

Macro Shocks and Schooling Decisions: The Case of Argentina*

Graciana Rucci[†]

University of California at Los Angeles, CA, USA

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Abstract

This paper uses the Argentine Permanent Household Survey which covers 29 cities over the period 1996-2002 to study the impact of the Argentine crisis that began in 1998 on children's schooling decisions. Attendance may be affected by shocks in real income if borrowing constraints exist. An economic shock creates credit market problems and youths may drop out of school to work in order to help smooth household income.

Our findings indicate that real household incomes fell by 55% and that the probability of attending school decreased by 4.7-12% for 12-17 year olds. These results could reverse the 2-17% gain in attendance that had been achieved with the educational reforms of the middle 1990s if, in the medium run, the youths do not go back to school.

Key words: borrowing constraints; schooling decisions; poverty.

JEL classification: I30; I20; I28.

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[†]Correspondence to: Graciana Rucci, 3181 Sepulveda Blvd., Apt 208, Los Angeles, CA 90034, USA. Tel: (310) 9159390. E-mail: grucci@ucla.edu

1 Introduction

Argentina is suffering the deepest and longest recession in its history. The nature of the crisis is complex and the consequences are many. During the late nineties, and after several years of growth, Argentina faced several macroeconomic shocks which precipitated the current economic depression. Real incomes fell by 55% over the period 1998-2002.

Macroeconomic crises are frequent in less developed economies and the way that families react in the face of unexpected changes in the economic situation may have dramatic long run consequences on the well-being of the society. The Argentine crisis constitutes a natural experiment which can be used to study the economic impact of macro shocks on people's welfare in developing countries.

This paper addresses the issue of how the economic crisis affected schooling decisions. The economic shock created liquidity constraints and in response, youths might drop out of school to work. We use data from the Permanent Household Surveys of main urban centers in Argentina from 1996-2002 to answer this question.

We characterize the crisis using the Brazilian nominal exchange rate -real per dollar- because huge changes in this rate were the biggest shocks and were arguably exogenous to Argentina as well as being unexpected. We argue that this exchange rate is a good instrumental variable for household income. We include different measures of income as proxies of welfare. We expect large effects on the incomes of household heads and weaker ones on total household income and youth incomes if families are able to smooth income. We first look at the impact of the crisis on household welfare and ask whether households were able to smooth the losses in income of the household head. We find that households did smooth some of this loss.

Having children drop out of school is one of the strategies that families may have implemented in order to smooth income. We concentrate on 12-17 year olds because recent efforts to increase schooling attendance have focused on this group, and because teenagers may be in a position to help their families by earning income. Schooling attendance is normally mandatory until age 14, and virtually all children between 6 and 12 attend.

We then study schooling decisions. Newspapers reports suggest that as many as 15% of high school children left school to support their families as a result of the crisis, while government reports emphasize that attendance has not been affected. Since 1993 increasing attendance among youths has been a main goal of government policy. Structural reforms changed the mandatory years of basic education from 7 to 10 in an effort to retain children in school beyond the primary years.

We find that the crisis impacted schooling attendance of youths. In particular, children belonging to households with parents with low level of education were affected more severely.

Lack of education in this age group might entail changes in society that could be more permanent if the youths do not come back to school when the recession is over. And it could also reverse the trend of increasing years of education over the past decade.

The rest of the paper is organized as follows. Section 2 presents some background on the situation in Argentina and a literature review. Section 3 describes a conceptual framework for schooling decisions. Section 4 focuses on data and Section 5 describes the methods. Results are presented in Section 6 and conclusions follow in Section 7.

2 Background

2.1 The Argentine context

2.1.1 The economic situation and a big macro shock

In the 90s, Argentina adopted a currency board system. The main characteristic of this system is that the board stands ready to exchange domestic currency for the foreign reserve currency at a specific and fixed rate. To perform this function the board is required to hold realizable financial assets in the reserve currency at least equal to the value of the domestic currency outstanding.

The currency board was a strong tool for transforming the monetary and financial system after long periods of inflation. For almost a decade, the country received huge capital inflows from abroad: investment increased 35% from 1993 to 1998, GDP grew at a rate of 5% per year, and the country used external savings for a long period. Argentina had an intensive trade in the region, exported commodities and some industrial goods.

Today, after almost a decade of high economic growth, Argentina is suffering a deep recession; probably, the hardest and longest political, social and economic crisis in its history. It began in 1998 and it is still worsening. The unemployment rate is near 22% according to official statistics, investment has fallen 60%, and GDP has decreased 20% since 1998. Capital inflows that were 6% of the GDP in 1997/98 and 3% in 2000 became an outflows in 2001. Export prices fell 15% from 1995 to 2001. The depreciation of commercial partners' currencies (Europe, Brazil and Chile) and the impossibility of adjusting the Argentine peso made Argentina lose exports.

The exogenous shocks that Argentina faced were of an unusual size. They began with the Asian crisis in 1997 which led to a fall in commodity prices that affected cities with large primary goods exports. The Russian default

in 1998 led to a rise in the spread for all emerging economies, and impacted areas with high level of external investments.

The Brazilian devaluation in 1999, and the following variations in the real-per-dollar exchange rate, had a particularly large impact on Argentina because Brazil is a big economy which is highly integrated with Argentina. For instance, more than 40% of Argentine exports go to Brazil. The main channel of impact has been through a huge decline in aggregate demand. We argue that this real-per-dollar exchange rate is one way to measure the effects of the continuing Argentina crisis and it is exogenous to Argentina.

Different economic measures suggest that the Brazilian devaluation and the following crisis were widely unexpected. For instance, the spread of interest rates between deposits in pesos and deposits in dollars is a very sensitive indicator of people's expectations about the future. If people expect that a bad shock is coming, they switch from peso to dollar accounts instantaneously, as a way of self-insurance. Therefore, upward variations in the interest rate of peso accounts relative to dollar accounts would suggest domestic uncertainty and risk. The Central Bank's statistics show that not only the spread among interest rates but also the levels did not change before July 2001.¹

Moreover, the Argentine financial system was widely developed and people used the banking system a lot during the nineties. This means that almost all medium and large savers had their savings in the domestic banking system. In fact, the Argentine devaluation that took place in 2002 surprised at least 90% of the savers who had their savings in the Argentine banking

¹30-60 day saving accounts in pesos and in dollars offered an annual interest rate of 8-9 and 5-7 %, respectively, from January 1996 to January 2001. In July 2001, the rates grew 21% and 10% respectively, and during April 2002, they changed to 46% and 5% respectively.

system. Hence, it is very difficult to believe that people expected any of the previous shocks.

We focus on the Brazilian devaluation, and consequent nominal exchange rate variations, because they were the largest shocks. The devaluation created incredible variation in the magnitude of the real-per-dollar nominal exchange rate. The Brazilian exchange rate rose from .89 in 1996 to 2.34 in 2002 for a positive change of 162%.² We exploit this dramatic variation in order to identify the effect of exogenous macro shocks on welfare.

2.1.2 The schooling system

Seven years of elementary education corresponding to primary school have been mandatory in Argentina since 1884. Primary and secondary schooling have traditionally been public³ and free. Up to the nineties, primary schooling involved school attendance from 6 to 12 years and secondary schooling, from 13 to 17 years old. According to the Population Census, the primary schooling's attendance rate was 96.9% and the secondary schooling's attendance rate was 66.8% data in 1991.⁴ In 1993, a national law increased the period of obligatory schooling to 10 years by including the last year of pre-school (5 years old) and the first two years of high school (13-14 years old). It was hoped that this change would also encourage youths to stay longer

²During the period considered in this paper, the Brazilian inflation rate was very low and did not change (it was lower than 9%). Then, the changes in the Brazilian real exchange rate come only through variations in the nominal exchange rate. Because of this, and even considering that the effect is through an aggregate demand channel, we will focus on the nominal rate's variations.

³Official statistics from the Educational Ministry are only available for 1996-2000. They estimate that private schools concentrated 20% of primary school's students during this period, and 28% of the high school students in 1996 and 27% of them in 2000.

⁴These rates vary across provinces, from 89.4% to 99.3 in primary schooling's rates, and from 49.4 to 87.7% in high school's rates in 1991.

and attend the last three years of high school.

Implementation of the change meant significant investments in physical and human capital to adapt old schools to the new system and to create new ones. Therefore, it was not instantaneous and results are from 1996. The law establishes that the federal, provincial and municipal governments should guarantee free and public education at all levels: preschool (3-5), primary school (6-12), high school (13-17), undergraduate and graduate. They also have responsibility for control of quality and attendance.

According to the rates before the crisis, schooling attendance was increasing, on average, at 1% rate per year among 12-13 year olds and 4% rate per year among 14-17 year olds.

Figure 1 summarizes the percentage of people of different ages attending school in May 1996 and May 2002. Unfortunately, we do not have similar data for previous periods but the evidence is clear. Among 6-12 year olds, the percentage in attendance was 99%. For younger and older groups, the rates are much lower. The problem of quitting school is dramatic and increasing across age groups after 13. But comparing both years, it seems to be the case that schooling attendance has been improving over time.⁵

However, Figure 2 shows that schooling attendance among teenagers increased until 2001. And at the end of 2001 and beginning of 2002, the increasing pattern disappears.

The timing suggests that the economic crisis slowed or even interrupted the increasing attendance that Argentina experienced during the nineties. In

⁵Official Statistics from the National Educational Ministry on grade repetition are only available from 1996-2000. They report the following repetition percentages: 13.7% in 1996 and 10.6% in 2000 for first grade of high school (13 years old); 13.6% in 1996 and 9.1% for second grade of high school (14 years old). Considering the 5 year period of high school, they estimate them as 10% in 1996, and 8.1% (first two years) and 2.3 % (last 3 years) in 2000.

a context of borrowing constraints, changes in household incomes could cause changes in human capital investments. Credit markets for individual education have never existed in Argentina and the crisis meant the disappearance of most other forms of credit. The link between human capital accumulation and income is one of the main questions of this paper and we will study it in next sections.

2.2 Literature and evidence for other countries

The literature on the effects of economic crises in developing countries is extensive and varied. But past analyses of the impact of crises on welfare have some common factors. They mainly use two measures of welfare: real earnings and consumption. Each measure has advantages and disadvantages related to measurement error, cost of collection and smoothness. Ideally, we would like to have surveys that collect both kinds of data at the individual and household levels. But we have only income data and therefore, we will focus on real earnings.

The other main issue in this literature is how to measure macro shocks. Some authors use the community-specific mean change in the logarithm of per capita income or the average change in the logarithm of per capita consumption. Ruhm (2000) stresses state unemployment rates as the primary indicator of macroeconomic conditions. The National Bureau of Economic Research (2001) emphasizes employment, real personal income, volume of sales in the manufacturing and trade sectors, and industrial production as indicators of recessions in United States. We will use the Brazilian nominal exchange rate as the measure of the shock in order to eliminate any problem of endogeneity in proxing the shock. As we discussed above, the Brazilian devaluation was the most dramatic shock. It created huge variations in the nominal exchange rate over time and it was especially unexpected.

