

The True Cost of an Education:
Income's Effect on Educational Attainment in
Buenos Aires, 1980-2006

Submitted to Princeton University
Department of Economics
In Partial Fulfillment of the Requirements for the A.B. Degree

April 11, 2012

PLEDGE:

This paper represents my own work in accordance with University regulations.

Acknowledgements

First, I would like to thank my parents , without whom I would not be where I am today. They have loved me, supported me, and helped me to succeed in my every endeavor. They gave of themselves so I could achieve my dreams. They inspired me and helped me get up every time I failed. I am so grateful for the blessing of having them as my parents.

I would also like to thank my sister , who has always helped me get through the hard times and good times. From her first day to now she has been my constant companion and has helped me even more than she knows with her joy and positive attitude.

I must thank my advisor, Prof. , without whom this thesis would not have been written. Her insight and careful critiques helped me to hone my ideas and create a work I can be proud of.

I would like to thank my friends for their support through the past four years. have been there since the beginning, and I am so thankful for the jokes, study breaks, and fun experiences we have shared. have supported me from within the thesis bubble, and I could not have made it through many late nights in the library without them. has supported me from outside the bubble, and I am so thankful for our day trips to venture into the real world. have supported me spiritually for the past three years, and I am so thankful for their listening ears and gracious words of advice.

Finally, I would like to thank the library for giving my thesis a home away from home.

Abstract:

I document a large increase in the effect of family income on college attendance and secondary school completion in the Greater Buenos Aires region of Argentina from 1980-2006. These changes coincide with large increases in the unemployment rate and a financial crisis. I find that those in the lowest income quartile were less likely to attend college during the period of high unemployment while their counterparts in other income quartiles were more likely to attend college. I further investigate this relationship by looking into whether unemployment and government spending affected educational attainment. I find different effects in this model when I separate cohort members of the lowest income quartile from the rest of the sample, which supports my hypothesis that income was the main factor in determining educational attainment at this time.

Table of Contents

I. Introduction	1
II. Literature Review	5
III. Data	12
IV. Methodology	23
V. Results	26
<i>A. Income's Effect on Educational Attainment</i>	26
<i>B. Economy's Effect on Educational Attainment</i>	32
<i>C. Government's Effect on Educational Attainment</i>	38
<i>D. Wage Returns to College Attendance</i>	43
VI. Conclusion	45

I. Introduction

Human capital is not a new concept. Jacob Mincer (1958) and Gary Becker (1993) were not even the first to use it, but they developed how modern economists view human capital. In this paper, I will study educational attainment as one aspect of human capital. I use data from the Permanent Household Survey (Encuesta permanente de hogares or EPH) in Greater Buenos Aires, Argentina, to analyze how family income, economic factors, and government spending affected educational attainment in the Greater Buenos Aires region of Argentina from 1980-2006. By analyzing educational attainment in this very specific area, I want to add another dimension to the discussion on which factors affect educational attainment and the policies a government can actually implement to encourage educational attainment in its society.

The idea that educational attainment is linked to family income and economic factors is not something new. Many theories exist as to how income affects educational outcomes and lifetime earnings. Looking at intergenerational transfers of income and education level, Becker and Tomes (1979) and Behrman and Taubman (1976) find that genetic endowments and family environment are the largest factors in determining the child's income. Most recent papers find that family income is one of the most important determinants of educational attainment, and therefore, earning potential (Heckman, Lochner, and Todd 2008; Belley and Lochner 2007; Cameron and Heckman 2001; Carneiro and Heckman 2002). However, these papers either use one specific year of observations or compare two different observation years. I use data which allows me to see yearly changes in educational attainment instead of discrete moments in time. Thus, I can analyze the theories put forth in these papers through an empirical lens.

Argentina is unique because it is a developing country, according to the World Trade Organization and the International Monetary Fund's World Economic Outlook Report; however, it has a per capita GDP which allows it to have the benefits of a middle income country. Buenos Aires is the largest city in Argentina, and the Greater Buenos Aires region (containing the city and the surrounding suburbs) had 12,806,866 inhabitants as of the 2010 Argentine census (INDEC), which accounts for approximately 35% of the population of Argentina. In addition, there were several large shifts in economic policies and at least one financial crisis during this time in Argentina, which gives me more interesting data to analyze. The wide range of economic policies adopted during this time, the extreme hyperinflation of the late 1980s, and the high unemployment of the late 1990s all make Argentina an interesting case to study how different economic factors affect educational attainment.

I document a large increase in the effect of family income on college attendance and secondary school completion starting in 1995, even after controlling for family background. These changes coincide with large increases in the unemployment rate and a financial crisis. I investigate this relationship further by looking into whether unemployment affects educational attainment. I perform a probit estimation model while controlling for the same family background factors as before, but I add economic factors to see their effects on college attendance. I find different effects in this model when I separate the cohort members of the lowest income quartile from the rest of the sample. This only supports my hypothesis that family income became more important after 1995, even given the changing economic conditions.

The importance of family income on educational attainment has large consequences in Argentina. Since free public education was established in Argentina in 1916, the country has a long tradition of high literacy and relatively high college attendance. However, the existence of free public education from primary to tertiary school does not mean that it is costless. All other things equal, the opportunity cost of attending college should increase when the unemployment rate decreases (O'Connor 2010). In addition, the search costs of finding a job while attending college are higher than finding a job while not attending (O'Connor 2010). Therefore, given these two conclusions, we would expect that during times of high unemployment young adults would choose to attend college and during times of low unemployment young adults would choose to find work.

The results for income quartiles 3 and 4 follow this logic, but the results for income quartiles 1 and 2 do not. For the higher income individuals, the low opportunity cost of attending college is the dominant factor, but for the lower income individuals, the high cost of finding a job while attending college is the dominant factor. These costs tend to be higher for low income individuals because their incomes are necessary to supplement their parents' contributions to the family. Therefore, in the lower income group, it is more important to try to find work than to attend college, especially during an economic slowdown when unemployment is high.

This disparity in motivation for college attendance is important, since the direct costs of attending college in Argentina are low to none. It is true that students have to pay for books and transportation costs, which in some cases could be prohibitively high for

the poorest in the society. Still, this is not the sole reason for the large difference in college attendance between the richest and poorest.

This thesis proceeds as follows. Section II outlines the related literature on family income and educational attainment. Section III describes the EPH data in detail. Section IV outlines the methodology by which I will analyze the EPH and economic variable data. My empirical results are found in Section V. I run three series of regressions. First, I only look at family background factors and family income to establish income's effect on educational attainment for each cohort. Second, I add economic indicator variables to establish how they interact with income in a given cohort and income quartile. Third, I add the amount of government spending to establish how government spending played a role in affecting income and economic factors in a given cohort and income quartile. I offer some concluding thoughts in Section VI.

II. Literature Review

Most studies of the relationship between family income and schooling have focused on the potential role borrowing constraints play in determining college attendance. Borrowing constraints could be a major concern in the United States where college tuition averages \$20,986 per year for a four-year institution (National Center for Educational Statistics). However, in Argentina, where tuition for public universities is free, borrowing constraints are not a problem in the traditional sense. We will explore this idea further in this thesis, but it is important to note that students in Argentina do not experience borrowing constraints to cover tuition costs, which is a common occurrence in the United States. This assumption of the existence of high tuition costs is a basic premise for all models testing the importance of credit constraints on educational attainment in the United States.

Cameron and Heckman (1998; 2001) and Carneiro and Heckman (2002) find relatively small gaps in college enrollment by family income (in the National Longitudinal Survey of Youth of 1979), after controlling for Armed Forces Qualifying Test (AFQT) scores, which are a measure of ability. Therefore, they argue that long-term factors that are highly correlated with family income – for example, quality of the home environment and early investments in children – better explain different college enrollment rates by family income than do short-term borrowing constraints during the college-going years.

Carneiro and Heckman (2002) estimate the percent of individuals who are experiencing borrowing constraints based on several dimensions, including: whether the individual is enrolled in college, whether he or she has completed a 4-year college

degree, whether he or she has completed a 2-year college program, the proportion of individuals not delaying college entry, and an individual's choice to enroll in a 4-year vs. 2-year college. They separate the results by sex and race and find that overall, the percentage constrained ranges from 7.7% (for completion of two year college) to essentially zero percent for completion of four year college. They conclude that there is little evidence that short term credit constraints explain much of the gap in college participation. When they set statistically insignificant gaps equal to zero they get a range of 0 to 1% for white females, no gaps for blacks and Hispanic females, and a range of 0 to 5% for Hispanic males.

They also regress whether or not an individual is enrolled in college on his or her average discounted family income between the ages of 0 and 18, average discounted family income between the ages of 0 and 5, average discounted family income between the ages of 16 and 18, and his or her PIAT-Math (a math test score) at age 12. Their results show that the total level of family resources affects college enrollment, but the family income received in the adolescent years has no additional effect on college enrollment decisions. The evidence Carneiro and Heckman present is consistent with the hypothesis of no short-run credit constraints. Only the long-run factors embodied in the child's test score and in permanent income affect college enrollment.

Since these papers argue that long-term factors are more important than short-term credit constraints in the United States, we would assume these models to hold in the case of Argentina, where the costs of higher education are lower. Carneiro and Heckman refer to these long-run factors as a type of credit constraint, but they are not determined by short-term borrowing limits. Instead, they are credit constraints on the family as the

child is growing up which affect the outcome of the decision whether or not to enroll in college.

Other papers have used other methods to show that borrowing constraints have little impact on the decision to enroll in college. Cameron and Taber (2004) test whether different interest rates among individuals affect their rates of return to schooling using different instrumental variable estimators. They find no evidence of heterogeneous returns, and they conclude that borrowing constraints are not important. Keane and Wolpin (2001) allow for individual heterogeneity, parental transfers, borrowing (with limits), and work while in school by estimating a dynamic structural model of schooling behavior. They estimate tight borrowing limits, but their estimates suggest that these limits have little impact on final schooling outcomes. They find that relaxing borrowing constraints tends to increase consumption and reduce labor supply while in school.

Belley and Lochner (2007) use a methodology similar to that of Carneiro and Heckman (2002). They argue that while family income is one of the most important determinants of college enrollment by income level, based on NLSY97, credit constraints might have a larger role than previously discussed. However, they concede that more research is necessary to determine whether this is true. They test the estimated effects of family income, AFQT, and family background on educational attainment at age 21. They use family background factors such as sex, race, mother's age at birth of child, whether the family was intact during adolescence, whether the child lived in an urban/metropolitan area during adolescence, the number of siblings or children under 18 living in the household, whether the mother was a high school graduate, and whether the mother had some college education. AFQT quartile is used as a measure of ability. They

look at the results from the National Longitudinal Survey of Youth 1979 (NLSY79), a survey of men and women born in the years 1957-64 and aged 14 to 22 when first interviewed in 1979; and the National Longitudinal Survey of Youth 1997 (NLSY97), a survey of young men and women born in the years 1980-84 and aged 12 to 17 when first interviewed in 1997, to see changes over time for two different cohorts.

