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FROM AGGREGATE SHOCKS TO LABOR MARKET ADJUSTMENTS:
SHIFTING OF WAGE PROFILES UNDER HYPERINFLATION IN
ARGENTINA

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Diciembre 1993
N° 95

1. Introduction¹

This paper examines a neglected economic phenomenon - the impact of inflation on the structure and inequality of wages. There is little evidence for the nonneutrality of inflation on income and earnings of individuals; however, the goal of lowering inflation rates seems to be the most important one in countries that experience even a moderate level of inflation. This goal, moreover, seems to be associated with a goal to improve income distribution².

Argentina offers a unique opportunity to study the consequences of inflation on the structure and inequality of wages. In the first half of 1989, Argentina experienced a hyperinflationary process. The rest of the year continued with some calm, until 1990 when high inflation hit again. This paper compares wage profiles from October 1987 and 1989 cross-sections of micro data. Between these two time periods Argentina experienced a major bout of hyperinflation, which peaked in July 1989 at 196.6% per month. The purpose of this research is: (1) to have a sense of what it means to analyze earnings profiles from a single cross-section in an economy subject to aggregate changes; (2) to study the possible non-neutrality of inflation among different individuals; and (3) to determine what type of optimal contracting model or informational story might produce results similar to the ones observed in this economy.

The Argentine case provides the researcher with exogenous shocks which are sufficiently sharp to be "natural experiments". Freeman (1989) proposes that this use of natural experiments should be one of the ways in which an empirical economist deals with the problems of nonexperimental social science. The huge variation in aggregate amounts at a point in time is the main "identification" tool used in this paper.

¹ Financial support from the Rockefeller Foundation is gratefully acknowledged. In the US I have benefitted from the comments of Gary Becker, James Heckman, Deborah Levison, María José Moyano, Gustav Ranis, T. Paul Schultz and Duncan Thomas. I also wish to thank workshop participants at Boston, Chicago, MIT, Pennsylvania, San Andrés and Yale University and the X Latin American Meeting of the Econometric Society. In Argentina, I thank members of INDEC and FIEL for providing data and their advice. Agustín Villar and Leonardo Giacchino provided able research assistance.

² Even in a highly indexed country as accustomed to inflation as Argentina, the goal of lowering inflation seems to be of priority. In Argentina, the main purpose of stabilization plans in the last twenty years has been to lower inflation. The most recent major stabilization plans, the Austral Plan and the current Convertibility Plan (in effect since April 1991), lowered inflation and thereby helped both governments in 1985 and in 1991 to win the parliamentary elections of those years. On the other hand, the failure of the Radical Party to win the presidential elections of 1989 is attributed to the failure of the Austral plan in lowering inflation. The "average" voter, in fact, valued this target more than real growth, since in neither of those periods real income increased. Other Latin American countries with chronic inflation have the same goals as Argentina. In other parts of the world, inflation also seems to have distributional consequences. Dornbusch and Fischer (1991) cite a work on Korean inflation mentioning that among other things, there was growing frustration of workers confronting a widening disparity in the distribution of income and wealth.

Argentina experienced three main macroeconomic shocks during the last twenty years: technological shocks, external shocks (summarized by fluctuations in the real exchange rate) and inflationary shocks. The two first macroeconomic aggregates remained at similar levels at both points in time analyzed in this paper. Real exchange rates were very similar in these two time periods and GDP per capita continue with its "normal" (negative) trend.

Most of the literature on the welfare costs of inflationary finance concentrate on the tax costs of inflation. On this basis, inflation worsens income distribution because it taxes more heavily the poor, who hold proportionately more cash balances. When one considers the existence of nominal wage contracts, the prediction is that aggregate wages lag behind inflation because of nominal price rigidities. This is the story for the "representative" individual. However, individuals differ in terms of their wage contracts and their ability to predict and to adjust to inflation. Moreover, there is evidence that contracts are indexed differently both between the wage employed and groups as well as within each group. On this basis, inflation is not neutral even among wage earners.

There are three main empirical findings in this paper. The first is that macroeconomic shocks -in this case inflation- affect wage profiles in a non-neutral way. The second conclusion is that the higher the stock of general and specific human capital, the less is the negative impact of inflation on real wages. Finally, those that have less formal contracts or are in the self-employed/employers category suffer less from inflation than the wage-employed under formal contracts. This finding complements and extends a simultaneous finding by Montuschi (1991) that profit margins in manufacturing in Argentina increased and real wages decreased during the hyperinflation episode.

It is hoped that by analyzing the Argentine case, some light can be shed on the effects of macroeconomic shocks in more general settings. The goal of identifying the effects of macroeconomic shocks on the structure and inequality of wages is present in the current economic literature. The main problem confronting these studies is that they deal with countries with very smooth time series, so that which macroeconomic shock is causing shifts in wage profiles is hardly identified. Recent US research has focussed on analyzing the impact of different aggregate shocks on a more disaggregated level. Not surprisingly, researchers have studied "major" macro shocks or unexplained (by using the representative consumer paradigm) macro events of the US economy. To my knowledge, these studies have concentrated on three issues: the "baby boom" effects of the 1940's and 1950's (see the pioneering papers of Freeman (1979) and Welch (1979)), the decline in aggregate real wages and the increase in inequality observed during the 1980's (a decline of roughly 4 to 8% in aggregate real wages analyzed by MaCurdy and Mroz (1989), Katz and Murphy (1990) and other authors cited therein), and the puzzle produced by the "stylized fact" that employment fluctuates more than real wages during the business cycle (see Bils (1985) and Keane, Moffitt

and Runkle (1988)).

The papers studying the impact of macro shocks on age-earnings profiles for different segments of the population (for example, for college graduates vs. high school graduates) have concluded that macro shocks affect the demand for labor and that the simple supply oriented Mincer schooling model provides only a partial explanation. Apart from providing measures of the differential impact of the shocks on different groups, this literature has begun to analyze what macroeconomic or institutional variables have caused these effects. Macro shocks can affect cohorts differently depending on the rate of substitution between experienced and unexperienced workers, educated and uneducated ones, different expectations about their level of future wealth, and the time in their life cycle at which the different shocks occurred. Each cohort of individuals shares the same aggregate-level shocks in each year of their life. The main assumption in this literature is that groups of workers categorized under some definition are different factors in the economy's production function. Standard human capital models of the age-earnings profile of a cohort which posit that earnings rise with age or experience solely as a result of individual investment behavior are incomplete. If elasticities of substitution among age groups are not infinite, human capital cannot be treated as a homogeneous input with a single rental price, whose "units" of investment determine the age-earnings profile. Differences in the activities of different type of workers and in the demand for those activities decisively influence the shape of that profile.

While external and technological shocks will impact differently on wages of different individuals by assuming they are imperfect substitutes in production, inflation produces differential effects by assuming that different individuals "contract" prices in advance differently. There are at least two complementary stories in this paper on how individuals may differ in their response to inflationary shocks according to the nature of their jobs and their stocks of general and specific human capital. I argue that education tends to increase the ability of individuals to deal with disequilibria (see Schultz (1975)) and hence better process information on how to adjust to inflation and relative price variability. On the other hand, Smith (1989) produces a model in which there is private information on worker types, and employers use partial or total indexation of wages for different type of workers to induce self-selection.

The plan of the paper is as follows. Section 2 includes a brief description of the main macroeconomic shocks experienced by Argentina in the 1970's and 1980's. Section 3 provides "stories" of how these macro shocks might have affected the structure and inequality of earnings at different levels of aggregation. Special emphasis is given to inflationary effects, using models of indexation under imperfect information. Section 4 describes the hyperinflation experience of mid-1989 and also describes the data and sample used in the analysis. Section 5 compares experience-earnings profiles from two cross-sections (October 1987 and 1989) of Greater Buenos Aires microdata. It provides preliminary evidence that rates

of return to education, job seniority and self-employment increase after the hyperinflation event. Section 6 analyzes wage profiles by sector and occupational category. The aim of section 6 is to confirm or reject the findings of the previous sections by introducing knowledge of how these different occupational skills and sectors are related to formal or informal contracts. Section 7 concludes the paper.

2. Argentina: Macroeconomic Shocks during the 1970's and 1980's.

Argentina's economic performance in recent decades has been heart-rending. The level of real per capita GDP in 1989 was similar to that in the early 1960's. Alongside with a decline in per capita GDP of 24.0% in the period 1974-1989 (when the stagnation and subsequent decline actually began), the price level increased by a factor of 51 million, that is on average an annual rate of inflation of 426%.

The economic downturn of Argentina did not occur without simultaneous political instability and turmoil. From 1973 (when democratic rule was restored after almost seven years of military rule) to 1989 Argentina had 10 different presidents and 17 Economy Ministers. Table 1 presents the chronological order of Presidents, Economy Ministers and Stabilization Plans and when the Plans were abandoned. The two majority parties are represented during this period. Peronism, or, more formally, Justicialism, was installed in power in May 1973. In March 1976, there was a military coup which adopted the name of "Process of National Reorganization". Argentines call this period that ends in December 1983 as "The Process". The Radicals (a traditionally middle class political party) came to power at this time led by Raul Alfonsín, who is about to complete a 6 year term. However, major economic instability and political uncertainty (over the future president) obliged him to hand power to Carlos Menem from the Peronist party in July of 1989. Much has been written about whether political events generate economic turmoil or viceversa. (For an excellent analysis of the interactions between political and economic events in Argentina during the period 1946-1983 see di Tella and Dornbusch (1989)).

The high turnover in Economy Ministers at the rate of about one a year reflected almost exactly the failure of a particular major or minor "Stabilization Plan" introduced previously, sometimes two or three years before and sometimes just two or three months before the ministerial change. From the experience of Argentina, the duration in the "credibility" of each of these stabilization plans seems to be positively associated with a change in government and negatively associated with past failures. In some ironic sense, these Plans give some unification to the period 1974-1989. All of them call on different sectors, especially the Labor Unions and the Industrial and Entrepreneurial Sector, to "control" prices and "freeze" wages. Sometimes the controls were mandatory, other times there was a form of "friendly" accord. These controls

TABLE 1

Governments in Argentina and Major Stabilization Plans
1973-1990

Timing	Government	Presidents	Economy Ministers	Major Stabilization Plans & (end)
5/73-7/73 7/73-9/73 10/73-7/74 7/74- 10/74-6/75 6/75-7/75 7/75-8/75 8/75-2/76 2/76-3/76	Peronism	Cámpora Lastiri J.D. Perón M.E.M. Perón	Gelbard G. Morales Rodrigo Bonanni Cafiero Mondelli	Social Pact (Rodrigazo)
3/76- 6/77- 12/78- 3/81-12/81 12/81-6/82 7/82-8/82 8/82-12/83	Military	Videla Viola Galtieri Bignone	Martínez de Hoz Sigaut Alemann D.Pastore Wehbe	Fin.Reform 20/12/78 Plan (Devaluat.) (Malvinas) (Licuación)
12/83- 2/85- 6/85- 7/88- 4/89-5/89 5/89-7/89	Radicalism	Alfonsín	Grinspun Sourouille Pugliese Rodríguez	Austral Plan Spring Plan (Hyper)
7/89-7/89 7/89-12/89 12/89-12/90 12/90- 4/91-	Peronism	Menem	Roig Rapanelli E.Gonzáles Cavallo	BB Plan Erman Plan(s) Convert. Plan

were imposed at the beginning of this period with a belief in their effectiveness in controlling inflation. Later on, with experience and learning by Argentines, price controls were aimed at lowering "expectations" of inflation waiting for a good moment in which to exercise fiscal restraint. This moment never arrived in any of the plans, and they all ended in major devaluations and inflation or hyperinflation. The point of this short account of the events giving rise to some of the monetary, devaluatory or inflationary macro shocks is that they are easily identifiable and can be used as "natural" experiments to analyze distributional responses in the labor market. For countries like Argentina with serious and recurrent shocks and in need for constant stabilization, it is also crucial to learn what might have been the distributional effects of the alternative stabilization plans.

In this Section, I will refer mainly to three (possibly interrelated) shocks that have affected the Argentine economy during 1974-1989: shocks to output, external shocks and inflationary shocks.

It is not my purpose to try to explain or relate the comovements between the time series. This is strictly for modern macroeconomics to do. The purpose is to give an account of major secular or cyclical behavior of these time series, to relate them to policy measures and stabilization plans, to provide a context for the analysis of the different cross-sections of individual data below, and to begin to assess how the variation in these macroeconomic aggregates affect distributional measures in the labor market.

2.1 Supply shocks.

The first aggregate measure that I will consider is GDP per capita. Figure 1 shows the graph for the period 1974-1989. GDP is measured in 1970 australes. Per capita GDP begins at a historical peak in 1974, and has never been able to surpass this level in spite of reaching it again in 1977 and 1979. From 1974 to 1989, GDP per capita decreased by 24%. The series presents cyclical fluctuations along a declining trend. For the purpose of this paper, it is interesting to have some sense of the difference between transitory and permanent output fluctuations. If changes are transitory, we expect that people will intertemporally substitute labor and consumption since they expect better times to come. Thus, we expect that consumption "smooths" the change in income. In Figure 1, I plot GDP per capita and aggregate consumption together, both measured in 1970 australes. Except for a brief period between 1975 and 1979, aggregate consumption mimics aggregate income³. Of course, aggregate shocks to the economy can only be smoothed through international borrowing, so the aggregate time series combines both types of effects. Argentina has also had a sad history in terms of domestic and international financial markets. Credit markets have been practically

³ The correlation coefficient of consumption and per capita GDP is .77 for the period 1970-1979 and .95 for the period 1980-1989.