The previous literature suggests several things that households undertake in order to smooth the impact of a crisis. We can distinguish among ex-ante and ex-post mechanisms.

The use of savings, previous investments, migration are some ex-ante possibilities. As an example, Rosenzweig and Wolpin (1993) use longitudinal Indian household data to show that investment in bullocks has an important role in smoothing consumption when income is exogenously variable and borrowing is constrained. Rosenzweig (1988) finds that in low-income rural settings in India, the geographical dispersion of households constitutes an income smoothing mechanism. If one area faces a negative shock, members of the family in other villages transfer income to the damaged family. These transfers reduce the variability of pooled incomes. Moreover, marriages across villages are also a way of getting income insurance (Rosenzweig and Stark (1989)).

The presence of these kinds of mechanisms in the Argentina of the nineties is limited for several reasons. In general, the previous literature does not apply to middle income countries like Argentina. The Argentine economy was highly dollarized and the financial system was widely developed: so people trusted in domestic markets.

Ex-post decisions have also been studied and they will be the main focus of this paper. Changes in labor force participation are a possible behavioral response. Smith, Thomas, Frankenberg, Beegle and Teruel (2000) use the Indonesia Family Life Survey to analyze the impact of the Indonesian crisis -a large devaluation in 1998- on labor market outcomes. They find evidence that the main shock lay not in aggregate employment but in the real hourly earnings of both men and women. Employment remained stable but there was switching between sectors. Comparing the decline in real household incomes with the decline in individual hourly earnings, they show that households are able to partially smooth the consequences of the crisis.

Frankenberg, Smith and Thomas (2002) stress changes in the size and composition of households as well as changes in labor supply as smoothing mechanisms during the Indonesian crisis. They find that households became larger and that some consumer members in the family became earners. At the same time, and because the crisis implied a change in relative prices, people cashed in more liquid assets, such as gold in rural areas.

McKenzie (2003) studies the effect of the 2002 devaluation in Argentina (i.e. the last shock in the crisis) on incomes and labor market responses. He finds that the main effect was on real incomes for all sectors of the economy and that total household labor hours per week declined. He also concludes that there are not evidence of changes in household sizes.

In the case of Argentina, teenagers becoming earners could be one of the mechanisms to smooth income since they may be in a position to help their families by earning income. Even with a worse household real income than before the crisis, it is possible that the head income decreased dramatically because he or she lost the job or worked less hours but young members began to contribute to the household budget.

2.2.1 On Schooling decisions

Decisions about investments in schooling are also a possible behavioral change undertaken to smooth the effects of an economic crisis. With borrowing constraints, some household members could leave school to work - at home or outside- or they might leave only because schooling consumption is too expensive. Therefore, there can be income effects that may influence investment allocations within a household. If there were no borrowing constraints, young people might increase educational attainments since the opportunity cost of schooling in terms of lost earnings would be lower with the recession.

Another reason to change human capital investment decisions could be a change in the returns to schooling. For instance, youths could decide to

leave school if returns to school fall dramatically.

In the case of Argentina, we cannot argue that educational consumption has a high price because the main system is free. However, credit constraints may bind.

Moreover, it is hard to believe that returns to schooling are falling with the crisis. Previous research on past Argentine crises found that schooling returns not only did not fall but increased with bad macroeconomic shocks. Pessino (1995) estimates schooling returns in Greater Buenos Aires from 1986-1993 using the Permanent Household Survey. She found that the average rate of return to education for 25-54 year old men increases with a crisis, especially for the less educated groups in the population. For instance, during the first subperiod she studied, 1986-1989, the rate of return to education increased by almost 3 percentage points, from 10 percent to almost 13 percent.⁶⁷

In any case, changes in demand for education may have long-run consequences at the household level and in society. In Latin America, there is a great deal of concern about low schooling attainment among children from poor families. Youths who quit school at early ages seldom go back. And even when the economy recovers, after some years of working, many will prefer to work rather than study.

Filmer and Pritchett (1998) show that the Latin American pattern is characterized by almost universal enrollment in grade 1 but high levels of dropping out between the 4th and 6th grades. For instance, in Brazil 92% of the poor complete grade one but only 50% complete grade 5 (data from 1996). Panadeiros, Susmel and Nores (1998⁸) study the educational reform

⁶Pessino (1995) also estimates marginal returns to education by level during 1985-1993. The rates range from 2-8% for primary school, from 8-18% for high school and from 10-20% for college.

⁷In early years the Permanent Household Survey was only available for Greater Buenos Aires.

⁸Fundacion de Investigaciones Económicas Latinoamericanas, FIEL

that took place in Chile in the early 1980's. The main goals of the reform were to increase enrollment and lower drop out rates. The results show that even though enrollment rates for basic education were stable during the last 25 years and around 95%, the reform dramatically lowered drop outs, repetition and mean time to complete primary school. In 1981, 8.1% of children left school before completing primary school compared to 1.7% in 1995.

Thomas, Beegle, Frankenberg, Sikoki and Teruel (2001) find the Indonesian crisis had an extremely negative effect on school attendance among the poor, especially among young children with older siblings in the same household.

Jacoby (1994) uses grade repetition data from Peru to show that if parents have borrowing constraints and child time is valuable in home or in market production, children will gradually withdraw from school to work in order to smooth household consumption. Jacoby and Skoufias (1997) study the response of human capital investments in children to fluctuations in family income using panel data from India. They find that seasonal fluctuations in school attendance constitute a form of self-insurance when households face unexpected income shocks.

Data shown below suggests that the Argentine crisis created liquidity constraints for families and evidence of smoothing behaviors which suggests youths might drop out to work.

This finding would be particularly important for policy makers in developing countries and international agencies who should take into account the potentially permanent effects of economic crises when they consider policies designed to mitigate the effects of the shocks. Moreover, the Argentine crisis may highlight that a subsidy targetted at young people from poor families is a useful tool for keeping them at school for a longer period of time.

3 A conceptual framework

Schooling decisions are essentially investment decisions: present sacrifice for future benefit. Under the heading of investment theory, economists have addressed the problem of how to choose rationally in situations that involve a trade-off between the present and the future. More precisely, the object of investment is taken to be one's consumption pattern over time.

Any person's choice over time will be determined by his preferences and his opportunities. It is useful to distinguish two components of the opportunity set: productive opportunities (i.e. investment) and exchange opportunities (i.e. borrowing and lending).

The problem of the individual with productive and exchange opportunities is to maximize

$$U(x_1, x_2)$$

$$\text{subject to } g(y_1, y_2) = k \text{ and } p_1x_1 + p_2x_2 = p_1y_1 + p_2y_2 \quad (1)$$

where $g(x_1, x_2) = k$ denote the opportunities for transforming present consumption into future consumption using the available technology and endowments. The market prices of present consumption and future consumption are p_1 and p_2 , respectively. We distinguish between the bundle produced, (y_1, y_2) and the bundle consumed (x_1, x_2) . If there are no trade possibilities, the produced and consumed bundles are the same.

The key Proposition (Fisher separation theorem) is that the optimal decision in a regime of perfect and complete markets can be thought of as taking place in two stages. First he locates his productive solution maximizing wealth. Then he locates his consumption solution maximizing utility by borrowing or lending.⁹

⁹If there is uncertainty and as long as we can assume a regime of perfect and complete

It should be emphasized that maximizing wealth means adopting all the investment projects that have a positive net present value.¹⁰ Thus, using the proposition stated above, the adoption of the net present value rule is consistent with the intertemporal optimum of the individual. As an obvious corollary, if two available projects are mutually exclusive, the one with larger net present value should be chosen.

Under imperfect and/or incomplete markets¹¹ maximizing wealth (i.e. the NPV rule) is not necessarily consistent with the intertemporal optimum of the individual.

The main features of the model for analyzing schooling decisions are:

- The agent is a household with a child.
- The household has only one potential investment: sending the child to school.
- Schooling implies a lower wage today and a higher wage tomorrow.

Three basic assumptions are needed: 1) At the market interest rate, the project has a positive net present value; 2) households prefer more to less; and 3) households have a preference for consumption smoothing.

Therefore, on one hand, a household with access to borrowing at the prevailing market interest rate will send their child to school. Since education implies a higher level of wealth for the family, and more is preferred to less, the child is educated.

markets, the Fisher Separation Theorem holds. Therefore, the present value rule keeps to be consistent with the intertemporal optimum of the individual.

¹⁰We are assuming the the production frontier consists of a set of independent projects ordered according to their rate of return.

¹¹Borrowing constraints exist when we cannot borrow as much money as we would like.

On the other one, in a household with no access to borrowing at the prevailing market interest rate, not educating their child can be supported as an equilibrium. If the household has a strong preference for consumption smoothing, it maximizes utility by not choosing the schooling investment.

One consequence of an unexpected shock is that households could lose access to credit, or to the resources of other household members.¹² Therefore, not taking the schooling investment may be the optimal decision.

The Argentine crisis was highly unexpected: 90% of medium and large savers and investors had their savings in the domestic financial system and were surprised. Also, we may expect poor and less educated people to have faced the biggest negative shocks. The most disadvantaged families had smaller savings and, fewer possibilities of getting any kind of credit. We expect young people with low educated parents to leave school firstly.

4 Data

The main source of data for this project is the Permanent Household Survey from 1996 to 2002. It is a national socio-economic survey that began in 1972 with a few cities and has been modified and enlarged over time. Today, it covers 29 urban centers, which represent 70% of the national urban population and, 61% of the national population. It is important to note that the rural population in Argentina is less than 10% of the total population. There are two waves per year, in May and October.¹³

This survey is the only one that covers almost the entire country over a long period of time. Moreover, it has been improving and adding new areas

¹²Uncertainty does not play a key role in our issue but if there where uncertainty, we just only need to take into account expected values for all the aspects that take place in the second period.

¹³There is a third wave in August only for a few cities.

of interest over the years. It involves an individual questionnaire focusing on labor issues, income and education; and a family questionnaire about household characteristics. All incomes declared correspond to the previous month, and since the academic year in Argentina runs from March to November, the two waves involve attendance during the third and eighth months of the school year, respectively.

The sampling is a two-stage random sample. In a first stage, census areas are chosen with proportional probability according to their size. These primary units are stratified according to head education. In a second stage, households are chosen using a systematic sampling method. The survey is designed as a rotative panel. Each household appears in four consecutive waves and after that, it disappears to be replaced with a new one. Therefore, in principle, we could construct a two-year panel. However, attrition is a major problem and we therefore treat the data as repeated cross sections.¹⁴ Moreover, to eliminate problems due to repeated individuals, we use only one observation per youth, in each age group. If the household cannot be found, a new one is added according to the corresponding stratum to keep a comparable sample. The survey does not follow the household if it moved but maintains the sample size and strata.

