Family Allowances and Child School Attendance. An ex-ante Evaluation of Alternative Schemes in Uruguay

Verónica Amarante, Rodrigo Arim, Gioia de Melo and Andrea Vigorito[♣]

Instituto de Economia, Facultad de Ciencias Económicas-Universidad de la República

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Summary

Asignaciones Familiares is an Uruguayan child allowances program that has been significantly modified in 2008. This paper presents an ex-ante evaluation on the effects of this reform on teenager school attendance, poverty, inequality and labor supply.

Our results indicate that teenage attendance rates might be increased between six and eight percent points as a result of the new program, and that this change in school attendance shows a progressive pattern. The program also reduces significantly extreme poverty, and to a lesser extent, the intensity and severity of poverty. Effects on poverty incidence and inequality are of small magnitude. Finally, the transfer may influence adult labor supply, inducing a reduction of hours of work for household heads and spouses.

Keywords: impact evaluation, conditional cash transfers, school attendance, poverty, inequality

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♣ Authors e-mail addresses: vero@iecon.ccee.edu.uy; rodrigo@iecon.ccee.edu.uy; gioia@iecon.ccee.edu.uy; andrea@iecon.ccee.edu.uy

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Introduction

Asignaciones Familiares is a child allowance that was incepted in Uruguay in 1942. Compliance with school enrolment has always been a requirement of the program. Originally it was a universal benefit with a wide coverage among formal workers. In 1995 the program became a means-tested benefit, and in 2004 it extended its coverage towards households that did not include formal workers, provided their earnings did not surpass an income threshold. During 2008, the old program of *Asignaciones Familiares* was substituted by a reshaped one. The new design deepens the non contributory nature of the regime, extending significantly the coverage of the social protection network among the first income quintile. Its main aims are increasing household income and fostering attendance to the educational system at secondary school, as long as attendance rates in primary school are almost universal in Uruguay.

This research aims at shedding light on the effects of this renewed conditional cash transfer program on teenage school attendance and work, adult labor participation, poverty and income inequality, by carrying out an ex-ante evaluation. This exercise can provide inputs for policy implementation and further improvement of the intervention. Our work is based on the methodology developed by Bourguignon *et al* (2002) for *Bolsa Escola.*

We focus on the impact of the policy change on teenage child schooling, poverty and inequality, considering that the program only affects household well-being through child behaviour. We develop microsimulations on teenage schooling behaviour considering three alternative designs of the transfer (the real design, and two different schemes). To analyse the impacts of the new transfer on poverty and inequality at the household level, we consider two additional extreme scenarios: one assumes that the transfer exerts no influence on attendance, and the other considers that, as a consequence of the transfer, all children attend school. Finally, we explore the effects of the new program on adult labor supply.

In what follows we present a short description of the program *Asignaciones Familiares*, focusing on the recent reform (section I). Then we depict the present situation of children in terms of poverty and school attendance (section II) and discuss our methodological approach (section III). Our main results, including regression outputs for basic equations and the estimated effects on schooling, poverty and inequality, are presented in section IV. Finally, we present some concluding remarks in section V. Additional information is gathered in two annexes.

I. *Asignaciones Familiares*: short history and present legislation

I.1 The old Asignaciones Familiares regime

The program was created in 1942, as an income transfer scheme reaching formal workers with children. Since its creation, the program was completely embedded in the growing social security system. Following the French legislation, it became one of the pioneering programs of this kind in Latin America. Access to child benefits depended on contributing to the social security system and meeting the requirement of school attendance for children aged 6 to 18. Those aged over 15 years old were kept in the system only if they attended secondary school.[2] The value of the benefit was fixed in 8% of the minimum wage.

Due to fiscal constraints, in 1995, the system was transformed into a means-tested regime. Later on, two subsequent interventions carried out in 1999 and 2004, loosened the reception of the benefit from the contributory status of adults. The transfer continued to be conditional on children aged 6-17 attending school. Nevertheless, controls on compliance have always been very loose and they were even looser after this expansion of the regime. Meanwhile, controls on income were strict, based on social security records of formal earnings and benefits. But as most of the new beneficiaries were informal workers this control was of scarce value.

The effects of the old program of *Asignaciones Familiares* on poverty or inequality were not significant, mainly because the monthly stipend was very low and it seemed not to exert any influence on individual behaviour (Arim y Vigorito, 2006).

I.2 The new Asignaciones Familiares regime

This new system that was implemented during 2008 deepens the changes introduced in 1999 and 2004, as it completely removes the contributory requirement to become a beneficiary of the program. Its main objectives are to contribute to poverty alleviation and to foster attendance to the educational system, particularly for the age group 14-17 where drop-out rates are high. One of the strengths of this new program is that it is embedded in the social security system, feature that is not common in the Latin American experience on conditional cash transfer programs, that have most of the times been set on ad hoc institutional structures (see ECLAC, 2006; Rawlings, 2004).

The target population of the new *Asignaciones Familiares* is composed of 500,000 children that belong to households under the national poverty line, despite adults' contributory status. Those households that have a per capita average income below a certain threshold (equivalent to 20 US per capita) and present structural poverty conditions measured through a proxy-means score, are entitled to obtain the benefit, for all their children aged 0 to 5 and for those aged 6 to 18 that attend to school. Hence, the previous 1999 and 2004 systems are substituted by this program that is more comprehensive. Non eligible households that have children and at least one formal worker will keep on the old regime, receiving 5 US dollars a month per child, provided their total income is below 870 US, despite household size. Monthly stipends will be preferably transferred to women in charge of the children but the decision is left to households.

The monthly transfer is significantly augmented with respect to the old regime. At the same time, the new stipend increases when children attend to secondary school. The base

[2] In Uruguay, primary school lasts six years and is compulsory. Children enter the system when they are six years old. Since 1996 a pre-primary year was also made compulsory. Secondary school takes another six years, and the first three ones are compulsory.

benefit is of 700$ (31 US dollars) a month for the first child that attends primary school and 1000$ (45 US dollars) for the first child that attends secondary school. In order to avoid undesired effects on fertility, an equivalence scale of 0.6 is used to calculate benefits at the household level. The total benefit per household can then be calculated as:

$$Th = 700.(under18)^{\wedge 0.6} + (300).(under18\,\text{sec})^{\wedge 0.6}$$

where $under18$ is the number of children aged 0 to 17 in the household, $under18\,\text{sec}$ is the number of children that attend secondary school and whose age is lower than 18; and 0.6 is the equivalence scale. The value of the transfer is adjusted quarterly according to the evolution of retail prices.

I.3 Our baseline scenario

The new Administration that rules Uruguay since March 2005 implemented a new and temporary program from May 2005 to December 2007. It was called *Plan de Atención Nacional a la Emergencia Social* (PANES) and aimed at alleviating poverty and strengthening household earnings capacity. Its target population was the first quintile of the population under the poverty line, which represented approximately 8% of the whole population. This temporary program included an income transfer of 65 US dollars a month per household, among other components.

Our simulations are based on micro-data coming from the 2006 household survey (Encuesta Nacional de Hogares Ampliada). During that year, some households were receiving the monthly stipend corresponding to *Ingreso Ciudadano*. As a first stage of the analysis, we simulated our baseline scenario in order to reflect the situation that would prevail if *Ingreso Ciudadano* was removed. We took this option due to the temporary nature of that cash transfer. So our baseline simulated scenario includes the old *Asignaciones Familiares* and does not include *Ingreso ciudadano,* so that the effect of the new *Asignaciones Familiares* can be isolated.

II. Poverty, school attendance and child work before the reform

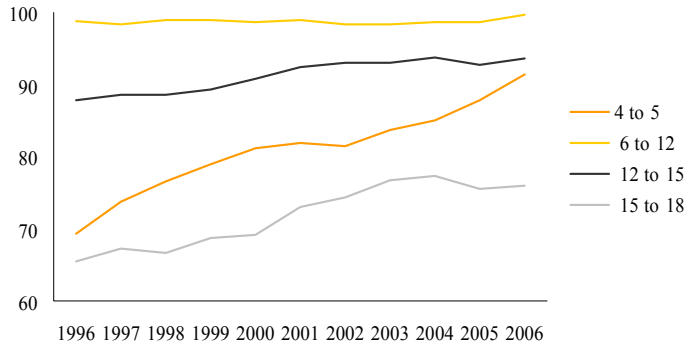
Households with children are the group that experiences higher income deprivation in Uruguay. Since the early 1990 decade, poverty incidence, intensity and severity is three fold in households with children compared to elder adults' households. Previous research showed that this outcome is closely linked with increasing labor earnings inequality and rising unemployment, which mainly hit low skilled workers (UNDP, 2005; Amarante *et al*, 2004). Meanwhile, the better situation of elder adults is related to the almost universal pensions system that was established in Uruguay since 1950 and to the 1990s increase of average benefits real value.