Belley and Lochner are most interested in the role of ability and family income after controlling for family background. Their estimates suggest that ability is an important determinant of high school completion for both cohorts; however, they also reveal that ability has become less important over time. For both cohorts, ability is most important at the bottom of the distribution. Family income plays a modest role in determining high school completion, with little change across cohorts.

Belley and Lochner also find that while ability is equally important for both cohorts, family income plays a substantially more important role in determining college attendance for the NLSY97 youth. Their estimates suggest modest effects of family income on attendance for the NLSY79 sample (a nine-percentage point difference between the highest and lowest income quartiles), slightly larger than the difference reported in Carneiro and Heckman (2002). Altogether, their results suggest that NLSY79 youth from lower family income quartiles were more likely to delay college a few years than their higher-income counterparts, but the overall college attendance rates are largely constant when controlling for family income. Their results for the NLSY97 cohort imply substantial family income effects on college attendance measured at all ages from 20 to 23, and there is little evidence of any systematic decline in attendance gaps with age, meaning that most individuals are not delaying college enrollment. Measuring attendance

as of age 21 (their baseline specification) suggests that college attendance rates are 16 percentage points higher for NLSY97 youth from the highest income quartile relative to the lowest. This is nearly twice the difference between the highest and lowest income quartiles in the NLSY79 youth. The NLSY97 difference is statistically significant at the 10 percent level. Regardless of the age at which they measure college attendance, Belley and Lochner find differences by family income have risen substantially across cohorts between 1979 and 1997.

Furthermore, these studies have mainly focused on the United States. Some of the assumptions made in those papers cannot therefore be made in this paper, and some of the conclusions drawn from those studies may not be applicable in the case of Buenos Aires. O'Connor (2010) uses Belley and Lochner's (2007) and Carneiro and Heckman's (2002) methodologies for data available from the Permanent Household Survey (EPH) for the Greater Buenos Aires area from 1974-1999. O'Connor documents stagnation and general decline in college attendance and secondary completion in the lowest family income quartile in the 1990s in Buenos Aires, which led to increasing gaps in attainment between the lowest quartile and the other quartiles. He concludes that the increased effect of family income on educational attainment during this time is evidence of increased credit constraints during this time. He also offers an overwhelming spike in the unemployment rate as a possible explanation for a tightening of credit constraints in the 1990s. Finally, O'Connor presents several models, one of which suggests that an unemployment rate increase should sufficiently tighten credit constraints to lower college attendance among the very poor, despite the drop in the opportunity cost of college. He presents another model which suggests why, given the unemployment environment of

Argentina at any given time, one might expect credit constraints to be tighter in the early to mid-1990s than in the late 1990s.

I disagree with O'Connor's conclusion that the increased effect of family income on educational attainment in the 1990s in Buenos Aires is evidence of increased credit constraints in the strict sense of borrowing constraints. The fact remains that tuition for public universities in Argentina is free. Families which are too constrained to send their children to university in the mid-1990s would not be part of the group which would send their children to university under ideal economic circumstances. I will use O'Connor's methodology to test my hypothesis that the loss of income caused by the spike in unemployment in the late 1990s caused young adults in the lowest income quartiles to decide not to attend college.

I will also use conclusions from Menendez and Rozada (2002) in this thesis. They look at who makes up the population of public and private universities in Argentina and whether the free tuition subsidy actually encourages more college attainment by poorer individuals. They use data from the May 1998 Permanent Household Survey (EPH). Menendez and Rozada model the probability of attending university by including one set of explanatory variables with personal characteristics such as sex and age and another set which tries to describe the family's socioeconomic background. The second set of variables includes per capita family income, dummy variables for educational level of the head of household (HH), number of siblings living in the parents' home, and a dummy indicating whether the last educational institution attended was public or private.

They find that individuals attending university come from the top deciles of the income distribution and relatively highly educated families. They do not find any

difference in socioeconomic variables between those who attend tuition-free public universities and those attending private colleges. In addition, they find that almost half of the students in public universities completed their secondary education in private high schools where they paid tuition. They conclude that these facts reveal an implicit transfer to the richest individuals in society. Therefore, in Argentina, only a privileged group is able to attend college. Their analysis indicates that poor students are excluded from higher education and they are not able to enjoy the subsidy which should benefit them.

These findings are generally consistent with O'Connor's findings, but they do not include the possibility of credit constraints as a reason for whether or not to attend college. Once again, given that university attendance in Argentina is free, it is unlikely that short-term credit constraints faced by a student not attending college who otherwise would have been high enough to actually deter him from attending.

III. Data

I will analyze yearly micro data from the Permanent Household Survey (EPH) for 1980-2006.¹ This data is collected each year by the National Institute for Statistics and Census (INDEC) of Argentina. I am using the October observations from each year so that my observations are consistent. These surveys cover the geographical region of Buenos Aires and the Greater Buenos Aires area.

I group the data in year-of-birth cohorts. There are six cohorts, each covering four or five years. The first begins in 1962 and the last ends in 1988. It is important to mention the restrictions to cohort eligibility. Cohort members must be living in their parent's household in order to capture parents' educational effects on them. This is also important in order to capture the family income's effect on the cohort member's education. Second, the cohort members are all aged 19 to capture initial college attendance decisions. If students in the Greater Buenos Aires region continue school consistently, they will begin attending college in the year they turn 19, and since I am looking at October observations, all cohort members' choices will come through in the sample. Although there might be a bias in choosing to only look at 19-year-olds living with their parents, I do not expect this to affect my results since it is common in Argentina for individuals of this age to live with their parents. Young adults tend to attend local universities and live at home, and only those coming from rural areas or small towns will live in a shared apartment outside of their parents' home. Living at home while attending school is not in and of itself evidence of a credit constraint. In fact, 89% of 19-year-olds in the survey data are living with their parents, and only 1% of 19-year-olds are classified as heads of

¹ I am unable to use the year 1983, since the data is not available for that year. I also cannot use the years 1981 and 1989, since some essential income data is unavailable for those years.

Table 1. Cohort Definitions and Characteristics

Cohort Label	Years of Birth	Years in Primary School*	Years in Secondary School*	Years in First Year of College**	No. of Obs.
Cohort 1	1961-1966	1967-1978	1973-1984	1980-1985	461
Cohort 2	1967-1971	1973-1983	1979-1989	1986-1990	384
Cohort 3	1972-1975	1978-1987	1984-1993	1991-1994	528
Cohort 4	1976-1979	1982-1991	1988-1997	1995-1998	617
Cohort 5	1980-1983	1986-1995	1992-2001	1999-2002	543
Cohort 6	1984-1987	1990-1999	1996-2005	2003-2006	622

Notes: *Assumes children entered school at age 6 and attended continuously. **Unlike primary and secondary school, I am only concerned with people attending at least one year of college. These are the years the cohort members are in their first year of college, assuming they entered school at age 6 and attended continuously.

households in the data. Lastly, cohort eligibility is limited to those observations with non-missing values for parent's education, family income, and years of schooling. Table 1 describes the cohorts. Tables 2 and 3 respectively show percentages for male as well as female educational attainment by cohort. The overall trend shows greater educational attainment over time in each educational category. In addition, more women attended college than men in every age cohort. However, this upward trend in educational attainment does not hold for all income levels across all cohorts.

Table 4 shows the breakdown of college attendance by sex, cohort, and family income. There are some interesting trends by gender: namely, women have higher levels of educational attainment than men in every cohort in the lowest income quartile, except in cohort 4 where the two are equal. Looking at the different income quartiles also sheds some light on the shifts of educational attainment over time. Figures 1 and 2 are the graphed results of Table 4.

Table 2. Percentage of Males Attaining at Least Each Educational Level by Cohort

	Primary	Secondary Dropout	Secondary Completed	College Attendance
Cohort 1	96.6	40.5	27.0	17.6
Cohort 2	97.5	43.0	32.2	21.8
Cohort 3	96.5	46.0	29.9	20.6
Cohort 4	96.5	48.5	29.1	18.1
Cohort 5	97.7	45.4	35.9	26.1
Cohort 6	98.1	35.7	55.7	31.9

Table 3. Percentage of Females Attaining at Least Each Educational Level by Cohort

	Primary	Secondary Dropout	Secondary Completed	College Attendance
Cohort 1	96.7	29.7	47.5	34.1
Cohort 2	98.4	29.2	51.9	36.9
Cohort 3	97.1	31.4	54.4	38.7
Cohort 4	99.1	35.7	51.7	36.1
Cohort 5	98.6	39.5	49.5	33.7
Cohort 6	98.1	23.4	71.0	45.5

Table 4. Percentage Attending College by Sex, Cohort, and Family Income Quartile

	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
Men:				
Cohort 1	6.9	19.6	17.7	23.1
Cohort 2	8.9	9.1	20.0	40.9
Cohort 3	7.0	16.4	17.9	24.7
Cohort 4	4.2	11.3	12.9	36.8
Cohort 5	3.4	17.2	24.2	51.4
Cohort 6	7.1	13.5	32.6	50.0
Women:				
Cohort 1	27.3	23.5	31.5	50.0
Cohort 2	22.0	23.4	42.4	57.4
Cohort 3	32.6	29.5	34.5	62.7
Cohort 4	8.1	26.7	30.3	65.8
Cohort 5	8.0	11.1	25.7	64.7
Cohort 6	21.7	27.0	47.4	66.7