We use all households with children younger than 18 years old during the period May 1996-May 2002. Thus, any households with teenage heads are included in the sample. With two waves over 7 years (except 2002) for 29 cities, we have an average of almost 10,000 households per year and 6,200 12-17 year olds per wave. This sample has only multi-person households.¹⁵

¹⁴Each panel would cover a 25% of a wave. When we check these households over time, less than a half of the original 25% is present. The crisis does not seem to increase the attrition relative to previous waves.

¹⁵One-person household were not excluded, the original sample did not present 12-17 aged people living alone.

It includes 3.15% of households with 2 people, 11.5% with 3 people, 24% with 4 people, almost 25% with 5 people, 15.4% with 6 people and 20% with more than 6 individuals. At the same time, 90% of 12-17 aged youths live with at least one of the parents and almost 24% of the young people live in extended families. Finally, less than 1 % of the children declared that they were the head of the household.

We do not include previous years because several cities were not surveyed and relevant information in covered cities, such as identification of different sources of earnings, was not asked before 1996.

Tables 1 and 2 summarize some sample statistics. At the household level, we characterize the sample according to characteristics of heads such as education in an effort to track similar groups over time. We define the head as the person who is declared in the survey to be the head of the household. Table 1, Panel A and B, shows the means and percentage changes in total, head and other members incomes, at the household level, over time. All measures are monthly incomes. Also, we distinguish any kind of real income and labor real incomes.

The impact of the crisis on real earnings is evident. Panel A shows that real incomes, on average, increased over time for almost all groups during 1996-1998 (i.e. the period before the crisis). From 1998 on, households with less educated heads (i.e. less than high school) begin to face a fall in total real earnings while head incomes present a decline for all groups. The Argentine devaluation at the end of the period led to a dramatic fall in real resources.

In terms of other member's participation in the household budget, it is interesting to highlight that the participation of other members is higher for poor households (34% in 1996) than for rich ones (23% in 1996). In other words, head real earnings relative to other people earnings are more important in households with less educated head.

Looking at the percentage variation in incomes from 1996 to 1998 in Panel B, the data suggest that head labor incomes increased during this period for all heads while other incomes coming from the head increased for all heads but heads with high school education. Other member incomes rose -relative to heads- more before the crisis. If we compare the changes in any income of heads and other household members from 1996 to 2001, head incomes fell dramatically. However, the percentages indicate that other members either suffered smaller losses than heads or increased their earnings in two out of three categories of households. For instance, households characterized by a head with intermediate education (i.e. high school), suffered a 17.71% loss in head income, compared to a 12.98% loss in other member incomes. Moreover, in the case of households with highly educated heads (i.e. more than high school), the head incomes fell while other member incomes rose (a decline of 12.60% versus an increase of 10.46%). This phenomenon suggests smoothing behaviors for some groups. When the head suffers a large fall in real income, other household members begin contributing to the budget in order to smooth the decline in income. These changes in household income may also reflect changes in living arrangements. For example, household income could rise not only because existing members work more, but because new members join the household.¹⁶

At the individual level, we are particularly interested in studying the 12-17 year old group because it involves young people that should be attending the last years of primary school or high school but who could also be earners during a crisis. The data suggest that there are huge variations in labor force participation, school attendance and in the percentage of youths neither studying nor working for these ages. Table 2 describes these three aspects

¹⁶It is interesting to note that families were able to smooth income through some of the earlier macroeconomic shocks. However, the last shock in 2002 was so large that little smoothing was apparently possible.

of the data for 12-17 year old people during the period, by age intervals and sex. We distinguish between May and October because there can be seasonal differences in economic activity and school enrollment. For instance, May corresponds to the beginning of the academic year and October to the last part of it.

It is also important to note that the crisis began at the end of 1998 and it continuously worsened over time until the end of the period considered in this paper. The data suggest that changes in youth behaviors begin to be observed some time after the crisis precipitated while the bad economic situation deepens.

Panel A in this table concerns changes in labor force participation measured as the percentage of people in certain age ranges who are working or willing to work. These ratios suggest that up to 2000, participation was decreasing for all groups, but after that year this trend begins to be reversed.

Panel B and Figure 2 highlight school attendance rates. The educational system in Argentina establishes a fixed number of hours per grade. Therefore, a person does not choose how much time she remains at school, but only whether to remain in school or not. Attendance is increasing before 2001 and then begins to stabilize or decrease for all age groups in 2001. For instance, the rate of attendance increased around 2-2.7%, 16-17% and 17% for 12-13, 14-15, 16-17 year old groups, respectively, from 1996 to 2001. Then, from May 2001-May 2002, the attendance rate fell for 12-13 aged females and 14-17 aged males. There are differences among male and females, not only in levels but also in changes. Female rates are always higher and some continue increasing slowly during the crisis while for the same age group, male youths present decreasing ratios. For instance, from May 2001-May 2002, attendance increased 1.34% in the case of 14-15 aged girls and decreased .46% in the case of 14-15 aged boys¹⁷. It is possible that young men have more labor market

¹⁷Unfortunately, the Permanent Household Survey do not contain information about

possibilities than young women.

Finally, it is interesting to show statistics corresponding to people who are neither working nor studying. Panel C summarizes the percentage of youths who declared this category. It is clear that the percentages of youths "doing nothing" decreased for all groups before 2001. For example, this percentage fell 47% for the 16_17 males and 47.8 % for 16-17 females over the entire period. But at the same time, the data suggests that the rates increase for some groups at the end of the period as schooling attendance decreases, indicating that these groups may be available for work.

The data analysis suggests that the crisis caused a large decline in real income for all households and it could be the case that it also had an adverse effect on schooling attendance because of liquidity constraints.

5 Methodology

Human capital investments could be affected by household income in a context of borrowing restrictions. The crisis could have caused a fall in real incomes and thus, given the absence of credit markets, changes in educational demand. As a first attempt to measure these effects we estimate OLS models of the schooling decision on the real income of the household and control for other covariates which may affect the dependent variable.

This basic regression model has the form:

$$y_{icwy} = \alpha_0 \cdot year + \delta_0 \cdot wave + \gamma_0 \cdot city +$$

the grade that the young is attending or attended before quitting school. The only piece that we may know is if the person who left school finished it or not. In other words, it can be the case that a person dropped out school just after finishing primary school or without getting the degree. This last case is worsening over time for primary and high school by more than 30%.

$$\rho \cdot \log(HH_inc)_{icwy} + \beta \cdot x_{icwy} + \mu_{icwy} \quad (2)$$

where y_{icwy} is equal to 1 if individual i during wave w in year y and city c attends school and 0 otherwise. $\log(HH_inc)_{icwy}$ is the logarithm of total real income of the household, and x_{icwy} are different individual characteristics that may affect the dependent variable, including education, age and gender of the head of the household; and size and composition of the household. Year is a vector of year dummies from 1996-2002, wave is a wave dummy and city is a vector of city dummies.

In this regression the main coefficient of interest is that on household incomes. Other variables are included in order to control for other important determinants of outcomes which could be correlated with the variables of primary interest. For instance, we control for some characteristics of heads that could be affecting the attendance decision, including education and age, and some other household features as size and composition that might affect the way a household responds to the shock. We argue that the main effect of the shock is through real household income but it could be the case it also affected size and composition of the household. Then, if we do not control for this possibility, we would have a problem of omitted variables. In other words, we assume that if there is any change in size or composition, it is due to the crisis, and that these kind of variables are predetermined to schooling decisions.

We include year and wave dummies in order to control for overall trends and systematic differences between May and October, respectively, in the dependent variables; and city fixed effects are included in order to control for persistent differences between regions.

It is well known that OLS estimates are biased and inconsistent when we have endogenous regressors. Real income is endogenous with respect to the schooling decision since both variables are simultaneously determined.

Therefore, we implement an Instrumental Variable Approach as a solution for this problem of endogeneity. The identifying assumption is that the Brazilian nominal exchange rate impacted the real earnings of households but did not have any direct effect on schooling decisions other than through its effects on household income. Moreover, as we mentioned before, the Brazilian exchange rate is a key economic variable for the Argentine economy and the Brazilian devaluation was a widely unexpected shock. Hence, we instrument total income with the Brazilian nominal exchange rate lagged one month given that the effect cannot be instantaneous.¹⁸ We exploit the dramatic variation in the Brazilian nominal exchange rate over the period to identify the effect of exogenous macro shocks on welfare.

This IV regression model has the form:

$$y_{icwy} = \alpha_1 \cdot year + \delta_1 \cdot wave + \gamma_1 \cdot city + \rho_{iv} \cdot \log(\widehat{HH\ income})_{icwy} + \beta_1 \cdot x_{icwy} + \eta_{icwy} \quad (3)$$

where $\log(\widehat{HH\ income})_{icwy}$ is the fitted value of the reduced form of $\log(\text{HH income})$ on the Brazilian nominal exchange rate and all the other exogenous variables. Household incomes do not include the income of the particular young person under study. Year is a vector of year dummies from 1996-2002, wave is a wave dummy and city is a vector of city dummies, x_{icwy} are different exogenous or predetermined variables

The model discussed above suggests that the economic crisis affected schooling decisions because families needed youths to help smooth declines in household income. Hence, we next look for direct evidence that such smoothing behavior was important.

We present several reduced form estimates of the impact of the shock on different real incomes at the household level in an effort to detect the

¹⁸This is only because of rigidities in the labor legislation in Argentina.

presence or absence of income smoothing behaviors. It could be the case that new household earners could compensate for the initial fall in real earnings in such a way that we do not see any fall in the budget constraint of families.

We use different measures of real earnings as measures of welfare. In particular, we use the real income of the members of the household, of heads and, of 12-17 year old youths as the dependent variable. Moreover, we estimate models of any income and of only labor income. We expect to see a larger impact of the crisis on head income than on youth's if smoothing behaviors are taking place.

The regression models have the form:

$$y_{hcwy} = \alpha_2 \cdot year + \delta_2 \cdot wave + \gamma_2 \cdot city + \rho_2 \cdot BrazNER_{wy} + \beta_2 \cdot x_{hcwy} + \varepsilon_{hcwy} \quad (4)$$

where y_{hcwy} is the measure of income for household h , expressed in logarithms, during wave w in year y and city c . As before, $year$ is a vector of year dummies from 1996-2002, $wave$ is a wave dummy and $city$ is a vector of city dummies; $BrazNER_{wy}$ is the Brazilian nominal exchange rate lagged one month and x_{hcwy} are different exogenous or predetermined variables involving household characteristics.

Next, we analyze reduced forms of the schooling equations at the individual level to check that the IV estimates are consistent with the reduced forms. In particular we are interested in total real incomes, schooling decisions and availability to work among 12-17 year olds. The first case would allow us to check whether the instrument is a valid one. Based on the previous literature, we expect changes in schooling attendance and labor market participation of household members if young people had to become new earners or if they had to help with home activities.

These regression models have the form:

$$y_{icwy} = \alpha_3 \cdot year + \delta_3 \cdot wave + \gamma_3 \cdot city + \rho_3 \cdot BraNER_{wy} + \beta_3 \cdot x_{icwy} + \mu_{icwy} \quad (5)$$

where the observational unit is now an individual young person, y_{icwy} is the outcome of interest for individual i during wave w in year y and city c . We focus on three different dependent variables: total real income of the i child's household, expressed in logarithm units, an attendance variable equal to 1 if the person attends school and 0 otherwise, and an availability to work variable which takes the value of 1 if the youth works or is willing to work and 0 otherwise.