Figure 1

GNP and Consumption per Capita Australas 1970

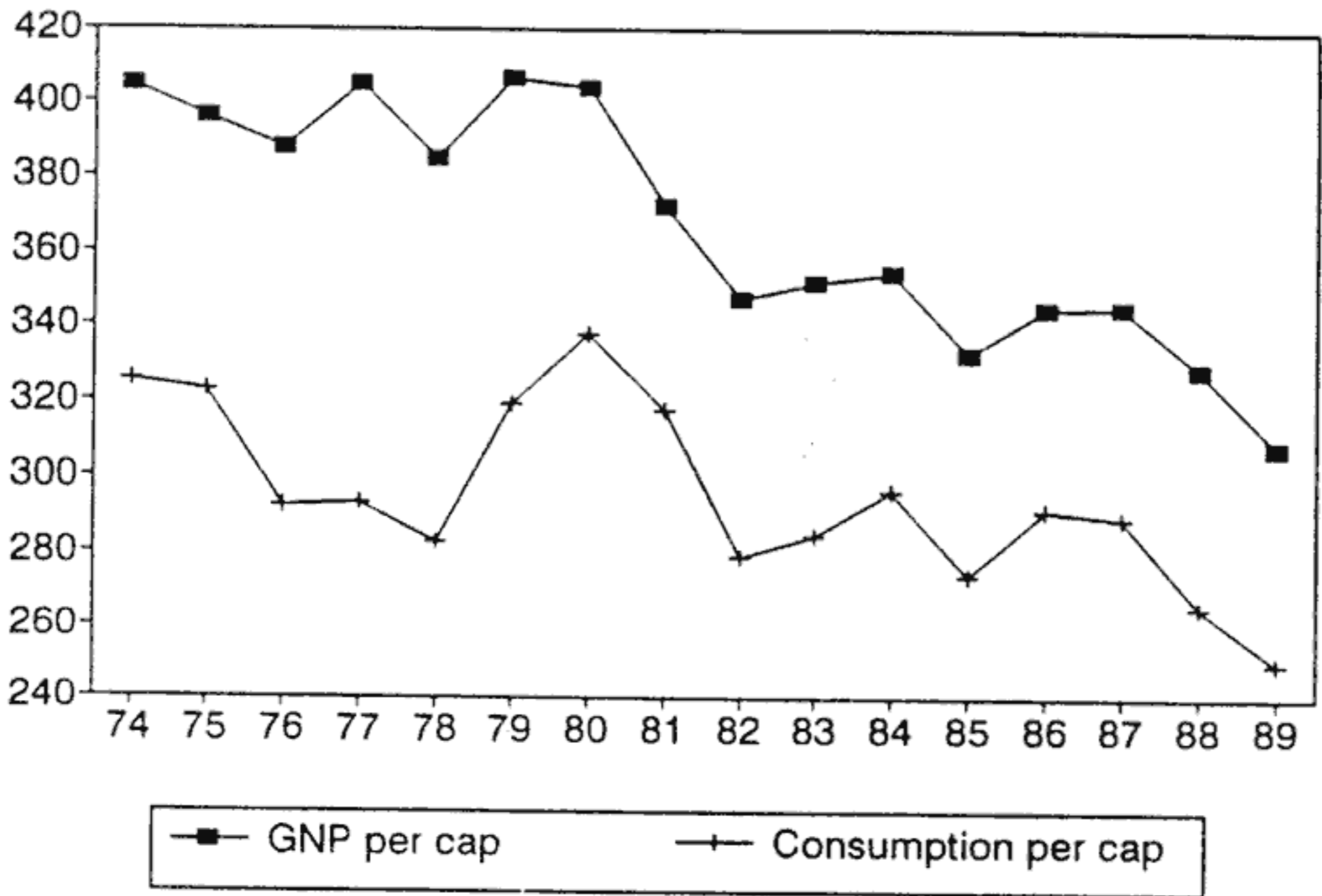
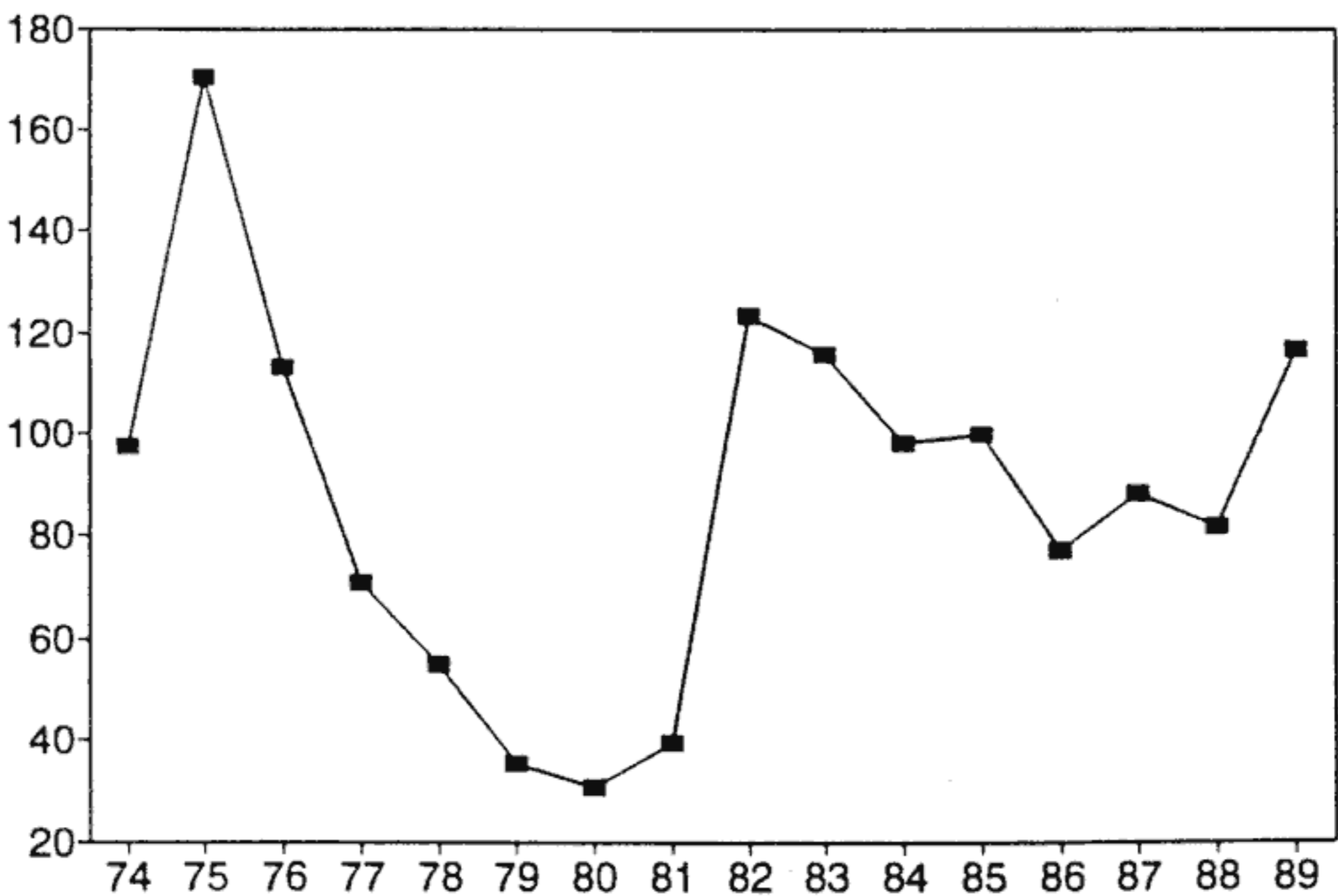


Figure 2

Real Exchange Rate 1985=100



absent at the individual level for the whole period of interest⁴. An exception is the period starting in June 1977 (see Table 1) with the Financial Reform. Before this date, the financial system was heavily regulated by the Central Bank in all possible dimensions. In particular, interest rates were set by the Central Bank and credit was normally rationed since the interest rates tended to be negative in real terms. The financial reform of 1977 freed interest rates and allowed banks to capture interest earning deposits called "Plazos Fijos"⁵. From this period, till the abandonment of the Plan and increasing regulation, the country engaged in heavy international borrowing and to some degree, there existed a credit market for consumption. After the failure of the plan, most deposits held by Banks (that in a "normal" system are used to grant credit to the private sector) were used to acquire liabilities of the Central Bank. In 1989, 80% of all assets of the commercial banks consisted of these liabilities. At the same time, the external debt of Argentina passed from 9678 million dollars in 1977 to 35671 million dollars in 1981, that is an increase of almost 170%. As of 1989, the external debt of Argentina amounts to 100% of GDP. This heavy increase in foreign debt plus the raise in real interest rates in international markets put the country at default risk, and since then it has been excluded from borrowing. In fact, since 1988 Argentina is not even paying the service on the debt. So, after 1981-1982, Argentina does not have a capital or credit market to "smooth" consumption.

In summary, given the almost complete absence of credit markets at the individual level in Argentina (and a complete absence after 1982) , most supply shocks can be taken as permanent shocks.⁶

2.2 External Shocks

⁴ At the level of the firm, there exists an informal market called the "interfirm" market where firms borrow and lend among themselves through a set of institutions called "money-market desks". Most transactions are done on a one to seven days basis

⁵ The financial liberalization was part of what later was the Stabilization Plan of December 20 1978 (See Table 2). The financial opening of 1977 was followed by the Tabla Cambiaria (prefixed exchange rate path) and the trade reform of 1988. The Plan was abandoned after March 1981 because of severe currency overvaluation, persistence of inflation and the external debt problem. (See Rodríguez (1979, 1990), Calvo (1981,1987) and De Pablo (1983)).

⁶ Dueñas (1985) tested the permanent income theory for Argentina for the period 1940-1981 using time-series methods. He finds, not surprisingly, that for the Argentine case consumers react both to permanent and transitory fluctuations (anticipated or unanticipated ones) because they are constrained in credit markets. He estimates that the proportion of people that have restrictions in their consumption because of liquidity problems is of 66%

The real exchange rate is one of the most fundamental relative prices in an open economy⁷. It is the internal price of tradeable goods ($IPT=PT.E$) over the price of non-tradeable ones (PN) and it fundamentally affects the allocation of resources in the Argentine economy.

Figure 2 shows the evolution of the real exchange rate for this time period. It is defined as the WPI of the USA multiplied by the parallel market exchange rate in Argentina (australes/dollar) and divided by the Consumer Price Index of Argentina. This measure is an approximation for the Argentine case of $e = PT.E/PN$. Defined in this way, a high real exchange rate implies an improvement in Argentina's competitive position relative to other economies. Given the smoothness in WPI from the USA, its variations are determined mainly by differential rates of increase in the nominal exchange rate and prices. A variety of factors are found in the literature about the determinants of changes in this measure: among others, the ratio of trade balance to GDP, internal terms of trade, government spending, etc. (See, for example Edwards (1989)).

The importance of the evolution of e for this economy is that in this period it has become extremely volatile. Although correlated, changes in two or three times the level of this variable can take only a couple of years.

Argentina experienced a major overvaluation during 1979 and 1980; the real exchange rate was in 1980 half the level of 1977-78 and a third of the level in 1974. This overvaluation of the Argentine currency has been explained in the literature (see Sjastaad and Rodríguez (1979) and Calvo (1987) as being a consequence of the December 20 1978 plan that imposed a "Tablita" of devaluation but failed to reduce the fiscal deficit, so that it produced an increase in the prices of non-traded goods with a "hooked" nominal exchange rate (real exchange rate "misalignment"). After the abandonment of the plan, through successive nominal devaluations, the real exchange rate depreciates to reach three times the level of 1980.

2.3 Inflationary Shocks

Figure 3 presents the evolution of the inflation rate for the period 1974-1990. Referring back to Table 1, we can almost match plans with ex-post peaks in the rate of inflation. The first time the Argentine economy reached levels surpassing the 200% per year was in 1975, with the "Rodrigazo" (after the minister

⁷ The terms of trade, defined as the ratio between the dollar price of exports and the dollar price of imports, is another important relative price in an open economy. The effect of this variable on microeconomic relations in Greater Buenos Aires is presumably of second order when compared to the effects of variations in the real exchange rate. Additionally, it is expected that an improvement in the terms of trade will decrease the real exchange rate through an increase in foreign exchange. For these reasons, I leave the analysis of the impact of this variable on micro relations for future work.

Figure 3

Inflation Rate (CPI) 12 months rate

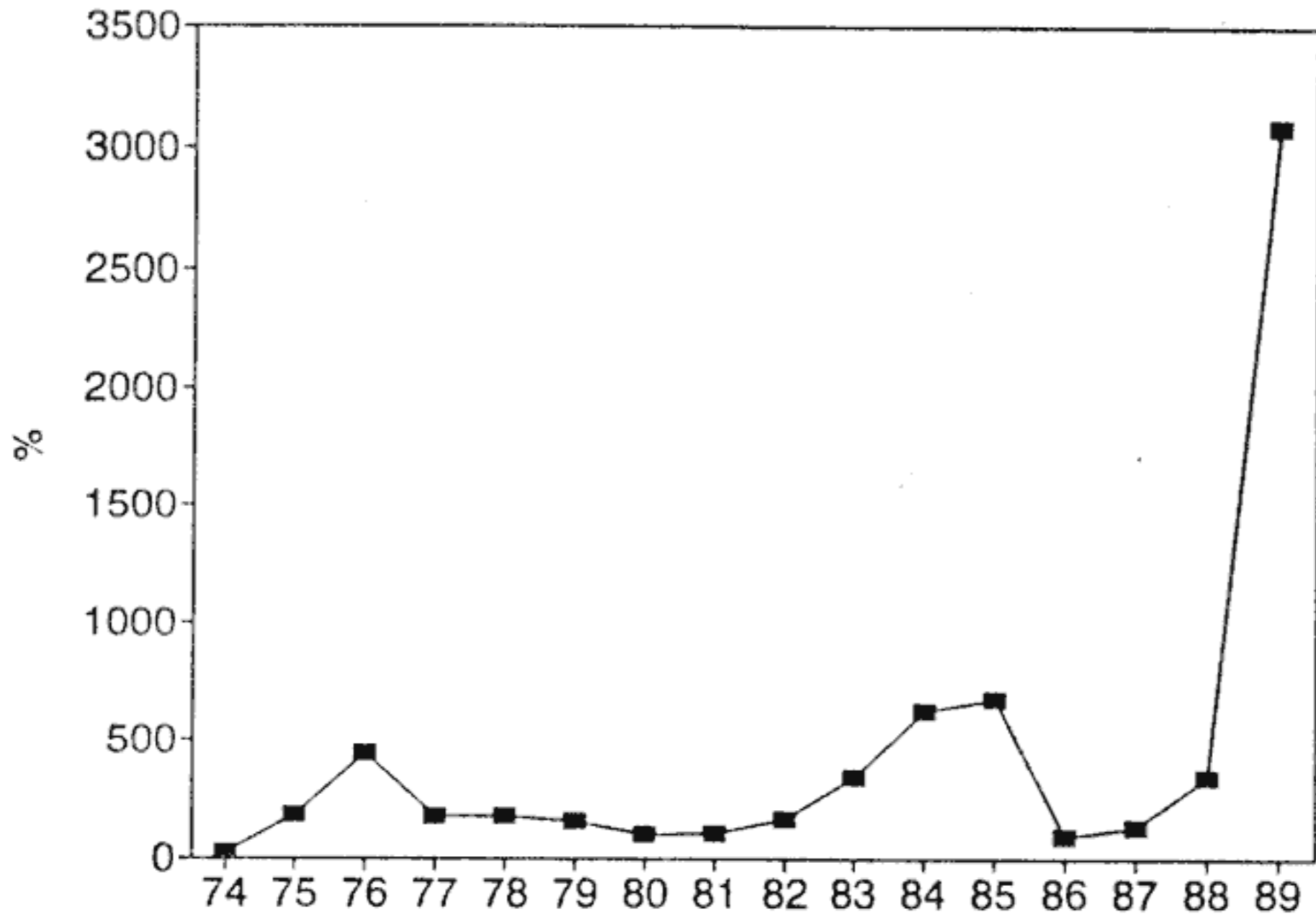
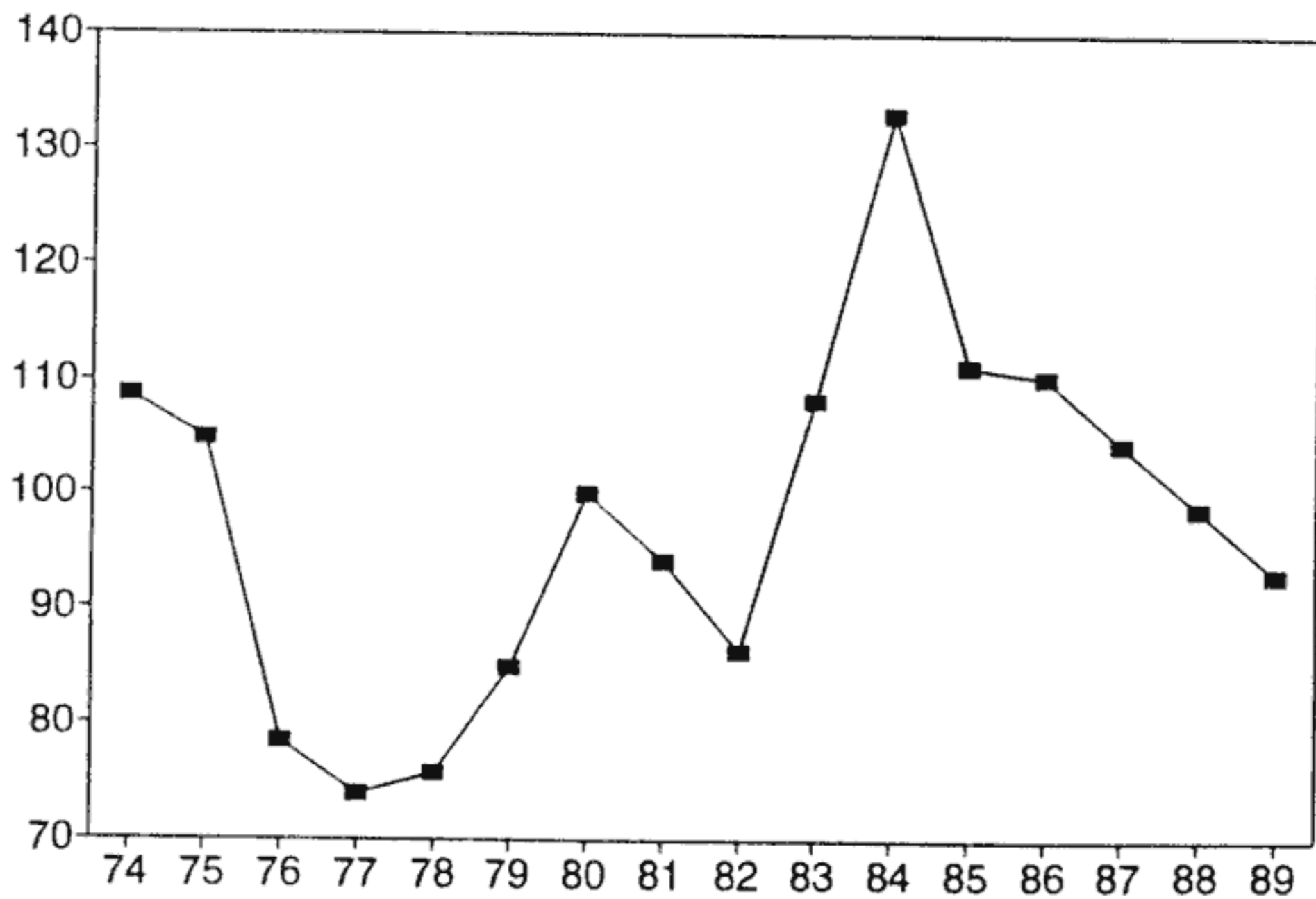


Figure 4

Real Wages in Manufacture 1985=100



that devalued the currency) that liberalized prices that were subject to control by the "Pacto Social". Afterwards, each peak surpassed the previous ones. The "December 20, 1978" plan had the immediate effect of lowering the inflation rate; however, after the abandonment of the plan in 1981, with massive and successive devaluations and in 1982 with the "Licuación de pasivos", inflation began to peak again through 1985. That is when the "Austral" Plan was implemented. From an initial decrease in the rate of inflation, it began to peak again so in 1987 the Primavera Plan was implemented and ended with the hyperinflation of 1989. Inflationary shocks are attributed in Argentina to growing and constant positive fiscal deficit. While theoretically, it is possible to have periods of fiscal deficits, Argentina has had one every year at least since 1961 (see Rodríguez (1990)). In consequence, the government has systematically resorted to issuing money and interest-earning debt. This resulted in high inflation and high real interest rates that fluctuated enormously during this period.