An important number of children aged 0 to 18 that belong to poor households, do not receive the old *Asignaciones Familiares* stipend. All these children living in poor households belong to the target population of the new *Asignaciones Famliares* (if they satisfy the conditionalities), so the new regime will extend the coverage in poor households in a significant way (Table A.1).

There may be several reasons why these children did not receive the benefit of the old programme. In the case of an important proportion of indigent households, the restrictive income threshold for non contributing households is the main explanation. Other reasons, such as low secondary school attendance rates that make teenagers non eligible, and also lack of interest in the program because of the very low amount of the transfer, are also plausible explanations.

We now turn to child school attendance to show the situation before the new regime started. By the middle of the 1990s the government started a reform of the educational system with three main clear purposes: expanding coverage to children aged 3 to 5 years old, increasing secondary school attendance and expanding the number of hours children spent at primary school (the ordinary system consists of four hours per day). As a result, attendance rates for children aged 4 and 5 increased significantly (Graph 1).
Attendance rates at primary school are almost universal since the early decades of the XX century and have been steady for a long time. Still, repetition is a severe problem, particularly in the first year where rates are stagnant around 25% and mainly concentrated in low income groups.

Graph 1. Attendance rates to the educational system by age group. Uruguay. 1996-2006



The main failure of the educational system in Uruguay is located at secondary school where dropping out rates have been endemic since the 1980 decade. As a result, average years of schooling in the adult population are stagnant around 8.6 and Uruguay's achievements in this dimension have been surpassed by other Latin American countries. Despite the reform already mentioned, the difference in average school attainment by income quintile remained almost unchanged in the last twenty years (UNDP, 2008).
This problem is concentrated at lower income strata and mainly affects boys who also show higher labor market participation rates (Bucheli and Casacuberta, 2000).[3] This long lasting problem located at secondary school is one of the motivations for the reformulation of *Asignaciones Familiares* and for the higher amount of the monthly stipend for those who attend secondary school.
Hence, both in terms of income poverty and educational achievements, which can be translated into present and future poverty, children, and especially those aged 12-18, constitute a vulnerable group.

[3] During the crisis, attendance rates in secondary school grew.

Some of the reasons of school drop-out clearly refer to income shortages. Moreover, the decision of school attendance and work is probably a joint decision, as previous research suggests (see Bucheli and Casacuberta, 2000). We present the corresponding information for children aged 14 to 17, as long as the household survey gathers information on labor force attainment for individuals aged 14 years old or more (Table 1).

Table 1. Study and work condition of children aged 14 to 17 by income group. Uruguay. 2006

Income group	Number of children aged 0 to 18	Beneficiaries of Asignaciones familiares	% of total children aged 0 to 18	Attends school	Attends school and works	Only works	Does not attend school and does not work
Hh. under the poverty line	396.271	70%	21%	62%	5%	9%	24%
First income quintile	331.604	72%	20%	60%	5%	9%	26%
Hh. under the indigence line	38.879	57%	19%	52%	5%	9%	34%
All households	944.581	62%	24%	74%	3%	6%	15%

Source: own calculations based on household surveys and population estimates

The number of children that do not attend school nor work is surprisingly high, reaching 24% of children in poor households. In order to deepen our analysis of this group, we processed the information from a special module of questions which were included in the household survey for one quarter during 2006. This module gathered information on child work and domestic work, so for that period, the household survey allows to classify children aged 14 to 17 into work status condition by the two criteria: the traditional classification used for working age population, and the classification derived from the specific questions on child labor and domestic work that were asked to all children from 6 to 18. This analysis indicates that most of the children aged 14 to 17 that are labeled under the not study/not work condition with the traditional questions, do in fact work (almost 44%), as they undertake domestic work. The incidence of domestic work among the group of young people that do not work or study is considerable higher among girls than among boys (26, 5 versus 62, 5%) (Table A.2). This evidence is consistent with that found in other countries, showing that traditional questions on activity and work for working age population are not able to capture teenage work in a proper way.

This evidence on the prevalence of domestic work among those who either not study or work is important in terms of our simulation counterfactuals. Unfortunately, it is difficult to value domestic work, as our data does not include any information about the specific tasks, periodicity and hours of work involved, among other aspects. In our simulations, the opportunity costs of these children correspond to the predicted market wage.

III. The microsimulation model

Although the problem of predicting the effects of social programs is an old challenge for economists, the development of techniques such as micro simulations applied to social policies is relatively new. The increasing concern for poverty and distributional impacts of public policies has led to the extension of this methodology, which allows to fully exploit the information contained in large data sets as household surveys. Although the literature on ex post evaluations of conditional cash transfers is abundant, ex ante analysis has not been an extended practice. A well known attempt is the ex-ante evaluation of *Bolsa Escola*

in Brazil (Bourguignon, Ferreira and Leite, 2002), which is also the key methodological reference for this research.

Micro simulations can be based on structural models where the estimated equations have a foundation on rigorous theoretical models. This approach is difficult to undertake, as it usually involves many econometric problems and data requirements. They can also be based on the estimation of reduced form equations that are indirectly related to a theoretical model and can be estimated in practice. This is the strategy followed in this paper. Following Bourguignon, Ferreira and Leite (2002) (BFL from now on), we consider two dimensions as endogenous in a first step: child labor supply and child school attendance. In a second step, we depart from the BFL framework and analyze the behavioral response of adult labor supply. Family composition and fertility decisions are considered as exogenous and independent of the conditional cash transfer. In what follows we discuss the modeling of individual behavior for each of the endogenous dimensions.

Considering that one of the objectives of the program is to foster school attendance at secondary level and that attendance at primary level is almost universal in Uruguay, this part focuses on children aged 14-17. Child labor supply has been examined theoretically (for example, Grootaer and Kanbur, 1995) and has been widely addressed in empirical research (see for example Ravallion and Wodon, 2000; Arat, 2002; and Chakraborty and Das, 2005). Following BFL, we develop a discrete labor supply model, where a child decides either to go to school, to work, or to carry out both activities. This specification is suitable for developing countries where it is usual for children at these ages to be involved in both activities.
The school attendance decision is taken at the household level, and can be modeled as a discrete variable S_i:[4]

S_i=0 if *i* does not go to school
S_i=1 if *i* works and goes to school
S_i=2 if *i* goes to school and does not work

BFL estimate a multinomial model for this decision, with each *i* representing an optimal choice according to:

$$S_i = k \quad \text{if} \quad Sk(.) > S_j(.) \quad \text{for all } j \neq k \qquad (1)$$

The schooling decision is then a function of a set of variables:

$$S_j(X_i, H_i, Y_{ij,} v_{ij}) \qquad (2)$$

Where X_i represents characteristics of individual *i* (age, sex, schooling, etc.), H_i represents household of *i* (type of household, parental education, etc), Y_{ij} represents the income of the household characteristics *i* when choosing *j* and v_{ij} is the disturbance term (iid).
Household income is the sum of children's income (y_{ij}) and the income of the rest of the members of the household (Y_{-i}). The set of non income variables X_i and H_i can be combined

[4] In this setting we do not consider separately those youngsters who do not work nor attend school. To differentiate them, the choice variable should have taken four values, and this may generate some problems in the econometric estimation.