We estimate different regressions by age and sex groups. We distinguish three age groups by sex: 12-13, 14-15, and 16-17 year olds because it may be the case that the effect is not the same over different grades of school. The first two age intervals involve mandatory grades, and the last one age range covers optional grades. Also, differences between boys and girls in the same age range are feasible.

Finally, we try some reduced forms including the shock variable interacted with dummies for head education in an effort to test for the presence of liquidity constraints. We expect that households with more educated heads were less affected by the crisis in terms of income decline and have less problems borrowing (or more savings) than families with less educated heads.

These models are similar to (4) and (5) except that the first one includes the variable $BraNER_{cwy} * less_educ_head$, where $less_educ_head$ is a dummy variable that takes the value 1 if the head has less than high school and 0 otherwise. The second one is going to be estimated separately into two subsamples: one with all youths belonging to families where the head has

less than high school, and another one with youths whose heads have high school or higher level of education.

6 Results

6.1 OLS and IV estimates

Table 3 presents OLS estimates corresponding to equation (2). Each column corresponds to a particular age interval and sex. OLS estimates of the effect of real household income on the schooling decision suggest that an increase of 1% in real income increases the probability of schooling attendance by .69% for 12-13 year old girls, around 2% for 14-15 year old boys, 1.3% for 14-15 year old girls and almost 4% for 16-17 year old boys. The differences between the sexes in each age group are not significant.

Table 4 presents reduced forms for household incomes corresponding to equation (5), expressed in logarithms, at the individual level, by age and sex groups. The estimates confirm the strong impact of the macroeconomic shock on real incomes for all the subsamples. It is important to mention that these results mean that the Brazilian nominal exchange rate is highly correlated with incomes and therefore, could be a good instrument for household income. The F test and the partial correlation between the Brazilian rate and real income suggest that we have a valid instrument. The differences between the sexes within age groups is significant for the 14_15 subsample. We would expect to have no significant differences among male and females within age groups if the composition of the groups tracked is similar or if we are able to control for all the differences.¹⁹

¹⁹In an effort to track more similar samples at the cost of reducing the subsample sizes, we estimated the model with different subsamples. For instance, we tried all households with both parents, all households with identical family composition (ages and gender by

Table 5 presents instrumental variable estimates for models of schooling decisions²⁰. The results suggest that household income plays an important role with respect to schooling decisions. But the effects are different across age and gender groups. In particular, 14-17 year old men are more likely to leave school when there is a decline in household real incomes. The crisis implied an increase in the probability of dropping out of school of almost 12% in the case of 14-15 year old men and 7.7% in the case of 16-17 year old men. Among women, only 14_15 aged girls face a higher probability (8.6%) of leaving school when the household income falls. As we said above, it may be the case that in a context of a crisis the possibilities of getting a job are higher for young men than for young women.

It is interesting to note that the probabilities are not the same across age groups. The most affected group is the 14-15 year old and it was the targetted group of the reform. In all the cases, OLS estimates are smaller and more precise than IV estimates.

The control variables included suggest that some characteristics of the head such as education and age, and household structure are also important to the schooling decision.²¹ The presence of other members in the household other than parents and siblings has a negative effect on youth's schooling which suggest that these other people are neither contributing to household income nor taking care of other members. At the same time, the presence of (age), all non-extended households, etc. In these cases, we found that the effect of the shock was large and significant and that the gender differences were not statistically significant. The coefficients vary from .24 to .50.

²⁰All the regressions were also estimated using the brazilian real exchange rate. We achieved to identical results. This is case because the variation in the real rate is only due to the nominal rate during the period considered in this paper.

²¹Because household structure can be an endogenous variable, all the models were also estimated without including size and composition of the household. The results are not presented in the paper. The estimates are almost the same but less precise.

Finally, all the results are robust to the exclusion of all 2002 observations.

kids and younger people increases the probability of quitting school for 16_17 year old boys. We assume that size and age composition are predetermined variables to the schooling decisions but to eliminate the doubt about possible endogeneity of household structure, all the models were also estimated without including these controllers. The estimates, even not presented in this paper, were almost the same but less precise.

6.2 Reduced forms

6.2.1 On household incomes: Smoothing behavior at household level

Table 6 shows estimates corresponding to equation (4). We use household, head and youth real incomes, labor and any income, as dependent variables, and all are expressed in logarithms.²² Looking at these reduced forms we try to answer two questions. First, we are interested in the comparison between the effect of the crisis on head income and youth income to identify any possible smoothing behavior. Second, we focus on total income to capture the final effect on household incomes. It could be the case that head incomes were negatively affected but new earners compensated for their loss and hence, the total income does not suffer any change.

The estimates suggest that the crisis meant a huge fall in incomes for households with young children. In the case of heads, labor earnings suffered a larger negative change than total income suggesting that non-labor income could have increased. Comparing head and youths incomes, the results indicate the presence of some smoothing by other members of the household. But, even with efforts to maintain the previous real incomes, the crisis causes

²²Less than 4% in the sample declares parcial incomes, huge amounts or incompatible situations. In the case of people who declare zero income (less than 10%), we transformed zeros into 1 in order to include them in the sample.

a dramatic fall in household incomes. We estimate that the Brazilian shock caused a 55% fall in household incomes.

The control variables are generally statistically significant. In particular, some characteristics of the head of the household are relevant. For instance, the level of education of the head has a positive effect on personal and household real income. The fact that the head is a man implies higher household income but lower income of young people. The age of the head is also significant indicating that 31-54 aged heads contribute more to the household budget than heads of other ages.

Finally, Table 7 presents the model summarized in equation (4) but including the effect of the shock interacted with a dummy for heads with low levels of education. The results suggest that the effect of the shock was large enough to affect every kind of household in terms of real incomes. The shock is jointly significant at 5% level in all the cases. The results suggest that the Brazilian exchange rate had a stronger effect on households with less educated heads. The crisis reduced household real incomes by 48% in the case households with more educated heads, and 60% in the case of families with less educated heads. Almost all the decline in real incomes is concentrated on falls in labor incomes for both kind of households. The differential effect of the shock is not significant.

All the results indicate that the crisis caused a dramatic decline in household real income. Even in the presence of smoothing behaviors undertaken by members of the household, the shock was large enough to impact family resources. Moreover, the results assure that the instrumental variable we are using is highly correlated with the endogenous variable.

6.2.2 On schooling and working decisions

We begin by estimating regression (5) to capture the reduced form effect of the shock on schooling and "availability to work" decisions among 12-17 year olds. Tables 8 and 9 show reduced forms models for both decisions, respectively. As before, each column corresponds to a particular age interval and sex.

In the case of schooling attendance, the shock impacted the educational decisions of 14-15 youths and 16-17 youths. The coefficients indicate a rise of almost 12% in the probability of not attending school in the 14_15 male group, almost 9% for 14-15 females, 7.7% for 16-17 males and almost 5% for 16-17 females. But the differences between male and female estimates in each age group are not significant at 5% level. As we discussed above, the attendance rate increased 2-2.7% for 12-13 year olds, 16-17% for 14-15 year olds and 17% for 16-17 year olds during the middle nineties. Hence, this crisis led to a significant reversal of earlier gains.

The reduced form for working decisions suggests that the crisis increased the availability to work for young people. In particular, we find that it increased the probability by 1.8-3.3% for the first group, 13.4% for 14-15 males, 9.3% for 14-15 females, and 7.7% for 16-17 males.²³ The different effects between male and female are not statistically significant. The results suggest that 14-15 year old youths constitute the first group that quit school to work.

These findings are consistent with the previous estimates. For instance, taking into account the reduced form and IV coefficients corresponding to

²³Even we do not present them in the paper, we also estimated reduced forms using a dummy variable equal 1 if the person works and zero otherwise. The results are consistent with those corresponding to availability to work.

14-15 males, we calculate that the change in the exchange rate meant a 28% fall in household incomes, and this negative change increased the probability of dropping out of school 12.3%, which is fully consistent with the direct effect of the devaluation on schooling decisions.

Our results indicate that 14-15 males and 16-17 males left school and tried to get a job to contribute to the household budget. Moreover, liquidity constraints would negatively affect schooling decisions in these groups. At the same time, the situation would be different for 16-17 girls. This group has a lower probability of attendance, but they are not more willing to work. Reasons for this outcome could be that there are fewer market opportunities for girls than for boys and that girls are more useful at home, taking care of other members and/or doing home activities. This last possibility is evident and significant in the case of 16_17 girls: the IV estimate is not significant, the reduced form estimate for the schooling decision is only significant at 10%, but the effect of the crisis on household real income is significant and large, and the availability to work does not change. Also, comparing the results for girls, it is likely that older girls can do home activities better than young girls.

Finally, the youngest group, particularly the boys, only show a higher availability for work. It seems to be the case that households do not sacrifice attendance of sons and daughters with 6-7 years of schooling, but the children are still trying to contribute to family resources. The point estimates suggest that 12-13 year old boys face harder possibilities of getting a job due to age than 14-17 year old boys.

In an effort to confirm that the only effect of the macro shock on education comes through changes in household resources, we estimate reduced forms for schooling attendance in two separate subsamples: youths with less educated heads (i.e. less than high school), and youths with more educated heads (i.e. high school level or more education).

The argument is that families with less educated heads face worse problems than families with more educated heads since they are less likely to have access to credit or to have previous savings. Also, as we saw above, they faced larger declines in household income. Thus, the estimates measure the differential impact of the shock on families with fewer resources.

The results are shown in Table 10 and Table 11, and they suggest that the crisis affected 12-17 year old youths belonging to disadvantaged families more severely. While almost all youths from less educated heads faced a large decline in the probability of schooling attendance, boys and girls with highly educated heads increased attendance. The probabilities declined from 3.5 to 21% in the first subsample depending on age and sex, and they increased from 4.7 to 19.7% in the second subsample. The gender differences within each age range are only significant (at the 5% level) for the 14_15 group with less educated heads.

It is also interesting to highlight differences in the effect of the shock on availability to work by head education. The effects are opposite to each other. For example, in the case of 14-15 boys, while disadvantaged males increased the availability to work by almost 18%, advantaged males decreased it by 8.7%. Gender differences are significant at 10% level in the case of 14-17 year old people with less educated heads and, at 1% in the case of 14-15 with more educated heads.

It is important to note that even with much lower monthly income in all kind of households, high educated parents have more savings and assets, and larger possibilities of loans such that their children may continue attending schooling and they do not need to work.

7 Conclusions

During the middle 1990s, Argentina increased mandatory schooling from 7 to 10 years. Large gains were made in the fraction of youths attending school. According to the rates before the crisis, schooling attendance was increasing, on average, at 1% rate per year among 12-13 year olds and 4% rate per year among 14-17 year olds. The crisis certainly reduced these trends.

