improving children's living conditions and school performance (Greenstein and Shapiro 1998, Dahl and Lochner 2010).

In future research, it is important to analyze and explore potential adjustments to the structure, design, and elements associated with the implementation of a program like the EITC in Chile, taking into consideration the country's demographic and distributive characteristics.

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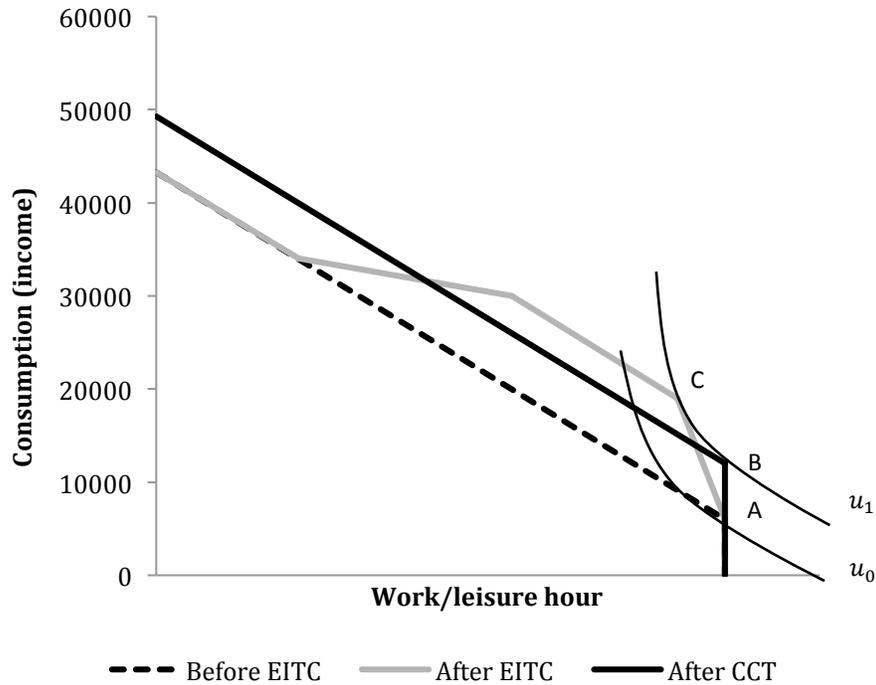
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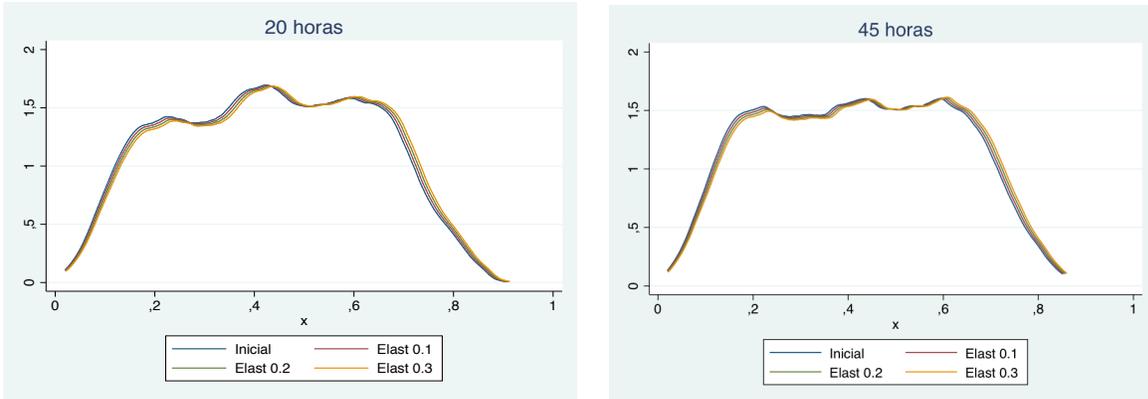
Appendix

FIGURE A1: BUDGET CONSTRAINT EFFECT



Note: The initial situation, without EITC or a conditional transfer program, for an individual who doesn't work is found at point A, with a corresponding level of welfare on the curve. The provision of a conditional transfer increases non-work related income and allows the person who doesn't work to attain a higher level of welfare, for instance, on the curve. If the individual initially works, the lifting of the budgetary constraint will have an income effect associated with it that will allow this individual an increase in leisure time (reducing his or her working hours) and in consumption. An individual who doesn't work before or after the EITC will remain at the initial point A after the credit is applied. However, if this individual decides to join the labor market, s/he will have access to a higher welfare, for example. Therefore, for the same level of ultimate welfare, a conditional transfer program allows one arrive to point B, while the EITC encourages work and makes it possible to arrive to point C. *Source:* Prepared by the authors

FIGURE A2: PREDICTED PROBABILITY OF ELIGIBLE WOMEN (20 and 45 HOURS)



Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE A1: HECKMAN SELECTION ESTIMATES OF WAGE EQUATION (PEOPLE AGE 18 TO 60)

