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URBAN INCOME INEQUALITY IN ARGENTINA AND BRAZIL: A COMPARATIVE ANALYSIS

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INTRODUCTION

The decade of the 1980's for the Latin American countries has been one of unprecedented decline even in comparison with the 1930's. Not surprisingly, the consequence has been a concentration upon macroeconomic issues at the expense of others. But the high degree of inequality found in Latin America should remain a matter of serious concern, the more so since the supposed negative relationship between macroeconomic performance and the income distribution undergirds much of the opposition to orthodox stabilization policy.

In this essay we examine the comparative response of the size distributions in Argentina and Brazil to economic deterioration in the beginning of the 1980's. Such a methodology takes advantage of the available annual income distribution data, and also allows comparison of the responses in an economy whose performance was already stagnating, Argentina, with one whose growth rate had been the highest and steadiest in the region, Brazil. This distinction turns out to be a central part of the explanation we offer to the rather different results that emerge in each of the countries.

In Section I, we present a summary of changes in the distributions in the two countries over more than the last decade. In Section II, we decompose the observed changes in inequality into two component parts, the economic structure of the labor force and relative earnings. In Section III, because it is changing relative incomes with respect to education that account for the largest part of the changes in inequality, we examine the time pattern of returns to different levels of education in the two countries. Our explanation for the distinct

cyclical variation of returns in Brazil and its absence in Argentina turns on different processes of labor market adjustment in the countries.

1. VARIATIONS IN THE INCOME DISTRIBUTION

Tables 1 and 2 present information on the income distributions in Argentina and Brazil from the mid-1970's to the 1980's. While the Argentine data refer to the Buenos Aires metropolitan area and the Brazil information is for males in urban areas only,[1] other information confirms that they are representative.[2] The time pattern of the Argentine urban labor force as a whole is similar, and the exclusion of female workers in Brazil does not alter the observed cycle, or levels of inequality.[3]

Two principal conclusions emerge from these tables. One is the much higher inequality in Brazil than Argentina, regardless of measure. This distinction carries through even more vividly were the measurement to limit itself to the percentage of the population in poverty. Thus, while the percentage of the Brazilian population in poverty was 17.7 in 1980 and 23.3 in 1987 (Fox and Morley [1990]), the incidence of poverty in the case of Argentina was only 8% in 1980 and 13% in 1987 (CEPAL [1985] and [1989b]). Higher Argentine income per capita and a lesser dependency ratio accentuate the divergence in measures of inequality. Even in 1981 when the difference between the two countries is at its

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[1]The Argentine data are from the Buenos Aires Household Survey ("Encuesta Permanente de Hogares") undertaken by the Argentine National Institute of Statistics and Census (INDEC). The Brazilian data are from the "Pesquisas Nacionais de Amostra de Domicilios" (PNADs) and correspond exclusively to males in urban areas. A more complete description of the data is provided in Appendix 1.

[2]See Bonelli and Sedlacek [1991] and Barros and Reis [1990].

[3]Measures of inequality were calculated for a set of ten urban areas in Argentina for 1974, 1980, 1982, and 1985. The Gini coefficients were 0.36, 0.42, 0.41, and 0.42 respectively. For the consequences of excluding female workers in the Brazilian case see Ramos [1990].

minimum, the bottom 60 percent of the Argentine distribution receive almost 30 percent of the income while the comparable Brazilian group accounts for less than 24 percent. This difference is greater than the entire earnings of the bottom quintile.

Of special concern here, however, are the divergent time trends in the two countries. In Argentina, there is a clear increase over time in the degree of inequality, as the Gini coefficient rises from .34 in 1974 to .45 in 1988. This increase is very substantial relative to deteriorations recorded in other countries. A simple experiment reveals its magnitude.[4] If in 1974 a lump-sum tax equal to 21.6% of the Argentina per capita income had been levied on all individuals earning below the median -equal to almost twice as great a percentage of that group's income- and redistributed to those above the median, the equivalent 1988 inequality would have resulted. A significant rise occurs between 1976 and 1978, and again between 1985 and 1988.

For Brazil, the results exhibit no trend, but rather a cyclical variation over the period. Inequality declines from 1976 through 1981 and then rises steadily almost to replicate its initial value in 1985. As Figures 1 and 2 graphically reveal, there is an inverse conformity to income per capita in this variation. As income growth continued at the end of the 1970's inequality began to decline, and as income per capita actually fell from its 1980 peak, deterioration of the distribution likewise occurred. Recovery after 1983 was associated with resumed improvement in a Theil measure of inequality in 1984, but not with the Gini coefficient.