2.4 Institutional Shocks in the Labor Market

Apart from the changes of political regimes during this period, there are also sharp changes in the characteristics of labor market institutions that might affect distributional responses in the labor market. The main aspects of labor market institutions that need to be taken into account are the degree of and change in the power of unions during the period; the modifications in the law of minimum wage and the changes in social security contributions.

Argentina has been regulated in most markets since the 1940's and the labor market is not an exception. In 1945 the law of Professional Workers' Associations (Asociaciones Profesionales Obreras) was sanctioned. This law established as mandatory to have a union per industry registered with the Ministry of Labor. The law also established mandatory payments of union quotas. From this period on, the government also regulated different aspects of the labor market. Several labor laws were sanctioned, establishing among others, paid vacations according to seniority, end-of-year bonuses equivalent to a monthly salary, and severance payments extended to all type of workers in case of contract termination.

The degree of unionization and strike activity has varied enormously throughout this period. Data on degree of unionization is not readily available in Argentina. According to Godio and Palomino (1987), 56 percent of Argentine wage-earners belonged to unions in 1986; according to FIDE (1988) during the same period there were 2.6 million union members which accounts approximately for 40 percent of wage-earners. However, there were important changes in the degree of unionization by sector of economic activity. According to Sánchez (1987), between 1975 and 1985, although overall union membership declined by only 4 percent, traditionally strong unions saw their membership decline (Construction by 54%, Energy by 32%, Manufacture by 25%, Railroad by 20%) while the service sector saw its membership increased (Government

by 30%, the Financial Sector by 31%, Commerce by 52%).

Has this union power and strike activity manifested itself in improvements in wages and working conditions for its members?. Have the strongest unions got a premium in wages?. Available evidence suggests that the average wage for the different sectors of the economy moved in parallel ways during the period 1974-1989. Economy-wide fluctuations dominate the picture during the period, so that an assessment of the impact of the unions on wages has to be purged from them. Moreover, from 1975 to 1988, economy-wide nominal wages were set by Executive decree at the time of implementation of a major stabilization plan or as an amendment to them when union and sectoral pressure escalated after a burst of inflation⁸. The centralization of increments in nominal wages during this period, either through government decrees or collective bargaining, presumably prevented wages across sectors from moving freely according to the evolution of productivity or sectoral demand.

2.4 The Evolution of Aggregate Real Wages and Income Distribution: 1974-1989

In this section I present the evolution of real wages in manufacture and income distribution in the economy. I do not pretend at this point to establish a casual link between these time series and the aggregate macroeconomic shocks. However, the evolution of these two time series is so dramatic, that not doubt that these shocks have had a dramatic impact on real wages and overall income distribution.

The time series for aggregate real wages in manufacture is shown in Figure 4. It does not have a clear trend, but it has wide and enormous fluctuations even in short time periods. At this point, I prefer not to associate it with the other macro and institutional fluctuations till I await further research with micro data. Díaz Alejandro (1970) and Rodríguez (1981) have associated the fluctuations in the time series of real wages with the real exchange rate and Rodríguez (1984) also with the rate of inflation.

The data on personal income distribution is from Greater Buenos Aires for October each year from 1974 to 1989.⁹ It refers to the whole income receiving population, whatever the origin of the income; that is, all individuals with income earned or non-earned are included in the sample used here. This population

⁸ In 1953, a law on Collective Bargaining was passed by which the only recognized union of each sector has to discuss in a centralized manner, with the respective employer association, wages and other working conditions. The terms of the labor contract arrived at through this bargaining are then mandatorily imposed to all the sectoral workers, unionized or not. This law was suspended in 1967 and after that has only been in effect in April 1971, January 1973, June 1975 and sporadically after 1988. After mid 1986, the government permitted collective bargaining within preestablished "bands" (Decree 1155).

⁹ See section 5 on the geographical extension of Greater Buenos Aires and additional description of the data.

TABLE 2

Income distribution by income deciles and Gini coefficients.
 EPH October 1974 and 1989
 Greater Buenos Aires

Decile	% of income		
	1974	1989	% change
Lowest	4.40	1.80	-59.1
Second	4.40	2.90	-34.1
Third	4.50	3.20	-28.9
Fourth	6.20	4.10	-33.9
Fifth	7.50	5.20	-30.7
Sixth	9.20	6.40	-30.4
Seventh	10.70	8.10	-24.3
Eighth	13.60	10.60	-22.1
Ninth	15.90	16.10	1.3
Highest	23.60	41.60	76.3
Gini coefficient	31.40	50.08	

is a constant proportion of the entire population for each Survey year: around 40% of the total population, which in 1988 included more than 4,750,000 persons. The population includes both labor force participants as well as persons out of the labor force (but receiving income from pensions, social security, students scholarships, rents, interest for different types of assets, etc.). As of 1988, 45% to 50% of the non-economically active populations are included in the first 4 lowest deciles. The reference month for income is the month prior to the Survey, that is September of each year.

Table 2 shows the income distribution by income deciles for 1974 and 1989 for Greater Buenos Aires. The lowest decile, which in 1974 accounted for 4.4% of the income, accounts in 1989 for only 1.8%, a loss of 59% in a 16 year period. The increase in concentration at the highest decile is even more astounding, going from 23.6% of the income to 41.6%, an increase of 76.3%!

The Gini coefficient was 31.04 for 1974, increasing to 50.1 in 1989 (see Figure 5). Fields (1980) based on data from Kuznets, reports an average Gini coefficient that is .37 for DC's and .44 for LDC's.¹⁰ By this yardstick, Buenos Aires went from having a better income distribution than a DC to having a worst than average income distribution for an LDC in just 16 years. This increase in inequality is not, however, uniform across time. Figure 6 shows the highest decile divided by the lowest decile. For example, in 1974 the richest decile had somewhat more than 5 times the income of the poorest decile; in 1979, the richest decile had 24 times the income of the lowest. The largest increases in inequality, using this definition, occurred between 1980 and 1982 and between 1987-88 and 1989; the Gini coefficients follow the same pattern.

3. Stylized responses in the labor market to the different macro shocks

This section summarizes possible effects of each macro shock on the individual, cohort, family and demographic group. The possible effects of supply and external shocks are here analyzed to provide for a test of the "ceteribus paribus" condition.

3.1 Supply shocks

The most salient point of the 1974-1989 evolution of GDP in the Argentine economy during 1974-1989 is that of a process of a permanent decrease in output, that is coupled with capital decumulation.

How might supply shocks affect differently individuals, demographic groups and the family?

¹⁰ Empirically, the minimum and maximum values for the empirical Gini coefficient are between 25 and 60.

Figure 5

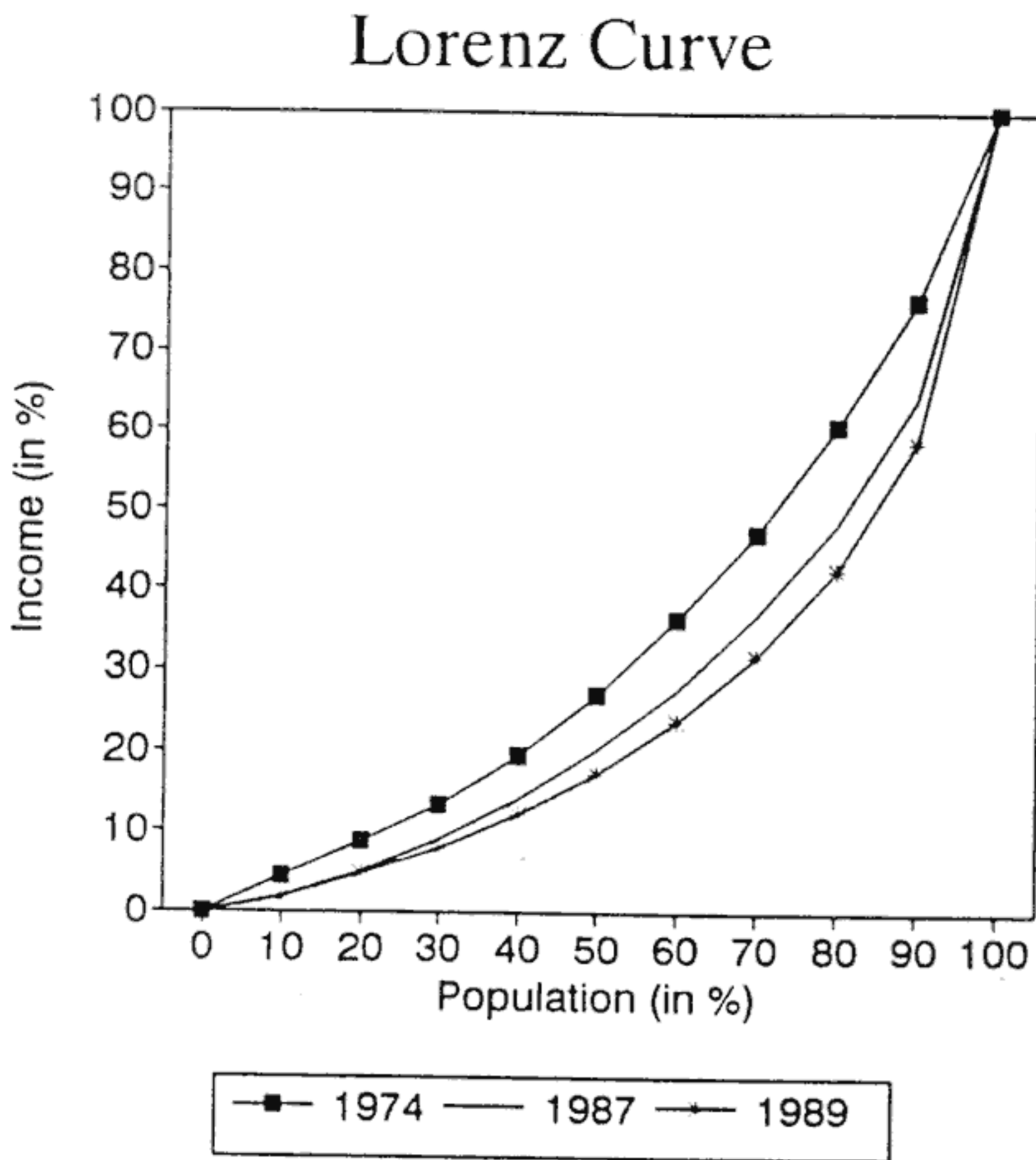
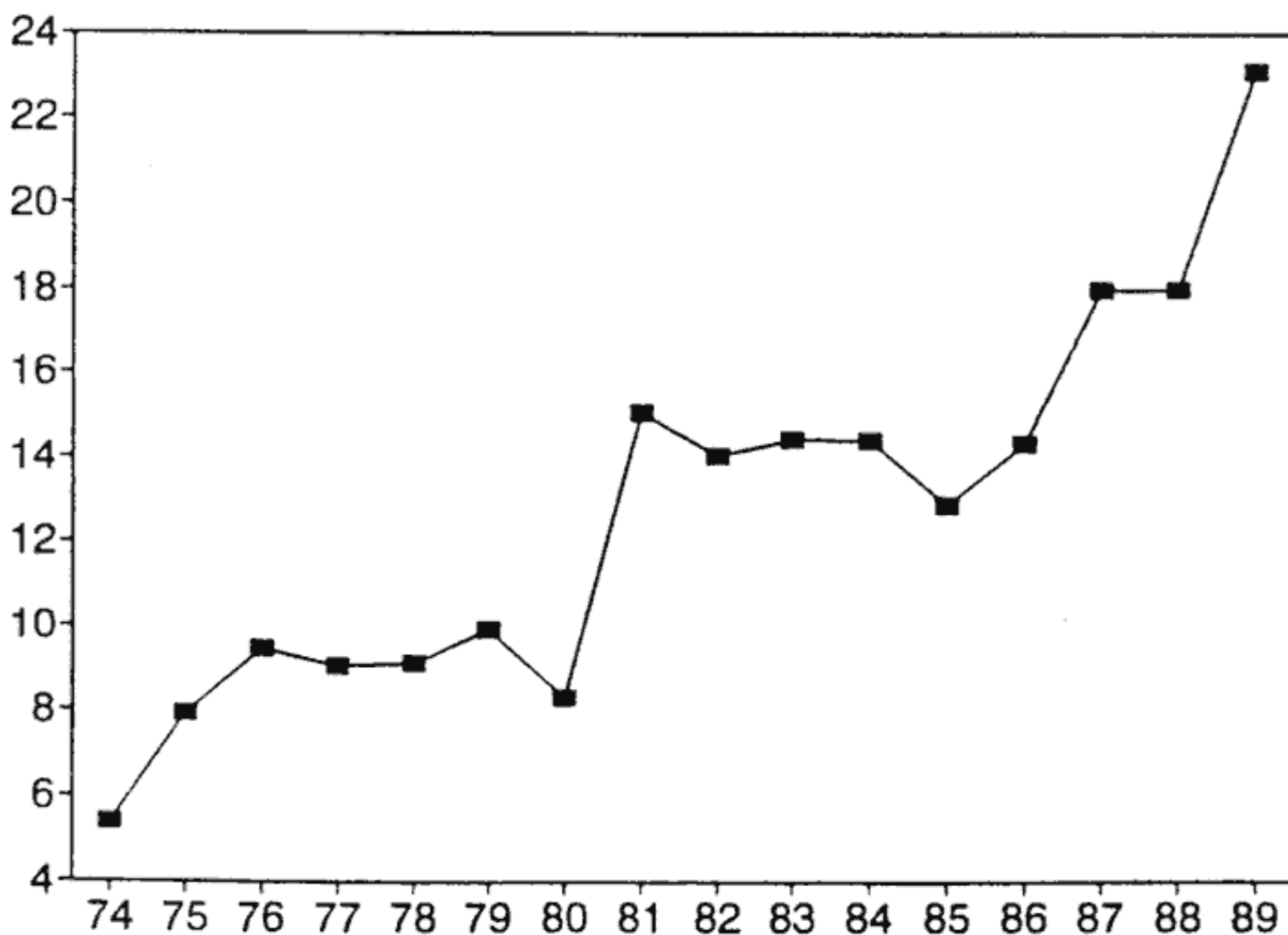


Figure 6

Income Distribution Highest 10% divided by lowest 10%



From the individual point of view, taking the "representative consumer" paradigm, and for the time being taking the shocks as permanent shocks and allowing the individual to choose his/her labor supply, a permanent decrease in wealth will decrease permanent consumption and increase labor supply (through the wealth effect). However, we expect that real wages decrease through a decrease in demand for labor that is higher than the increase in labor supply; but the quantity of work is uncertain in the new equilibrium. (See Barro (1987)). As Barro points out in his book, if one assumes that economic development involves a series of permanent improvements to the production function, then the analysis shows that economic development leads to increases in the real wage rate. For Argentina, we expect a **decrease** in real wages and in some measure of income inequality.

Going from the representative consumer to a heterogeneous model is more difficult. The ultimate answer will be found in what originated the supply shock in the first place. In Argentina, the decrease in GDP has been accompanied by a decrease in the importance of manufactured goods in total GDP. In 1974, the share of manufactured goods in GDP was of 24%, while in 1989 it was of 19%. Social and personal services share increased in the same period, from 12% to 17% of GDP. Though, real GDP stayed constant from 1974 to 1989, the service sector increased by 37% and the manufacture sector decreased by 23%. So, there was a change in labor demand that was not uniform across sectors of the economy.¹¹ Depending on the demographic and educational characteristics of the labor force in each sector, we expect differential effects on earnings for them.