	Hourly salary logarithm
Years of Education	0.0383*** (0.00129)
Potential work experience (age-school years-6)	0.00585*** (0.000838)
Squared potential work experience	-0.00000442 (0.0000169)
Other household member's income	0.000000250*** (2.78e-08)
Zone (1:urban)	0.0373*** (0.00944)
Metropolitan Region	0.0255*** (0.00785)
Mother's Education: secondary education	0.0675*** (0.0120)
Mother's Education: higher education	0.132*** (0.0222)
Father's Education: secondary education	0.0358*** (0.0100)
Father's Education: higher education	0.179*** (0.0192)
Gender	0.0852*** (0.00721)
Constant	2.561*** (0.0228)
Rho	-0.216*** (0.0274764)
Lambda	-0.0694*** (0.0090625)
Observations	132565
F Test	250.3

Note: Bootstrap standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. *Source*: Authors' calculations based on data from the 2009 Casen Survey.

TABLE A2: SELECTION EQUATION- PROBIT MODEL OF LABOR PARTICIPATION

	Labor participation
Years of Education	0.0461*** (0.00245)
Age	0.196*** (0.00426)
Squared Age	-0.00228*** (0.0000552)
Other household member's income	-0.000000209*** (4.53e-08)
Zone (1:urban)	0.0423** (0.0177)
Metropolitan Region	0.152*** (0.0185)
Mother's Education: secondary education	0.118*** (0.0284)
Mother's Education: higher education	0.257*** (0.0770)
Father's Education: secondary education	0.0176 (0.0246)
Father's Education: higher education	0.0456 (0.0625)
Gender	0.925*** (0.0163)
Other > 18 who are employed in the household	-0.253*** (0.0234)
Other > 18 who neither work nor study in the household	-0.0331* (0.0172)
Disabled	-0.729*** (0.0315)
Other disabled in the household	-0.0293 (0.0219)
Marital status (1: Widowed)	0.0576 (0.0562)
Marital status (1: Divorced)	0.276*** (0.0302)
Children between 0 and 2 years in the household	0.0437** (0.0202)
Children between 3 and 5 years in the household	0.0617*** (0.0206)
Children between 6 and 12 years in the household	-0.00214 (0.0154)
Constant	-4.302*** (0.0913)

Note: Bootstrap standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. *Source:* Authors' calculations based on data from the 2009 Casen Survey.

TABLE A3: SAMPLE STATISTICS

	Complete Sample			Sample used in simulations		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Younger than 24	244118	40%	49%	230116	40%	49%
Between 25 and 34	244118	11%	31%	230116	11%	31%
Between 35 and 44	244118	14%	34%	230116	14%	34%
Between 45 and 60	244118	19%	39%	230116	18%	39%
Older than 60	244118	17%	38%	230116	17%	38%
Years of education	193763	9,1	4,3	182246	9,1	4,3
No education	193763	6%	23%	182246	6%	23%
Incomplete primary-secondary education	193763	55%	50%	182246	55%	50%
Complete secondary education	193763	27%	44%	182246	27%	44%
Higher education	193763	13%	34%	182246	13%	34%
Marital status (1: Single)	246924	49%	50%	232772	49%	50%
Marital status (1: Married)	246924	42%	49%	232772	42%	49%
Marital status (1: Widowed)	246924	5%	21%	232772	5%	21%
Marital status (1: Divorced)	246924	4%	19%	232772	4%	19%
Zone (1: Urban)	246924	64%	48%	232772	64%	48%
Metropolitan Region	246924	20%	40%	232772	20%	40%
Hourly salary	85784	2,333.5	5,454.5	82991	2,321.4	5,473.7
Before tax household per capita income	246924	124,774.8	219,286.6	232772	125,459.6	220,510.4

Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE A4: EARNED INCOME TAX CREDIT PARAMETERS, 1996

<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (2 Children)</i>
\$0 – \$8,890	Phase-in	40% * x
\$8,890 – \$11,610	Flat region	\$3,556
\$11,610 – \$28,495	Phase-out	\$3,556 - 21,06% * (x - \$11,610)
<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (1 Child)</i>
\$0 – \$6,330	Phase-in	34% * x
\$6,330 – \$11,610	Flat region	\$2,152
\$11,930 – \$25,750	Phase-out	\$2,152 - 15,98% * (x - \$11,610)
<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (Without Children)</i>
\$0 – \$4,220	Phase-in	7,65% * x
\$4,220 – \$5,280	Flat region	\$323
\$5,280 – \$9,500	Phase-out	\$323 - 7,65% * (x - \$5,280)

Source: Prepared by authors based in information from the Internal Revenue Service (IRS), <http://www.irs.gov>