into Z_i, and so the linearization of the model becomes the random utility representation for the household of child *i* under the schooling choice *j*:

$$U_{ij} = \gamma_j Z_i + \alpha_j (Y_{-i} + y_{ij}) + v_{ij} \qquad (3)$$

Assuming that potential earnings for child *i* are observable (w_i), the contribution of the child to household income, y_{ij}, becomes:

$$y_{i0} = Kw_i \qquad (4)$$
$$y_{i1} = My_{i0} = MKw_i \qquad (5)$$
$$y_{i2} = Dy_{i0} = DKw_i \qquad (6)$$

meaning that if child only works and does not attend school ($S_i=0$) he gets a fraction *K* of his potential earnings, if he works and attends school ($S_i=1$), he gets a fraction *MK* of his potential earnings, and if he only goes to school ($S_i=2$) he may contribute to domestic production for a fraction *DK* of his potential market earnings. This last equation implies including the contribution of children to the income of a household through domestic work. Assuming that wages are determined in accordance to the standard Mincer human capital model, earnings w_i can be modelled as:

$$\log w_i = \delta X_i + m.1\{S_i = 1\} + u_i \qquad (7)$$

where X_i is the traditional set of individual characteristics, u_i is a random term that represents unobserved earnings determinants and the second term (indicator function 1) reflects that earnings of a child under option S_i=1 may be lower because some time is spent at school.
Combining these equations in the utility representation of the household of child *i* under each schooling option become:

$$U_{i0} = \gamma_0 Zi + \alpha_0 Y_{-i} + \beta_0 w_{i0} + v_{i0} \qquad (8)$$
$$U_{i1} = \gamma_1 Zi + \alpha_1 Y_{-i} + \beta_1 w_{i1} + v_{i1} \qquad (9)$$
$$U_{i2} = \gamma_2 Zi + \alpha_2 Y_{-i} + \beta_2 w_{i2} + v_{i2} \qquad (10)$$
$$\text{with } \beta_0 = \alpha_0 K; \beta_1 = \alpha_1 MK; \beta_2 = \alpha_2 DK. \qquad (11)$$

In this way we get a complete simulation model. Assuming exponentially distributed errors, this model becomes the multinomial logit model and child's occupational type selected by household *i* is

$$j^* = \text{Arg max } [U_i(j)] \qquad (12)$$

The model can be used for microsimulation by looking at the effect of an exogenous variation of household income under schooling options j=1, 2. What remains is obtaining estimates of α, β, γ and v_{ij}
A problem arises from the fact that in a discrete choice model estimation, the coefficients are identified only relative to a certain choice category ($\alpha_j - \alpha_0$;$\beta_j - \beta_0$; $\gamma_j - \gamma_0$), but as the cash transfer is state dependent, meaning that t income is asymmetric across alternatives, it is necessary to identify the three components (ie: α_0, α_1 and α_2).

If we call $\hat{\alpha}_j$ and $\hat{b}_j$ the coefficients estimated from the multinomial model, then:

$$\alpha_1 - \alpha_0 = \hat{\alpha}_1 \quad (13)$$

$$\alpha_2 - \alpha_0 = \hat{\alpha}_2 \quad (14)$$

$$\alpha_1 MK - \alpha_0 K = \hat{b}_1 \quad (15)$$

$$\alpha_2 DK - \alpha_0 K = \hat{b}_2 \quad (16)$$

BFL propose to arbitrarily set a value for *K* or for *D*. This strategy allows identifying all the parameters, as M is identified from the earnings equation. Their identifying assumption is that K=1, meaning that children working on the market and not going to school have zero domestic production. So, the the model estimates can be transformed into the structural parameters of the model:

$$\alpha_1 = \frac{\hat{a}_1 - \hat{b}_1}{1 - M} \quad (17)$$

and $\alpha_2 = \alpha_1 + \hat{a}_2 - \hat{a}_1$ (18)

The set of residuals can not be observed or precisely estimated, but for each *i* the set of residuals v_{i0}, v_{i1} and v_{i2} are expected to belong to a certain interval, such that given the parameter estimates and the individual characteristics they are consistent with the actual choice. For instance, if observation *i* has made choice 1, it must be the case that:

$$Z\ \gamma_1 + Y_{-i}\hat{a}_1 + \hat{b}_1 w_1 + (v_{i1} - v_{i0}) > Sup\left[0, Z_i\gamma_2 + Y_{-i}\hat{a}_2 + \hat{b}_2 w_i + (v_{i2} - v_{i0})\right] \quad (19)$$

So disturbance terms v_{ij}-v_{i0} must be drawn to satisfy this inequality.

We also need to estimate potential earnings for each child, w_i. Following BFL, this estimation uses OLS, and random terms u_i for non working children will be generated by drawing in the distribution generated by the residuals of the OLS estimation. Potential selection bias in the estimation of wage equations is not addressed. [5]

Once the model is completely identified, the cash transfer impact can be simulated. Supposing that the transfer amount is T_i and we incorporate means test (assuming that the household is eligible if household income is not greater than Y^0), our model leads to choosing the alternative with maximum utility among the three following conditional cases:

$$U_{i0} = \gamma_0 Zi + \alpha_0 Y_{-i} + \beta_0 w_{i0} + v_{i0} \quad (20)$$

$$U_{i1} = \gamma_1 Zi + \alpha_1 Y_{-i} + \beta_1 w_{i1} + v_{i1} \quad \text{if} \quad Y_{-i} + Mw_i > Y^0 \quad (21)$$

$$U_{i1} = \gamma_1 Zi + \alpha_1 (Y_{-i} + T) + \beta_1 w_{i1} + v_{i1} \quad \text{if} \quad Y_{-i} + Mw_i \le Y^0 \quad (22)$$

$$U_{i2} = \gamma_2 Zi + \alpha_2 (Y_{-i}) + \beta_2 w_{i2} + v_{i2} \quad \text{if} \quad Y_{-i} > Y^0 \quad (23)$$

$$U_{i2} = \gamma_2 Zi + \alpha_2 (Y_{-i} + T) + \beta_2 w_{i2} + v_{i2} \quad \text{if} \quad Y_{-i} \le Y^0 \quad (24)$$

[5] BFL fail to find a correct instrument to correct selection bias. They argue that is does not seem a serious problem and that trying to correct using no convincing instrument led to rather implausible results.

This general framework can be used to evaluate the effects of modifying the amount of the transfer, changing the means test. Nevertheless, it must be kept in mind that the schooling decision is reflected in a very simple way that entails the following simplifying assumptions (BFL, 2002):

1) the problem of more than one child in the same household and the simultaneity of the decision is not considered. This implies assuming that all households are single child form a behavioural point of view, so a transfer ceiling per household can not be introduced.
2) households behave as a unit and income is assumed to be pooled. The issue of how the decision about child's time allocation is taken within the household is not addressed.
3) the decision on child schooling is taken once occupational decisions of adults in the household have already been made
4) non child income is also exogenous as is not affected by the presence of the means tested transfer[6]. In this aspect, as stated before, we go beyond BFL methodology and model adult labor supply and its response to different transfer settings.
5) household structure is exogenous
6) cross sectional income effects estimated using a household survey coincide with the income effects that will be produced by the program under study. This means that income effects over time for a given agent are the same as the effect of cross sectional incomes.

The first and second assumptions are very restrictive for our purposes, considering the scheme of benefits that we are analysing. In our simulation the conditional cash transfer design involves equivalence scales, and so decisions regarding one of the children in those households with more than one child can affect the other children in the household. This may be an important issue in the process of decision making. We assume that all eligible children under 14 receive the transfer. This is a reasonable assumption as most children aged 6-13 fulfill the condition of school attendance. For children aged 14-17, we consider the marginal contribution to total income of each child, taking into account each child's decision in a separate way.
We also estimate behavioural responses of adult's labor supply, in an attempt to loosen assumptions 3 and 4. Our main results are presented in the next section. Another departure from BFL methodology is that we estimate a dogit model instead of a multinomial logit.

IV. Main results

In this section we describe the results obtained from the regression analysis (IV.1) and then focus on microsimulated changes on school attendance (IV.2), poverty (IV.3) and inequality (IV.4). We also analyze the potential effects on labor supply (IV.4).
Micro simulations are based on micro-data coming from the 2006 household survey (*Encuesta Nacional de Hogares Ampliada*) that gathered information for 85.316 households in urban and rural areas.

[6] BFL argue that assuming that the presence of the means test does not affect labor supply of adults in the household might not be so restricting if means test is based on some score based proxy for permanent income and not on current income.

IV.1 Basic equations estimates

In order to micro simulate the program impact on poverty, inequality, school assistance and child work, we estimated a wage equation and a discrete choice model to predict the probability of study and work for children.
The estimation of a wage equation was required to obtain parameter M to carry out the microsimulation and to predict potential earnings that were plugged into the estimation of the schooling decision equation.
Dependent variable is the log of monthly earnings. Explanatory variables include region, sex, schooling and schooling squared, and a dummy variable indicating if the child works and studies at the same time. Additionally, we included a quadratic expression on age in the equation for the whole age group (Table 2). Although our interest group is aged 14 to 17, we estimated the wage equation for those aged 14 to 20 to strengthen its explanatory power.

Table 2. Wage equation estimates. Explained variable: logarithm of monthly earnings. Workers aged 14 to 20 years old.