Why will output shocks affect individuals' decisions differently? A key element determining the way permanent output shocks affect individuals must operate through their capacity to get either access to capital markets or to household "insurance". If an individual belongs to a wealthy household consumption can be smoothed over time through transfers between family members. If an individual does not belong to a wealthy household (or if the wealth that used to exist has been depleted), the whole labor supply decision of the family will change more dramatically. I expect women of households of this type to increase their labor supply more dramatically than men, unless their earnings have been so depressed that the wealth and substitution effects cancel each other. The decisions of the young and the old will also be altered. In the case of the young, where more fundamental investment decisions are being taken, the whole human capital accumulation decision cum labor supply will change. If they belong to a more wealthy household, they will probably increase their investment in schooling (if real wages are depressed); although their expected rate

¹¹ Of course, other type of shocks, such as real exchange rate shocks will also affect the composition of output between different sectors of the economy and this raises the issue of what type of shock caused what. However, per capita GDP shows a clear declining tendency over time, while other macro shocks show more transitory fluctuations with correlations for a limited number of periods.

of return to education will also affect their schooling decision. With respect to the old, I also expect to find increases in labor supply for the less wealthy and for those who do not have children or whose children are unable to support them (unfulfilled or frustrated expectations). In Argentina, the social security system is one of the most deteriorated areas of the government. Pensions and retirement funds have been declining in real and relative terms through time.¹²

3.2 External Shocks

The effects of the volatility of real exchange rates on different distributional aspects of the labor market seem to be enormous.

The change in relative demands for tradeable and non tradeable goods will cause changes in the relative wages for these sectors and depending on how sectors are differentiated by intensity of education, sex and experience, we will expect differential effects. For example, women are overrepresented in the service sector and tend to have lately higher levels of education than men. If the real exchange rate decreases we will expect their earnings to rise relative to those of men.

3.3 Inflationary shocks

What are the effects of inflation on distributional aspects of the labor market?

Macro theory has, in the past, emphasized informational types of stories, giving rise to increases in real output when inflation increases through confusions between a monetary and a real shock (the Lucas-Barro island model). This is hardly believable in the case of Argentina, and in fact most empirical tests in Argentina have not only rejected this hypothesis but showed a negative relationship between unexpected money creation and output (or employment). However, there are two aspects of inflation that have "real" consequences. Lucas (1987) emphasizes two kinds of mechanisms. The first is the inflation tax story; indeed inflation is like any other type of tax since it decreases the real value of money holdings. The second is the existence of "rigid" or "nominal" wage contracts in the economy which adjust to inflation with some type of lag, distorting relative wages. One wonders why in an inflationary context like Argentina's, workers accept nominal wages fixed in advance. As Greenwood (1988) mentions, further research should be done on the interaction between business cycle fluctuations and the design of contracts. Smith (1989) provides an

¹² Beginning in the sixties, the number of beneficiaries of social security increased dramatically. On the one hand, there was a sharp increase in the incorporation of self-employed to the system. Currently, their fund receives less than 30% of their expenditures (the fund for government employees has a similar chronic deficit). On the other hand, the population of 65 years of age and older increased from 4.4% of the population in 1950 to 8.2% in 1980.

example of such type of research in an environment with private information and randomness in the price level where it is optimal for firms and workers to agree on nominal wage contracts one period in advance. This model provides some rationale for differential indexation of contracts by type of worker (depending on characteristics such as productivity and attitudes toward risk, consumption and work). The main testable implication of the model is that high-productive workers who are also less risk-averse should receive incompletely indexed contracts, while the less productive receive fully indexed contracts. This hypothesis should be contrasted or combined with one in which education enhances the ability of an individual to deal with disequilibria (Schultz (1975)). In this case, better educated workers will also tend to be the more productive and hence will tend to have better designed contracts than less productive ones.

With respect to the effects at the individual or demographic group level, the "lag in adjustment" story seems to be more appropriate. Though Argentina has become an "indexed" country, the extent and form of indexation changes from sector to sector, even from firm to firm. Individuals working in firms with more flexible indexation policies will respond more rapidly. Also, the self-employed are expected to adjust more rapidly to inflationary shocks than the wage-employed. The self-employed, by definition, can adjust the price at which they sell their services or output immediately or go out of business. With respect to the wage-employed, as was discussed above, the extent of wage indexation by type of worker in terms of their productivity is a matter of empirical testing. While the Smith type of model predicts relatively less indexation for the high-productivity worker, incorporating Schultz's value of education will make the result ambiguous. What about differences in indexation by other type of individual characteristics, such as general experience in the labor market (general human capital) and specific experience in a particular job (specific human capital)? To my knowledge, the literature is silent on these issues. However, one can extend the contracting model to this type of heterogeneity. Returns to general labor market experience are by definition not tied to any particular job. In this sense, there is no a priori presumption that more experienced individuals will get better (in terms of indexation) contracts than the less experienced. When we come to analyze the effects of indexation on the returns to job seniority, contracting issues are again relevant. The idea behind positive returns to job seniority lies either behind the theory of specific human capital (Becker (1964)) in which workers receive a stake in the specific value of the employment relationship or related agency theories that deferred compensation to insure the right amount of effort for part of the worker (Becker and Stigler (1974); Lazear (1981)). Under the first of these theories, renegotiation of a contract under inflation will tend to give a premium to more tenured employees since the value of the lost worker to the firm will be directly related to its tenure. Under the agency theory, the timing of wages is the strategic device for affecting worker productivity; hence, I suspect that the credibility of this strategy will be related to the partial or total indexation of future wages.

In Argentina, massive nominal wage adjustments and the impact of unions on wage indexation are an important part of the picture. In some cases, unions have included automatic wage indexation clauses in their contracts; however nominal wages continue to be fixed one period in advance. Massive wage increases by government decree, sometimes in fixed amounts, will tend to decrease the rate of growth of earnings between less and more experienced workers.

4. The Data before and after the Hyperinflation of Mid 1989.

The microdata analyzed in this section comes from The Permanent Household Survey (Encuesta Permanente de Hogares, EPH) conducted in Greater Buenos Aires in October 1987 and 1989. This survey is conducted by the Instituto Nacional de Estadísticas y Censos (INDEC) which is subordinate to the National Planning Secretariat. Greater Buenos Aires (GBA) includes the Federal Capital and the 19 suburban districts around it; its estimated population at the time of the 1989 Survey was more than 11 million. The population of the country is estimated at 32 million, so that the percentage of the population covered is about 36%¹³. In terms of participation in GDP, the Federal Capital accounted for 29.8% of the national GDP while the province of Buenos Aires accounted for an additional 30%. The 19 Districts are an important part of the province, so that the participation of GBA in national GDP should be proportionally greater than its participation in the population. While I do not want to imply that by just studying GBA I will get a comprehensive understanding of the country, macroeconomic shocks will have presumably a parallel effect on the country as a whole and distributional impacts within the country. I leave for future research the study of macro fluctuations between different urban regions of Argentina.

In this paper I compare two cross-sections, October 1987 and October 1989, of the Argentine household data. The purpose of this step of the research is to have a sense of what it means to analyze behavior in a single cross-section in an economy subject to large aggregate changes; as well as to learn about the non-neutrality of inflation among different individuals. In addition to the overall decline in economic indicators, during May/July of 1990 Argentina experienced a major bout of hyperinflation. Figure 7 shows the evolution of the inflation rate from January 1987 to June 1990. Using the CPI index, the monthly rate of inflation was 78.5% in May 1989, 114.5% in June and 196.6% in July, in August it declined to a "low" of 37.9% and finally to a "very low" of 9.4% in the Survey month. The average annual rate of inflation for the year was 3079%. In contrast, 1987 had an annual rate of inflation of 137%, and in September the

¹³ Greater Buenos Aires contained 36% of the country's population according to the Census of 1960, and 38% according to the Census of 1980.

Figure 7

Inflation Rate (CPI) Monthly rate

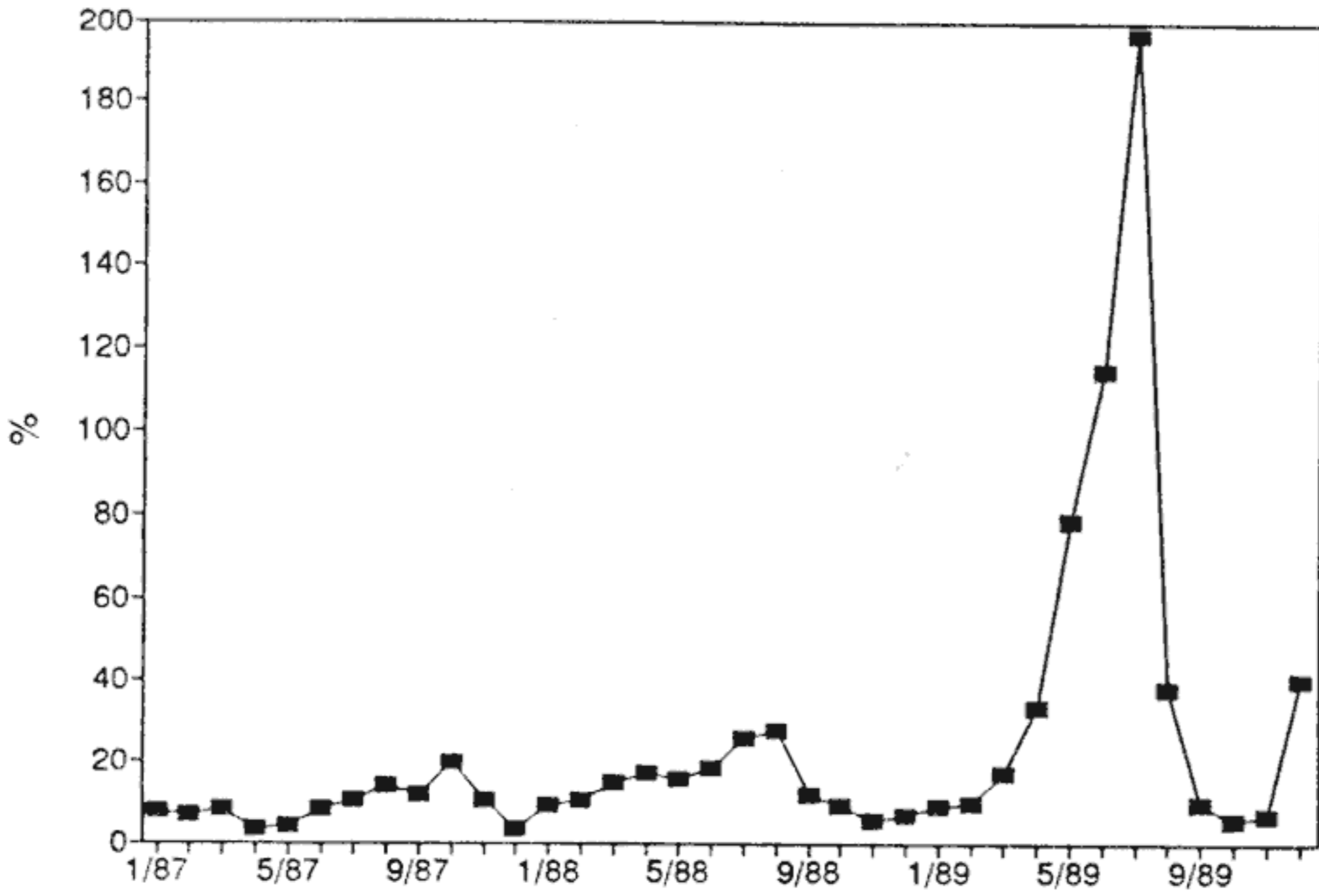
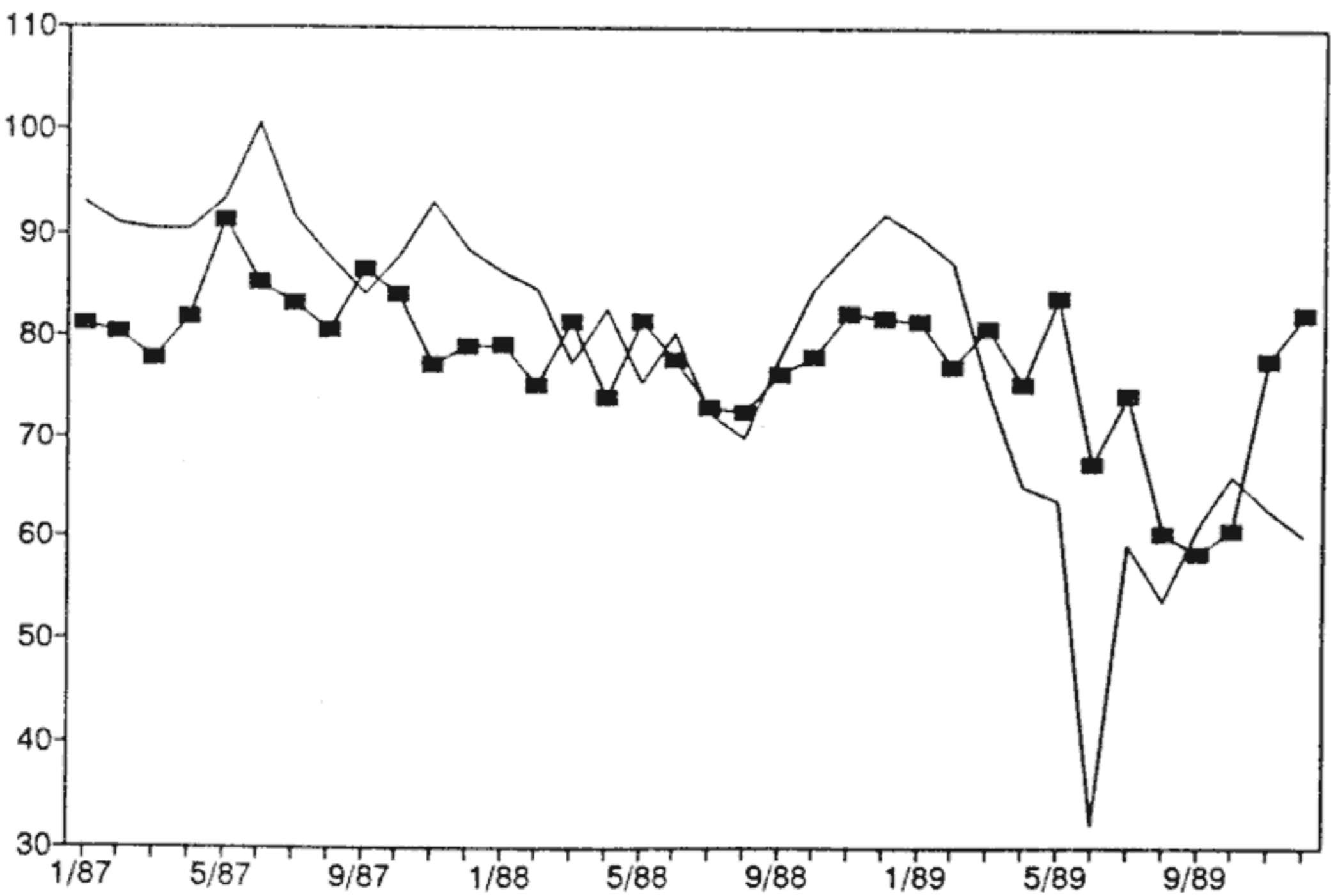


Figure 8

Real Wages and Purchasing Power Manufacture June 1985 = 100



monthly rate was 11.7%.

This hyperinflation came after two stabilization plans by the Alfonsín government. The first one, the Austral Plan, was launched in June 1985. As with most plans during the last two decades, the aim was to lower inflation through price freezes and the promise of a tight monetary policy. The start of the plan was a success in terms of the decrease in the rate of inflation and interest rates. However, fiscal deficits were not lowered and monetary expansion continued increasing. This accelerated inflation during 1986-87 at a level of 10% per month. In Figure 7, we can see that the rate of inflation accelerated in 1988 until July. In that same month, the Spring Plan was introduced. This plan liberalized somewhat the exchange rate, opened up the economy a bit, involved an agreement with labor unions to keep wages under control, and created a Price Commission to follow up prices, but fiscal reform was not achieved. Inflation accelerated from 9.6% in December 1988 to the peak of 196.6% in July 1989. The lack of credibility in the plan and the fear of repudiation of government debt increased interest rates at levels never seen before in Argentina. The severity of the crisis forced Alfonsín to relinquish power six months before the end of his term to president-elect Carlos Menem on July 9, 1989. The Menem administration then introduced what Argentines called the BB plan (BB stands for Bunge & Born, a multinational corporation that provided a high-ranking executive for Economy Minister). The BB plan announced privatizations and reductions in fiscal deficit, together with the customary accord to freeze prices. The plan was effective in stopping hyperinflation. For the months of September, October and November 1989 inflation reached one digit per month.