Note that the Brazilian pattern of changing inequality rejects a dominant role for wage policy between 1979 and 1983 as an important leveler. During that interval, indexation was integral for groups earning up to three times the minimum wage, but only partial for higher wages. In principle, such a disparity would have produced greater equality. It is clear from these data that other sources of relative income changes dominated this policy effect.

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[4]See Blackburn [1989] for a methodological description of the experiment.

The Argentine income per capita series is marked by its trend decline over this period. But this does not translate into a comparable negative association with inequality, despite the consistency of the aggregate direction of change. From 1978 to 1983, inequality is relatively stationary while the income decline is at its greatest; and the sharp decline in 1985 corresponds to the brief income spurt associated with the initial success of the Austral Plan.

This difference in the patterns in the two countries provides us with our basic question: why? What processes were at work to produce such a large increase in inequality in Argentina while in Brazil there was evidence of improvement during the first part of the period followed by later decline? Note, moreover, that later data for Brazil, extending to 1989 show a new pattern of decline, associated with renewed income stagnation, after 1986.[5]

2. DECOMPOSITION ANALYSIS

An important step towards a better understanding of the socio-economic mechanisms responsible for the changes in the income distribution is the decomposition analysis. This technique allows one to separate two principal sources of variation in measured inequality, income and allocation changes. For the class of additively decomposable inequality measures, as shown by Shorrocks(1980), it is possible to break down the change in inequality between two points of time according to whether it can be attributed to modifications in the socioeconomic groups relative incomes, relative group sizes or in their internal inequalities.

The inequality indices of this class can be written as:

$$I = I(\alpha_g, \beta_g, Ig)$$

[5]See Bonelli and Sedlacek [1991], as well as Ramos and Trindade (1991).

where α_g is the ratio between the average income of ggroup g and the average income of the whole population, β_g is the proportion of the population in group g, and I_g is the internal dispersion of incomes in group g. In this context, the composition or allocation effect[6] corresponds to the variation induced in the inequality index I by modifications in the allocation of the population among the groups (changes in the βs), with no direct changes in the group relative incomes (αs).[7] The income effect corresponds to the changes in I induced by changes in group incomes (αs), without changing the group population shares (βs), and the internal effect is the change in the inequality caused only by modifications in the dispersions at group level (the I_gs).

Therefore, in order to allow a Kuznetian characterization of the changes in the income distribution,[8] the composition effect should be of considerable magnitude and more important than the income effect. When the reverse takes place, i.e, when the income effect outplays the allocational changes, then the reasons for the alterations in the distribution should be related to the suplly and demand for the particular profiles under study. Finally, if neither of them happen to be of considerable significance, one can say that the explanation for the changes in inequality is not related to that particular stratification of the population.

There are three indices, among the most commonly used, that belong to this class: the coefficient of variation and the first and second Theil's measures of

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[6]The difference between this and what Knight and Sabot (1983) call the "compression" effect is that in the present exercise we are including the indirect change induced in I through the variation in the weights of the I_gs.

[7]Of course the individuals αs change as the βs change, since the overall average income is altered. Nevertheless, given that the relative group average incomes remain the same, this indirect impact is also computed in the composition effects (see Appendix 2).

[8]The Kuznets inverted U-curve of inequality as income rises was attributed by him to the shift from low income rural activity to higher income urban industry and services. In an initial phase, the increased heterogeneity of the labor force would lead to increase in measured inequality, while in the second phase, there would be increased homogeneity as more and more of the labor force moved to the secondary and tertiary sectors.

inequality - the Theil T and Theil L, respectively. In this essay we have chosen to use a decomposition of the Theil T:[9] the coefficient of variation was discarded for not satisfying the principle of composite transfers established by Shorrocks and Foster (1985)[10], and the preference over the Theil L was mainly due to its its wider use in the literature.