Variables	Coefficient	T statistic
Region 2: major urban areas except Montevideo	-0.074	(2.69)**
Region3: minor urban areas	0.084	(2.37)*
Region 4: rural areas	0.140	(4.45)**
Sex (0=female; 1=male)	0.396	(16.49)**
Age= 15	0.230	(2.67)**
Age= 16	0.423	(5.32)**
Age= 17	0.565	(7.40)**
Age= 18	0.710	(9.23)**
Age= 19	0.872	(11.41)**
Age= 20	0.983	(12.91)**
Schooling=secondary school	0.175	(6.38)**
Schooling=technical school	0.051	(1.25)
Schooling=tertiary	-0.057	(0.91)
Ethnic group (white=0; African Urug.=1)	-0.126	(3.80)**
Average income by census tract	0.489	(10.86)**
Study and work=1	-0.455	(9.81)**
Constant	2488	(6.41)**
Observations	6097	
R-squared	0.21	

Robust t statistics in parentheses. *significant at 5%; ** significant at 1%

Source: own calculations based on household surveys

Regional dummies separate Montevideo (omitted), major urban areas, minor urban areas and rural zones. Earnings of children living in major urban areas are lower than those living in the remaining regions. In turn, children living in rural zones have higher earnings conditional on the remaining covariates.
Boys´ earnings are approximately 40% higher than girls', pattern that is similar to the adult labor market for monthly wages. As long as the estimation was carried out on total earnings, differences can arise from hourly earnings or from differences in the number of hours of work. As expected, age shows a non linear and increasing pattern on earnings.

Schooling was reflected by including dummies on maximum educational level, separating primary school or less (omitted), secondary school, technical school and tertiary education. Signs show a very different pattern respective to the one observed in wage equations for adults since earnings of children that reached secondary school are higher than that of the remaining groups. Technical and tertiary schooling do not present significant differences in relation to the omitted category. In the former case, this can be related to the fact that those attending tertiary school tend to work in part time jobs, especially at these ages.
Having African ancestors reduces child earnings around 12% and needs to be interpreted whether it can reflect discrimination or differences in hours of work.
School attendance is reflected in a dummy variable that is significant and presents the expected sign suggesting that most of the differences in earnings are related to the amount of time allocated to work.

The next step was to obtain predicted wages for children aged 14 to 17 by computing the observed part of the prediction on the basis of the regression estimates and obtaining the corresponding residuals. Residuals were obtained by bootstrapping several times the wage equation and computing the corresponding residuals till we obtained 17,698. These were randomly merged to the observations corresponding to each child.

The following step consists on the estimation of a multinomial logit model considering three different situations: the child does not study (0), the child studies and does not work (1) and the child studies and works (2). Separate equations were estimated for boys and girls.[7] Pseudo R2 coefficients were around 0.25 indicating a reasonable adjustment.
The potentially relevant drawback of multinomial models is the underlying assumption of independence from irrelevant alternatives (Hausman and McFadden, 1984). In the context of the model estimated in this paper, it implies that the probability of choosing "only studies" relative to that "only works" is independent of the possibility of "studies and works" simultaneously. Hausman´s test results showed that the null hypothesis was not rejected and the multinomial estimation should not be carried out. Following Harris and Duncan (2002), we estimated a dogit model (see Annex 2), compatible with the utility function assumed in section III but does not require the assumption of irrelevance of alternatives (Table 3).
Explanatory variables included household and child characteristics. Income was included in two separate variables. The first one reflects per capita household income excluding child earnings, and shows a positive effect in both groups respect to the omitted one. There are no significant differences by gender. A second variable included is the prediction of the child's potential earnings obtained from the first equation. Estimates show a negative relation of the probability of studying or studying and working relative to not studying. Gender differences are also minor.

Educational attainment of adults, measured by their average years of schooling, is positively correlated with full-time school attendance and with study and work, showing a separate effect from income. Differences among boys and girls appear for group 2 where the coefficient for girls is twice the one of boys. This difference may be reflecting that the option of working and study for girls is associated with households that present a clearly higher educational attainment (though lower than group 1) relative to the omitted group, whereas in the case of boys differences are fuzzy. Child's completed years of schooling is

[7] Those who do not study nor work are included in the first group.

positively correlated with the probability of being in groups 1 or 2. Coefficients are higher for girls in the two groups.

A negative association with household size was also found. The ranking of the child shows a strong and positive association with present schooling: the higher the rank of the child, the higher the probability of studying. Regional dummies were significant for group 1 for boys and girls.

Table 3. Dogit estimation results. Children aged 14-17

Variables	Boys						Girls					
	Only studies (1)			Studies and works (2)			Only studies (1)			Studies and works (2)		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
Per capita household income	0,00003	0,0000	0,0	0,00001	0,0000	0,0	0,00004	6,0E-06	0,0	0,00002	0,0000	0,0
Child´s predicted wage	-0,0002	0,0000	0,0	-0,0007	0,0001	0,0	-0,00022	3,8E-05	0,0	-0,0007	0,0001	0,0
Average schooling of adults	0,1358	0,0190	0,0	0,0148	0,0284	0,6	0,13609	2,3E-02	0,0	0,0728	0,0300	0,0
Log household size	-0,7575	0,1210	0,0	-0,6078	0,2020	0,0	-1,05103	1,3E-01	0,0	-0,4483	0,2000	0,0
Child's years of school	1,0944	0,0544	0,0	1,2820	0,0740	0,0	1,11941	5,5E-02	0,0	1,2825	0,0700	0,0
Ranking of the child	1,1029	0,1115	0,0	0,8493	0,1992	0,0	1,17321	1,2E-01	0,0	0,6822	0,2000	0,0
Region 2	-0,2258	0,0931	0,0	-0,1637	0,1570	0,3	-0,03670	1,0E-01	0,7	0,1271	0,2000	0,4
Region 3	-0,6684	0,1601	0,0	-0,3613	0,2565	0,2	-0,15429	1,8E-01	0,4	-0,1769	0,3000	0,6
Region 4	-1,0844	0,1778	0,0	-0,0139	0,2565	1,0	-0,69912	1,8E-01	0,0	-0,4977	0,3000	0,1
Constant	-8,6763	0,4724	0,0	-10,7770	0,7189	0,0	-8,82941	5,2E-01	0,0	-12,1460	0,7000	0,0
Wald Statistic	541,2						547,938					
Observations	8919						8779					

Source: own calculations based on household survey

Once these equations were estimated, we computed parameters α_0, α_1 and α_2, *M*, *K* and *D* on the basis of the formula presented in the previous section (Table 4). The resulting α parameters are very similar by gender.

Table 4. Micro simulation parameters

	Boys	Girls
α_1	0,00187	0,00205
α_1	0,00190	0,00208
α_2	0,00189	0,00207
M	0,63433	0,63433
D	0,87057	0,87817
K (by assumption)	1	1

Source: own calculations based on household survey

On the basis of these parameters, we computed the differentials on child utility for non study, full-time study and study and work and obtained the predicted changes in schooling. To obtain our final predictions, residuals were randomly sampled from a Gumbell distribution. Residuals were chosen to be consistent with the actual choice of the individual in the baseline (equation 19).

IV.2 Effects on schooling

In order to micro simulate the evolution of the outcome variables of interest we considered three scenarios that involve similar costs. In each case, results were compared to our simulated baseline situation, which does not consider the amount of the transfer of *Ingreso Ciudadano*. As it was earlier discussed, the focus on teenage school attendance comes from the fact that primary schooling is almost universal in Uruguay and high school drop-outs are significant and have not been lowered in the last 15 years.

The first scenario is the new *Asignaciones Familiares* regime recently implemented. Additionally, we evaluated two additional transfer schemes that entail the same government expenditure. Scenario 2 considers a per capita transfer of 400 $ for children aged 0 to 12 years and 900 for those aged 13 and 17 years. The aim of this alternative is to assess the effect of the equivalence scale stated in the first scenario and to increase the premium for children attending secondary school relative to the first scenario. Scenario 3 considers a per capita amount of 500 $ for all children, to evaluate the effects of the removal the additional incentive for secondary schooling (table 5).