In conclusion, the analysis of the two cross-sections is carried over for a period before the Spring Plan and after the hyperinflation. The main assumption is that if there is a shift in wage profiles it should be attributed to hyperinflation effects. The real exchange rate indexed to July 1985=100, was 80.7 on average for 1987, while it was 85.4 for September 1989. Real GDP per capita decreased during this period also, and that might introduce some effects on the structure of wages, but the huge effect should come from the hyperinflation. I plan to complement this analysis with an analysis of unemployment and data from October 1988. The exercise carried out compares the earnings profile of male self-employed, employers and wage workers for the two periods.¹⁴ The stable labor force participation of men makes it an attractive candidate for analyzing the change in the structure of wages without worrying about biases arising from the more selected participation decision of women.

For 1989, the sample consists of 2999 men aged 25-54, of whom 90.5% are employed, 5.7% are

¹⁴ The category "employer" was also left in the earnings equations. The reason being that it is not clear what the difference is between employers and self-employed people in Argentina. See Guisarrri (1989) for a discussion on this issue.

unemployed, and 3.9% are out of the labor force. Of the 2713 individuals who are employed, only 2104 (22%) report their earnings. From that number, observations were deleted if they contained unrecoverable missing data, leaving the final sample size at 1955. Similarly, the sample size for October 1987 is 1948 adult males.¹⁵

Table 3 presents the definition of the variables used in the analysis while Table 4 presents the means of the variables in each of the samples.

From Table 4, the average real wage rate decreased by almost 30% during this period. This is similar to the decrease of 36% in aggregate real wages for manufacture during the same period (real wages decreased approximately 6 percent from 1987 to 1988). Figure 8 presents the monthly evolution of aggregate wages in manufacture together with the evolution of purchasing power in the same sector. Purchasing Power is another measure for real wages that takes into account the lag between the moment the wage is perceived and its expenditure given the deterioration that inflation causes¹⁶. In September 1989, real wages reached a minimum. However, purchasing power reached the minimum at the peak of the hyperinflation in June; by September it recovered 90 percent of that minimum value. In this sense, September 1989 is a "calm" month in terms not only of inflation and purchasing power but also as related by specialized magazines (FIEL (1989), *Novedades Económicas* (1989))¹⁷.

5. Comparison of Overall Wage Profiles for October 1987 and 1989.

As suggested by human capital theory, the natural logarithm of wages or earnings is in its most basic form a function of schooling and experience in the labor market (Mincer (1974)):

$$(1) \quad \ln w_i = \ln w_0 + \beta_1 s_i + \beta_2 X_i + \beta_3 X_i^2 + u_i$$

where $\ln w_i$ is the natural log of earnings or wages for the i th individual, s_i is a measure of schooling or educational attainment, X_i indexes the human capital stock of general experience, and u_i is a random

¹⁵ Self-selection corrections for non-reporting and self-employment will be carried out soon.

¹⁶ For its definition, see FIEL (1988).

¹⁷ The subsequent peak in real wages at the end of 1989 was caused by demands on the part of the unions through collective bargaining. However, as can be seen from the graph, the high peak was rapidly deteriorated by inflation.

TABLE 4

SUMMARY STATISTICS FOR SELECTED VARIABLES
Men age 25-54

	October 1987		October 1989	
	Mean	Std. dev.	Mean	Std. dev.
Education				
Edup	.328	.469	.344	.475
Edusi	.211	.408	.197	.398
Edus	.128	.334	.166	.371
Eduui	.074	.261	.064	.245
Eduu	.109	.311	.095	.293
Yearse	9.18	4.19	9.20	4.00
Experience/Age				
Age	38.70	8.18	38.49	8.29
Agesq	1564.85	645.33	1550.71	652.95
Exper	23.46	9.59	23.21	9.59
Exper2	642.15	471.72	630.64	469.59
Tenure				
Ten1	.297	.457	.262	.440
Ten2	.418	.493	.433	.496
Ten3	.106	.308	.091	.288
Employment				
Selfemp	.232	.422	.232	.422
Employer	.062	.242	.038	.193
Professional	.106	.307	.105	.306
White-collar	.652	.476	.693	.461
Blue-collar	.241	.428	.193	.395
Sector				
Manufacture	.293	.455	.298	.457
Services	.537	.499	.514	.500
Construction	.089	.285	.100	.300
Public Sector	.077	.267	.079	.269
Other	.003	.055	.006	.078
Wages				
Lwage	6.62	0.71	6.16	0.86
Wage	1007.51	1033.91	709.97	979.86
Sample Size	1948		1955	

disturbance term (usually assumed to be normally distributed with mean zero and constant variance) reflecting unobserved (to the econometrician) ability traits and the inherent randomness of earnings statistics.

There are at least two interpretations of estimated coefficients of equation (1); the first uses the accounting identity of equality between lifetime costs of investment (foregone earnings) to its return, the second interpretation is as a hedonic wage function where heterogeneous workers get matched to firms with different attributes. Under the first interpretation of equation (1), $\ln w_0$ is the level of the logarithm of earnings in the absence of schooling and β_1 is the average rate of return to schooling. The coefficients β_2 and β_3 measure the assumed quadratic returns to experience. Human capital theory suggests that $\beta_2 > 0$ and $\beta_3 < 0$.

Tables 5 and 6 record parameter estimates for Greater Buenos Aires for a variety of specifications of the wage function. Columns (1) and (2) of these tables present estimates of the parameters for the schooling model (Mincer model); while the rest of the columns present elaborations of the basic Mincer specification.

I first consider estimates of the simple schooling model for October 1989 in Table 5. This specification uses the natural log of the hourly wage as the dependent variable. The independent variables are years of schooling (YEARSE) and as measures of general experience I use two specifications: potential experience (age minus schooling minus six) and its square for column (1) and age and its square for column (2). The estimate of the rate of return to schooling is 12.8%. This rate of return is somewhat below the estimated rates of return for Latin America (18%) and it is above rates of return reported in the US and other DC countries that range from 8% to 10% (see Psacharopoulos (1985)). The returns to general experience are 2.1 percent at schooling completion declining only to 2.0 percent after 10 years of schooling (1.9 %). The returns to experience are much lower than those reported for most countries (For the US, Mincer (1974) reports that the growth rate of male earnings at schooling completion was 8.1 percent and that it declined to 5.7 percent as of 10 years after school); however the flat experience profile is shared by other LDC countries¹⁸.

There is sufficient worldwide evidence that education enters nonlinearly in the wage equation. Columns (3) and (4) of Tables 5 and 6 present estimates of equation (1), using dummies for highest schooling (complete or incomplete) level attained. The second panel of Table 7 reports estimates of the

¹⁸ This flat wage profile can be explained by two factors in the Argentine case. The first is that the estimates reported are based on private and public sector employees. Because of the equalization policy of pay scales in the public sector, returns to education and experience will tend to be biased downwards. The second factor is the incidence of massive wage increases through decree or collective bargaining independent of experience or educational level.

TABLE 5

Wage Equations for men age 25-54 from the Greater Buenos Aires
October 1989 Permanent Household Survey

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	4.537 (38.169)	3.533 (9.189)	4.957 (44.057)	4.024 (10.407)	4.946 (42.818)	4.988 (44.595)	4.976 (43.289)
<u>Education</u>							
Yearse	0.128 (26.324)	0.110 (26.309)					
Edup			0.332 (5.939)	0.284 (5.278)	0.309 (5.563)	0.337 (6.063)	0.314 (5.686)
Edusi			0.628 (9.940)	0.536 (9.024)	0.589 (9.389)	0.612 (9.755)	0.576 (9.226)
Edus			1.097 (16.191)	0.956 (15.391)	1.018 (14.969)	1.073 (15.930)	0.999 (14.765)
Eduui			1.404 (16.534)	1.213 (15.178)	1.331 (15.725)	1.348 (15.888)	1.282 (15.154)
Eduu			1.720 (21.859)	1.473 (20.792)	1.618 (20.448)	1.675 (21.320)	1.580 (20.003)
<u>Experience</u>							
Exper	0.021 (2.413)		0.029 (3.421)		0.023 (2.646)	0.025 (2.861)	0.019 (2.155)
Expersq	-0.00005 (-0.298)		-0.00026 (-1.435)		-0.00020 (-1.291)	-0.00017 (-0.981)	-0.00015 (-0.878)
Age		0.067 (3.339)		0.064 (3.221)			
Agesq		-0.0006 (-2.444)		-0.0006 (-2.348)			
<u>Tenure</u>							
Ten1					0.143 (2.966)		0.137 (2.879)
Ten2					0.267 (6.028)		0.256 (5.805)
Ten3					0.433 (6.201)		0.419 (6.035)
<u>Employment</u>							
Sel femp						0.122 (3.104)	0.120 (3.067)
Employer						0.442 (5.064)	0.408 (4.722)
Adj R2	0.27	0.27	0.28	0.28	0.29	0.29	0.31
MSE	0.54	0.54	0.54	0.54	0.53	0.52	0.52
F-Stat	241.25	244.38	107.46	108.24	82.43	88.41	72.01
D. of F	3,1951	3,1951	7,1947	7,1947	10,1944	9,1945	12,1942

Note.- t-statistics in parentheses

TABLE 6

Wage Equations for men age 25-54 from the Greater Buenos Aires
October 1987 Permanent Household Survey

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	5.064 (53.594)	3.547 (11.333)	5.432 (61.473)	3.976 (12.714)	5.437 (59.686)	5.483 (62.664)	5.486 (60.772)
<u>Education</u>							
Yearse	0.109 (28.835)	0.094 (29.563)					
Edup			0.200 (4.662)	0.197 (4.769)	0.173 (4.055)	0.189 (4.464)	0.164 (3.884)
Edusi			0.502 (10.462)	0.468 (10.431)	0.461 (9.613)	0.487 (10.254)	0.449 (9.446)
Edus			0.831 (15.163)	0.753 (14.847)	0.780 (14.227)	0.791 (14.529)	0.744 (13.660)
Eduui			1.101 (17.095)	0.965 (16.173)	1.038 (16.111)	1.047 (16.341)	0.989 (15.436)
Eduu			1.489 (25.170)	1.303 (24.699)	1.408 (23.541)	1.449 (24.691)	1.374 (23.146)
<u>Experience</u>							
Exper	0.037 (5.590)		0.049 (7.204)		0.043 (6.310)	0.046 (6.761)	0.040 (5.943)
Expersq	-0.0005 (-3.720)		-0.00076 (-5.516)		-0.00069 (-5.100)	-0.0007 (-5.169)	-0.0006 (-4.812)
Age		0.103 (6.325)		0.102 (6.290)			
Agesq		-0.0011 (-5.531)		-0.0011 (-5.535)			
<u>Tenure</u>							
Ten1					0.055 (1.402)		0.052 (1.356)
Ten2					0.242 (6.495)		0.231 (6.237)
Ten3					0.216 (4.018)		0.212 (3.979)
<u>Employment</u>							
Selfemp						-0.039 (-1.271)	-0.047 (-1.509)
Employer						0.382 (6.946)	0.357 (6.556)
Adj R ²	0.32	0.32	0.33	0.33	0.35	0.35	0.37
MSE	0.35	0.34	0.34	0.34	0.33	0.33	0.32
F-Stat	303.05	311.83	139.62	139.84	106.40	117.43	94.93
D. of F	3,1944	3,1944	7,1940	7,1940	10,1937	9,1938	12,1935

Note.— t-statistics in parentheses

TABLE 7

Marginal and Average Rates of Return to Education
to Successive Education levels

October 1987

Education category	Mean years	Marginal Return	Average Return
EDUPI	3		
EDUP	7	5.0	5.0
EDUSI	9.5	12.1	7.7
EDUS	12	13.2	9.2
EDUI	14.5	10.8	9.6
EDUU	17	15.5	10.6

October 1989

Education category	Mean years	Marginal Return	Average Return
EDUPI	3		
EDUP	7	8.3	8.3
EDUSI	9.5	11.8	9.7
EDUS	12	18.8	12.2
EDUI	14.5	12.3	12.2
EDUU	17	12.6	12.3

marginal and average rates of return for each successive educational category. The return to primary education (EDUP) is a return over primary school dropouts given the near absence of illiterates in the labor force in Greater Buenos Aires. Notice that marginal returns to education increase till secondary school and then decrease for complete and incomplete university level. This result contrasts with findings by Psacharopoulos (1985) who reports declining rates of return for completed schooling levels.

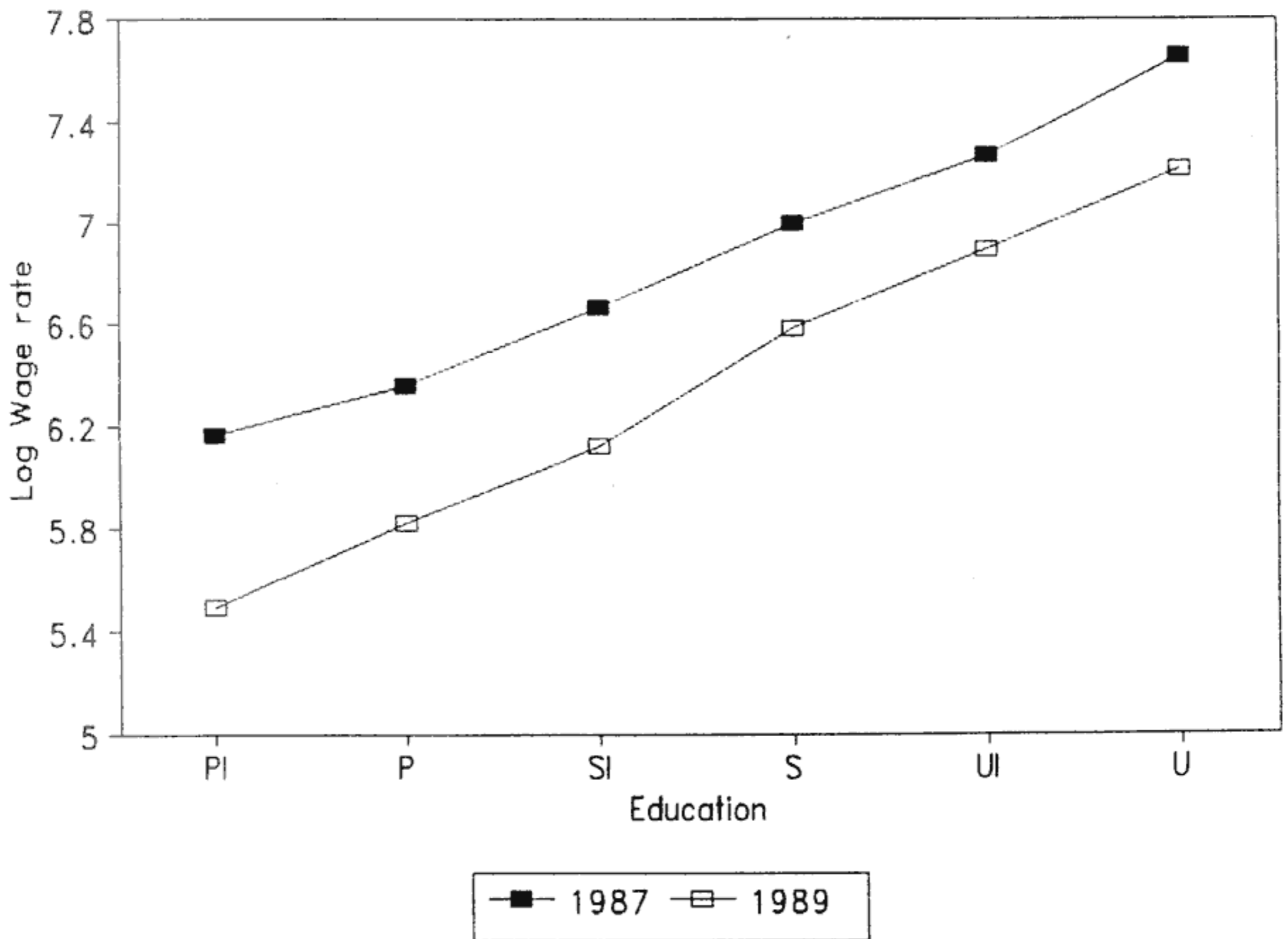
While most studies on wage profiles in LDC's analyze and try to rationalize the differences in slope coefficients with other countries (especially with DC's) by the use of a single cross-section, one of the objectives of this study is to show that such an approach can lead to misleading interpretations of the estimated returns¹⁹. Moreover, the most important macroeconomic event between 1987 and 1989 was the hyperinflation episode, so that an economic interpretation can be placed on the shift of this wage profile. Table 6 reports estimates of equation (1) for October 1987, while the first panel of Table 7 reports marginal and average rates of return to education based on column (3) of Tables 5 and 6.