The decomposition was performed according to the following expression, whose analytical derivation is shown in Appendix 2.

$$dT = \sum_{g=1}^{G} \alpha_g (\ln \alpha_g + T_g - T - 1)\, d\beta_g + \sum_{g=1}^{G} \beta_g (\ln \alpha_g + T_g - T)\, d\alpha_g + \sum_{g=1}^{G} \alpha_g \beta_g \qquad (1)$$

Then the gross contribution of a variable can be defined as the sum of the income and allocation effects corresponding to the decomposition according to that variable taken alone. On the other hand, the marginal contribution of a variable is the additional contribution to the explanation of the variations in inequality when that variable is added to a model already containing other variables.

We decompose inequality changes here into the following potential explanatory personal characteristics: education, position in occupation, and sector, in the case of Argentina, and the same three variables with the addition of age in the case of Brazil.[11] These are the principal available variables that in other studies have successfully captured the variation in individual income levels, and here too explain much of the variance.

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[9]Most of the times in the text we will refer to it simply as Theil index.

[10]See Ramos [1990].

[11]The number of variables that could be used in the decomposition in the case of Argentina was limited due to the relatively smaller number of observations. The choice of the variables was done on the basis of the importance of their gross contributions. See Appendix 1 for a description of categories used in the decomposition.

When applied to observed changes in inequality in the two countries, a very similar result obtains. For all characteristics and periods, the variations in the distribution turn out to be dominated by relative income effects. In the case of Argentina, two-thirds of the observed rise in inequality derive from differential earnings[12]; in the case of Brazil, a narrowing of relative incomes explains almost half of the improvement from 1977 to 1981, and just above half of the deterioration in 1981-85. Indeed, in the case of Brazil, not only is the composition effect close to zero, but actually negative: in a Kuznets framework, one was beyond the turning point.

Secondly, it is the variation in the returns to education in both countries that is more related to measured changes in inequality, particularly in the case of Argentina where it alone explains more than half of the measured changes. Sector of activity turns out to be much less important, reflecting the relative stability of the observed intersectoral wage differentials.

The variable position in occupation is important in the Brazilian case, rivalring with education in both subperiods, but not for Argentina, where its gross and marginal contributions are small and negative in the second subperiod, despite somewhat high values in the first. This variable differentiates between employers, employees, and those who are self-employed. It may be regarded as a partial proxy for wealth and family status, capturing both changes in the functional distribution and additional elements not represented by education. Thus, in the case of Brazil, its behavior can be related to a process of capital deepening at the end of the 1970s, which came to an end in the beginning of the 1980s during the period structural adjustment that greatly squeezed real wages. For Argentina, its relative importance in the 1974/80 period may be asociated to the deterioration in the functional distribution of income that took place as a consequence of the institutional transformations resulting from the 1976 military coup (Orsatti [1983]).

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[12]This is consistent with the findings of CEPAL's [1986] study of the changes in the distribution between 1974 and 1983.

3. RETURNS TO EDUCATION

The decomposition analysis has shown the central role played by changing relative incomes with respect to education, in accounting for the changes in income inequality. Thus, we now turn our attention to educational differentials and examine the time pattern of returns to different levels of education in the two countries.

Tables 5 and 6 show the principal parameters determining the changes in the distribution by level of education. Individuals have been categorized in similar groups in the two countries. The group with elementary education in Brazil includes individuals with one to four years of schooling, and thus corresponds to the group with less than primary education in Argentina.[13] The percentage of illiterates in the Argentine case was negligible.

Even though both countries present signs of educational expansion (for example, the percentage of individuals with university education doubled in Argentina and increased by almost 50% in Brazil), the allocation effect was not important in explaining the changes in inequality.

In the case of Argentina we find an upward trend in educational income differentials. For example, while in 1974, on average, individuals with university education earned 2.9 times the income of individuals with less than primary education, in 1980 they earned 3.4 times, and in 1988 3.9 times. In the case of Brazil, table 6 shows some evidence of a cyclical behavior of differentials. For example, individuals with university education earned 8.2 times the income of illiterates in 1977, 7.3 times in 1981, and 7.9 times in 1985.