Table 5. Different designs of the new program of Asignaciones Familiares

Scenario 1	$Th = 700\$.(under18)^{\wedge 0.6} + 300\$.(under18\,\text{sec})^{\wedge 0.6}$
Scenario 2	$Th = 400\$.(under18) + 900\$.(under18\,\text{sec})$
Scenario 3	500 $ per children

Note: 1 US dolar=20$

Source: own calculations based on household survey

We turn first to the effects on child work and schooling for children aged 14 to 17, to assess the magnitude of the changes predicted when behavior is considered. Compared to the baseline situation, all scenarios show a considerable increase in school attendance (Table 6). The change in attendance rates for children only studying varies between six and

eight percentage points (depending on the scenario). The change is higher for girls than for boys. As female enrollment rates were higher than male ones before the implementation of the program, the gap is widened by the transfer. If we compare with the actual situation in 2006, the increase in attendance rate is between one and three percentage points. This indicates that the removal of *Ingreso Ciudadano* and the inception of the new *Asignaciones Familiares* have a net positive (but moderate) effect on school attendance.

The second scenario, which consists of a higher per capita transfer for children in secondary school and does not include equivalence scales, yields the more promising results in terms of school attendance achievements, although differences between the three scenarios are moderate.

The work status of children also changes although the magnitude of the change cannot be directly estimated as long as the omitted group includes drop outs, despite their work status.

Table 6. Predicted child status by scenario

Scenario	Only studies (1)			Studies and works (2)			Drop outs (0)			School attendance (1+2)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
2006	69,6	79,3	74,4	5,9	3,6	4,8	24,5	17,1	20,8	75,5	82,9	79,2
Baseline (2006 without Ingreso Ciudadano)	**65,2**	**73,8**	**69,5**	**4,8**	**3,3**	**4,0**	**30,0**	**22,9**	**26,5**	**70,0**	**77,1**	**73,5**
Scenario 1	71,2	81,7	76,4	5,9	3,5	4,7	22,9	14,9	18,9	77,1	85,2	81,1
Scenario 2	72,7	82,9	77,8	6,0	3,5	4,8	21,3	13,5	17,4	78,7	86,5	82,6
Scenario 3	70,7	80,9	75,8	5,8	3,5	4,7	23,4	15,6	19,6	76,6	84,4	80,5

Source: own calculations based on household survey

The transition matrix between the labor/school assistance status before reform and after the policy change shows that around 28.5 % of the children who are out of the educational system would return to study under scenario 1, being this proportion higher for girls (34.9%) than for boys (23.7%) (Table 7). In this scenario, only 0.4% % of those children that work and study would leave their present occupation to full-time study. This transition matrix also indicates that favorable movements (from not attending to attending or attending and working) are maximized under scenario 2.

Table 7. Simulated effects of Asignaciones Familiares on schooling and working status by scenario

Baseline situation									
	Boys			Girls			Total		
	Not attending	Attend-ing	Attend-ing and working	Not attending	Attend-ing	Attend-ing and working	Not attending	Attend-ing	Attend-ing and working
Scenario 1									
Not attending	76,3	0	0	65,1	0	0	71,5	0	0
Attending	20,1	100	0,2	33,8	100	0,8	26	100	0,4
Attending and working	3,6	0	99,8	1,1	0	99,2	2,5	0	99,6
Scenario 2									
Not attending	71	0	0	59,2	0	0	66	0	0
Attending	24,9	100	0,2	39,5	100	0,6	31,2	100	0,3
Attending and working	4,1	0	99,8	1,2	0,6	99,4	2,9	0	99,7
Scenario 3									
Not attending	78,1	0	0	68,2	0	0	73,9	0	0
Attending	18,5	100	0,2	30,8	100	0	23,7	100	0,1
Attending and working	3,4	0	99,8	1	0	100	2,4	0	99,9

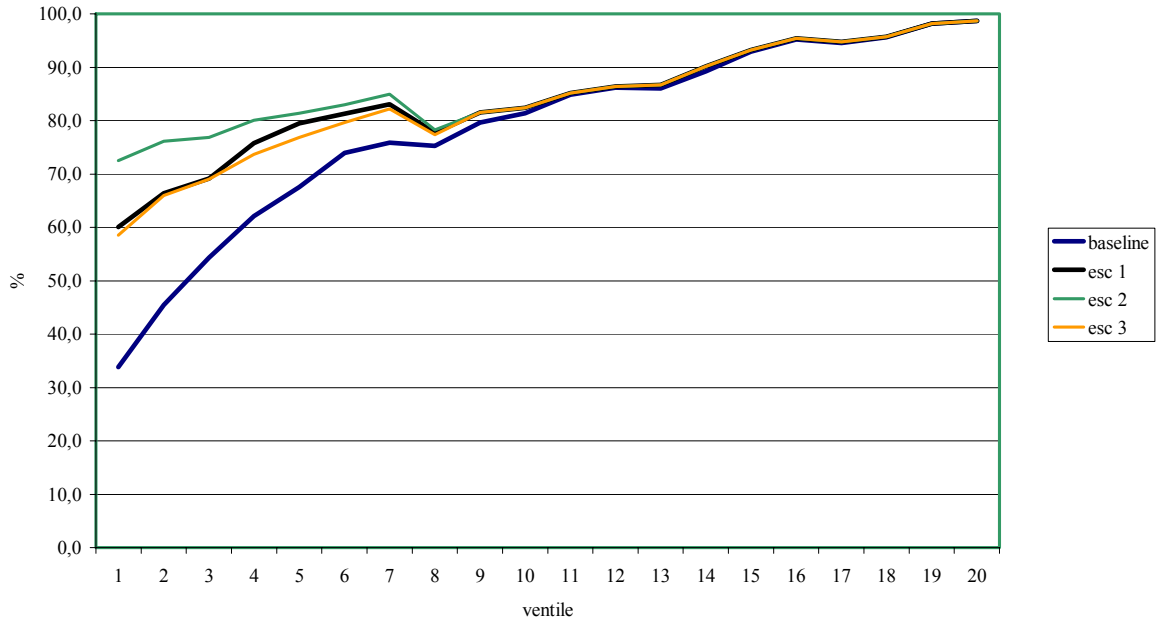
Source: own calculations based on household survey

Our results are surprisingly similar to those obtained by BFL for *Bolsa Escola*. They report that one of every three children aged 10-15 who are presently not enrolled in school would get enough incentive from *Bolsa Escola* to change occupational status and go to school, a figure very close to our 34.1 % under scenario 2. So although our target population is elder and has higher opportunity costs, the conditional cash transfer exerts a similar and significant effect on school attendance in the two programs.

In all scenarios the increase in school attendance is progressive, as changes are higher for children belonging to the lower income strata. This result can be driven by the fact that at low income levels, drop out rates are higher and at the same time the incentive is bigger if measured by the share of the transfer compared to household income. Scenarios 1 and 3 yield similar results, whereas under scenario 2 changes are higher for children from poorer households (Graph 2). The progressive movement on school attendance also emerges when the cumulative pattern of children that attend to school in the baseline and in the different scenarios is compared to the cumulative distribution of children aged 14 to 17. Lines representing the three scenarios are indistinguishable among themselves but lie in between the distribution of children and the pre reform situation (Graph A.1).

Graph 2

Attendance rates by scenario and income ventile. Children aged 14-17



Results presented up to now reflect that the equivalence scale used in scenario 1 reduces the additional monthly stipend received by the child and hence, the incentive to attend school is higher under scenario 2. We analyzed the distribution of children by income strata using different equivalence scales (0.4, 0.6, 0.8 and 1). The effect of the adjustment is considerably larger in the lower income strata, as larger households are placed there. Hence, the incentive to schooling provided by scenario 2 is higher in the first 6 ventiles and this explains differences across schooling behavior by scenario. A case for increasing the equivalence scale, or even not including this adjustment, could be done on this basis. Nevertheless, it must be kept in mind that we are not taking into account the potential effects on fertility, which could lead in the medium term to an increase in the size of poorer households as a response to the transfer.

Under the scheme of transfers that we are analyzing, changes in the behavior of teenagers aged 14-17 regarding school attendance can be attributed to different factors. There is a pure income effect due to the increase in household income because of transfers corresponding to children younger than 14. There is another direct incentive given by the transfer that strictly corresponds to the teenager. Our model does not allow disentangling these effects due to the income pooling assumption in the schooling equation, where the decision depends on total household income, despite the beneficiary of the transfer. In this setting, the effect due to the transfer to siblings equalizes the effect due to the transfer of the teenager, and so results are unchanged whether the target population of the transfer is constituted by the teenager or by his/her younger siblings. This is a limitation of our model, and further research should try to advance in modeling of these effects.

IV.3. Effects on poverty

Results on the effects on inequality and poverty include two additional static scenarios. The first one considers that the cash transfer has no effect on schooling, and so child schooling remains the same as present. This can be interpreted either as the removal of the

conditionality of the transfer or as a full take-up scenario. The second one considers that, as a result of the transfer, all children aged 6-17 attend school.