Not only has the average rate of return to schooling changed overall (from 10.9 percent in 1987 to 12.8 percent in 1989), but it has changed more for some categories than for others. The hypothesis of equality of schooling coefficients between 1987 and 1989 (allowing for separate intercepts among years) is rejected at the 5% level (The F statistic is 2.57 with 5 and 3887 degrees of freedom). I also did the same test with weights given that the variance changes significantly across specifications and also rejected the hypothesis. The average rate of return to education increased after the hyperinflation. On average, it has increased for all categories. Figure 9 plots the education-wage profile for 1987 and 1989 for average years of experience in the labor market. Marginally, the largest return increase has occurred for workers with primary and secondary complete schooling. On the other hand, those with a university degree have had a decrease in their marginal rate of return compared to 1987. The marginal rate of return refers to the increase in return compared to the group immediately below. We can see that those who completed primary school have achieved a large gain against those with incomplete primary schooling, while the group which completed secondary schooling makes a large gain as compared to the group that did not complete it. Of course for Argentina, as for other South American countries, family background matters and that might be the ultimate reason for the differences. Heckman and Cameron (1991) have shown, in the US context, that the group that did not complete high school might be a very selected group of the population. In the case of Argentina, they seem to be the least able to cope with inflation or have the worst jobs in terms of indexation. Relating these findings to the available theory on indexation of section 3.3 is rather tentative

¹⁹ Willis (1986) notices that another source of bias in estimated rates of return for LDC's is that most studies rely on data on wage and salary workers; while they omit the large self-employed sector.

Figure 9

Education-Earnings Profile



at this point. Concerning the overall rate of return to education, Schultz's hypothesis on the ability of the worker to deal with disequilibrium tends to be accepted by these data and Smith's hypothesis rejected. However, when different levels of schooling are considered, these hypotheses tend to complement each other. If one considers that low-productive workers are those with lower levels of schooling, those are the ones with the highest increase in marginal rates of return (Primary complete and Secondary complete against University). However, if low productive workers are the ones with incomplete degrees, that theory is rejected by these data.

Education seems to be a good investment for job returns as well as a protection against inflation. Heckman and Hotz (1986) in their study on earnings of Panamanian males cite Psacharopoulos and others where it was found that rates of return to education are inversely related to the level of economic development. These studies do not consider whether these effects could in fact be due partly to inflation. Separating by region, Heckman and Hotz (1985) calculated rates of return to education that are higher for Latin America (18.2) than for Africa (13.4), Asia (12.8), Intermediate (9.7) and Advanced (7.7). It seems to me that Latin America is more developed than Africa, and that Asia is very heterogeneous; other factors such as inflation at the time of the estimation might be influencing rates of return to education.

With respect to the estimate of the experience coefficients, according to the measure used in column (3) of Tables 5 and 6, wage profiles have become flatter after hyperinflation. The F-test for equality of experience coefficients between 1987 and 1989 is 4.3417 with 2 and 3887 degrees of freedom. According to the theories reviewed on indexation of nominal contracts, there is no a priori reason to expect a flattening of the experience-wage profile. However, the newly installed Menem administration established by decrees 157/89 and 881/89 a fixed increase in wages of 8000 australes for July, August and September 1989. In September 1989 the average hourly wage for men (see Table 4) was more than 700 australes, so that for an average 40 hours worker this fixed amount meant an increase in 7 percent for wages in September. For the less experienced and less educated this increase meant a much larger percentage, tending to flatten the profiles²⁰.

The specifications of the wage equations analyzed till now implicitly assume that all education groups share the same experience profile. However, one implication of human capital theory is that if abilities are correlated with years of schooling and if individuals with more schooling receive more on the job training, then the posteducation age-earnings profile of the more educated should be steeper than that of the less

²⁰ This fixed increase will also tend to flatten the education-wage profile. Since I found that rates of return to education increased on average, this measure might have reduced the otherwise larger increase in educational returns.

educated. One way of incorporating these effects is to specify interactions between schooling and experience. Moreover, the shift in the cross-section wage profile might be masking important differences that occurred for each cohort separately. To account for these effects the following variant of equation (1) was fit to the October 1987 and 1989 data:

$$(2) \quad \ln w_{ij} = \ln w_0 + \sum_{ij} \beta_{ij} s_i a_j + u_{ij}$$

where i refers to the educational group and j to the age group. The variable a_j is a dummy variable that takes the value 1 for persons in the j th age group and 0 otherwise, with j covering six age groups: 25-29, 30-34, 35-39, 40-44, 45-49, and 50-54.

The results of the estimations are summarized in Tables 8 and 9. Table 8 presents the estimated log wage profiles by age and education and Table 9 the implied rates of return to education for completed schooling for the different age groups. The corresponding age-earnings profiles for the different schooling categories in 1987 and 1989 are plotted in Figure 10. The profiles for 1987 present a much more standard pattern than those in 1989: wages for primary complete and incomplete workers tend to be flatter and peaking earlier (age 35) than those for secondary complete and incomplete (peak at age 40). Those with a complete or incomplete university degree show a less standard pattern. Wages for this group tend to increase till age 35-40 and then remain fairly constant or even increase²¹. In the lower panel of Figure 10, we have the corresponding age-earnings profiles for October 1989. The first striking difference with those of October 1987 is the higher dispersion in earnings between and within educational classes. Notice that at age 25 log wages for different schooling categories tend to be more dispersed while for older cohorts they tend to get narrower as in 1987. This is the result of a steeper profile for less educated workers as compared to the more educated in 1989. In conclusion, as for experience, the overall age-earnings profile

²¹ Notice that these are cross-section age-earnings profiles in contrast to age-earnings profile of a cohort. The cross-section profiles confound cohort, age, and year effects. The different cohorts have experienced different macroeconomic shocks during their lifetime. In addition, the educational attainment of the labor force has changed. While only 32 percent of the cohort 50-54 had attained more than primary schooling, the corresponding figure for cohort 25-29 is 66 percent. The implication of this changing structure of education on the patterns of rates of return in 1987 should be highlighted. Looking at Table 9, the first column shows the rate of return of those that completed primary schooling against those that are dropouts. The average return of 5% overstates returns to elementary schooling for recent cohorts and understates the return for older cohorts. Older men at present are earning more than would be possible at comparable ages for oncoming cohorts of graduates from elementary school. The same argument applies on the other extreme to university graduates; the cross-section profiles show increasing wages after age 45; this is a reflection of the scarcity of university graduates at that time. For the purpose of this study, it is important to recognize these patterns, but comparing successive cross-sections the contamination will be minor.

TABLE 8

Estimated log Wage Profiles by Age and Education

October 1987						
Age	EDUPI	EDUP	EDUSI	EDUS	EDUUI	EDUU
25-29	6.139	6.149	6.320	6.728	6.780	7.183
30-34	6.121	6.251	6.523	6.800	7.148	7.167
35-39	6.270	6.431	6.548	6.892	7.103	7.593
40-44	6.252	6.437	6.887	7.228	7.232	7.553
45-49	6.167	6.411	6.756	6.787	7.242	7.581
50-54	6.124	6.430	6.750	6.798	7.163	7.716
All	6.163	6.363	6.665	6.994	7.264	7.652
October 1989						
Age	EDUPI	EDUP	EDUSI	EDUS	EDUUI	EDUU
25-29	5.307	5.660	5.819	6.268	6.650	6.634
30-34	5.450	5.786	5.988	6.488	6.926	7.130
35-39	5.722	5.773	6.262	6.519	6.661	7.088
40-44	5.741	5.956	6.148	6.748	7.047	6.991
45-49	5.697	6.053	6.375	6.609	6.455	7.291
50-54	5.765	6.096	6.231	6.657	6.932	7.234
All	5.490	5.822	6.118	6.587	6.894	7.210

TABLE 9

Estimated Rates of Return to Education for Completed Schooling
(in %)

October 1987

Age	EDUP/EDUPI	EDUS/EDUP	EDUU/EDUS	EDUU/EDUPI
25-29	0.25	11.58	9.10	7.46
30-34	3.25	10.98	7.34	7.47
35-39	4.02	9.22	14.02	9.45
40-44	4.62	15.82	6.50	9.29
45-49	6.10	7.52	15.88	10.10
50-54	7.65	7.36	18.36	11.37
All	5.0	12.62	13.16	10.63

October 1989

Age	EDUP/EDUPI	EDUS/EDUP	EDUU/EDUS	EDUU/EDUPI
25-29	8.82	12.16	7.32	9.48
30-34	8.40	14.04	12.84	12.00
35-39	1.28	14.92	11.38	9.76
40-44	5.38	15.84	4.86	8.93
45-49	8.90	11.12	13.64	11.39
50-54	8.28	11.22	11.54	10.49
All	8.30	15.30	12.46	12.29

tends to become flatter although for the less educated it becomes steeper due mainly to the larger decrease in earnings for the young in this group.

With respect to more disaggregated analysis of the rates of return to education, Figures 11, 12 and 13 plot the education-wage profiles for the different cohorts (these should be compared with the overall education-earnings profile of Figure 9) for 1987 and 1989. For the two younger cohorts in Figure 11, a clear pattern emerges. The log-wage differences between years decrease the more educated is the worker. This pattern is not that clear for older cohorts; however, these tend to show larger differences for those with primary or incomplete primary schooling. In Table 9 we can see that the rate of return for primary schooling increased substantially for all cohorts except for the one aged 35-39. The rate of return to secondary schooling also increases for all cohorts but more for the older, while rates of return to university degrees decrease for all cohorts, except for cohort 30-34. The increase in the overall rate of return to education between 1987 and 1989 is the product of a large increase for the younger cohorts and milder changes for older cohorts (actually cohorts 40-44 and 50-54 experienced a decrease in the rate of return because of a deep decrease in the rate of return to university education which more than compensates the increases in rates of return to primary and secondary schooling) coupled with a parallel larger increase in return for the less educated. These results tend to point (further statistical testing will be carried out) to a modified version of Smith's theory of nominal contracts. Wage contracts of workers with primary school and secondary school (in a lesser degree) tend to be more indexed than contracts of university graduates.

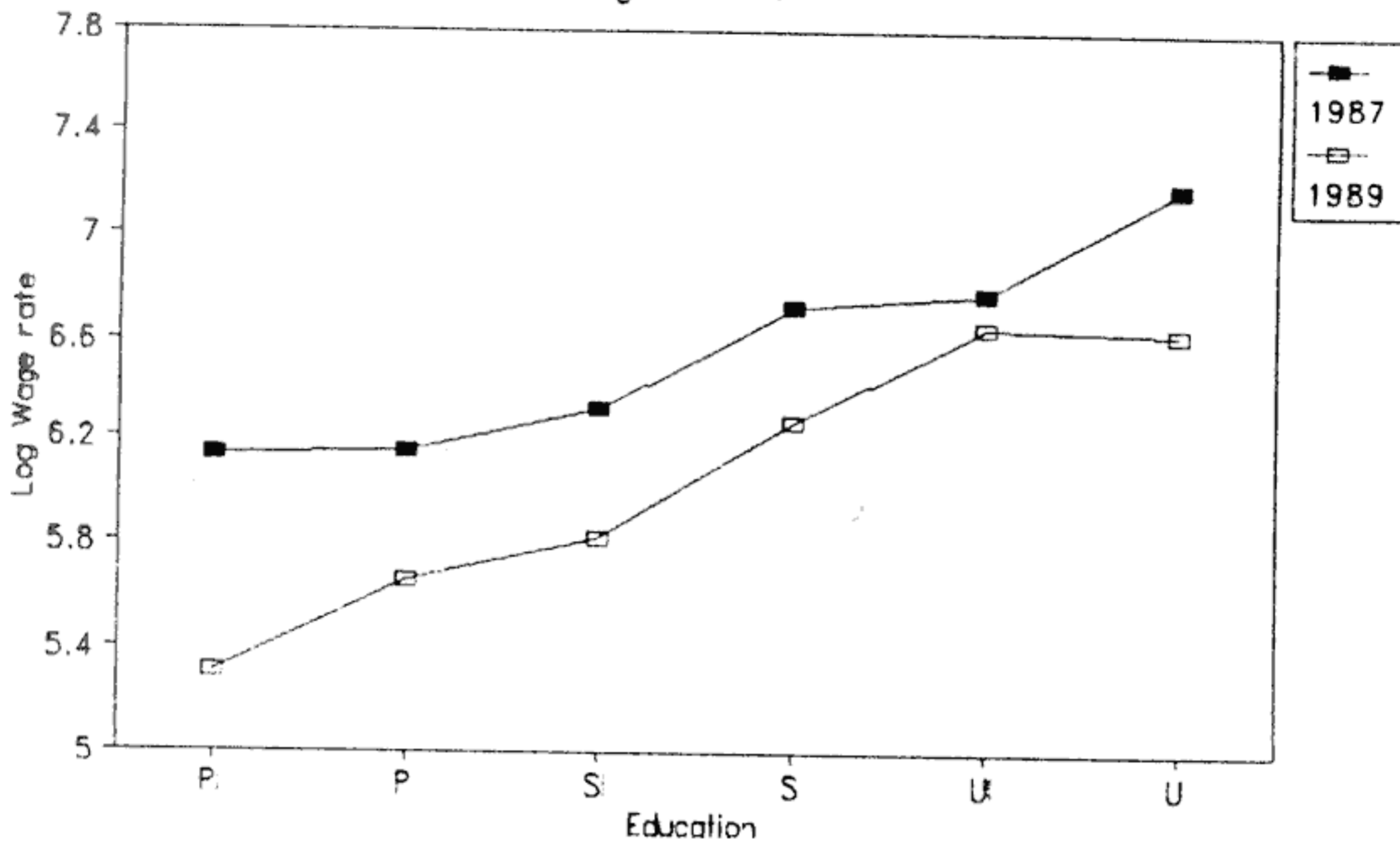
The basic Mincerian equation (1) is now extended to include a measure of specific human capital. The idea is that compensation rises with job tenure or seniority and that in comparing the two cross-sections, returns to specific human capital should have increased. Column (5) of Tables 5 and 6 report the estimates including a measure of tenure on the job, with the variables Ten1, Ten2 and Ten3, to proxy for specific human capital investment. In 1987, an average of 12 years of current job seniority raise the wage of the typical male worker in Greater Buenos Aires by 24 percent. For workers with an average of 3 years of specific investment, there is no significant rise in wages, while for workers with more than 20 years of job seniority the increase in wages is not significantly different (22 percent) than that experienced by the 12 year seniority group. These are estimates of what the typical worker would lose if his job were to end exogenously²². After the hyperinflation episode, the returns to specific human capital increase for all tenure groups. In particular, the return to 3 years of seniority is now 14 percent, while before it was not

²² Topel (1991) who conducted an exhaustive analysis of seniority effects on wages in the US reported that 10 years of job seniority raise the wage of the typical US worker by over 25 percent; similar rate to the one found for Greater Buenos Aires.