Ramos (1990) used three synthetic measures to summarize the changes related to education: m^t, that represents the average level of schooling of the labor

[13]Those who have completed their primary education have at least seven years of schooling.

force,[14] i^t, which corresponds to the degree of inequality in the distribution of education,[15] and s^t, that summarizes the variations in the income ratios associated with education.[16]

The results for Brazil and Argentina are shown in Table 7. The figures in there just confirm the steady improvements in the mean level of education in both countries, adding up to an increase of 14% in Argentina in a span of 14 years, and to the same 14% in Brazil in a span of 8 years (we cannot compare the absolute levels of the index m_t for the two countries, as they are on differente 'scales"). What is very surprising is that the inequality of education deteriorates in all periods for Argentina, and in the first one in the case of Brazil.[17] This findind highlights the fact that an improvement of the educational level does not necessarily translate into a better distribution of schooling, at least up to a point (the Kuznets' turning point, as a matter of fact). It also helps to explain the nature of the composition effect: always positive in the case of Argentina, whereas small and even negative for Brazil.

The behavior of the income profiles related to education, as indicated by s^t, also points to a continuous deterioration in Argentina and a U-pattern in

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[14] $m^t = \Sigma_i \alpha^*_i \beta^t_i$, where α^*_i represents the standardized income of the educational category i in the base year. For Brazil the year chosen as the basis was 1981 and, accordingly, we have: $\alpha^*_1 = 0.137$, $\alpha^*_2 = 0.217$, $\alpha^*_3 = 0.273$, $\alpha^*_4 = 0.423$ and $\alpha^*_5 = 1.0$. For Argentina the basis year is 1980, leading to: $\alpha^*_1 = 0.137$, $\alpha^*_2 = 0.217$, $\alpha^*_3 = 0.273$, $\alpha^*_4 = 1.0$.

[15] $i^t = (1/m^t).\Sigma_i \alpha^*_i \beta^t_i \log(\alpha^*_i) - \log(m^t)$, that corresponds to the Theil T index that would prevail in a population with no inequality within the educational groups, and where the group incomes were proportional to the group average incomes in the basis year.

[16] $s^t = (1/\Sigma_i \alpha^t_i \beta^*_i)\ \Sigma_i \alpha^t_i \beta^*_i \log(\alpha^t_i) - \log(\Sigma_i \alpha^t_i \beta^*_i)$, which can be understood as an indicator of the relative steepness of the income profiles related to education. If one fixes the the fraction of the labor force in each educational group, it follows that the steeper the income profile the larger the between group inequality (as before, the ßs were also fixed for 1980 and 1981).

[17] In spite of this continuous deterioration, education is still much better distributed in Argentina than in Brazil.

Brazil. Given that the income distribution displayed this very same evolution, the income effects associated to schooling are, accordingly, always positive.[18] In both countries the changes were much more pronounced in s^2 than in i^2, what lends additional support to a more cautious investigation of the evolution of the schooling income differentials.

A. Estimating Income Differentials.

This evidence on relative incomes for different educational classes confirms patterns first found in overall income inequality: a trend toward higher inequality in Argentina, and cyclical behavior in the case of Brazil. In order to explore these different patterns we have estimated income differentials associated with education, controlling for a number of additional variables.

A concise way of estimating the returns to schooling is by using conventional earnings equations based on the human capital paradigm, with controls for other characteristics that might influence the differentials.[19] This approach allows one to disentangle the association between individual earnings and levels of education from the joint influence of other variables on earnings. It can be summarized by the relation $Y = f(S,Z)$, $dY/dS > 0$, where Y represents labor income, S is the number of years of schooling, and Z is a set of control variables.

There are three points that one needs to pay attention to in order to estimate the earnings differentials associated to schooling in this framework.

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[18]It is worth noticing that steeper income profiles, higher inequality in the distribution of education, and the overall explanatory power of education are the key factors to understand why the income distribution is much worse in Brazil than in Argentina.

[19]We are deliberately ignoring all the debate about the pertinence of this paradigma, as this discussion is not within the scope of the paper. It should be stressed, however, that despite all the disagreement on the specific role education plays in the formation of earnings, no scholl of thought denies its major importance in that process.