Simulation results indicate that the reform significantly reduces extreme poverty. The inception of the transfer scheme reduces indigence incidence between 40%-50% in overall households and the reductions of its intensity and severity are around 50% and 65% respectively, reflecting again a progressive pattern (table 8). As before, scenario 1 and scenario 3 show similar effects, whereas under scenario 2 the reduction in extreme poverty is a bit higher. Although indigence is low in Uruguay, the finding that *Asignaciones Familiares* contributes significantly to lower it, is relevant since the removal of *Ingreso Ciudadano* could have led to an important income loss for those households situated at the bottom of the income distribution.Confidence intervals where calculated using bootstraps. Changes in extreme poverty indexes are in all cases statistically significant.

Table 8. Extreme poverty indexes by scenario and presence of children in the household. Urban areas

	FGT 0				FGT 1				FGT 2			
	Est.	STD	LB	UB	Est.	STD	LB	UB	Est.	STD	LB	UB
All households												
Baseline	0,026	0,000	0,025	0,026	0,006	0,000	0,006	0,007	0,003	0,000	0,002	0,003
Static simulation												
No change in schooling	0,015	0,000	0,014	0,015	0,003	0,000	0,003	0,003	0,001	0,000	0,001	0,001
All children attend school	0,013	0,000	0,013	0,014	0,004	0,000	0,004	0,005	0,001	0,000	0,001	0,001
Behavioral simulation												
Scenario 1	0,016	0,000	0,015	0,016	0,004	0,000	0,003	0,004	0,001	0,000	0,001	0,002
Scenario 2	0,014	0,000	0,013	0,014	0,003	0,000	0,003	0,003	0,001	0,000	0,001	0,001
Scenario 3	0,016	0,000	0,015	0,016	0,003	0,000	0,003	0,004	0,001	0,000	0,001	0,002
Households with children												
Baseline	0,040	0,001	0,039	0,041	0,010	0,000	0,009	0,010	0,004	0,000	0,004	0,004
Static simulation												
No change in schooling	0,022	0,000	0,021	0,023	0,005	0,000	0,004	0,005	0,002	0,000	0,002	0,002
All children attend school	0,020	0,000	0,019	0,021	0,004	0,000	0,004	0,005	0,002	0,000	0,002	0,002
Behavioral simulation												
Scenario 1	0,024	0,000	0,023	0,025	0,005	0,000	0,005	0,006	0,002	0,000	0,002	0,002
Scenario 2	0,021	0,000	0,020	0,022	0,005	0,000	0,004	0,005	0,002	0,000	0,002	0,002
Scenario 3	0,024	0,000	0,023	0,025	0,005	0,000	0,005	0,005	0,002	0,000	0,002	0,002

Source: own calculations based on household surveys

Poverty incidence decreases around 1 percent point for the population as a whole and 2 points for households with children (Table 9). Although this reduction is mild compared to that of indigence, poverty incidence falls 5% and it is statistically significant. Again, the reduction of the intensity (around 13%) and severity (around 21%) of poverty is higher, reflecting a progressive pattern. The three scenarios yield similar results.

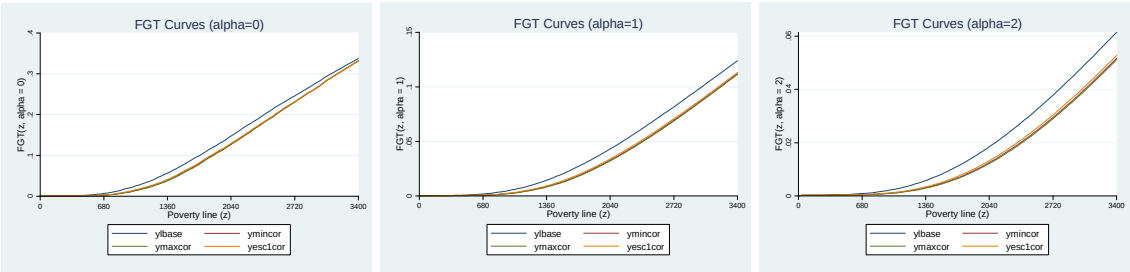
Table 9. Poverty indexes by scenario and presence of children in the household. Urban areas

	FGT 0				FGT 1				FGT 2			
	Est.	STD	LB	UB	Est.	STD	LB	UB	Est.	STD	LB	UB
All households												
Baseline	0,258	0,001	0,256	0,260	0,088	0,000	0,087	0,089	0,042	0,000	0,041	0,042
Static simulation												
No change in schooling	0,245	0,001	0,243	0,248	0,076	0,000	0,075	0,077	0,033	0,000	0,033	0,034
All children attend school	0,245	0,001	0,243	0,247	0,075	0,000	0,074	0,076	0,033	0,000	0,032	0,033
Behavioral simulation												
Scenario 1	0,246	0,001	0,244	0,248	0,077	0,000	0,076	0,078	0,034	0,000	0,034	0,035
Scenario 2	0,245	0,001	0,243	0,247	0,075	0,000	0,075	0,076	0,033	0,000	0,033	0,033
Scenario 3	0,247	0,001	0,245	0,249	0,078	0,000	0,077	0,078	0,034	0,000	0,034	0,035
Households with children												
Baseline	0,379	0,002	0,376	0,383	0,132	0,001	0,131	0,134	0,064	0,000	0,063	0,064
Static simulation												
No change in schooling	0,359	0,002	0,355	0,362	0,113	0,001	0,112	0,115	0,050	0,000	0,050	0,051
All children attend school	0,357	0,002	0,354	0,361	0,112	0,001	0,111	0,113	0,049	0,000	0,049	0,050
Behavioral simulation												
Scenario 1	0,360	0,002	0,357	0,363	0,115	0,001	0,114	0,116	0,052	0,000	0,051	0,052
Scenario 2	0,358	0,002	0,355	0,361	0,113	0,001	0,111	0,114	0,050	0,000	0,049	0,050
Scenario 3	0,362	0,002	0,358	0,365	0,116	0,001	0,115	0,117	0,052	0,000	0,051	0,053

Source: own calculations based on household surveys

This progressive pattern of the transfer is shown in Graph 3, where the distance of the FGT curves increases with the poverty aversion parameter, despite the poverty threshold. As long as curves corresponding to scenarios 1, 2 and 3 overlap, we only present microsimulations corresponding to scenario 1, the two static scenarios and the baseline curve. In this case, differences by scenario increase with the parameter of poverty aversion, showing that the conditions mainly affect poorer households. This finding suggests that the introduction of the conditions could turn into a loss of the poverty reduction power of the intervention, result that is not clearly seen when considering aggregate indexes instead of curves.

Graph 3



IV.4 Effects on inequality

The program entails a reduction in inequality: for all scenarios, Gini coefficients decrease around one point (table 10). Confidence intervals for the simulated Gini coefficient do not overlap with the baseline index, indicating that the reduction is statistically significant. Differences between the three behavioral scenarios are not statistically significant.

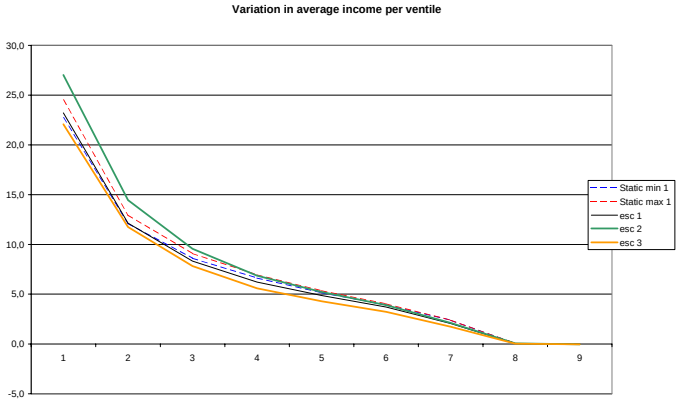
Table 10. Gini indexes by scenario

Scenario	Estimate	STD	Lower Bound	Upper Bound
Baseline	45,5	0,1	45,2	45,7
Static simulation				
No change in schooling	44,6	0,1	44,4	44,8
All children attend school	44,6	0,1	44,3	44,8
Behavioral simulation				
Scenario 1	44,7	0,1	44,5	44,9
Scenario 2	44,6	0,1	44,4	44,8
Scenario 3	44,7	0,1	44,5	45,0

Source: own calculations based on household survey

The redistribution operates increasing average incomes from the lowest strata in a higher proportion (Graph 4). This outcome results from two facts: attendance grows faster in the lower strata and the transfer represents a bigger share. Although the pattern is the same in all the scenarios, scenario 2 performs better in terms of changes in income for poorer households.