The results suggest that the economic recession has impacted schooling decisions. During the nineties attendance rose 2-2-7% among 12-13 year old youths, 16-17% among 14-15 year olds and 17 % among 16-17 year olds. However, the Brazilian devaluation and the following variations in the exchange rate have reduced the probability of attending from 4.7-12% for some groups. The groups that suffered the largest declines are the corresponding to 14-15 males (12%), 14_15 females (8.6%) and 16-17 males (7.7%).

The results are even worse for youths belonging to households with parents with low level of education. For this group, the decline in the probability of school attendance goes from 3.5% to almost 21%. For instance, the probability of schooling attendance decreased by 9.3% for 14-15 year old girls, 21% for 14-15 year old boys, and 18% for 16-17 year old girls.

These findings are important because dropping out of school at a young age may entail long run adverse consequences not only within a household but also in society, particularly if the educational system cannot capture them again. Moreover, this development could worsen income inequality since it is the youths from poor families who are most affected.

Unfortunately, we cannot yet be sure about the long term consequences for these dropouts. We have studied short run effects and it could be the case that when the crisis is over, youths will go back to school. A priori, we suspect that this is unlikely, particularly if the crisis is extended over time and youths stop attending school for several years. Moreover, previous

statistics from Argentina show that a very low percentage of people who left high school ever finished.

In any case, because macroeconomic shocks are very frequent in developing countries, policy makers and international agencies should take into account the potentially permanent effects of these scenarios when they consider policies designed to mitigate the effects of the shocks. In particular, a subsidy targetted at young people from poor families might be a useful tool for keeping them at school for a longer period of time.

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Table 1: Real incomes: mean and variation over time, by head education
Household level

Panel A: Means

head:	<i>less HS</i>	<i>HS</i>	<i>more HS</i>	<i>less HS</i>	<i>HS</i>	<i>more HS</i>
	HH 's real income			HH 's real labor income		
1996	715.61	1295.30	2064.31	633.03	1080.54	1915.26
1997	771.06	1200.47	1985.55	687.11	1094.75	1824.98
1998	796.77	1262.66	2184.32	717.97	1150.06	2030.33
1999	714.06	1264.31	2261.65	636.52	1150.97	2077.45
2000	676.64	1269.53	1958.37	600.50	1152.80	1773.50
2001	606.81	1083.48	1916.14	537.41	974.36	1694.91
2002	396.86	723.15	1353.42	339.15	599.54	1214.96
	Head's real income			Head's real labor income		
1996	453.08	923.14	1578.63	394.58	755.33	1480.41
1997	481.45	858.55	1541.32	422.73	787.34	1430.83
1998	501.04	875.62	1654.60	442.12	801.55	1548.62
1999	440.55	801.98	1653.63	387.98	730.23	1532.41
2000	437.02	897.34	1479.83	384.96	815.88	1340.52
2001	388.39	759.62	1379.65	338.47	679.02	1250.08
2002	263.91	511.01	1026.57	224.14	414.98	921.42
	Other member's real income			Othe member's real labor income		
1996	262.53	372.15	485.67	238.45	325.21	434.84
1997	289.61	341.91	444.23	264.37	307.40	394.15
1998	295.73	387.04	529.73	275.85	348.51	481.71
1999	273.50	462.33	608.01	248.54	420.74	545.04
2000	239.61	372.18	478.54	215.54	336.92	432.98
2001	218.42	323.86	536.49	198.94	295.34	444.83
2002	132.95	212.14	326.85	115.02	184.56	293.54

Panel B: % Variations

head:	<i>less HS</i>	<i>HS</i>	<i>more HS</i>	<i>less HS</i>	<i>HS</i>	<i>more HS</i>
period	HH 's real income			HH 's real labor income		
1996/1998	11.34	-2.52	5.81	13.42	6.43	6.01
1996/2001	-15.20	-16.35	-7.18	-15.11	-9.83	-11.50
1996/2002	-44.54	-44.17	-34.44	-46.42	-44.52	-36.56
	Head's real income			Head's real labor income		
1996/1998	10.58	-5.15	4.81	12.05	6.12	4.61
1996/2001	-14.28	-17.71	-12.60	-14.22	-10.10	-15.56
1996/2002	-41.75	-44.64	-34.97	-43.20	-45.06	-37.76
	Other member's real income			Othe member's real labor income		
1996/1998	12.65	4.00	9.07	15.69	7.17	10.78
1996/2001	-16.80	-12.98	10.46	-16.57	-9.18	2.30
1996/2002	-49.36	-43.00	-32.70	-51.76	-43.25	-32.50

Table 2: Labor Force Participation, Schooling Attendance and "doing nothing" among 12_17 year olds

Panel A: Labor force participation

	12_13		14_15		16_17	
	male	female	male	female	male	female
<i>May</i>						
1996	5.1	4.11	21.93	18.93	39.68	35.22
1997	3.38	1.66	16.79	12.13	39.93	26.77
1998	2.78	2.67	14.48	8.27	30.2	25.35
1999	2.24	2.47	10.91	9.82	30.08	24.44
2000	2.73	1.08	7.27	4.87	27.42	20.86
2001	2.72	1.66	6.29	5.4	20.62	17.44
2002	2.38	1.48	6.7	4.14	20.27	17.46
<i>October</i>						
1996	3.02	3.34	20.24	15.46	42.43	36.14
1997	2.8	2.16	15.64	13.31	33.63	34.3
1998	2.91	1.36	12.31	14.16	34.42	22.67
1999	2.98	1.44	9.73	6.18	32.58	24.8
2000	1.83	0.71	7.41	6.31	24.69	22.61
2001	3.63	1.8	8.66	7.55	23.1	16.85

Panel B: Schooling Attendance

	12_13		14_15		16_17	
	male	female	male	female	male	female
<i>May</i>						
1996	95.56	96.11	80.94	81.9	65.88	67.49
1997	97.17	98.48	85.88	88.68	68.11	76.79
1998	97.69	98.58	89.87	93.06	74.32	77
1999	98.78	97.82	91.64	91.83	76.37	78.12
2000	97.59	99.22	94.03	95.67	79.77	82.96
2001	97.49	98.72	95.16	94.87	83.96	85.77
2002	98.02	98.65	94.72	96.14	83.7	84.12
<i>October</i>						
1996	97.36	96.74	82.05	85.39	64.19	68.11
1997	98.38	97.84	87.03	87.49	71.22	69.51
1998	98.22	98.85	89.16	88.17	70.61	82.37
1999	97.89	98.72	91.85	95.02	75.73	78.11
2000	98.61	99.53	95.55	94.87	79.74	80.94
2001	98.35	98.73	92.38	93.22	82.47	85.17

Panel A: Neither working nor studying

	12_13		14_15		16_17	
	male	female	male	female	male	female
<i>May</i>						
1996	3.87	3.44	13.93	15.7	20.04	25.8
1997	2.02	1.51	9.76	9.75	14.84	19.35
1998	1.52	1.36	6.01	6.2	14.44	18.41
1999	1.17	2.06	6.41	6.99	11.54	16.34
2000	2.27	0.78	4.28	3.74	12.41	13.15
2001	1.98	1.15	2.03	3.64	9.34	11.57
2002	1.7	0.86	4.1	3.36	10.53	13.48
<i>October</i>						
1996	2.35	3.22	11.61	13.46	21.76	27.05
1997	1.3	2.15	9.66	9.94	19.46	23.04
1998	1.6	1.03	5.35	10.34	14.92	14.17
1999	1.76	1.27	4.95	4.1	13.05	15.88
2000	1.39	0.34	3.09	4.54	11.89	14.58
2001	1.4	1.14	4.57	6.37	12.06	11.51

Table 3: OLS Estimation - Schooling Attendance
Individual level

1 if youth attends school	12_13		14_15		16_17	
	male	female	male	female	male	female
log (HH income net of youth income)	0.0069 (0.0047)	0.0069 (0.0022)**	0.0192 (0.0047)**	0.0129 (0.0042)**	0.0392 (0.0061)**	0.006 (0.0043)
1 if there is spouse	-0.0197 (0.0128)	-0.0161 (0.0163)	0.0157 (0.0147)	-0.0142 (0.0270)	0.0234 (0.0256)	0.0238 (0.0274)
1 if other members	-0.0111 (0.0096)	-0.0144 (0.0095)	-0.0516 (0.0194)**	-0.0754 (0.0197)**	-0.0511 (0.0189)**	-0.0968 (0.0197)**
# of members less 3 yrs	-0.0191 (0.0056)**	-0.0032 (0.0038)	-0.0438 (0.0169)**	-0.0438 (0.0151)**	-0.0851 (0.0198)**	-0.1351 (0.0152)**
# 3_5	-0.0141 (0.0060)*	-0.0142 (0.0023)**	-0.034 (0.0097)**	-0.0248 (0.0145)***	-0.0509 (0.0127)**	-0.0228 (0.0192)
# 6_12	0.0011 (0.0039)	0.0054 (0.0029)***	-0.019 (0.0038)**	-0.0114 (0.0062)***	-0.0389 (0.0089)**	-0.0368 (0.0097)**
# 13_14	-0.0091 (0.0032)**	-0.0109 (0.0036)**	0.0254 (0.0112)*	0.0105 (0.0081)	-0.0161 (0.0184)	0.0146 (0.0131)
# 15_17	-0.011 (0.0033)**	-0.0027 (0.0034)	-0.0299 (0.0076)**	-0.0271 (0.0068)**	-0.0316 (0.0150)*	-0.0134 (0.0103)
# 18_22	-0.0031 (0.0055)	0.0058 (0.0031)***	-0.019 (0.0055)**	-0.0004 (0.0062)	-0.0402 (0.0077)**	-0.0126 (0.0101)
# 23_29	0.0046 (0.0070)	-0.002 (0.0053)	0.0139 (0.0108)	0.0005 (0.0127)	-0.0147 (0.0143)	0.0017 (0.0107)
# 30_44	0.0167 (0.0094)***	0.0104 (0.0069)	0.0323 (0.0086)**	0.0574 (0.0086)**	0.0329 (0.0167)*	0.1223 (0.0132)**
# 45_54	0.0113 (0.0097)	0.0037 (0.0073)	0.0252 (0.0090)**	0.058 (0.0111)**	0.0359 (0.0161)*	0.1301 (0.0116)**
# 55_64	0.0121 (0.00710)***	-0.0148 (0.0148)	-0.017 (0.0320)	0.0503 (0.0173)**	0.0389 (0.0377)	0.0811 (0.0201)**
# 65 & older	-0.0018 (0.0121)	0.0052 (0.0100)	0.0516 (0.0149)**	0.0695 (0.0237)**	0.064 (0.0346)***	0.1179 (0.0200)**
1 if head is male	0.015 (0.0100)	0.0097 (0.0169)	-0.013 (0.0135)	-0.004 (0.0236)	0.0141 (0.0265)	-0.0777 (0.0226)**
1 if head is 31_54 yrs old	0.0104 (0.0176)	0.0106 (0.0157)	0.0417 (0.0344)	0.2025 (0.0374)**	0.1593 (0.0357)**	0.1821 (0.0414)**
1 if head is 55_64 yrs old	-0.0058 (0.0264)	0.023 (0.0297)	0.0845 (0.0551)	0.2002 (0.0475)**	0.1325 (0.0623)*	0.2109 (0.0447)**
1 if head is 65 or older	0.0173 (0.0281)	0.0093 (0.0193)	0.0527 (0.0336)	0.2124 (0.0550)**	0.1016 (0.0604)	0.168 (0.0528)**
1 if head has HS	0.0055 (0.0047)	0.01 (0.0046)*	0.0651 (0.0137)**	0.0472 (0.0094)**	0.1395 (0.0151)**	0.1283 (0.0156)**
1 If head has more than HS	0.0091 (0.0034)**	0.0021 (0.0052)	0.071 (0.0092)**	0.0463 (0.0122)**	0.1692 (0.0140)**	0.1659 (0.0113)**
Observations	13537	13089	13475	12986	13471	13500
R-squared	0.04	0.04	0.12	0.13	0.18	0.23

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: 1 if the young person attends school.