Figure 1:
College Attendance Rates by Family Income Quartiles, Males

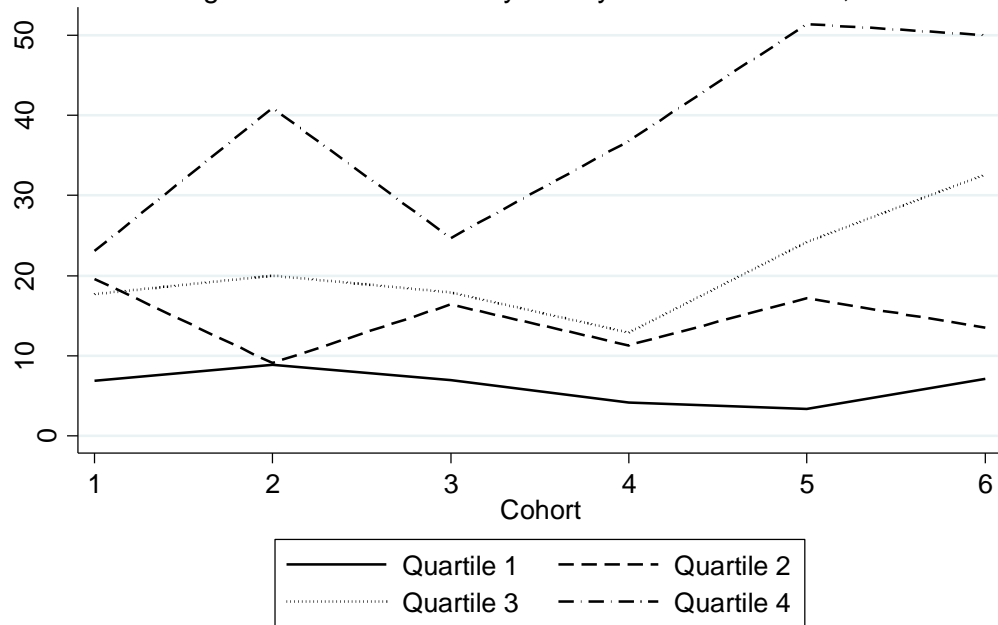


Figure 2:
College Attendance Rates by Family Income Quartiles, Females

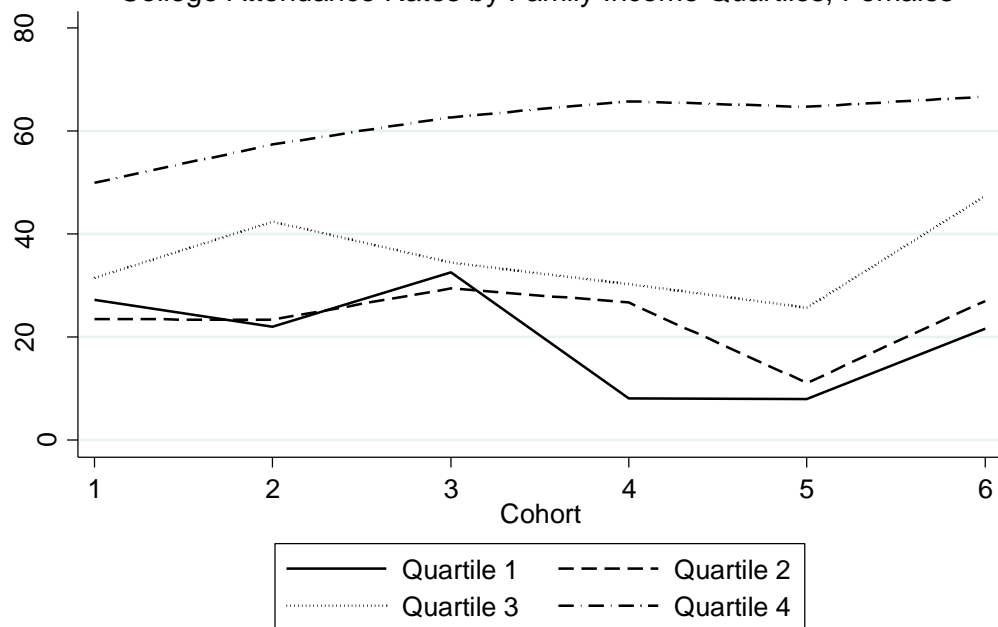


Table 5. Percentage Attending College by Cohort and Family Income Quartile

	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
Cohort 1	16.8	21.5	24.1	36.0
Cohort 2	15.1	15.0	31.1	49.3
Cohort 3	18.4	22.2	26.3	40.3
Cohort 4	6.0	17.9	20.5	50.3
Cohort 5	5.5	14.0	25.0	58.0
Cohort 6	14.4	20.9	39.3	58.3

We can see some interesting trends when we look at educational attainment by income quartile, without separating the genders of the cohort members (Table 5). In the lowest income quartile, college educational attainment stays steady during the first three cohorts. However, college attendance drops considerably during cohort 4. While college attendance makes slight gains in cohort 6, it is still lower than it was at the beginning of the period. The second income quartile shows a similar trend of decreased college attendance in cohort 4 and rising again in cohort 6. In this quartile there is also a drop in college attendance in cohort 2, but it rises to surpass the previous level in cohort 3. The top two income quartiles show overall increases in college attendance even though they experience rises and falls in between cohorts. The top income quartile sees an explosion of college attendance in cohort 4, which coincides with the large decrease in college attendance by those in the lowest income quartiles.

Trends in secondary schooling are similar to those in college attendance. Table 6 shows the breakdown by income quartile. In the lowest income quartile we see once again the large decrease in secondary completion during cohort 4, which inevitably led to the decrease in tertiary enrollment for this cohort. However, there is a large leap in secondary school completion during cohort 6. The second income quartile follows almost the same pattern in secondary completion as it did in college attendance: a slight decrease in cohort 2 followed by an increase in cohort 3 and a decline in cohorts 4 and 5. Again,

Table 6. Percentage At Least Completing Secondary School by Cohort and Family Income Quartile

	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
Cohort 1	29.2	31.8	32.8	51.2
Cohort 2	26.4	26.5	41.2	66.4
Cohort 3	26.2	39.4	36.0	51.6
Cohort 4	12.7	28.6	38.4	65.0
Cohort 5	13.8	24.8	42.4	71.0
Cohort 6	41.0	51.5	66.7	78.1

we see the large increase in secondary completion we saw in the lowest income quartile during cohort 6. As was the case for college attendance, the trend is overall increasing secondary completion, and the top income quartile once again sees huge increases during cohort 4. As in the previous two income quartiles, these income quartiles also experience large gains in secondary completion during cohort 6. The changes in secondary completion set up what to expect in trends of college attendance, so I will also try to explain this variable in this paper.

So far, I have talked about how family income changed in Argentina during this time. But another important factor is the government. The government in Argentina has at varying times been more and less involved in education since the establishment of free, compulsory education in 1916. However, I am not going to look at government spending on education. Instead, I will focus on how the government has affected income and economic indicators, and therefore, education.

The Argentine government since 1980 has been characterized by its presidents. From 1976-1983, a right-wing military junta ruled Argentina. They increased deficit spending and added to the already-high foreign debt left over from the failed efforts of import-substitution industrialization, even fighting the Falklands War at the end of their term. This high deficit spending caused rampant inflation, which persisted through the

decade and was only made worse in 1982 with the beginning of the Latin American debt crisis. In 1983 the junta created a new peso worth 10,000 old pesos in an attempt to curb the high inflation, which worked to temporarily fix the problem.

In December 1983, the junta allowed open elections that were deemed legitimate by international bodies. Raúl Alfonsín was elected president and inherited all of the bad debt and economic problems of the junta. During his presidency, government spending contracted dramatically, going from 11.01% of GDP in 1979 to 4.49% of GDP in 1989. Alfonsín's administration saw increased inflation, and in an attempt to redenominate the Argentine currency, his administration released the Austral in 1985. However, the government did not keep with the rules for monetary and fiscal policy set in the Austral Plan. The late 1980s were characterized by negotiations with creditors over debt and fiscal adjustment, and finally in 1989 the IMF refused to continue lending to Argentina. Hyperinflation immediately ensued (table 7). Alfonsín was unable to make any of the Argentine economic problems go away, and he continued borrowing until Argentina owed an external debt of US\$ 65 billion by the time Carlos Menem took office in 1989.

Menem began his term by enacting policies of deregulation, trade liberalization, and privatization of public companies. Privatization increased the productivity of services, but in many cases, corruption and mismanagement were suspected, especially in the form of large outlays given to employees. In April 1991, Minister of the Economy Domingo Cavallo enacted the convertibility law. This policy pegged the Argentine peso one-to-one with the US dollar, which brought the rampant hyperinflation in Argentina down to almost zero percent during the 1990s (table 7). However, this stabilization hid Argentina's major deterioration in fiscal solvency and came at a price; as Argentine

exports became more expensive, the reduced inflation led to more unemployment and combined with external shocks led to recessions in 1994-1995 and 1998.

When Fernando de la Rúa was elected president in 1999, the economy was in a recession made worse by the devaluation of the Brazilian real, the appreciation of the US dollar, and the 1998 Russian financial crisis. However, he saw Argentina as a country still “living beyond its means” (Gerchunoff and Llach 2003). De la Rúa and his advisors thought cutting government spending was their way out of the recession instead of devaluating the peso: “This quite anti-Keynesian strategy rested on what was loosely called the ‘country-risk model’: fiscal deficit leads to a high country risk, which builds into the interest rate and thus prolongs the recession” (Gerchunoff and Llach 2003). They chose to realize the fiscal tightening in the form of higher taxes on the middle class and hoped that this contraction in government spending would raise confidence enough to increase consumer demand and lift the country out of recession. However, none of the desired effects were realized as “new adjustments... not only failed to deliver recovery but could not even check the rise in country risk” (Gerchunoff and Llach 2003). In addition, taxes on the middle class only eroded away at their wealth and increased income inequality even more.

De la Rúa’s policies did not help Argentina’s economic situation, and he appointed Cavallo as his Minister of the Economy in April 2001 to restore confidence in his administration. Cavallo introduced policies aimed at instilling confidence in the Argentine economy, most notably announcing that the peso would not be worth one dollar but half a euro plus half a dollar once the two currencies reached parity. Instead of creating confidence in the Argentine peso, this announcement increased Argentina’s

country risk index. Investors and depositors realized that dollarization could be broken by an announcement from the Minister of the Economy, which took away any final confidence in the Argentine financial system. They pulled out of Argentina as quickly as possible, which led to a run on the banks (*corralito*) and a deposit freeze on withdrawals over 300 pesos per week (Perry and Servén 2002).

December 2001 to January 2002 is recognized as the peak of the Argentine financial crisis. There were three different presidents during this time. In light of the unrest after the *corralito*, De la Rúa resigned on December 21, 2001, initiating a political crisis since his vice president had resigned in October 2000 and had not been replaced. Following presidential succession procedures established by the Constitution, the Legislative Assembly, a body made up of both chambers of the Congress, was convened to choose a new president. By law, the candidates were the members of the Senate plus the governors of the provinces, and the Assembly appointed Adolfo Rodríguez Saá as president on December 22. Rodríguez Saá, unable to resolve the crisis, resigned on December 30 of that year. The Legislative Assembly convened again and appointed Eduardo Duhalde, a Senator from the Buenos Aires province, to take his place (Perry and Servén 2002).