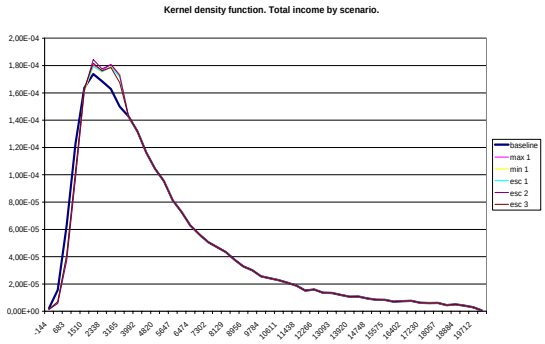
Graph 4

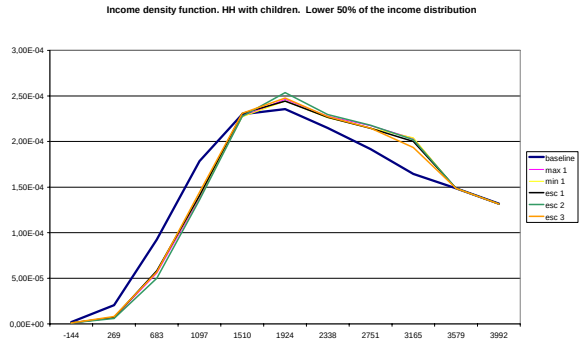


Changes in the income distribution are illustrated by kernel density functions (Graph 5). There is a movement to the right due to changes in the situation of households with children. Again, different scenarios show similar patterns.[8]

[8] As expected, the cash transfer generates movements of households along the distribution: a considerable percentage of households that do not have children and belong to the lower half of the distribution are downwards re-ranked.

Graph 5





As a final exercise, we analyzed the role of the targeting method. The interferences generated by the use of proxy-means tests to target beneficiaries are not usually addressed in the literature. We compared the effects of the program on the ideal target population with the ones obtained when the proxy means score is used to select beneficiaries. Effects on schooling, poverty and inequality are very similar whether we assume perfect targeting or we calculate the proxy means, suggesting that efficiency losses due to the use of a proxy means test to select the beneficiaries are not important, provided the information given by households is accurate.

IV.5 Effects on adult labor supply

In order to microsimulate behavioral responses of adult labor supply we estimated a labor supply model for adults, and we used the corresponding parameters to simulate the effect of changes in cash transfers under the three scenarios considered. By doing so, we are able to assess the potential effects of the transfer on adult labor supply, although we do not fully endogeneize labor supply within the model previously presented. Nevertheless, the exercise provides useful information about what to expect in terms of adult labor market behavioral responses to cash transfers, and sets questions for further research.

The traditional formulation of the labor supply model considers that:

$$H = h(W, V, X, \varepsilon) \text{ if } W > W_r$$
$$H = 0 \text{ if } W < W_r$$

Where W is the wage rate, V is non wage income, X are other variables determining labor supply, W_r is the reservation wage and ε is a random disturbance term. The estimation of this labor supply model faces the problem of constructing a wage variable for all individuals that may participate in the labor market. Specifically, it is necessary to predict wage rates for those who are not working, as the wage rate is missing for them. A way to deal with this sample selectivity problem is to estimate a Tobit model, also called standard censored regression (Amemiya, 1984), where the wage is replaced by human capital variables that are available for all the individuals. This method assumes that individuals are able to modify their observed hours of work at the margin as a consequence of a policy

reform, an assumption that has been criticized in the literature[9]. We argue that, although this assumption may be non realistic all workers, it may be a reasonable approach in our case. We are considering low skilled workers, highly concentrated in occupations such as domestic service in the case of women or construction in the case of men, or working as self employed (without investment). The nature of their labor market adscription may allow for more flexibility in changes in hours of work at the margin.

Results from the labor supply equation using the Tobit method (maximum likelihood estimation) for eligible households (both in terms of income and the presence of children) are presented in Table 11. Three equations were estimated, considering separately household heads, spouses and other adult household members' labor supply.
The coefficients obtained for the variables reflecting personal characteristics show the expected signs. Specifically, hours of work are decreasing with age and are higher for men in the three cases. Years of schooling has the expected positive sign, being its magnitude considerable lower for household heads. Controls reflecting region of residence (omitted variable is the capital, Montevideo) indicate that living in rural areas is associated with higher hours of work for household heads, but the contrary holds for spouses and other members of the household.
Average years of schooling are associated with higher hours of work both for household heads and spouses, but not for other members. The presence of children aged 0 to 5 has a negative effect on hours of work for both household heads and spouses, and the magnitude higher for the latter, as expected. On the contrary, the variable yields a positive sign for other members of the household. To interpret this two last results, it is worth noting that half of these other members in eligible households are younger than 24.
In the household heads equation, their own non labor income (in logs) is included as a dependent variable, showing the expected negative sign. In the case of spouses, household head's income is included, showing again the expected negative sign. In the equation for other members, both income from household head and spouse are included, and they present the expected negative association with hours of work.
A variable reflecting average years of schooling of adults in the household has been also included in order to reflect structural household conditions. It yields a positive and significant coefficient for household heads and spouses, and a negative sign for other members.
Our interest variable, income from non contributory transfers (in logs) is significant both for household heads and spouses, presenting the expected negative sign and a small magnitude. This result indicates that both household heads and spouses would be affected by transfer income to the extent of changing their labor behavior, and the effect is higher for spouses.

[9] Literature discussing labor supply modeling has been abundant, because many computational and analytical problems are involved. Two approaches have been proposed to model the choice of hours: they may be considered as a continuous and unconstrained (Moffitt 2002) or they may be treated as a number of finite outcomes, assuming for example that there is a choice between no work and part or full time work (Creedy and Duncan 1999).

Table 11. Labor supply estimation. (Tobit)			
	Household head	Spouse	Other members
Age	-0.600	-0.214	-0.182
	(54.76)**	(9.27)**	(8.66)**
Sex	15.691	28.551	22.121
	(53.22)**	(33.74)**	(38.69)**
Years of schooling	0.479	1.493	2.428
	(7.99)**	(14.75)**	(18.71)**
Major urban areas (exc. Mdeo)	0.850	0.635	-0.520
	(3.30)**	(1.35)	(0.88)
Minor urban areas	0.113	-9.933	-8.030
	(0.23)	(10.96)**	(6.61)**
Rural areas	8.127	-4.047	-6.007
	(16.39)**	(4.63)**	(4.59)**
Average years of school. (hh)	0.631	1.647	-2.267
	(8.97)**	(13.17)**	(14.17)**
Children 0-5	-4.302	-8.091	2.719
	(16.80)**	(16.91)**	(4.58)**
Non labor personal income	-1.799		
	(53.59)**		
Household head income (ln)		-1.494	-0.668
		(11.92)**	(4.82)**
Spouse´s income (ln)			-0.673
			(9.79)**
Transfers income (ln)	**-0.507**	**-0.906**	**0.014**
	(9.58)**	**(9.04)****	**(0.11)**
Constant	49.136	7.372	10.013
	(62.96)**	(4.25)**	(5.35)**
Observations	38069	29730	21208
Absolute value of t statistics in parentheses			
* significant at 5%; ** significant at 1%			
Source: own calculations based on household survey			

We carried out the microsimulation for household heads and spouses. The parameters obtained from their supply equation were used to predict their hours of work once households received the conditional cash transfer. Residuals were simulated assuming a normal distribution.

The amount of the cash transfer used for the microsimulation is given by the results from the simulation carried out in the previous section (considering the three scenarios). This means considering the studying status of children predicted by the previous model and implicates assuming that once the new regime is established, households choose the work/study status of the child and after that spouses´ labor choices are done. Comparisons of the predicted hours of work before and after the new cash transfer are presented in table 12.

Among eligible households, the cash transfer would imply a reduction of four hours of work per month for household heads, and of around of three hours per month for spouses.

In the three scenarios, the simulated hours of work do not belong to the confidence interval of the baseline hours of work, indicating that the change is statistically significant. Results from the three scenarios do not differ. For the whole population, the average change is of a very small magnitude.