Table 4: Reduced forms - Household real income
individual level - IV First Stage

log (HH income net of youth income)	12_13		14_15		16_17	
	male	female	male	female	male	female
Brazil non. exch. rate	-0.1562 (0.1076)	-0.3388 (0.0979)**	-0.1961 (0.0935)*	-0.6289 (0.1291)**	-0.6044 (0.0880)**	-0.2168 (0.0948)*
1 if there is spouse	0.0248 (0.0907)	-0.0131 (0.0529)	0.254 (0.1130)*	0.1533 (0.1555)	0.065 (0.1011)	0.2524 (0.1053)*
1 if other members	-0.0602 (0.0595)	-0.0522 (0.0570)	0.0549 (0.1001)	-0.0444 (0.0836)	-0.0805 (0.1139)	-0.0644 (0.0923)
# of members less 3 yrs	-0.1351 (0.0327)**	-0.2581 (0.0566)**	-0.1299 (0.0385)**	-0.0854 (0.0332)*	-0.1395 (0.0534)**	-0.0762 (0.0626)
# 3_5	-0.0811 (0.0408)*	-0.0559 (0.0550)	-0.0964 (0.0433)*	-0.102 (0.0435)*	-0.0253 (0.0753)	-0.0532 (0.0299)***
# 6_12	-0.0415 (0.0220)	-0.0499 (0.0126)**	-0.0855 (0.0137)**	-0.0763 (0.0146)**	-0.0805 (0.0232)**	-0.08 (0.0162)**
# 13_14	-0.0677 (0.0447)	-0.0807 (0.0327)*	-0.0249 (0.0391)	-0.0626 (0.0596)	-0.0278 (0.0395)	-0.0244 (0.0302)
# 15_17	0.0215 (0.0523)	0.0317 (0.0196)	-0.0137 (0.0450)	0.0296 (0.0387)	0.0259 (0.0404)	0.0165 (0.0567)
# 18_22	0.2146 (0.0304)**	0.188 (0.0444)**	0.2183 (0.0249)**	0.1604 (0.0345)**	0.2135 (0.0254)**	0.2084 (0.0214)**
# 23_29	0.2536 (0.0565)**	0.4344 (0.0493)**	0.3861 (0.0217)**	0.3856 (0.0381)**	0.3957 (0.0325)**	0.4324 (0.0196)**
# 30_44	0.4246 (0.0358)**	0.593 (0.0481)**	0.4235 (0.0716)**	0.4748 (0.0526)**	0.5375 (0.0578)**	0.4175 (0.0605)**
# 45_54	0.3557 (0.0465)**	0.4743 (0.0673)**	0.3159 (0.0748)**	0.4308 (0.0492)**	0.4701 (0.0450)**	0.3618 (0.0562)**
# 55_64	0.2336 (0.0786)**	0.453 (0.0779)**	0.2178 (0.0960)*	0.2285 (0.0846)**	0.3451 (0.0715)**	0.346 (0.0620)**
# 65 & older	0.3108 (0.0668)**	0.3039 (0.0801)**	0.0698 (0.1613)	0.2455 (0.1250)*	0.3533 (0.1000)**	0.293 (0.0822)**
1 if head is male	0.201 (0.0668)**	0.2268 (0.0864)**	0.0263 (0.0711)	0.14 (0.1509)	0.1924 (0.0817)*	0.1368 (0.0851)
1 if head is 31_54 yrs old	0.1816 (0.1431)	0.3032 (0.1089)**	0.8215 (0.3957)*	0.3795 (0.1772)*	0.857 (0.2555)**	0.8226 (0.1935)**
1 if head is 55_64 yrs old	0.0974 (0.1907)	0.0224 (0.1401)	0.7764 (0.4159)***	0.3165 (0.1570)*	0.7764 (0.2776)**	0.5951 (0.1890)**
1 if head is 65 or older	0.156 (0.2204)	0.3615 (0.2093)***	1.0809 (0.5475)*	0.2489 (0.2544)	0.7539 (0.2986)*	0.9583 (0.2091)**
1 if head has HS	0.6064 (0.0640)**	0.4956 (0.0556)**	0.5344 (0.0535)**	0.5453 (0.0558)**	0.5284 (0.0612)**	0.5804 (0.0770)**
1 If head has more than HS	1.0495 (0.0413)**	1.0489 (0.0581)**	1.09 (0.0449)**	1.0701 (0.0667)**	1.0666 (0.0617)**	1.0648 (0.0610)**
Observations	13537	13089	13475	12986	13471	13500
F(11, N-11)	82.71	171.85	1013.28	125.15	183.25	725.37
R-squared	0.19	0.21	0.23	0.21	0.23	0.25

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: logarithm of household real income net of the income of the young person.

Table 5: IV Estimation - Schooling Attendance
Individual level, Second Stage

1 if youth attends school	12_13		14_15		16_17	
	male	female	male	female	male	female
log (HH income net of youth income) - fitted value	-0.0384 (0.0851)	0.0111 (0.0145)	0.4327 (0.2073)*	0.0946 (0.0441)*	0.0875 (0.0178)**	0.1504 (0.1345)
1 if there is spouse	-0.0185 (0.0112)**	-0.0161 (0.0163)	-0.0901 (0.0650)	-0.0271 (0.0275)	0.0202 (0.0273)	-0.0127 (0.0464)
1 if other members	-0.0138 (0.0128)	-0.0142 (0.0093)	-0.0743 (0.0376)*	-0.0717 (0.0199)**	-0.0472 (0.0193)*	-0.0875 (0.0270)**
# of members less 3 yrs	-0.0252 (0.0115)*	-0.0021 (0.0052)	0.0099 (0.0390)	-0.0368 (0.0162)*	-0.0785 (0.0196)**	-0.124 (0.0211)**
# 3_5	-0.0178 (0.0115)	-0.0139 (0.0026)**	0.006 (0.0341)	-0.0164 (0.0170)	-0.0497 (0.0139)**	-0.0152 (0.0220)
# 6_12	-0.0008 (0.0049)	0.0056 (0.0032)***	0.0163 (0.0171)	-0.0053 (0.0060)	-0.035 (0.0103)**	-0.0253 (0.0145)***
# 13_14	-0.0122 (0.0055)*	-0.0105 (0.0040)*	0.0356 (0.0177)*	0.0157 (0.0112)	-0.0147 (0.0175)	0.0181 (0.0142)
# 15_17	-0.0101 (0.0048)	-0.0028 (0.0036)	-0.0242 (0.0139)***	-0.0294 (0.0090)**	-0.0328 (0.0159)*	-0.0157 (0.0122)
# 18_22	0.0067 (0.0199)	0.005 (0.0033)	-0.1093 (0.0408)*	-0.0134 (0.0111)	-0.0506 (0.0085)**	-0.0427 (0.0298)
# 23_29	0.0161 (0.0217)	-0.0038 (0.0077)	-0.1459 (0.0819)***	-0.0312 (0.0226)	-0.034 (0.016)*	-0.0607 (0.0635)
# 30_44	0.0359 (0.0400)	0.0079 (0.0076)	-0.1429 (0.0958)	0.0185 (0.0275)	0.007 (0.0144)	0.0619 (0.0578)
# 45_54	0.0275 (0.0338)	0.0017 (0.0078)	-0.1053 (0.0819)	0.0228 (0.0261)	0.0132 (0.0157)	0.0778 (0.0486)
# 55_64	0.0227 (0.0236)	-0.0167 (0.0132)	-0.1073 (0.0529)*	0.0316 (0.0256)	0.0223 (0.0345)	0.0312 (0.0643)
# 65 & older	0.0122 (0.0301)	0.004 (0.0105)	0.0227 (0.0621)	0.0497 (0.0216)*	0.0469 (0.0361)	0.0756 (0.0442)***
1 if head is male	0.0241 (0.0176)	0.0088 (0.0183)	-0.023 (0.0301)	-0.0152 (0.0201)	0.0049 (0.0257)	-0.0972 (0.0194)**
1 if head is 31_54 yrs old	0.0186 (0.0199)	0.0093 (0.0158)	-0.2981 (0.2234)	0.1719 (0.0424)**	0.1179 (0.0336)**	0.0637 (0.1215)
1 if head is 55_64 yrs old	-0.0015 (0.0252)	0.0229 (0.0298)	-0.2367 (0.2649)	0.1746 (0.0501)**	0.0949 (0.0650)	0.1251 (0.0863)
1 if head is 65 or older	0.0243 (0.0295)	0.0077 (0.0192)	-0.3944 (0.3078)	0.1924 (0.0601)**	0.0652 (0.0568)	0.0299 (0.1393)
1 if head has HS	0.033 (0.0504)	0.0079 (0.0095)	-0.1559 (0.1208)	0.0026 (0.0279)	0.114 (0.0202)**	0.0445 (0.0772)
1 If head has more than HS	0.0566 (0.0889)	-0.0023 (0.0155)	-0.3796 (0.2294)***	-0.0411 (0.0514)	0.1176 (0.0284)**	0.0121 (0.1436)
Observations	13537	13089	13475	12986	13471	13500

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: 1 if the young person attends school.