Duhalde's government abandoned convertibility in January 2002 and let the peso float before establishing a temporary exchange rate of 1.4 pesos per dollar. Gerchunoff and Llach describe 2002 as "a year of damage limitation." However, it seems as if the "instant adjustment" of default and devaluation of the peso did most of the work of reestablishing equilibrium. This instant adjustment was less harmful to the Argentine economy than previous administrations had believed it would be. In fact, the rate of

recovery was remarkable. By the end of 2002, the per capita GDP was increasing, and the inflation and unemployment rates were decreasing.

In 2003, Néstor Kirchner was elected president, and an agreement with the IMF in September 2003 that reduced Argentina's debt obligations was able to finish the process of stabilizing the economy (Gerchunoff and Llach 2003). Néstor Kirchner's administration was characterized by conservative fiscal policy and an export-led model of growth. As we can see from table 7, Kirchner's administration decreased unemployment and inflation, and increased per capita GDP. Among other policies, he increased the minimum wage, gave unions more leverage in wage negotiations, and financed many public works projects. All of these factors only helped to increase the growth started with the return to a floating exchange rate. After Kirchner's term ended in 2007, his wife Cristina Fernández de Kirchner was elected president, and she was reelected to a second term in 2011.

In order to get a better sense of the economic factors at play during each cohort's college-going decisions, table 7 gives the per-capita GDP, the inflation rates, the unemployment rates, and the government spending as a percentage of GDP in Argentina from 1979-2006².

² Data for government spending is not available from 1981-1986.

Table 7. Per-Capita GDP, Inflation Rate, Unemployment Rate, and Government Spending from 1979-2005

YEAR	PER-CAPITA GDP	INFLATION RATE	UNEMPLOYMENT RATE	GOV'T SPENDING
1979	8659	158.8	2.0	22.4
1980	8638	89.8	2.3	.
1981	8045	115.5	5.0	.
1982	7711	193.3	3.7	.
1983	7907	368.4	3.1	.
1984	7931	703.7	3.6	.
1985	7294	532.4	4.9	.
1986	7685	74.2	4.5	.
1987	7758	165.8	5.2	9.8
1988	7545	392.3	5.7	8.7
1989	6910	3702.8	7.0	8.4
1990	6823	1838.4	6.0	5.7
1991	7392	102.4	5.3	6.8
1992	7986	17.9	6.7	6.8
1993	8411	8.1	9.6	32.9
1994	8764	3.4	13.1	34.0
1995	8578	2.2	17.4	33.4
1996	8905	0.4	18.8	33.0
1997	9425	-0.1	14.3	34.4
1998	9690	0.9	13.3	37.0
1999	9330	-1.7	14.4	39.3
2000	9172	-0.5	14.7	39.2
2001	8812	-1.7	19.0	38.5
2002	8158	39.4	18.8	29.6
2003	8706	3.9	16.7	30.1
2004	9259	5.7	13.6	32.0
2005	9975	10.7	11.5	37.4
2006	10655	10.5	10.5	42.2

Notes: Per-capita GDP is in real terms and 2005 constant prices. Government spending is in billions of constant 2000 USD.

Sources: Data from Heton, Summers, and Aten 2011; INDEC 2011; World Bank WDI 2011.

IV. Methodology

I will use a methodology similar to that of O'Connor (2010). I run linear probability models of college attendance and secondary school completion on family income quartiles, family background measures, and demographic characteristics. To see how the importance of family income has changed over time, I repeat the regressions for each cohort. I do not have a measure of cognitive ability, so my results will be biased upward because cognitive ability and family income are positively correlated (Belley and Lochner 2007; Carneiro and Heckman 2002). However, this does not concern me because I am concerned with how family income affects educational attainment over time. One complicating factor is the possibility that the impact of ability on secondary and college attainment has changed over some of the cohorts. This means that some of the measured change in the effect of family income over time will actually be due to the unobserved change in the impact of ability over time.

Belley and Lochner (2007) find that the effect of cognitive ability on college attendance has been stable over time in the United States. They compare a cohort that makes its college attendance decisions in the early 1980s with one that makes its college decisions in the early 2000s. I am using cohorts from a similar time period in this paper. I will therefore assume that the effect of cognitive ability on college attendance and secondary completion has remained relatively constant across cohorts, even though I have no data to support this assumption.

My data analysis controls for several family background variables. I categorize the heads of household as high school dropouts, those who completed high school or more, and those who attended college to control for the head of household's education.

Table 8. Sample Descriptive Statistics

VARIABLES	COHORT 1	COHORT 2	COHORT 3	COHORT 4	COHORT 5	COHORT 6
Completed high school	.3666 (.482)	.4152 (.493)	.3886 (.488)	.3759 (.485)	.398 (.490)	.6088 (.488)
Attended college	.2495 (.433)	.2881 (.453)	.275 (.447)	.2483 (.432)	.272 (.445)	.3505 (.478)
HH is secondary graduate	.1800 (.385)	.1780 (.393)	.2023 (.402)	.1684 (.375)	.188 (.391)	.2055 (.404)
HH attended some college	.0564 (.231)	.0530 (.224)	.0568 (.232)	.0442 (.206)	.052 (.222)	.0665 (.249)
HH is unemployed	.0304 (.172)	.0424 (.202)	.0634 (.244)	.1071 (.310)	.132 (.339)	.0423 (.201)
Female	.4772 (.500)	.4746 (.500)	.4523 (.498)	.4490 (.498)	.502 (.501)	.4985 (.500)
Number of children under 18	2.0307 (2.122)	1.894 (2.162)	2.191 (2.162)	1.653 (1.909)	1.786 (2.133)	1.393 (1.743)
Average adjusted family income	2.00e+13 (3.3e+13)	4.97e+6 (5.62e+6)	8.15e+5 (5.37e+6)	362.8 (350.9)	322.6 (341.5)	324.2 (305.3)
Adjusted family income:						
Quartile 1	5.37e+12 (7.4e+12)	1.43e+6 (5.66e+5)	2.10e+5 (4.49e+5)	92.79 (38.09)	72.78 (32.54)	74.32 (31.89)
Quartile 2	1.19e+13 (1.6e+13)	2.75e+6 (5.35e+5)	3.90e+5 (7.87e+5)	193.4 (34.01)	155.7 (38.26)	159.5 (31.91)
Quartile 3	2.07e+13 (2.6e+13)	4.31e+6 (7.71e+5)	5.20e+5 (1.14e+6)	319.2 (48.65)	278.8 (65.93)	279.1 (55.82)
Quartile 4	3.96e+13 (5.0e+13)	1.02e+7 (8.28e+6)	1.93e+6 (9.96e+6)	770.7 (432.9)	708.0 (439.1)	684.5 (342.6)
Sample Size	461	472	440	588	500	662

Note: Table reports means (with standard deviations in parentheses). Sample is all cohort members aged 19. Adjusted family income in real 2000 Argentine pesos.

I account for family structure by controlling for the number of household members under the age of 18 as of the survey date. I allow for differences by year of birth cohorts. Table 8 shows some descriptive statistics.

I have already discussed educational differences among the cohorts, so I will instead concentrate on differences in family background. There are steady increases in the amount of head of household education, with the exceptions of cohort 4 in secondary education and cohorts 2 and 4 in college attendance. The unemployment rate of the head of household follows the reverse trend to that of college attendance; it mostly stays constant, with a slight increase in cohort 2 and a large increase in cohort 4 which continues into cohort 5.

In addition, the adjusted family income undergoes a major adjustment in between cohorts 3 and 4, most likely due to the pegging of the Argentine peso to the US dollar in 1991, which occurs during cohort 3. Prior to 1991 Argentina struggled with high inflation, and in the late 1980s hyperinflation was a major economic problem. The number of children in each household has stayed constant or dropped slightly in every cohort.

V. Results

A. Income's Effect on Educational Attainment

Table 9 shows the results of the linear probability model for college attendance. It is clear that the effect of family income is largest in cohort 4, with cohort 5 close behind. The importance of family income of cohorts 4-6 is considerably larger than the importance of family income on cohorts 1-3. In fact, the coefficient on belonging to quartile 4 is significant across all cohorts, but in cohort 4 the coefficients on belonging to quartiles 2 and 3 are significant at the 1% level as well. In cohort 5 the coefficients on belonging to quartiles 3 and 4 are also significant at the 5% and .1% levels, respectively. Additionally, the coefficients on belonging to quartiles 3 and 4 are significant at the 1% and .1% levels, respectively, in cohort 6.

The combined increase in importance and significance clearly support the hypothesis that income level had a large effect on college attendance during 1995-2006. Moreover, I performed chi-squared tests ($df=3$) that all three income quartile indicators are equal for the cohort or cohorts specified in that column versus the income quartile indicators for cohorts 4-6. Every p-value returned was significant at the .1% level, providing more evidence for the importance of income.

Additionally, whether or not the head of household graduated from secondary school has a large and significant effect on every cohort, but it has a larger effect on cohorts 2, 4, and 5. This coincides with the large drops in college attendance noted in Tables 3 and 5. Therefore, in households where the head has completed secondary school the cohort member is more likely to go to college, even in years where the overall

Table 9. Linear Probability Model for College Attendance

VARIABLES	COEFFICIENTS					
	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6
HH is secondary graduate	0.6516*** (0.188)	1.1921*** (0.191)	0.5669** (0.179)	1.1590*** (0.190)	1.0056*** (0.195)	0.8516*** (0.174)
HH attended some college	0.4937 (0.304)	-0.2006 (0.325)	0.1003 (0.301)	-0.5897* (0.296)	-0.1974 (0.297)	-0.2494 (0.245)
HH is unemployed	-0.1278 (0.460)	-0.2378 (0.412)	0.4065 (0.266)	0.0424 (0.247)	0.3468 (0.245)	-0.0881 (0.293)
Female	0.5257*** (0.136)	0.6301*** (0.135)	0.7417*** (0.138)	0.6426*** (0.131)	0.2922* (0.140)	0.4626*** (0.111)
No. of children	-0.0082 (0.039)	-0.0652 (0.043)	-0.0421 (0.036)	-0.1284** (0.045)	-0.2742*** (0.054)	-0.2338*** (0.044)
under 18						
Family Income:						
Quartile 2	0.1953 (0.205)	-0.1402 (0.230)	0.1677 (0.222)	0.6514** (0.235)	0.4413 (0.281)	0.0804 (0.184)
Quartile 3	0.3019 (0.205)	0.3763 (0.218)	0.1931 (0.214)	0.6303** (0.235)	0.6733* (0.273)	0.5671** (0.176)
Quartile 4	0.5060* (0.211)	0.7223** (0.221)	0.5895** (0.215)	1.1910*** (0.239)	1.2950*** (0.281)	0.6532*** (0.189)
Constant	-1.3760*** (0.215)	-1.3067*** (0.226)	-1.3181*** (0.217)	-1.7718*** (0.251)	-1.3970*** (0.264)	-0.9079*** (0.172)
N	461	472	440	588	500	662
Pseudo R ²	0.1109	0.2047	0.1262	0.2511	0.2765	0.1899

Notes: Robust standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

percentage attending college went down. This observation of the head of household secondary school completion includes those who went to college.