Table 12. Microsimulation of changes in hours of work per week for household heads and spouses

	Household heads			Spouses		
	Predicted hours of work (weekly)	95% confidence interval		Predicted hours of work (weekly)	95% confidence interval	
			All			
Baseline	40.4	40.3	40.5	32.3	32.2	32.4
Scenario 1	40.1	40.0	40.2	32.1	32.0	32.2
Scenario 2	40.1	40.0	40.2	32.1	32.0	32.2
Scenario 3	40.1	40.0	40.3	32.1	32.0	32.2
			Elegible households			
Baseline	37.3	37.1	37.5	28.4	28.3	28.5
Scenario 1	36.4	36.2	36.6	27.6	27.5	27.7
Scenario 2	36.4	36.2	36.6	27.6	27.5	27.7
Scenario 3	36.4	36.3	36.6	27.6	27.5	27.7

Source: own calculations based on household survey

As mentioned before, the occupational profile of this population allows some flexibility in terms of decisions of hours of work, so these results suggesting a reduction in the intensive margin of working hours seems plausible. It must also be said that it may be in line with preliminary results from an ex post evaluation of Ingreso Ciudadano, that shows weak signs of a negligible reduction in hours of work for women as an effect of the program (Amarante et al, 2008; Borraz and Gonzalez, 2008).

These results must be interpreted with caution. In the case of spouses, almost a third of them work as domestic service, in most cases engaged by different households 2 or 3 hours a week for an hourly wage. In the case of household heads, one third of them work as unskilled laborers and domestic service, and almost 60% are informal workers. So they are reducing hours of work in precarious and low paid jobs. This could also imply more time spent at home and with children.

As long as this exercise was not integrated in the whole microsimulation, we are not taking into account the reduction in household income derived from this reduction in hours of work (substitution effect). This effect is probably very low, as hourly wages for this population are the lowest in the labor market. Nevertheless, if we believe that there is some income substitution within the household because of the response of spouses, the impacts on poverty and indigence reduction presented in the previous section would be slightly overestimated.

V. Concluding remarks

This paper presents an ex ante evaluation of a conditional cash transfer program. Results on schooling indicate that that teenage attendance rates might be increased between six and eight percent points as a result of the policy change. This increase in school attendance shows a progressive pattern. The higher incentive for schooling is provided by the scenario which includes a higher transfer for secondary school students and does not consider equivalence scales. This scenario also maximizes progressiveness. A case for increasing the equivalence scale, or even not including this adjustment, could be done on this basis. Nevertheless, it must be kept in mind that we are not taking into account the potential

effects on fertility. The magnitude of the change in school attendance is very similar to the one found in the ex ante evaluation of *Bolsa Escola.* Unfortunately, our model does not allow disentangling the effect due to the transfer to the teenager and the effect due to the transfer to siblings. Further research should try to advance in modeling of these effects.

The new program reduces significantly extreme poverty, and there is also a decrease in the intensity and severity of poverty. Effects on poverty incidence and inequality are moderate. The removal of conditionalities does not entail a significant change in the progressiveness of the regime in terms of indigence, poverty and inequality.

Finally, the transfer may influence adult labor supply, inducing a reduction of hours of work for household heads and spouses. This result does not necessarily entail a negative consequence, as most of these workers have precarious and low paid jobs, and the substitution effect would allow them to stay more time at home. Nevertheless, if there are labor supply responses, our findings in terms of indigence, poverty and inequality changes might be overestimated.

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Annex 1. Tables and graphs

Table A.1. Children aged 0 to 18 by income group and coverage of old Asignaciones Familiares. 2006

	Children aged 0 to 18	Beneficiaries of old *Asignaciones Familiares* regime	Children aged 0 to 18 that do not receive *Asignaciones Familiares*	% required to cover the whole group
Hh. below the poverty line	488.978	324.088	164.891	50,9
First income quintile	328.795	224.558	104.236	46,4
Hh below the indigence line	65.896	36.094	29.802	82,6

Source: ILO (2007)

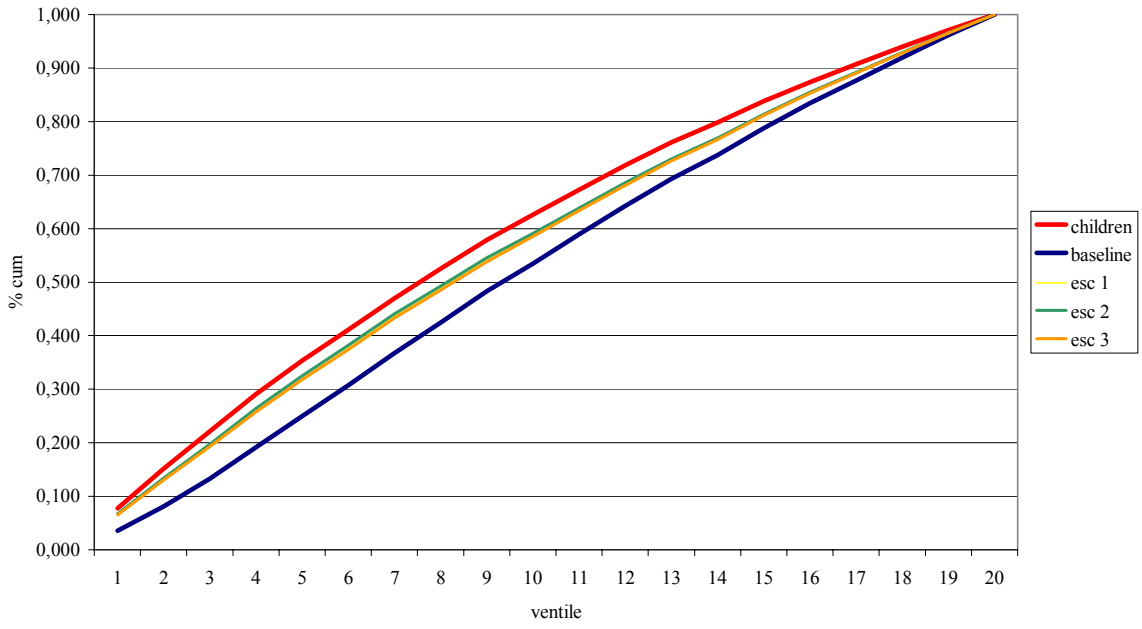
Table A.2. Analysis of children aged 14 to 17 that do not study nor work. 2006

	All children		Boys		Girls	
	Incidence	Distribution	Incidence	Distribution	Incidence	Distribution
Neither studying nor working	13,05	100,0	13	100,0	13,12	100,0
Domestic work	5,73	43,9	3,45	26,5	8,17	62,3
Working (module of child work)	0,2	1,5	0,28	2,2	0,11	0,8
Unemployed	3,2	24,7	4,13	31,8	2,26	17,2
Neither studying nor working	3,9	29,9	5,14	39,5	2,58	19,7

Source: own calculations based on household surveys

Graph A.1

Cumulative proportion of total children and attending school by scenario and income ventile. Age 14-17



Annex 2 Dogit estimator

Discrete choice models are frequently used in microsimulation exercises to analyze the effects of policy reforms on agents decisions on a set of alternatives. By far the multinomial logit model is the specification more oftenly used in empirical applications. This model provides a convenient closed form for underling choice probabilities allowing a relatively simple estimation.

However, it is widely known that that a potentially relevant drawback of these models is the underlying assumption of independence from irrelevant alternatives (Hausman and McFadden, 1984). This property states that the ratio between the probabilities of any two alternatives *i* and *j* is independent of the characteristics of any other alternative belonging to the choice set. For example, in the context of the model estimated in this paper, it implies that the probability of choosing "only studies" relative to that "only works" is independent of the possibility of "studies and works" simultaneously.

The Dogit model was introduced by Gaudry and Dagenais as an alternative discrete choice model that is in general unconstrained by the independence from irrelevant alternatives assumption. Harris y Duncan (2002) use dogit models in the context of microsimulation analysis. Dogit probabilities are given by:

$$P_i = \frac{e^{V_i} + \theta_i \sum_j e^{V_j}}{\left(1 + \sum_j \theta_j\right)\sum_j e^{V_j}} = \frac{e^{V_i}}{\left(1 + \sum_j \theta_j\right)\sum_j e^{V_j}} + \frac{\theta_i}{\left(1 + \sum_j \theta_j\right)} \quad i, j = 1,...,M$$

Where P_i is the probability of the i^{th} of M choice alternatives; θ_i is the parameter associated to the ei^{th} alternative; V_i if a function of the K independents attributes (X_{ik}). If all θ_j are zero, the dogit model collapses to the multinomial logit specification. Therefore, logit is a particular case of dogit model. The parameters of the both model have the same interpretation. The model can be consistently estimated using the maximum likelihood estimator.