Table 6: Reduced forms - Labor and total real income of different members.*Household level*

log of:	household real income	household real labor inc.	head's income	head's labor income	youths real income	youths real labor inc.
Brazil non. exch. rate	-0.383 (0.0789)**	-0.3977 (0.1035)**	-0.5781 (0.1029)**	-0.7322 (0.1508)**	-0.148 (0.0385)**	-0.1112 (0.0150)**
1 if there is spouse	0.0971 (0.0566)***	0.1537 (0.0410)**	-0.1952 (0.0861)*	0.2804 (0.0745)**	-0.1018 (0.0691)	-0.0609 (0.0548)
1 if other members	-0.0304 (0.0476)	-0.1869 (0.0376)**	-0.2652 (0.0568)**	-0.3382 (0.0626)**	0.1315 (0.0377)**	0.0573 (0.0292)*
# of members less 3 yrs	-0.1306 (0.0250)**	-0.0767 (0.0351)*	-0.1397 (0.0301)**	-0.1 (0.0388)**	0.0719 (0.0299)*	0.0671 (0.0189)**
# 3_5	-0.0879 (0.0191)**	-0.1051 (0.0351)**	-0.0223 (0.0317)	-0.0109 (0.0482)	0.0514 (0.0211)*	0.031 (0.0154)*
# 6_12	-0.0615 (0.0089)**	-0.0697 (0.0106)**	-0.0703 (0.0132)**	-0.0756 (0.0127)**	0.055 (0.0135)**	0.1688 (0.0111)**
# 13_14	-0.0468 (0.0233)*	-0.0395 (0.0247)	-0.0754 (0.0311)*	-0.0464 (0.0327)	0.0836 (0.0155)**	0.4759 (0.0113)**
# 15_17	0.033 (0.0106)**	0.0567 (0.0262)*	-0.0245 (0.0200)	0.0001 (0.0276)	0.4387 (0.0356)**	0.7844 (0.0310)**
# 18_22	0.1815 (0.0154)**	0.2621 (0.0234)**	-0.0393 (0.0150)**	-0.038 (0.0218)***	0.0052 (0.0158)	0.0034 (0.0102)
# 23_29	0.3709 (0.0159)**	0.6039 (0.0241)**	-0.0424 (0.0198)*	0.0016 (0.0290)	-0.0675 (0.0251)**	-0.0472 (0.0175)**
# 30_44	0.4577 (0.0221)**	0.923 (0.0316)**	-0.0073 (0.0355)	-0.0269 (0.0407)	-0.2003 (0.0268)**	-0.1223 (0.0206)**
# 45_54	0.3941 (0.0235)**	0.7716 (0.0333)**	-0.0982 (0.0492)*	-0.2198 (0.0485)**	-0.1764 (0.0289)**	-0.0913 (0.0200)**
# 55_64	0.2713 (0.0404)**	0.3644 (0.0731)**	-0.2092 (0.1002)*	-0.2886 (0.1269)*	-0.0233 (0.0633)	-0.0271 (0.0462)
# 65 & older	0.2414 (0.0517)**	-0.0536 (0.0550)	-0.0046 (0.0787)	-0.0124 (0.0609)	-0.0734 (0.0586)	-0.0327 (0.0394)
1 if head is male	0.1486 (0.0507)**	0.521 (0.0413)**	0.93 (0.0632)**	1.4973 (0.0518)**	-0.0856 (0.0508)***	-0.0012 (0.0448)
1 if head is 31_54 yrs old	0.2732 (0.0787)**	0.1727 (0.1035)	0.7018 (0.0857)**	0.8942 (0.1255)**	-0.5416 (0.0880)**	-0.295 (0.0797)**
1 if head is 55_64 yrs old	0.1814 (0.0747)*	-0.0353 (0.1232)	0.3608 (0.1580)*	-0.1442 (0.1672)	-0.6972 (0.1256)**	-0.3787 (0.1016)**
1 if head is 65 or older	0.2835 (0.1336)*	-0.5351 (0.1406)**	0.4452 (0.1653)**	-2.7281 (0.1446)**	-0.679 (0.1144)**	-0.4203 (0.1005)**
1 if head has HS	0.5058 (0.0289)**	0.488 (0.0253)**	0.6508 (0.0368)**	0.5928 (0.0391)**	-0.1441 (0.0204)**	-0.1237 (0.0190)**
1 If head has more than HS	1.0312 (0.0323)**	0.9962 (0.0441)**	1.2299 (0.0310)**	1.2424 (0.0466)**	-0.1155 (0.0312)**	-0.1539 (0.0182)**
Observations	58975	58975	58975	58975	58975	58975
R-squared	0.21	0.23	0.14	0.28	0.08	0.22

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: log of different real incomes

**Table 7: Reduced forms with differential macro shock effects, by head education
Labor and total real income of different members.**

log of:	household real income	household real labor inc.	head's income	head's labor income	youths real income	youths real labor inc.
Brazil non. exch. rate	-0.334 (0.1009)**	-0.339 (0.1340)*	-0.57 (0.1361)**	-0.7929 (0.1874)**	-0.0911 (0.0477)***	-0.0381 (0.0246)
BraNER* 1 if head has less than HS	-0.0733 (0.0523)	-0.0873 (0.0659)	-0.0138 (0.0629)	0.0864 (0.0688)	-0.0832 (0.0328)*	-0.1066 (0.0205)**
1 if there is spouse	0.0855 (0.0560)	0.1425 (0.0413)**	-0.2079 (0.0862)*	0.2662 (0.0742)**	-0.1025 (0.0690)	-0.0603 (0.0549)
1 if other members	-0.0455 (0.0473)	-0.2014 (0.0370)**	-0.2822 (0.0574)**	-0.3578 (0.0628)**	0.1311 (0.0374)**	0.0588 (0.0291)*
# of members less 3 yrs	-0.1311 (0.0247)**	-0.0773 (0.0343)*	-0.1397 (0.0302)**	-0.0991 (0.0386)*	0.0712 (0.0301)*	0.0661 (0.0191)**
# 3_5	-0.0896 (0.0201)**	-0.1068 (0.0357)**	-0.024 (0.0323)	-0.0127 (0.0487)	0.0511 (0.0210)*	0.0308 (0.0154)*
# 6_12	-0.0604 (0.0085)**	-0.0686 (0.0106)**	-0.0695 (0.0128)**	-0.0751 (0.0126)**	0.0554 (0.0133)**	0.1693 (0.0110)**
# 13_14	-0.0433 (0.0229)***	-0.0363 (0.0240)	-0.0713 (0.0310)*	-0.0414 (0.0323)	0.0835 (0.0156)**	0.4753 (0.0114)**
# 15_17	0.0373 (0.0099)**	0.061 (0.0256)*	-0.02 (0.0193)	0.0048 (0.0271)	0.4392 (0.0353)**	0.7846 (0.0309)**
# 18_22	0.1809 (0.0158)**	0.2617 (0.0238)**	-0.04 (0.0152)**	-0.0391 (0.022)***	0.0054 (0.0158)	0.0037 (0.0102)
# 23_29	0.3677 (0.0154)**	0.6009 (0.0237)**	-0.0461 (0.0202)*	-0.0028 (0.0293)	-0.0675 (0.0251)**	-0.0467 (0.0175)**
# 30_44	0.458 (0.0224)**	0.9234 (0.0317)**	-0.0072 (0.0363)	-0.0273 (0.0402)	-0.1999 (0.0270)**	-0.1218 (0.0209)**
# 45_54	0.4026 (0.0237)**	0.7799 (0.0333)**	-0.089 (0.0503)***	-0.2099 (0.0490)**	-0.1756 (0.0292)**	-0.0915 (0.0203)**
# 55_64	0.2815 (0.0417)**	0.3743 (0.0741)**	-0.1981 (0.1012)***	-0.2766 (0.1277)*	-0.0224 (0.0632)	-0.0273 (0.0459)
# 65 & older	0.2451 (0.0493)**	-0.0502 (0.0530)	0.0004 (0.0767)	-0.0053 (0.0587)	-0.0743 (0.0586)	-0.0345 (0.0392)
1 if head is male	0.1468 (0.0496)**	0.5193 (0.0414)**	0.9279 (0.0613)**	1.4946 (0.0509)**	-0.0855 (0.0507)***	-0.0009 (0.0449)
1 if head is 31_54 yrs old	0.2595 (0.0805)**	0.1593 (0.1010)	0.6876 (0.0872)**	0.8796 (0.1214)**	-0.5434 (0.0879)**	-0.2957 (0.0793)**
1 if head is 55_64 yrs old	0.1562 (0.0766)*	-0.0597 (0.1235)	0.3337 (0.1608)*	-0.1738 (0.1698)	-0.6992 (0.1257)**	-0.3782 (0.1010)**
1 if head is 65 or older		-0.4189 (0.1005)**	0.261 (0.1324)*	-0.5569 (0.1378)**	0.4203 (0.1672)*	-2.7562 (0.1434)**
1 if head has less than HS	0.2626 (0.0490)**	0.3086 (0.0338)**	-0.6489 (0.0935)**	-0.6002 (0.1143)**	-0.9153 (0.1139)**	-1.052 (0.1209)**
Observations	58975	58975	58975	58975	58975	58975
R-squared	0.2	0.23	0.13	0.27	0.08	0.22

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: log of different real incomes

Table 8: Reduced forms - Schooling Attendance*Individual level*

1 if youth attends school	12_13		14_15		16_17	
	male	female	male	female	male	female
Brazil non. exch. rate	0.006 (0.0118)	-0.0038 (0.0045)	-0.0848 (0.0051)**	-0.0595 (0.0291)*	-0.0529 (0.0139)**	-0.0326 (0.0196)**
1 if there is spouse	-0.0195 (0.0125)	-0.0162 (0.0164)	0.0198 (0.0146)	-0.0126 (0.0282)	0.0259 (0.0254)	0.0253 (0.0277)
1 if other members	-0.0115 (0.0097)	-0.0147 (0.0096)	-0.0505 (0.0199)*	-0.0759 (0.0198)**	-0.0543 (0.0200)**	-0.0972 (0.0196)**
# of members less 3 yrs	-0.02 (0.0055)**	-0.005 (0.0039)	-0.0464 (0.0175)**	-0.0449 (0.0151)**	-0.0907 (0.0199)**	-0.1355 (0.0153)**
# 3_5	-0.0146 (0.0058)*	-0.0146 (0.0024)**	-0.0357 (0.0096)**	-0.026 (0.0145)**	-0.0519 (0.0126)**	-0.0232 (0.0193)
# 6_12	0.0008 (0.0038)	0.005 (0.0029)**	-0.0206 (0.0038)**	-0.0125 (0.0063)*	-0.0421 (0.0088)**	-0.0373 (0.0098)**
# 13_14	-0.0096 (0.0034)**	-0.0114 (0.0038)**	0.0248 (0.0116)*	0.0097 (0.0077)	-0.0172 (0.0191)	0.0145 (0.0131)
# 15_17	-0.0109 (0.0033)**	-0.0025 (0.0035)	-0.0301 (0.0082)**	-0.0266 (0.0065)**	-0.0305 (0.0146)*	-0.0132 (0.0103)
# 18_22	-0.0016 (0.0046)	0.0071 (0.0032)*	-0.0148 (0.0056)**	0.0018 (0.0057)	-0.0319 (0.0078)**	-0.0114 (0.0098)
# 23_29	0.0063 (0.0065)	0.001 (0.0054)	0.0212 (0.0117)	0.0053 (0.0118)**	0.0006 (0.0142)	0.0043 (0.0105)
# 30_44	0.0196 (0.0081)*	0.0145 (0.0078)**	0.0404 (0.0091)**	0.0634 (0.0084)**	0.054 (0.0156)**	0.1247 (0.0137)**
# 45_54	0.0138 (0.0091)	0.007 (0.0079)	0.0314 (0.0092)**	0.0635 (0.0111)**	0.0544 (0.0158)**	0.1322 (0.0120)**
# 55_64	0.0137 (0.0069)*	-0.0117 (0.0144)	-0.013 (0.0325)	0.0533 (0.0172)**	0.0525 (0.0378)	0.0832 (0.0200)**
# 65 & older	0.0003 (0.0118)	0.0073 (0.0097)	0.0529 (0.0168)**	0.0729 (0.0249)**	0.0778 (0.0350)*	0.1196 (0.0201)**
1 if head is male	0.0164 (0.0105)	0.0113 (0.0170)	-0.0116 (0.0137)	-0.0019 (0.0240)	0.0217 (0.0263)	-0.0766 (0.0229)**
1 if head is 31_54 yrs old	0.0116 (0.0182)	0.0127 (0.0158)	0.0574 (0.0307)**	0.2078 (0.0378)**	0.1929 (0.0368)**	0.1875 (0.0407)**
1 if head is 55_64 yrs old	-0.0052 (0.0268)	0.0231 (0.0297)	0.0993 (0.0509)**	0.2045 (0.0477)**	0.1628 (0.0626)**	0.2146 (0.0440)**
1 if head is 65 or older	0.0183 (0.0286)	0.0118 (0.0193)	0.0734 (0.0317)*	0.2159 (0.0551)**	0.1312 (0.0630)*	0.1741 (0.0521)**
1 if head has HS	0.0097 (0.0067)	0.0135 (0.0049)**	0.0753 (0.0145)**	0.0542 (0.0096)**	0.1602 (0.0165)**	0.1318 (0.0164)**
1 If head has more than HS	0.0163 (0.0029)**	0.0093 (0.0056)	0.0921 (0.0111)**	0.0601 (0.0109)**	0.211 (0.0146)**	0.1723 (0.0121)**
Observations	13537	13089	13475	12986	13471	13500
R-squared	0.03	0.03	0.12	0.13	0.17	0.23