Another interesting coefficient is for whether or not the head of household attended college. While this value becomes negative from cohorts 3-6, it is only significant at the 5% level during cohort 4. This would imply that cohort members from the households where the heads had attended college were themselves less likely to attend college during this time. This is an unusual finding, since it coincides with a decrease in college attendance and increases in the importance of the head of household completing secondary school and the importance of family income in college attendance. It is possible that this change is due to an increase in unemployment of white-collar workers during this time. If some cohort members' parents had gone to college and lost their jobs anyway, it is possible that the cohort members decided that college was a waste of their time.

An interesting change occurs in the coefficient on the number of children under 18 living in the household. The coefficient is not significant during cohorts 1 and 2, but it is significant at the 1% level during cohorts 4-6. This effect more than doubles from cohort 3 to cohort 4 and remains higher during cohorts 5 and 6. This implies that the number of children in a cohort member's household did not affect his education decisions until cohort 4. What changed during this year that made cohort members with more children in the household less likely to attend college?

In order to better capture a sense of the trends surrounding the number of children in the household, table 10 shows the breakdown of the means and standard deviations of the number of children in the household by income quartile and cohort. We can see that

Table 10. Number of Children in Household, by Family Income Quartile

	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
Cohort 1	3.3220 (2.792)	2.4220 (2.015)	1.5763 (1.464)	.9683 (1.173)
Cohort 2	3.5849 (3.095)	1.9035 (1.624)	1.3361 (1.591)	1.0299 (1.103)
Cohort 3	3.3592 (2.429)	2.8713 (2.415)	1.7632 (1.766)	1.1290 (1.361)
Cohort 4	2.7333 (2.382)	2 (2.038)	1.1563 (1.325)	.9034 (1.123)
Cohort 5	3.144 (3.042)	2.0938 (2.048)	1.2432 (1.338)	.9167 (1.089)
Cohort 6	2.5324 (2.491)	1.5277 (1.747)	1.1607 (1.205)	.6563 (.784)

Note: Table reports means (with standard deviations in parentheses).

the mean number of children per household is decreasing with time and income level.

This drop is greatest in quartile 1, although all income levels experience drops in number of children. The means of every quartile level drop, but the standard deviations do not show large changes. This trend indicates that the observations are clustered around the means. When we look at quartile 1 of cohort 6, we can see that one standard deviation from the mean would mean the household has 5 children where in cohort 1 it would have had 6. Likewise, in quartile 4 of cohort 6, we can see that one standard deviation from the mean would mean that the household has approximately 1.3 children where in cohort 1 it would have had 2. This change of one child is not large; therefore, outliers do not explain the large change in college attendance associated with one more child in the household.

I also look at how these same factors affect secondary school completion in each cohort. Table 11 shows many of the same trends as table 9. Once again, the effect of family income is largest in cohort 4, with cohort 5 close behind. Likewise, the importance of family income is much larger for cohorts 4-6 than for cohorts 1-3. The coefficient for belonging to quartile 4 is significant at the 1% level for every cohort except cohort 1,

Table 11. Linear Probability Model for Secondary Completion

VARIABLES	COEFFICIENTS							
	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohorts 1-3	Cohorts 4-6
HH is secondary	0.7591*** (0.184)	0.9963*** (0.198)	0.5956*** (0.177)	1.2017*** (0.208)	0.6634** (0.202)	0.6474*** (0.196)	0.7545*** (0.106)	0.7990*** (0.112)
Graduate	0.5400	-0.3587	-0.2024	-0.8230** (0.307)	-0.2766	-0.1804	0.0284	-0.3209
HH attended some	0.328	0.333	0.309	0.1675	0.2964	0.282	0.184	0.170
College	-0.0094	-0.1782	0.4352	0.210	0.206	-0.0707	0.1076	-0.0629
HH is unemployed	0.369	0.336	0.256	0.7085*** (0.119)	0.5167*** (0.128)	0.275	0.175	0.123
Female	0.5589*** (0.128)	0.7048*** (0.127)	0.7396*** (0.129)	0.7085*** (0.119)	0.5167*** (0.128)	0.3919*** (0.105)	0.6514*** (0.073)	0.5080*** (0.065)
No. of children	-0.0561	-0.0879*	-0.0299	-0.0954*	-0.1692*** (0.041)	-0.1281*** (0.038)	-0.0520** (0.019)	-0.1376*** (0.023)
under 18	(0.036)	(0.036)	(0.032)	(0.038)				
Family Income:								
Quartile 2	0.0509	-0.1370	0.4560*	0.6270** (0.194)	0.3752 (0.214)	0.1216 (0.154)	0.1195 (0.113)	0.2604** (0.101)
Quartile 3	0.0636	0.2027	0.2392	0.8244*** (0.191)	0.7318*** (0.212)	0.4636** (0.159)	0.1808 (0.112)	0.5187*** (0.101)
Quartile 4	0.3919*	0.7690*** (0.201)	0.6697*** (0.197)	1.2869*** (0.203)	1.3204*** (0.227)	0.5313** (0.180)	0.6044*** (0.115)	0.8437*** (0.110)
Constant	(0.195)	(0.205)	(0.202)	(0.203)	(0.227)	(0.180)	(0.115)	(0.110)
	-0.8225*** (0.193)	-0.8015*** (0.199)	-1.0745*** (0.197)	-1.4474*** (0.194)	-1.0980*** (0.214)	-0.1228 (0.152)	-0.8969*** (0.112)	-0.6722*** (0.100)
N	461	472	440	588	500	662	1,373	1,750
Pseudo R ²	0.1232	0.1826	0.1140	0.2348	0.2163	0.1148	0.1275	0.1667

Notes: Robust standard errors in parentheses. * p<.05 ** p<.01 *** p<.001

where it is significant at the 5% level. In addition, the variable for belonging to the second income quartile in cohort 2 is positive and significant at the 5% level.

Interestingly, all of the income quartile variables are positive and significant at the 1% level for cohorts 4-6. This provides even stronger evidence for the relationship between family income and educational attainment at the secondary school level during 1995-2006.

Prior to 1995, the number of children in the household had no significant effect on a cohort member's secondary education completion. However, the total number of children in the household is significant at the 1% level for cohorts 4-6. Therefore, where the number of children in the household did not affect whether or not a cohort member completed secondary school up to cohort 3, starting in cohort 4, an increase of one child in the household made a cohort member almost ten percent less likely to complete secondary school. By cohort 5, the number increased to almost 17%, but in cohort 6 it fell to 13%. These numbers are still more than double what they were in previous cohorts. They also correspond to the increased importance of income in education decisions and an increase in the Argentine unemployment rate. It is possible that cohort members with more siblings had to try to find work instead of finishing secondary school to help support their families during the more difficult economic time.

B. Economy's Effect on Educational Attainment

In order to measure whether the economic climate had an effect on college attendance, table 12 shows the results of a linear probability model that is similar to table 9, but table 12 includes the unemployment rate, inflation rate, per capita GDP, and a dummy variable for whether there was a financial crisis during the given cohort, which takes place from 2001-2002, during cohort 5. In addition, I include a joint Chi-squared test to test the multicollinearity of the unemployment rate, inflation rate, per capita GDP, and dummy variable for financial crisis. The last column in table 12 is the same regression as Model 3, but it only includes male cohort members. The same factors are significant at lower levels in the fourth model, indicating that while being male has a strong negative effect on outcome, the effect of belonging to cohorts 4 and 5 and having more children in the family is even stronger.

In addition, table 12 shows results of the probit model only for cohort members of quartile 1. We can see that when we account for the unemployment rate, inflation rate, per capita GDP, and whether there was a financial crisis during the given cohort, the only significant coefficients are on being female, the number of children in the household, and belonging to cohort 5. Quartile 1 of cohort 5 has the lowest percentage of college attendants of any quartile-cohort group, so it makes sense that the coefficient on this variable is significant while the others are not.

Furthermore, when we control for a financial crisis, the coefficient on cohort 5 is less significant than it is when we do not control for a financial crisis. This indicates that the financial crisis from Dec 2001-2002 at least partially explains the continuing drop in college attendance during this time. This makes sense because the academic year 2002

*Table 12. Linear Probability Model for College Attendance,
Family Income Quartile 1*

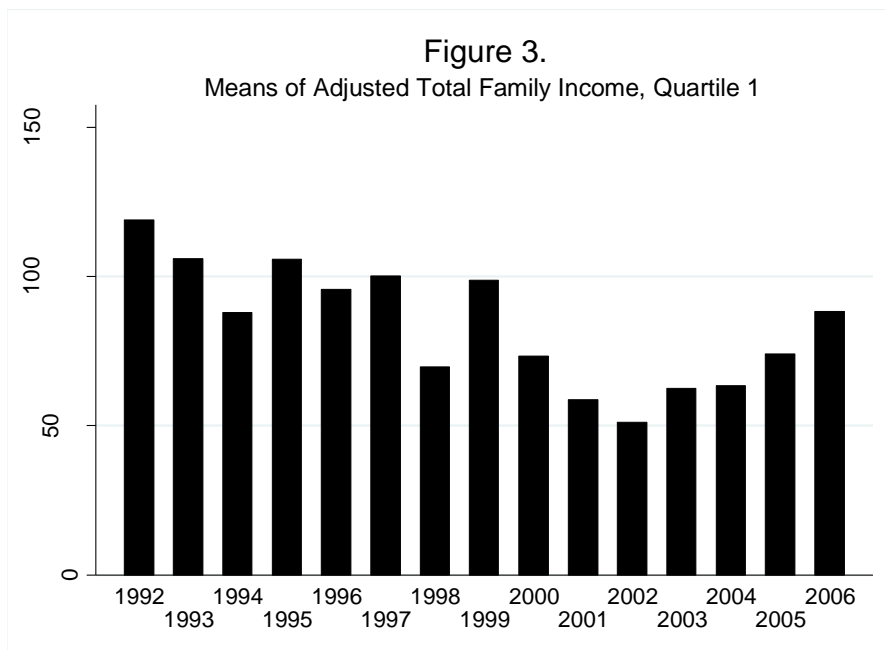
VARIABLES	COEFFICIENTS			
	Model 1	Model 2	Model 3	Model 4
HH is secondary graduate	0.3592 (0.232)	0.3464 (0.229)	0.3610 (0.232)	-0.1219 (0.525)
HH attended some college	0.1817 (0.446)	0.2320 (0.441)	0.1732 (0.447)	0.6386 (0.867)
HH is unemployed	0.1405 (0.188)	0.1927 (0.184)	0.1692 (0.187)	-0.1066 (0.282)
Female	0.7557*** (0.137)	0.7236*** (0.136)	0.7482*** (0.137)	.
No. of children under 18	-0.0836** (0.028)	-0.0832** (0.027)	-0.0838** (0.028)	-0.1335* (0.053)
Cohort 2	-0.0673 (0.228)	0.0057 (0.216)	-0.0865 (0.227)	-0.0557 (0.357)
Cohort 3	0.0119 (0.311)	0.1124 (0.213)	-0.1778 (0.300)	-0.6983 (0.553)
Cohort 4	-0.8605 (0.557)	-0.6571** (0.240)	-1.3385** (0.460)	-1.6980* (0.807)
Cohort 5	-1.4141* (0.649)	-0.6748** (0.260)	-1.4079** (0.476)	-1.8660* (0.821)
Cohort 6	-0.1667 (0.499)	-0.1306 (0.200)	-0.6326 (0.369)	-1.2432 (0.676)
Unemployment rate	0.0318 (0.035)	.	0.0583 (0.032)	0.0930 (0.056)
Inflation	-0.0000 (0.000)	.	0.0000 (0.000)	-0.0004 (0.000)
Per-capita GDP	-0.0001 (0.000)	.	.	.
Crisis	0.7617 (0.512)	.	.	.
Constant	-0.4117 (1.114)	-1.2204*** (0.189)	-1.4765*** (0.231)	-1.2441*** (0.308)
Chi-squared test p-value	0.3308	.	0.3711	0.0723
N	704	704	704	372
Pseudo R ²	0.1313	0.1182	0.1247	0.0827