Figure 11

Education-Earnings Profile by Age Men

Age 25-29



Age 30-34

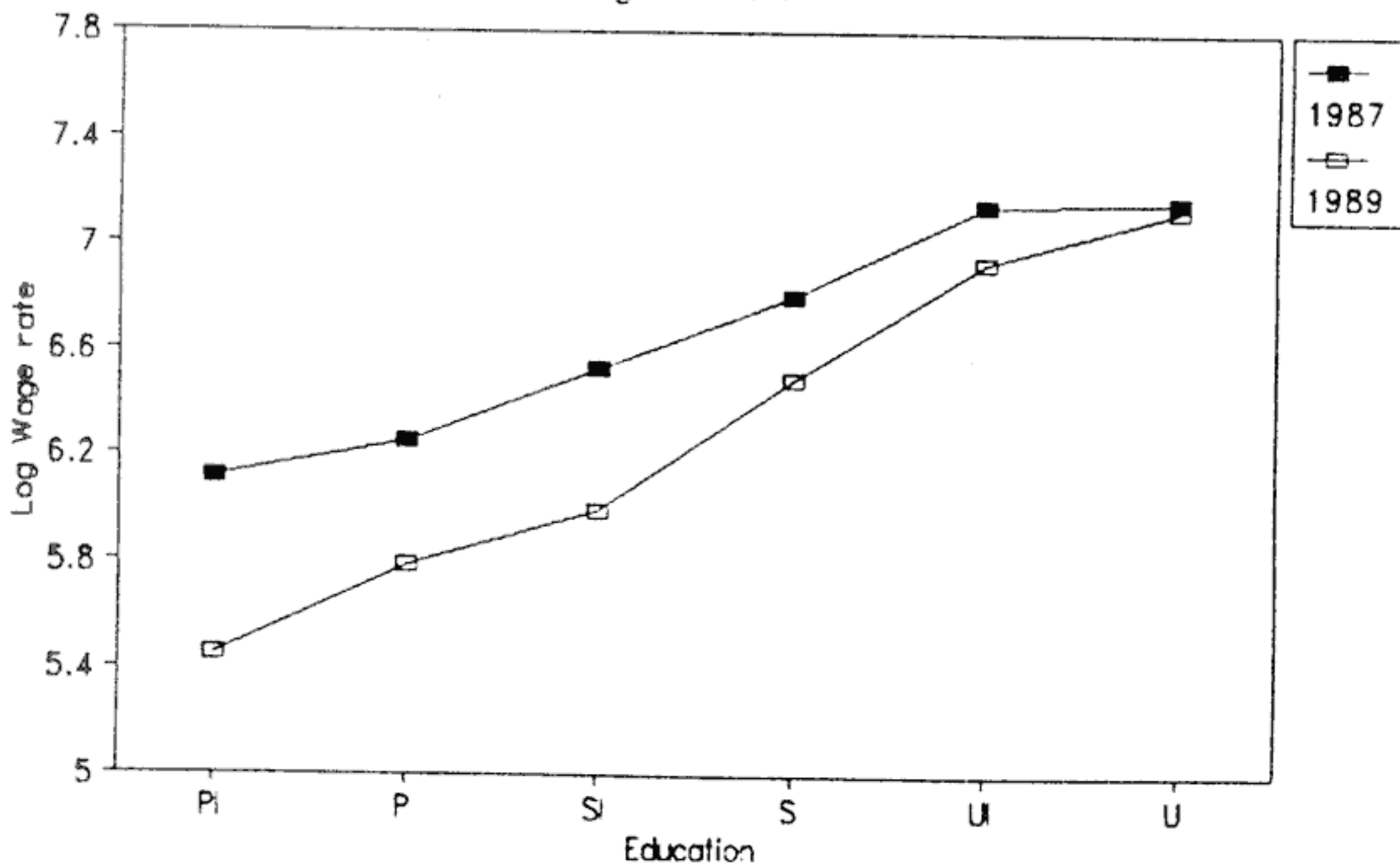
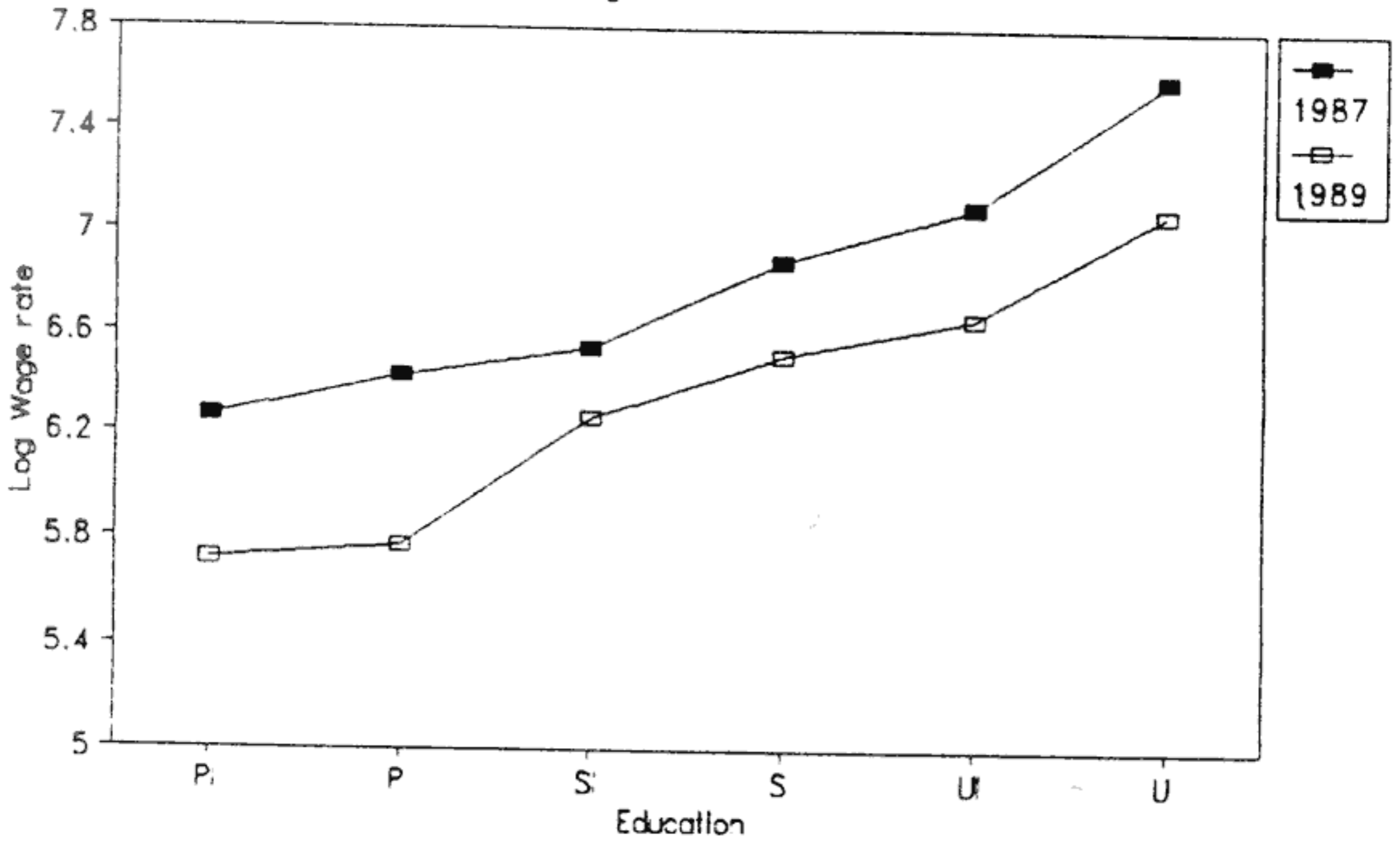


Figure 12

Education-Earnings Profile by Age Men

Age 35-39



Age 40-44

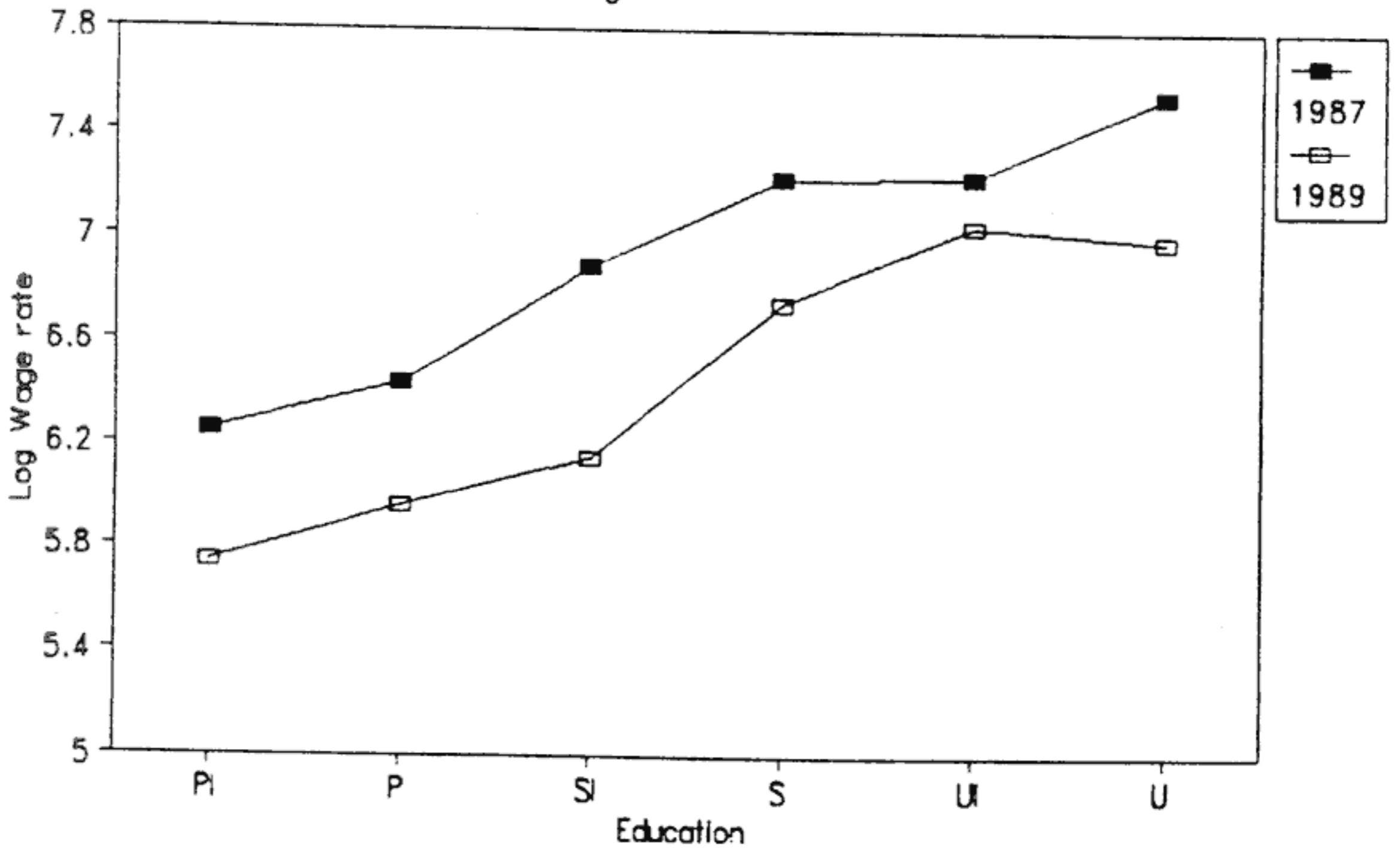
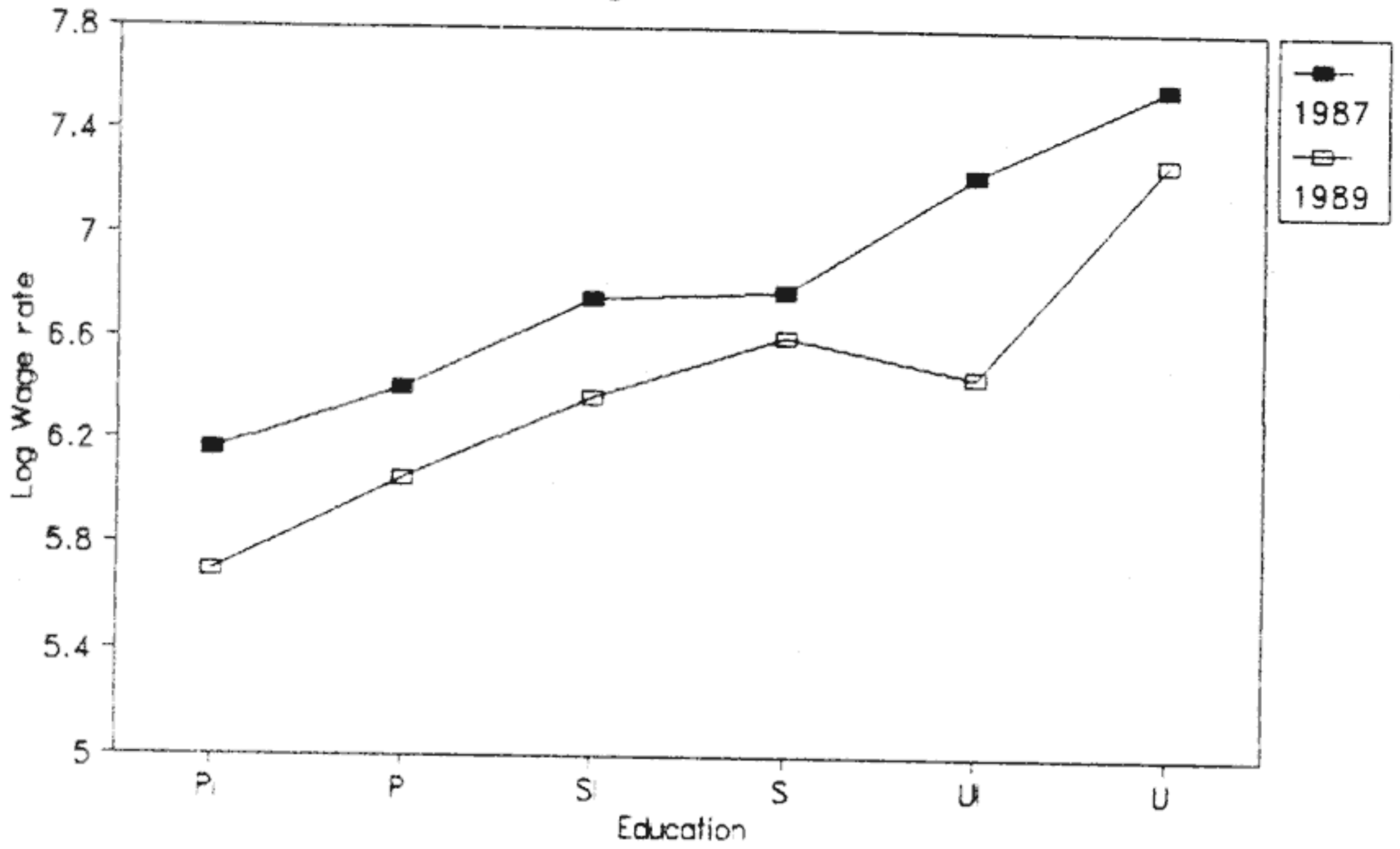
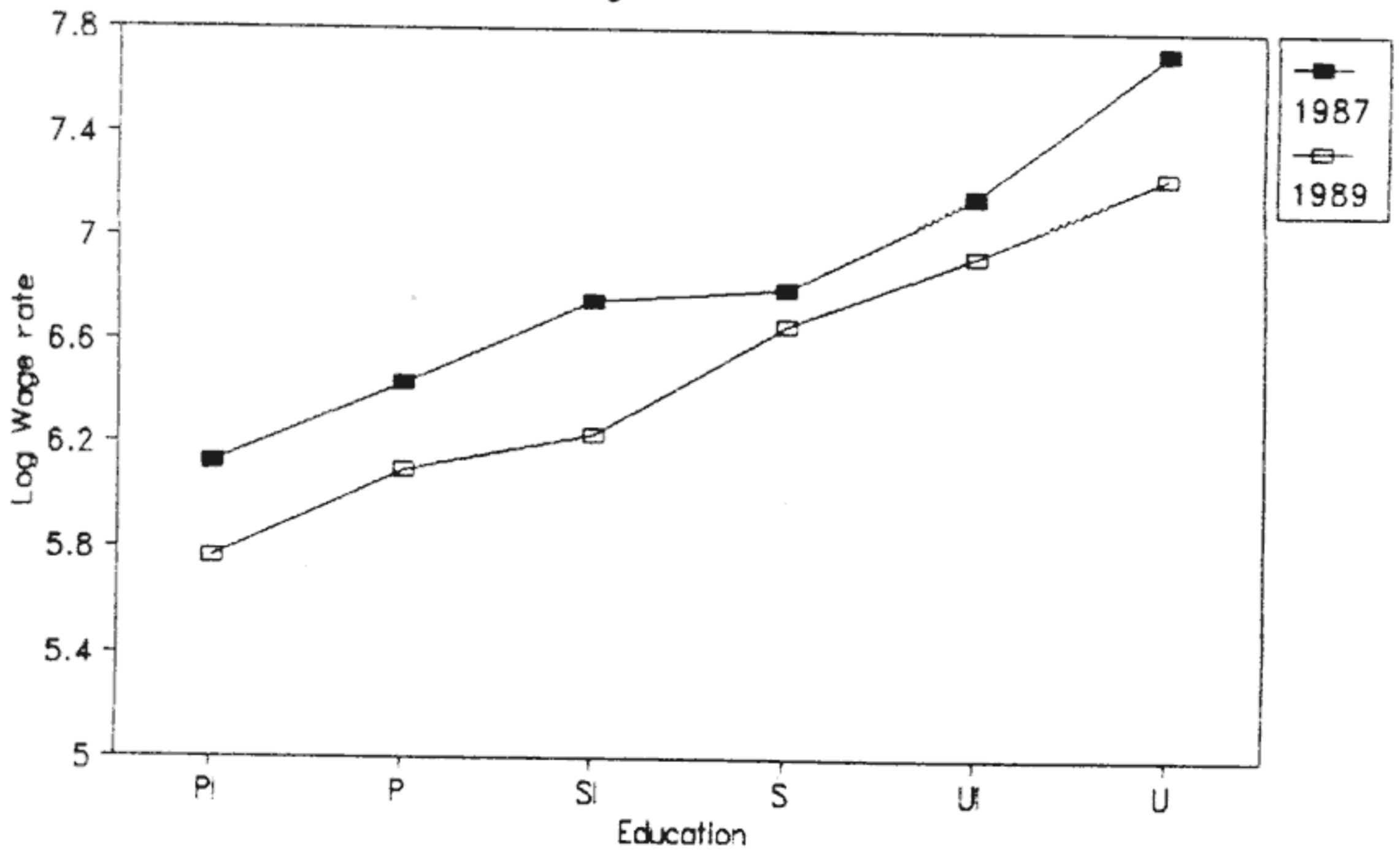


Figure 13
 Education-Earnings Profile by Age Men
 Age 45-49



Age 50-54



significantly different from zero; the return to more than 20 years of tenure is 43 percent increasing significantly with respect to that of 1987 (the F test for differences in the tenure coefficients is 2.6943 with 3 and 3881 degrees of freedom, the one that contributes more to the difference is the estimate of the coefficient of Ten³).