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: 1 if the young person attends school.

Logit estimates are significant and with the expected sign.

Table 9: Reduced forms - Availability to work
Individual level

1 if youth is available to work	12_13		14_15		16_17	
	male	female	male	female	male	female
Brazil non. exch. rate	0.0299 (0.0116)*	0.0127 (0.0042)**	0.0926 (0.0072)**	0.0644 (0.034)***	0.0528 (0.0312)***	-0.018 (0.0163)
1 if there is spouse	0.0218 (0.0137)	0.0203 (0.0166)	-0.0101 (0.0143)	0.0122 (0.0272)	-0.0529 (0.0383)	-0.0162 (0.0302)
1 if other members	0.0105 (0.0117)	0.0211 (0.0102)*	0.0401 (0.0204)*	0.0799 (0.0164)**	0.038 (0.0193)*	0.1173 (0.0268)**
# of members less 3 yrs	0.0214 (0.0057)**	0.0114 (0.0069)***	0.0553 (0.0151)**	0.049 (0.0138)**	0.1021 (0.0198)**	0.1254 (0.0168)**
# 3_5	0.0215 (0.0067)**	0.0167 (0.0038)**	0.0306 (0.0086)**	0.026 (0.0168)	0.0679 (0.0165)**	0.0177 (0.0210)
# 6_12	0.0022 (0.0035)	-0.0059 (0.0029)*	0.0246 (0.0040)**	0.0138 (0.0070)*	0.0461 (0.0080)**	0.0431 (0.0099)**
# 13_14	0.0155 (0.0048)**	0.0118 (0.0040)**	-0.0232 (0.0124)***	-0.0092 (0.0089)	-0.0005 (0.0173)	-0.0079 (0.0143)
# 15_17	0.0107 (0.0037)**	0.0005 (0.0037)	0.0349 (0.0084)**	0.0297 (0.0061)**	0.0403 (0.0135)**	0.0142 (0.0091)
# 18_22	0.0018 (0.0050)	-0.0085 (0.0034)*	0.015 (0.0057)**	-0.005 (0.0063)	0.0309 (0.0080)**	0.0084 (0.0105)
# 23_29	-0.0088 (0.0069)	0.0002 (0.0059)	-0.026 (0.0134)	-0.0036 (0.0128)	-0.0066 (0.0156)	-0.0079 (0.0121)
# 30_44	-0.0232 (0.0075)**	-0.0194 (0.0068)**	-0.0561 (0.0095)**	-0.0674 (0.0077)**	-0.0697 (0.0159)**	-0.136 (0.0161)**
# 45_54	-0.018 (0.0093)	-0.0116 (0.0070)	-0.0419 (0.0090)**	-0.0674 (0.0101)**	-0.0645 (0.0168)**	-0.1379 (0.0135)**
# 55_64	-0.0123 (0.0089)	0.0049 (0.0142)	0.0073 (0.0339)	-0.0506 (0.0168)**	-0.0507 (0.0348)	-0.108 (0.0195)**
# 65 & older	0.0022 (0.0134)	-0.0125 (0.0099)	-0.0284 (0.0177)	-0.0788 (0.0246)**	-0.0452 (0.0358)	-0.1181 (0.0236)**
1 if head is male	-0.0187 (0.0107)***	-0.012 (0.0169)	0.008 (0.0175)	-0.0059 (0.0231)	0.0106 (0.0361)	0.0587 (0.0239)*
1 if head is 31_54 yrs old	-0.0253 (0.0218)	-0.0056 (0.0169)	-0.1243 (0.0283)**	-0.2021 (0.0363)**	-0.2286 (0.0466)**	-0.1966 (0.0460)**
1 if head is 55_64 yrs old	-0.0143 (0.0308)	-0.0174 (0.0299)	-0.1676 (0.0483)**	-0.2011 (0.0441)**	-0.2267 (0.0656)**	-0.2027 (0.0481)**
1 if head is 65 or older	-0.0402 (0.0287)	-0.0051 (0.0209)	-0.1673 (0.0378)**	-0.2119 (0.0532)**	-0.2184 (0.0948)*	-0.2083 (0.0668)**
1 if head has HS	-0.0142 (0.0071)*	-0.0136 (0.0055)*	-0.0926 (0.0174)**	-0.0575 (0.0106)**	-0.1642 (0.0209)**	-0.1346 (0.0150)**
1 If head has more than HS	-0.0217 (0.0033)**	-0.0096 (0.0062)	-0.1118 (0.0140)**	-0.0623 (0.0115)**	-0.2346 (0.0149)**	-0.1828 (0.0144)**
Observations	13537	13089	13475	12986	13471	13500
R-squared	0.04	0.03	0.12	0.13	0.17	0.22

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%

All the regressions include city, year and wave dummies. Dependent variable: 1 if the young person is available to work.

Logit estimates are significant and with the expected sign.

Table 10: Reduced forms - School attendance by head education.
Individual level

	12_13		14_15		16_17	
	male	female	male	female	male	female
less educated heads						
Brazil non. exch. rate	-0.0015 (0.0188)	-0.0242 (0.0044)**	-0.1441 (0.0082)**	-0.0638 (0.0372)***	-0.1223 (0.0186)**	-0.1213 (0.0157)**
Observations	9485	9111	9529	9286	9716	9638
R-squared	0.03	0.04	0.1	0.13	0.13	0.21
more educated heads						
Brazil non. exch. rate	0.0411 (0.0113)**	0.033 (0.0127)**	0.0598 (0.0096)**	-0.0193 (0.0207)	0.1089 (0.0195)**	0.1357 (0.0391)**
Observations	4052	3978	3946	3700	3755	3862
R-squared	0.06	0.03	0.05	0.09	0.09	0.15

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%. The regressions include city, year, wave dummies; and all the controllers on size and composition of the HH included in the other regressions
Dependent variable: I if the young person attends school. Logit estimates are significant with the expected sign.

Table 11: Reduced form - Availability to work, by head education
Individual level

	12_13		14_15		16_17	
	male	female	male	female	male	female
less educated heads						
Brazil non. exch. rate	0.0519 (0.0177)**	0.0375 (0.0055)**	0.1548 (0.0123)**	0.0711 (0.0453)	0.1098 (0.0223)**	0.0508 (0.0095)**
Observations	9485	9111	9529	9286	9716	9638
R-squared	0.04	0.04	0.1	0.13	0.13	0.19
more educated heads						
Brazil non. exch. rate	-0.036 (0.0096)**	-0.0316 (0.0122)**	-0.0599 (0.0116)**	0.0192 (0.0210)	-0.0572 (0.0759)	-0.1392 (0.0402)**
Observations	4052	3978	3946	3700	3755	3862
R-squared	0.05	0.03	0.06	0.09	0.1	0.15

Robust standard errors in parentheses. *** significant at 10%, * significant at 5% and, **significant at 1%. The regressions include city, year, wave dummies; and all the controllers on size and composition of the HH included in the other regressions
Dependent variable: I if the young person is available to work. Logit estimates are significant with the expected sign.

Figure 1: School Attendance by age

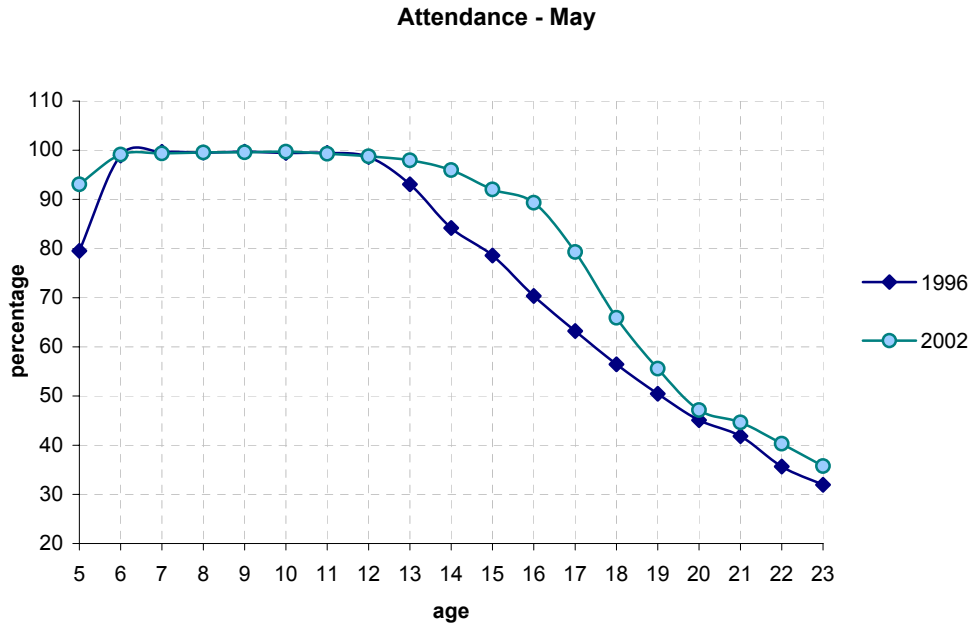


Figure 2: Schooling attendance