Notes: Robust standard errors are in parentheses. * p<.05 ** p<.01 *** p<.001

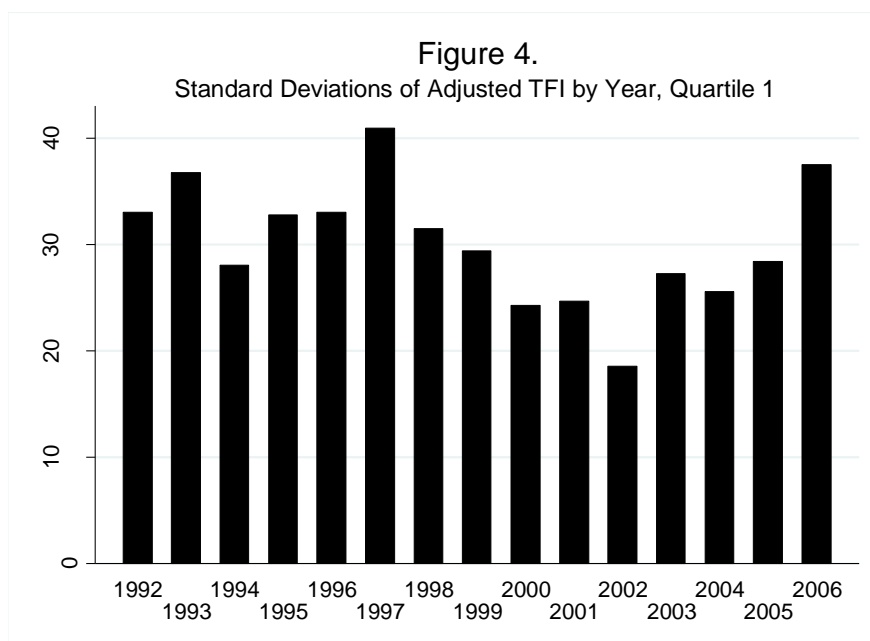
Model 4 includes only male cohort members.

Sources: Data from Heton, Summers, and Aten 2011; INDEC 2011.

Mean of AdjTFI



Standard Deviation of AdjTFI



starts in March 2002, which is only two months after the financial crisis of December 2001. The financial crisis and aftermath would clearly have an effect on the educational attainment decisions of young adults, and especially those in the lowest income quartile whose families probably do not have savings to rely on. However, we must also explore other explanations.

Moreover, in the models which exclude per-capita GDP and the variable for crisis, the coefficient on cohort 4 becomes significant as well. This would indicate that controlling for the average per capita GDP during each year renders the strong negative effect of being in cohorts 4 and 6 and members of quartile 1 insignificant. Even though the mean per capita GDP is increasing in each year during cohort 4 (refer to table 7), the mean adjusted family income in quartile 1 is decreasing during this same period (Figure 3). This could indicate that although the average individual is better off in Argentina during this time, the growth is not uniform across all sectors and obviously not across all income quartiles. In fact, the Gini coefficient increases from 45.2 in 1994 to 49.5 in 1998, which illustrates that the disparity between rich and poor increased greatly during this time.

Figure 4 shows the standard deviations of the average adjusted family income from 1992-2006. Cohort 4 contains the years 1995-1998, and the standard deviations for each of those years is relatively high compared to the other years in the sample. In fact, 1997 has the highest standard deviation of any given year.

These high standard deviations show that the range of incomes included in the lowest income quartile during this time was larger than in other times. Figures 3 and 4 together illustrate how the makeup of the lowest income quartile changed over time

*Table 13. Linear Probability Model for College Attendance,
Family Income Quartiles 2-4*

VARIABLES	COEFFICIENTS			
	Model 1	Model 2	Model 3	Model 4
HH is secondary	1.1326***	1.1291***	1.1309***	1.1267***
Graduate	(0.077)	(0.077)	(0.077)	(0.107)
HH attended some	-0.1636	-0.1592	-0.1628	-0.3344*
College	(0.123)	(0.123)	(0.123)	(0.170)
HH is unemployed	-0.1076	-0.0985	-0.1064	-0.0688
	(0.151)	(0.151)	(0.151)	(0.215)
Female	0.4761***	0.4754***	0.4751***	.
	(0.057)	(0.057)	(0.057)	.
No. of children	-0.1526***	-0.1520***	-0.1524***	-0.1470***
under 18	(0.022)	(0.022)	(0.022)	(0.035)
Cohort 2	0.0983	0.1167	0.0929	-0.0144
	(0.109)	(0.105)	(0.108)	(0.158)
Cohort 3	0.0991	0.0770	0.0461	-0.1508
	(0.159)	(0.112)	(0.145)	(0.208)
Cohort 4	0.0693	0.0301	-0.0625	-0.2990
	(0.272)	(0.102)	(0.203)	(0.293)
Cohort 5	0.0711	0.0771	-0.0210	-0.0244
	(0.265)	(0.104)	(0.212)	(0.308)
Cohort 6	0.2980	0.2329*	0.1696	0.1189
	(0.252)	(0.098)	(0.168)	(0.240)
Unemployment rate	0.0023	.	0.0097	0.0140
	(0.017)	.	(0.014)	(0.020)
Inflation	0.0000	.	0.0001	-0.0000
	(0.000)	.	(0.000)	(0.000)
Per-capita GDP	-0.0000	.	.	.
	(0.000)	.	.	.
Crisis	0.0880	.	.	.
	(0.153)	.	.	.
Constant	-0.6076	-0.8407***	-0.9011***	-0.8264***
	(0.551)	(0.089)	(0.110)	(0.149)
Chi-squared test				
p-value	0.8053	.	0.5529	0.7537
N	2,419	2,419	2,419	1,263
Pseudo R ²	0.1438	0.1433	0.1436	0.1264

Notes: Robust standard errors are in parentheses. * p<.05 ** p<.01 *** p<.001

Chi-squared test is a test that unemployment rate, inflation, per-capita GDP, and/or crisis are jointly equal to 0 for each model. Model 4 includes only male cohort members.

Sources: Data from Heton, Summers, and Aten 2011; INDEC 2011.

and revealed that families which might have been included in the second income quartile in another time were part of the lowest income quartile from 1995-1998. This change in relative income coincides with the large increase in the unemployment rate and the increased importance of family income on educational attainment. This makes sense: in families which perceived the recent increase in unemployment as a greater financial threat, the cohort members chose to seek work instead of attend college. It also makes sense that most of these families would be in the lowest income quartile, since they are likely to have the lowest skilled jobs and less savings than people in the higher quartiles.

Table 13 is the same regression as table 12, but it is for quartiles 2-4. This time the same three significant variables appear in all models: head of household completed secondary school, female, and number of children in the household. However, model 2 shows that the coefficient on belonging to cohort 6 is also significant. Since this model does not include economic variables, this implies that the improvement in the economic variables – or at least the unemployment rate – during cohort 6 accounts for the positive and significant effect of belonging to cohort 6 for those in quartiles 2-4. Table 9 showed similar results for those in cohort 6, and this conclusion is logical.

One more interesting note is that when quartile 1 is regressed separately from quartiles 2-4, the coefficient on the head of household being a high school graduate is not significant. This just shows how overpowering the effect of income is on college attendance decisions in this quartile. No matter the economic factors, cohort members in the lowest income quartile make their decisions based on how many family members they have and their family's income level.

C. Government's Effect on Educational Attainment

In order to start to quantify some of the effects the different Argentine presidential administrations had on college attendance, I replicate the regressions from tables 12 and 13, including government expenditures in billions of current USD. Since there is no government spending data available for cohort 1, I exclude those observations from my regression. I also include a joint Chi-squared test for multicollinearity in the unemployment rate, inflation rate, per capita GDP, dummy variable for crisis, and government spending, where the model includes two or more of those variables. Once again, Model 4 replicates Model 3, but only for the male cohort members. Table 14 shows these results.

The first similarity to table 12 is that the coefficient on whether or not the head of household completed secondary school is not significant. This coefficient was significant in every other regression up to table 12, but when we control for government spending it stays not significant. This simply means that whatever was causing the head of household's secondary attainment not to be significant in table 12 still persists here, even though we control for government spending. However, it is possible, as model 3 of table 14 shows, that the effect of government spending dominates the effect of the head of household's educational attainment due to its other effects in the economy.