TABLE A5: EARNED INCOME TAX CREDIT PARAMETERS, 2009

<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (3 or + Children)</i>
\$0 – \$12,570	Phase-in	45% * x
\$12,570 – \$16,420	Flat region	\$ 5,657
\$16,420 – \$43,279	Phase-out	\$5,657 - 21,06% * (x - \$16,420)
<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (2 Children)</i>
\$0 – \$12,570	Phase-in	40% * x
\$12,570 – \$16,420	Flat region	\$ 5,028
\$16,420 – \$40,295	Phase-out	\$5,028 - 21,06% * (x - \$16,420)
<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (1 Child)</i>
\$0 – \$8,950	Phase-in	34% * x
\$8,950 – \$16,420	Flat region	\$ 3,043
\$16,420 – \$35,463	Phase-out	\$3,043 - 15,98% * (x - \$16,420)
<i>Annual Household Income (x)</i>	<i>Segment</i>	<i>Credit (without children)</i>
\$0 – \$5,970	Phase-in	7,65% * x
\$5,970 – \$7,470	Flat region	\$ 457
\$7,470 – \$13,440	Phase-out	\$457 - 7,65% * (x - \$7,470)

Source: Prepared by authors based in information from the Internal Revenue Service (IRS), <http://www.irs.gov>

TABLE A6: POVERTY RATES BEFORE AND AFTER EITC (SCENARIO D)

	Poverty rate	Poverty gap	Poverty gap ²
Before EITC	0.225 (0.004)	0.101 (0.002)	0.069 (0.002)
Change after EITC			
Scenario C: 45 hours / $\gamma_k = 0.3$; $\epsilon_k = 0$	-0.021*** (0.001)	-0.012*** (0.001)	-0.009*** (0.000)
Scenario H: 45 hours / $\gamma_k = 0.3$; $\epsilon_k = 0.1$	-0.021*** (0.001)	-0.012*** (0.001)	-0.009*** (0.000)

Note: Bootstrap standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: Authors' calculations based on data from the 2009 Casen Survey.

TABLE A7: INDICATORS OF INEQUALITY BEFORE AND AFTER EITC (SCENARIO D)

	p10/p50	p75/p25	p90/p10	Gini coef.
Before EITC	0.357 (0.004)	2.987 (0.041)	9.264 (0.293)	0.512 (0.006)
Change after EITC				
Scenario C: 45 hours/ $\gamma_k = 0.3$; $\varepsilon_k = 0$	0.022*** (0.002)	-0.141*** (0.010)	-0.695*** (0.055)	-0.008*** (0.000)
Scenario D: 45 hours / $\gamma_k = 0.3$; $\varepsilon_k = 0.1$	0.022*** (0.002)	-0.124*** (0.012)	-0.552*** (0.060)	0.012*** (0.002)

Note: Bootstrap standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. *Source*: Authors' calculations based on data from the 2009 Casen Survey.

TABLE A8: POVERTY RATES BEFORE AND AFTER EITC (SCENARIOS B-1 Y C-1)

	Poverty rate	Poverty gap	Poverty gap ²
Before EITC	0.225 (0.004)	0.101 (0.002)	0.069 (0.002)
Change after EITC			
Scenario B: 20 hours/ $\gamma_k = 0.3$	-0.022*** (0.001)	-0.014*** (0.001)	-0.011*** (0.000)
Scenario C: 45 hours/ $\gamma_k = 0.3$	-0.021*** (0.001)	-0.012*** (0.001)	-0.009*** (0.000)
Scenario B-1: 20 hours/ $\gamma_k = 0.3$	-0.018*** (0.001)	-0.011*** (0.000)	-0.008*** (0.000)
Scenario C-1: 45 hours/ $\gamma_k = 0.3$	-0.017*** (0.001)	-0.009*** (0.000)	-0.006*** (0.000)

Note: Bootstrap standard error calculated with the bootstrap method in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. *Source*: Authors' calculations based on data from the 2009 Casen Survey.

TABLE A10: SOCIAL ALLOWANCE PROGRAM BENEFITS (2011)

Benefits based on the score at the Ficha de Protección Social (FPS)

Beneficiary	Benefit (frequency)	FPS Score Requirement		
		0-2515	2516-3207	3208-4213
Individual	Base bonus (monthly)	\$7,500	\$6,000	\$4,500
Children less than 6 years old	Health control bonus (monthly)	\$5,000	\$4,000	\$3,000
Between 6 and 18 years old	School enrollment bonus (monthly)	\$5,000	\$4,000	\$3,000
Between 6 and 18 years old	School attendance (over 85%) bonus (monthly)	\$5,000	\$4,000	\$3,000
Between fifth grade at secondary school and fourth grade at highschool.	Student performance bonus (Gpa above the percentile 75)(annually)	\$50,000		

Benefits base on work income (X)

Beneficiary	Benefit (frequency)	Income Requirement		
		\$1-\$172,000	\$172,000-\$215,000	\$215,001-\$387,000
Women over 18 who start working	Women labor participation bonus (annually and only once)	30%*X	\$51,600	\$51,600-30%*(X-\$215,000)

Source: Prepared by the authors based in information provided by the Ministry of Social Development at www.ministeriodesarrollosocial.gob.cl.