In specifications (6) and (7) of Tables 5 and 6, I added dummies for self-employment and employer. If I had only analyzed 1989 data, I would have concluded that the self-employed earn 12% more than the wage-employed. However, looking at 1987, the estimate of the same coefficient is not significantly different from zero (and changes sign). Since I am using inflation as an identifier I will instead argue that in 1989 the self-employed could better protect themselves against inflation because they did not depend on nominal wage contracts.

In conclusion, there was a substantial change in the age earnings profile for male workers before and after the hyperinflation.

6. Occupational and Sectoral Differences in Wage Profiles

The preceding results refer to wage-employed and self-employed persons in an array of occupations and sectors of the economy. Their occupations can range from highly skilled professionals to low skilled blue collar workers. The "self-employed" can range from street vendors who use small amounts of physical capital to an entrepreneur producing goods with varying amounts of equipment. With respect to the sectoral distribution of workers, the determination of wages will clearly be different between the public and the private sector and within the private sector, where the construction industry fluctuates more than manufacture and services.

In this Section, I compare wage profiles for different occupational and sectoral categories with a double purpose. First, I want to see if the results obtained in the previous section are a consequence of aggregating heterogeneous groups of workers. Second, and more important, this disaggregation can serve to determine whether the contracting theory makes sense by analyzing the differential shift in wage profiles of different occupations or sectors, some of which are known to have better designed contracts, either because of the presence of unions or because of their intrinsic natures.

Beginning with the occupational categories, I divided the groups of workers into professionals, white-collar (high-skilled as defined in the Survey), and blue-collar (semi-skilled and unskilled).

Table 10 presents the results of the estimation for the different skill groups for a variety of

TABLE 10

Wage Equations for men age 25-54 from the Greater Buenos Aires
October 1987 and 1989 Permanent Household Survey
BY OCCUPATIONAL CATEGORY

	Professionals		White-Collar		Blue-Collar	
	87	89	87	89	87	89
(1a)						
Yearse	0.081 (4.265)	0.102 (4.177)	0.083 (16.179)	0.104 (15.824)	0.066 (7.740)	0.087 (7.273)
Ten1	-0.096 (-0.525)	-0.081 (-0.389)	0.100 (2.094)	0.107 (1.843)	-0.014 (-0.226)	0.181 (2.205)
Ten2	0.207 (1.171)	-0.094 (-0.489)	0.227 (5.009)	0.207 (3.921)	0.149 (2.397)	0.415 (5.144)
Ten3	-0.140 (-0.618)	0.045 (0.174)	0.215 (3.363)	0.390 (4.660)	0.132 (1.252)	0.339 (2.286)
(1b)						
Yearse	0.080 (4.139)	0.083 (3.374)	0.083 (16.189)	0.103 (15.756)	0.065 (7.598)	0.088 (7.357)
Ten1	-0.095 (-0.519)	-0.066 (-0.322)	0.099 (2.071)	0.107 (1.833)	-0.015 (-0.246)	0.184 (2.238)
Ten2	0.191 (1.068)	-0.178 (-0.926)	0.228 (5.031)	0.206 (3.898)	0.148 (2.383)	0.425 (5.256)
Ten3	-0.148 (-0.649)	0.051 (0.199)	0.214 (3.342)	0.390 (4.669)	0.131 (1.246)	0.336 (2.280)
Selfemp	0.092 (0.701)	0.479 (3.011)	-0.061 (-1.718)	0.057 (1.313)	0.013 (0.276)	0.147 (1.427)
N	177	178	1190	1307	456	376
(2a)						
Yearse	0.078 (4.602)	0.091 (3.847)	0.084 (16.664)	0.107 (16.487)	0.066 (7.853)	0.087 (7.273)
Ten1	-0.121 (-0.722)	0.031 (0.146)	0.091 (1.867)	0.123 (2.101)	-0.020 (-0.325)	0.181 (2.209)
Ten2	0.174 (1.058)	-0.002 (-0.009)	0.235 (5.108)	0.209 (3.943)	0.159 (2.558)	0.413 (5.138)
Ten3	-0.181 (-0.851)	0.069 (0.263)	0.244 (3.785)	0.410 (4.945)	0.137 (1.305)	0.339 (2.286)
(2b)						
Yearse	0.079 (4.682)	0.084 (3.492)	0.084 (16.603)	0.106 (16.304)	0.065 (7.627)	0.088 (7.345)
Ten1	-0.122 (-0.725)	0.030 (0.144)	0.091 (1.879)	0.120 (2.059)	-0.023 (-0.366)	0.184 (2.239)
Ten2	0.148 (0.896)	-0.047 (-0.235)	0.234 (5.084)	0.205 (3.876)	0.157 (2.522)	0.421 (5.231)
Ten3	-0.189 (-0.887)	0.093 (0.355)	0.244 (3.792)	0.407 (4.917)	0.136 (1.294)	0.335 (2.260)
Patself	0.135 (1.323)	0.245 (1.813)	0.032 (0.932)	0.114 (2.690)	0.026 (0.465)	0.137 (1.355)
N	206	205	1270	1355	469	377

Notes. - t-statistics in parentheses

All specifications included Exper and Exper2.

Specifications (1a) and (1b) did not include observations on employers, while the rest did include them.

specifications of the wage equations²³. In specifications (1a) and (1b) I did not include observations on employers, while I did include them in specifications (2a) and (2b). Notice that except for professionals, rates of return to education increase 2 percentage points for all the specifications. For professionals, once I introduce the self-employment dummy, the 2 percentage point increase in the rate of rate to education washes out. This means that professionals under contracts have worse indexation clauses than less-skilled workers²⁴. Surprisingly, returns to tenure are not significantly different from zero in any of the years for professionals. Returns to tenure are more important in 1987 for white-collar workers than for blue-collar workers. However, after the hyperinflation episode, returns to tenure increase more for blue-collar workers. Note that in the "normal" year, returns to tenure are higher for white collars as predicted by the more standard specific human capital theory²⁵.

Returns to self-employment increased the most for professionals and the least for blue-collars. If one considers self-employed returns as returns to both human and physical capital, these results confirm that profit rates tend to increase during inflationary periods.

Now, we turn to differences in wage profiles shifts by sector of employment. The sectors considered are Manufacturing, Services, Construction and the Public Sector. I expect the Public Sector to design the poorest contracts in terms of economic incentives for the agents involved. In this sense, I do not expect a high increase in returns to general or specific human capital. The construction sector is the more volatile, contracts tend to be shorter and of lesser attachment than in other sectors. In thus case, I expect that the rate of return to education increases because of the ability of the worker to deal with disequilibrium. In the Manufacturing and Services Sectors, I expect that workers have economically meaningful contracts: rates of return to education will tend to increase less than in other sectors but returns to tenure will increase more significantly. The results of these estimations are shown in the first four columns of Table 11. Rates of return to education tend to increase more for Construction, followed by Services, then Manufacturing

²³ The small sample size of the EPH prevented me from defining more detailed categories, such as professionals who are self-employed.

²⁴ The intercept in the wage equation fro professionals also falls more than the other categories.

²⁵ Another possible explanation for this result is that unions are more important for the white collar workers, who might have premiums for seniority in terms of indexation. However, in the Argentine case, workers who are not unionized still receive any wage increase arranged in collective bargaining. A more plausible explanation hinges on the incidence of unemployment by skill category. The overall unemployment rate increased from 5.2% in October 1987 to 7.0% in October 1989. For men aged 25-54 these rates are lower; however the unemployment rate is lower for professionals, but similar in both years for white and blue collar workers.

TABLE 11

Wage Equations for men age 25-54 from the Greater Buenos Aires
October 1987 and 1989 Permanent Household Survey
BY SECTOR

	Manufacture 87	89	Services 87	89	Construction 87	89	Public Sector 87	89	Services Formal 87	89	Services Informal 87	89
(1a)												
Yearse	0.109 (14.763)	0.115 (11.590)	0.105 (20.015)	0.129 (18.378)	0.077 (5.992)	0.103 (5.849)	0.105 (7.490)	0.111 (8.940)	0.108 (17.643)	0.126 (15.142)	0.087 (7.951)	0.129 (9.412)
Ten1	0.052 (0.723)	0.279 (2.895)	0.061 (1.130)	0.129 (1.983)	0.026 (0.219)	-0.033 (-0.212)	-0.166 (-0.793)	0.028 (0.187)	0.121 (1.927)	0.155 (1.982)	-0.102 (-0.962)	0.067 (0.579)
Ten2	0.262 (3.695)	0.295 (3.401)	0.262 (5.046)	0.328 (5.221)	0.271 (2.512)	0.138 (1.105)	-0.161 (-0.816)	-0.046 (-0.345)	0.343 (5.685)	0.343 (4.587)	0.076 (0.744)	0.293 (2.624)
Ten3	0.232 (2.237)	0.522 (4.103)	0.198 (2.664)	0.393 (3.867)	0.327 (1.456)	0.367 (1.522)	0.023 (0.102)	0.238 (1.292)	0.258 (2.925)	0.346 (2.945)	0.046 (0.334)	0.538 (2.652)
(1b)												
Yearse	0.110 (14.765)	0.113 (11.361)	0.104 (19.753)	0.125 (17.953)	0.078 (6.013)	0.102 (5.816)			0.105 (17.057)	0.122 (14.711)	0.087 (7.942)	0.125 (9.081)
Ten1	0.054 (0.751)	0.284 (2.950)	0.060 (1.110)	0.124 (1.913)	0.012 (0.098)	-0.042 (-0.267)			0.124 (1.978)	0.147 (1.884)	-0.100 (-0.939)	0.069 (0.604)
Ten2	0.265 (3.734)	0.295 (3.409)	0.258 (4.967)	0.315 (5.047)	0.250 (2.203)	0.116 (0.915)			0.341 (5.676)	0.342 (4.596)	0.079 (0.769)	0.232 (2.053)
Ten3	0.238 (2.293)	0.495 (3.881)	0.202 (2.722)	0.396 (3.923)	0.295 (1.282)	0.345 (1.423)			0.272 (3.097)	0.377 (3.216)	0.048 (0.350)	0.401 (1.932)
Patself	-0.054 (-0.769)	0.181 (2.003)	0.076 (2.034)	0.195 (3.951)	0.059 (0.622)	0.097 (0.893)			0.130 (2.877)	0.184 (3.109)	-0.018 (-0.256)	0.238 (2.518)
N	571	682	1046	1006	173	196	150	154	757	758	289	248

Notes. - t-statistics in parentheses
All specifications included Exper and Exper2.

sector and lastly the Public Sector²⁶. Except for the Public Sector, the rate of return to education increases more the lower the expected incidence of formal contracts. The opposite relationship holds for returns to tenure. Construction workers show the lowest increase in tenure returns, while manufacture workers show the highest. Again, government employees do not seem to get a premium in terms of tenure or education after inflation. The self-employed do better in 1989 in the Manufacturing and the Services Sector. Notice that the self-employed do better in 1989 both in the Services and the Manufacturing Sector, where contracts for the wage-employed are more formal.

To further analyze the prediction that the less formal (in terms of contracts) the sector, the higher the increase in the rate of return to education, I subdivided the Service Sector into two categories. In the fourth and fifth columns of Table 11 I present the results for what I called Services Formal and Services Informal. Services Formal includes the following sectors: Electricity, Commerce, Transportation, Financial Services, Services to Firms and Medical Services. Services Informal includes Restaurants and Hotels, Social and Community services, Repair services, Domestic services and other Personal services. The results of the estimation confirms the prediction in terms of the rate of return to education: the more informal the sector, the higher the increase in this return. However, while the returns to tenure are more important for the Services Formal sector, they increase substantially more in 1989 for the Services informal. The results are not highly significant, however, when the dummy for self-employment is added into the analysis.

The results of this section clearly call for a modification of the theory of nominal wage contracts with heterogenous workers. There is clearly a difference between changes in return to the various attributes in sectors or skills that have differing degrees of contractual practices.

7. Conclusions

The study of the impact of macroeconomic shocks on microeconomic decisions is of crucial importance in the developed and especially in the less developed world. Most economic literature has concentrated in either one of these fields and have disregard the other partly because of the inherent difficulties in building macroeconomic (general equilibrium) models with heterogenous individuals and of incorporating macroeconomic shocks in typical labor market models (which are usually partial equilibrium models). The huge variation in aggregate time series in Argentina over short periods of time provides the

²⁶ Pooling all the sectors together and including a dummy for public sector affiliation, does not appear to be important, the dummies in both years are not significant. Average real wages of public sector employees decreased alongside the other sectors in Greater Buenos Aires.

researcher with sufficiently sharp natural experiments so as to identify these effects. For the period 1974-1989 the main aggregate shocks in Argentina were technological, external, inflationary, and institutional shocks apart from the overall level of uncertainty that these shocks created. Relying on current economic literature, I hypothesize what are the main effects of these macroeconomic fluctuations on the structure and inequality of wages and the ensuing optimal decisions of individuals.

With respect to effects of macro shocks on the structure of wages, I analyze the effects of the hyperinflation episode of mid 1989. This was the main macroeconomic shock during the period, so that the shift in wage profiles from the end of 1987 to the end of 1989 is attributed to inflation. Theoretical research on the effects of inflation on the structure of wages is almost non-existent in current economic literature. However, there is a consensus that inflation has real effects more because of the existence of nominal wage contracts than of informational type of stories confusing monetary with real shocks. Smith (1989) provides a theory of nominal contracts concluding that low-productive workers will have fully indexed contracts as against high-productive workers. Under his assumptions, this will induce optimal self-selection of workers in the labor force. This theory can be contrasted with one that incorporates the notion that education increases the value of a worker to deal with disequilibria (Schultz (1975)).

Contracting and human capital theory also provide hypothesis for the effects of inflation on returns to experience, seniority and whether the worker is wage-employed or self-employed. I compared the wage profiles for men age 25-54 in 1987 and in 1989, finding a significant shift in the wage profile that is not uniform across experience/age, education, tenure or sector of employment. The average rate of return to education increases after the hyperinflation episode, especially for the less educated groups in the population; providing partial support for Smith's hypothesis. The return to seniority raises significantly between periods providing support for the hypothesis that the firm will lose an amount proportional to the tenure of the individual if the wage is not indexed. Finally, self-employed workers tend to be better protected against inflation since they do not rely on wage contracts.

These results have several implications at different levels. First, for studies analyzing policy issues, such as whether to subsidize different levels of education, in the context of a single cross-section, care should be taken of the specific macroeconomic context at the time. Wage profiles shift in a significant way with macroeconomic shocks. Unless there is sufficient stability in the economy, these profiles should be interpreted with caution.

Second, while the non-neutrality of inflation has been usually studied in general in terms of increases in output and employment, inflation is non-neutral in a less orthodox way: it changes the structure and inequality of wages. Whether these non-neutral effects are more permanent than those found in this study await further research. Third, this study shows that Argentina's prospects for the future rely on smoother

time series. The changes found in wage profiles, and the ensuing changing in decisions that they entail increase enormously the well known welfare costs of macroeconomic fluctuations. Individuals change fundamental decisions on schooling, occupational choice, fertility and training with shifts in expected returns.

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