When government spending alone is included in the regression in model 2, the coefficients on cohorts 4 and 5 are not significant. This signals that if we control for government spending, belonging to cohorts 4 and 5 no longer have significant effects on college attendance. This would indicate that government spending also explains the drop

*Table 14. Linear Probability Model for College Attendance,
Family Income Quartile 1*

VARIABLES	COEFFICIENTS			
	Model 1	Model 2	Model 3	Model 4
HH is secondary graduate	0.2734 (0.317)	0.2002 (0.310)	0.2477 (0.312)	-4.3203*** (0.371)
HH attended some college	0.2625 (0.546)	0.3764 (0.544)	0.2489 (0.549)	5.1836*** (0.869)
HH is unemployed	0.0395 (0.205)	0.1250 (0.198)	0.0922 (0.201)	-0.2921 (0.326)
Female	0.7928*** (0.156)	0.7550*** (0.156)	0.7913*** (0.156)	.
No. of children under 18	-0.1065** (0.034)	-0.1060** (0.033)	-0.1059** (0.033)	-0.2098*** (0.057)
Cohort 3	-0.0704 (0.325)	0.2656 (0.269)	-0.0346 (0.324)	-0.5258 (0.532)
Cohort 4	-1.3045* (0.630)	-0.3617 (0.383)	-1.0428* (0.483)	-1.4623 (0.827)
Cohort 5	-1.6433* (0.667)	-0.3392 (0.414)	-1.0534* (0.505)	-1.5333 ¹ (0.840)
Cohort 6	-0.6490 (0.592)	0.1595 (0.368)	-0.2931 (0.424)	-1.0285 (0.739)
Unemployment rate	0.0978 (0.058)	.	0.0693* (0.034)	0.0984 (0.061)
Inflation	-0.0001 (0.000)	.	-0.0003 (0.000)	-0.0015 (0.001)
Per-capita GDP	0.0003 (0.000)	.	.	.
Crisis	0.6630 (0.523)	.	.	.
Government Spending	-0.0392 (0.026)	-0.0119 (0.010)	-0.0200 ¹ (0.011)	-0.0229 (0.021)
Constant	-3.8082 (2.807)	-1.0448*** (0.231)	-1.2138*** (0.341)	-0.6243 (0.616)
Chi-squared test p-value	0.1086	.	0.0574 ²	0.2138 ²
N	567	567	567	304
Pseudo R ²	0.1506	0.1316	0.1432	0.1461

Notes: Robust standard errors are in parentheses. ¹ p<.075 * p<.05 ** p<.01 *** p<.001

Chi-squared test is a test that unemployment rate, inflation, per-capita GDP, and/or crisis jointly equal 0 for each model. Model 4 includes only male cohort members.

²Chi-squared test is only for the unemployment rate and government spending

Sources: Data from Heton, Summers, and Aten 2011; INDEC 2011; World Bank WDI 2011.

in educational attainment during this time. If we look at table 7, we can see that government spending increased dramatically in 1993, which is two years before the start of cohort 4. However, this increase was large and persistent. It does not appear that the increased government spending came as a result of recession. It was more likely the result of a policy choice by the Menem administration that came after the rise of the Argentine peso one-to-one convertibility with the US dollar.

Model 3 shows how if we control for government spending in addition to the unemployment rate and inflation rate, cohorts 4 and 5 and the unemployment rate become significant. In the previous tables the unemployment rate was not significant in any regression. Therefore, controlling for the level of government spending makes unemployment have a significant and positive effect on college attendance. However, given our previous results this does not seem like the whole story. We found that in quartile 1, members of cohorts 4 and 5 had lower adjusted average total incomes and belonging to one of these cohorts had a significantly negative affect on college attendance. So we would expect for the unemployment rate to have a negative effect on college attendance, since higher unemployment would make the poorest cohort members even poorer and would coincide with their large decrease in college attendance.

Furthermore, the correlation between government spending and the unemployment rate is pretty high at 0.747. This makes sense because the unemployment rate is lower during the 1980s when government spending is lower, and the unemployment rate is higher during the late 1990s when government spending is higher to generate stimulus during a recession. Since I do not have government spending data for the beginning of the 1980s, when government spending was supposed to be high with

lower unemployment, my measure for government spending versus unemployment is not as insightful as some of the other measures. However, the joint Chi-squared test reveals that the variables for government spending and unemployment are not multicollinear.

Table 15 shows the results of the same regression, except for quartiles 2-4. In this regression, the coefficient on the head of household's college attendance is negatively significant. However, we would expect for the head of household's college attendance to be positively significant, especially given that the head of household's secondary completion is positively significant. One scenario which could explain the negative coefficient on this variable is if parents who attended college lose their jobs or do not get returns to education higher than their peers who did not attend college. Children who see this result would be unlikely to attend college since they would perceive the wage returns to college as low. Additionally, since we are looking at parents who did not complete college and parents who completed college together, this could be reflecting that the market does not reward partial college attendance. Persons who attended but did not complete college do not capture the higher returns to college attendance, so their children will not enroll in college unless they know they will be able to finish.

Another reason for this scenario is that the structure of the Argentine economy changed during the 1990s. While the country remained a service-based economy, the percentage of people working for the government dropped because many industries became privatized. The economy opened to even more trade, and it is likely that cohort members during this time saw college as an unnecessary obstacle to working in this new environment.

*Table 15. Linear Probability Model for College Attendance,
Family Income Quartiles 2-4*

VARIABLES	COEFFICIENT			
	Model 1	Model 2	Model 3	Model 4
HH is secondary graduate	1.1772*** (0.085)	1.1765*** (0.085)	1.1768*** (0.085)	1.2094*** (0.118)
HH attended some college	-0.2761* (0.135)	-0.2741* (0.135)	-0.2760* (0.135)	-0.4950** (0.186)
HH is unemployed	0.0188 (0.162)	0.0327 (0.162)	0.0219 (0.162)	0.0184 (0.226)
Female	0.4822*** (0.063)	0.4827*** (0.063)	0.4816*** (0.063)	. .
No. of children under 18	-0.1836*** (0.025)	-0.1831*** (0.025)	-0.1833*** (0.025)	-0.1961*** (0.040)
Cohort 3	0.0519 (0.160)	0.0458 (0.131)	0.0427 (0.156)	-0.1319 (0.223)
Cohort 4	0.0076 (0.301)	0.0380 (0.170)	-0.0377 (0.224)	-0.2514 (0.327)
Cohort 5	0.0294 (0.269)	0.1016 (0.184)	0.0201 (0.238)	0.0275 (0.351)
Cohort 6	0.2475 (0.290)	0.2498 (0.174)	0.2103 (0.205)	0.1616 (0.298)
Unemployment rate	0.0059 (0.029)	. .	0.0118 (0.014)	0.0107 (0.021)
Inflation	0.0001 (0.000)	. .	0.0001 (0.000)	-0.0001 (0.000)
Per-capita GDP	-0.0000 (0.000)
Crisis	0.0669 (0.162)
Government Spending	-0.0030 (0.013)	-0.0047 (0.005)	-0.0050 (0.005)	-0.0023 (0.008)
Constant	-0.5715 (1.338)	-0.6652*** (0.101)	-0.7668*** (0.151)	-0.7078** (0.215)
Chi-squared test p-value	0.8425	.	0.4861 ¹	0.8458 ¹
N	1,986	1,986	1,986	1,042
Pseudo R ²	0.1519	0.1514	0.1518	0.1453

Notes: Robust standard errors are in parentheses. * p<.05 ** p<.01 *** p<.001

Chi-squared test is a test that unemployment rate, inflation, per-capita GDP, and/or crisis jointly equal 0 for each model. Model 4 includes only male cohort members.

¹Chi-squared test is only for the unemployment rate and government spending.

Sources: Data from Heton, Summers, and Aten 2011; INDEC 2011; World Bank WDI 2011.

D. Wage Returns to College Attendance

In addition, in explaining the college attendance decisions of cohort members, it is important to note the importance of the returns to college attendance in this decision. I look at the wage returns to college attendance relative to secondary completion from 1980-2006.³ I am using the same methodology as O'Connor (2010) to do this. I will estimate a standard Mincer model, but with a quartic in potential experience as suggested by Murphy and Welch (1990) instead of a quadratic. Potential experience is defined as (age - years of schooling - 6). The analysis includes only workers with high labor force attachment rates, males from 25 to 49 years old, in order to minimize selection bias.

The regression equation is:

$$(1) \ln(y) = a + bP + c(P^2) + d(P^3) + e(P^4) + sD + e,$$

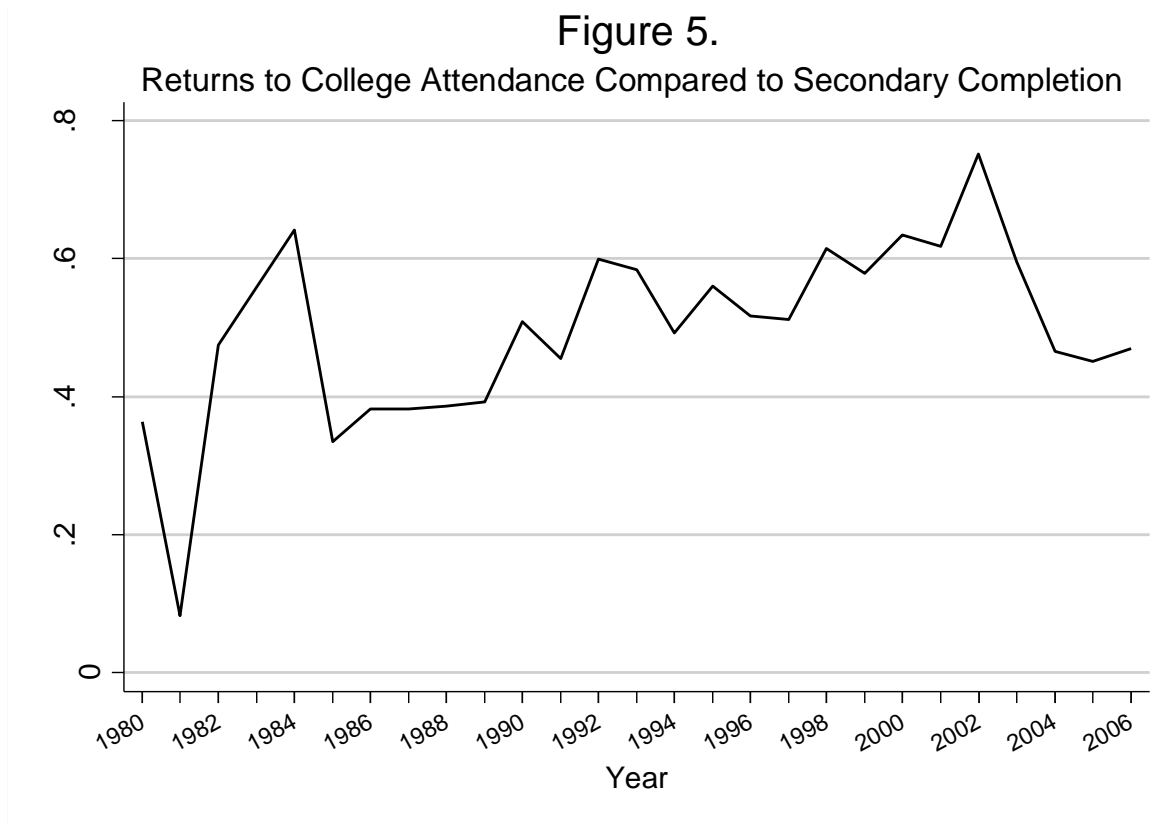
where y is the real⁴ wage, a is the intercept, P is potential experience, D is a dummy variable equaling 1 if one has attended college and 0 if one has attained secondary completion, and e is an error term. I repeat this regression separately for each year from 1980 to 2006. I plot the coefficients on the college dummy variable from (1) in Figure 5.

Figure 5 shows the growth in the wage return to college attendance relative to secondary completion over the whole sample period, and particularly the large upward trend in growth since 1990. It is interesting to note that the trend for the wage return to college attendance does not always follow the same pattern as the unemployment rate or the amount of government spending. For example, during the large increase in unemployment in cohort 4, the returns to college drop a bit, but during the other increase in unemployment in 2002 the returns to college increase, as would be expected.

³ I exclude the years 1983 and 1989 because some crucial income data is not available for those years.

⁴ I convert nominal levels to real ones with the Consumer Price Index of Greater Buenos Aires provided by INDEC.

Combined with the importance of family income during cohorts 4-6, it appears that each year (or group of years, in the case of cohorts) the same factors affect the choice of whether or not to attend college for young adults to varying degrees, depending primarily on income quartile.



VI. Conclusion

I have shown how income, economic factors, and government spending, separately and together affected college attendance in the Greater Buenos Aires region of Argentina. By dividing the sample into year-of-birth cohorts, I was able to test the specific effects of income on the college attendance decisions of 19-year-olds. By looking at the lowest income quartile separately from the others, I was able to test the specific effects of economic factors on the poorest cohort members versus their peers. By adding government spending, we could see how this factor impacted economic indicators and the income distribution and through them, the college attendance decisions of cohort members.

The most impressive result was the increased importance of family income on whether cohort members chose to attend college in cohorts 4-6. While income quartile was not a significant factor in the decisions of members of cohorts 1-3, it became significant in cohort 4 and remained significant for cohorts 5 and 6. What this importance means can be interpreted in a few ways. O'Connor (2010) chooses to interpret this increased importance as evidence of short-term credit constraints due to the borrowing conditions in Buenos Aires in the 1990s. I interpret this increased importance as evidence of credit constraints of a different nature.

Belley and Lochner (2007) found that long-term income and wealth better explained the constraints experienced by cohort members in their study. I agree with them here, as well. Short-term credit constraints due to borrowing limits should not have a large effect on the college decisions of cohort members because tuition at public universities is free. The child's family would have no more of an expense than if the child

had repeated his final year of secondary school. However, changing economic factors could impact whether or not cohort members choose to go to school. During the college attendance drop for cohort 4, Argentina was in a recession and unemployment was at the highest rate in twenty years. This meant the opportunity cost for attending college over working was lower, which would mean that more cohort members would go to college. But this was only the case in quartiles 3 and 4. Since income became the important factor in college attendance decisions, different income quartiles reacted differently to the change. Members of quartiles 1 and 2 overwhelmingly chose to work instead of attending college, even though the opportunity cost was lower.

To me, the increased importance of income is not evidence of an inability to borrow but instead is evidence of the increased importance of the cohort member's income to his or her family. Cohort members with more siblings were also much less likely to go to college than those who had fewer siblings, which supports this hypothesis. As I mentioned previously, all of the cohort members live with their parents, so the simultaneously increased importance of family income and the total number of children in the household together support this hypothesis. It should be noted that while the head of household's unemployment status was not significant to college attendance decisions, this could be due to the fact that many companies did not fire employees outright; instead, they kept on the same number of employees with reduced hours. It is possible, especially for cohort members in the lowest income quartiles, that the head of household was not unemployed but was underemployed. Unfortunately, we do not have data on underemployment in the survey, so we cannot test this hypothesis.

When I looked at how economic indicators influenced college decisions by income quartile, I found very different results in quartile 1 versus quartiles 2-4. While quartiles 2-4 showed that the head of household's education significantly impacted college decisions, this was not the case in quartile 1. The only significant factors in quartile 1 were total number of children in the household, gender, and belonging to cohort 4 or 5 in some regressions. This difference is even more evidence for the importance of the family's income situation on the cohort member's college attendance decision.

When I added government spending to the regression for quartile 1, I found that unemployment and government spending each became significant factors when I controlled for the other. As the country went into recessions, the government spent more money, but unemployment kept going up. However, the higher unemployment and the higher the government spending the less likely cohort members in quartile 1 were to go to college. Once again, the simple model that uses opportunity cost to explain college decisions cannot explain why cohort members chose to work even when the unemployment rate was higher. The only explanation that works in the Argentine context is that those in the lowest income quartiles thought they and their families were better off if they tried to find work in a difficult setting instead of going to school and working once the conditions were easier.

O'Connor (2010) points out that although there is a lower likelihood of being hired after 1995, cohort members sought work to provide for their families instead of attending school in the meantime to increase the amount of time they could spend looking for a job and raising the likelihood of being hired. Therefore, we can look at the decrease

in college attendance in quartile 1 of cohorts 4-5 as evidence of constraints on family income, but not on borrowing. These constraints in income then led to the large drop in college attendance among cohort members in quartile 1, while the same unemployment effect led to the large increase in college attendance among cohort members in quartiles 3 and 4.

This conclusion reiterates much of what Belley and Lochner (2007) said about long-term credit constraints but puts it in an Argentine context. Of the variables I tested, family income and structure were the ones that were consistently significant. The head of household's unemployment was never significant, which might have been due to the fact that the head of household may have become underemployed during this time, not technically unemployed. Therefore, the large drop in the college attendance of 19-year-olds in the lowest income quartile after 1995 was not simply due to the increase in unemployment or the increase in government spending. Instead, it was due to the fact that cohort members, once finished with high school, felt that their families needed them to work to provide in the short term. Unfortunately, in the long term this lack of education would help to perpetuate income inequality and worsen the poverty already experienced by Argentines in the lowest income quartile.

REFERENCES

- Aráoz, María Florencia. 2011. "La calidad institucional en Argentina en el largo plazo." Universidad Carlos III de Madrid Working Papers in Economic History 11-11.
- Anon. National Center for Educational Statistics: Fast Facts. National Center for Education Statistics. <http://nces.ed.gov/fastfacts/display.asp?id=76>.
- Becker, Gary S, and Nigel Tomes. 1979. "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility." *Journal of Political Economy* 87 (6): 1153-1189. <http://www.jstor.org/stable/1833328>.
- Becker, Gary S. 1993. *Human Capital: a theoretical and empirical analysis, with special reference to education*. 3rd ed. Chicago: University of Chicago Press.
- Behrman, Jere, and Paul Taubman. 1976. of Transmission Intergenerational Income and Wealth. In *Eighty-eighth Annual Meeting of the American Economic Association*, 66:436-440. The American Economic Review. URL: <http://www.jstor.org/stable/1817257>.
- Belley, Philippe, and Lance Lochner. 2007. "The Changing Role of Family Income and Ability in Determining Educational Achievement The Changing Role of Family Income and Ability in Determining Educational Achievement." *Journal of Human Capital* 1 (1): 37-89. <http://www.jstor.org/stable/10.1086/524674>.
- Cameron, Stephen V, and Christopher Taber. 2004. "Estimation of Educational Borrowing Constraints Using Returns to Schooling." *Journal of Political Economy* 112 (1).
- Cameron, Stephen V., and James J. Heckman. 1998. "Life Cycle Schooling and Dynamic Selection Bias: Models and Evidence for Five Cohorts of American Males." *Journal of Political Economy* 106 (2) (April 22): 262. doi:10.1086/250010. <http://www.jstor.org/stable/10.1086/250010?origin=api>.
- . 2001. "The Dynamics of Educational Attainment for Black, Hispanic, and White Males." *Journal of Political Economy* 109 (3) (June 22): 455-499. doi:10.1086/321014. <http://www.jstor.org/stable/10.1086/321014?origin=api&>
- Carneiro, Pedro, and James J Heckman. 2002. "THE EVIDENCE ON CREDIT CONSTRAINTS IN POST-SECONDARY SCHOOLING *." *The Economic Journal* 112 (482): 705-734. <http://www.jstor.org/stable/798529>.
- Gerchunoff, Pablo, and Lucas Llach. 2003. *Entre la equidad y el crecimiento : ascenso y caída de la economía argentina, 1880-2003*. Buenos Aires, Argentina: Siglo XXI.

- Heckman, James J, Lance J Lochner, and Petra E Todd. 2008. "Earnings Functions and Rates of Return Earnings Functions and Rates of Return." *Journal of Human Capital* 2 (1): 1-31. <http://www.jstor.org/stable/10.1086/587037>.
- Keane, Michael P, and Kenneth I Wolpin. 2001. "The Effect of Parental Transfers and Borrowing Constraints on Educational Attainment." *International Economic Review* 42 (4): 1051 - 1103. <http://ideas.repec.org/a/ier/iecrev/v42y2001i4p1051-1103.html>.
- Menendez, Alicia, and Martin Gonzalez Rozada. 2002. "Public university in Argentina : subsidizing the rich ?" *Economics of Education Review* 21: 341-351. [http://dx.doi.org/10.1016/S0272-7757\(01\)00030-9](http://dx.doi.org/10.1016/S0272-7757(01)00030-9).
- Mincer, Jacob. 1958. "Investment in Human Capital and Personal Income Distribution." *Journal of Human Capital* 66 (4): 281-302. <http://www.jstor.org/stable/1827422>.
- O'Connor, Hugh. 2010. Credit Constraints and Educational Attainment in Buenos Aires in the 1990s. *October*. Chicago.
- Perry, Guillermo, and Luis Servén. 2002. The Anatomy of a Multiple Crisis: Why was Argentina special and what can we learn from it. World Bank.
- Rivas, A. 2004. *Gobernar la educación: Estudio comparado sobre el poder y la educación en las provincias argentinas*. Buenos Aires, Argentina: Granica.
- World Development Indicators. 1980-2006. "Unemployment (% total labor force) - SL.UEM.TOTL.ZS" World Bank. (accessed November 22, 2010).
- World Development Indicators. 1980-2006. "GDP per capita (constant 2000 US\$) - NY.GDP.PCAP.KD" World Bank. (accessed November 22, 2010).