First, we have to consider the question of causality. We are interested in measuring the change in an individual's earnings if she, and only she, where to increase her education from, say, the level s to s+1. This differential cannot be directly measured, as it envolves the difference between an observed variable (the wage she actually gets) and an unobserved one (the wage she would receive if she were more educated). The usual way out is to assume that the wage she would obtain under these circumstances is just the average wage of individuals that in fact are in the s+1 educational level, and are otherwise identical to her (i.e., display the same set of characteristics depicted by Z). Therefore, under this assumption, the observed differentials would correspond to the actual changes induced by marginal improvements in education.[20]

Of course the adequacy of this assumption depends on the "homogeneity" of the groups formed by the set of variables Z. The second point relevant for the estimation of returns to education, hence, concerns the choice of Z. According to the human capital theory, some of the variables in Z should be experience, ability, and family background, among others. Unfortunately these variables are not easily observable, and there is no consensus that they exhaust the set of income determinants. Therefore, the design of Z is somewhat arbitrary in the literature. The control variables used in this essay, for both countries, were age, sector of activity, and position in occupation. Additionaly, we used gender, in the case of Argentina, and geographic region, in the case of Brazil.[21]

Finally, there is also the question of the most adequate functional form for f(S,Z). There is a wide range of possibilities here, most of them of an ad hoc nature. Again, we followed this tendency and opted for the following specification:

$$\log Y_t = a_t + b_{ijt} X_t + u_t$$

[20]See Barros and Ramos [1991] for a formal discussion of this issue.

[21]The Argentine data did not allow the use of geographical regions. The size of the Brazilian data set permitted us to concentrated the analysis on males only, therefore avoiding the question of gender differences in the labor market attachment.

where:

Y_t : vector of individual earnings in year t;

a_t : logarithm of the mean income of the reference group in year t;

b_{ijt} : wage differential associated to the ith group of variable j for year t;

X_t : matrix of explanatory variables (S,Z) for year t;

u_t : vector of residual terms for year t, $E[u_t] = 0$ and $E[u_t u_t'] = \sigma^2 I$.

Tables 8 and 9 present the estimates of the differentials associated with education for Argentina and Brazil respectively. The coefficients in the regression are converted to indices. The reference group is individuals with less than primary education in the case of Argentina and individuals with elementary education in the case of Brazil.[22]

The results in table 8 show that, in Argentina, income differentials for individuals with high-school and university education followed an upward trend during this period. Their income differentials increased from 1974 to 1980, were relatively stable between 1980 and 1985, and increased again from 1985 to 1988. In contrast to those for better educated individuals, income differentials for individuals with primary education did not follow any clear pattern throughout this period.[23]

In the case of Brazil individuals with intermediate, high-school and university education experienced decreases in their income differentials prior

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[22] The nature of the two data sets, and the characteristics of the educational composition of the labor force in the two countries, did not allow adopting exactly the same specification. However, as indicated above, these two groups are roughly similar.

[23] When the null hypothesis $\beta_{74}=\beta_{80}=\beta_{85}=\beta_{88}$ (where β is the coefficient multiplying the variable education in the earnings equation) was tested for individuals with university and high-school education, the p-values were lower than 0.1%. The p-value in the case of individuals with primary education was 79.86%.

to 1981, and increases since then. Income differentials for the group of illiterates followed a somewhat erratic pattern.[24]

As we had anticipated from the decomposition analysis, in both countries the patterns of change in returns to different levels of educational achievement appeared to mimic those in overall income inequality, as measured in tables 1 and 2. In the case of Argentina the two periods in which the income inequality increased significantly were periods in which returns to education also experienced significant increases. In the case of Brazil, the same cyclical variation found in income inequality is seen in returns to education.

B. Explaining the Different Patterns in Returns to Education.

The Brazilian data reviewed so far, suggests that educational income differentials (and income inequality) vary counter-cyclically. One pertinent hypothesis is related to the effects of short run fluctuations in the level of output and real income on the operation of labor markets. The literature on labor "hoarding"[25] suggests that wage differentials between skilled and non-skilled labor tend to increase during economic slumps, and to narrow in the upper part of the business cycle. Accordingly, the distribution of earnings within the active labor force would exhibit a cyclical behavior, improving during periods of excess demand and worsening in times of excess supply.

When labor is regarded as not a fully variable factor of production but as quasi-fixed (meaning that part of its total employment costs are fixed as a result of hiring and training costs), the amount of labor input to be used is no longer determined exclusively on the basis of the current relation between wages

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[24]When the null hypothesis ($\beta_{74}=\beta_{80}=\beta_{85}=\beta_{88}$) was tested for individuals with university and high-school education, the p-values were lower than 0.1%, while for individuals with intermediate education it was 1.5%. The p-value in the case of illiterates was 24%.

[25]See Oi [1962], Okun [1981], Coleman [1984], and Fay and Medoff [1985], among others.

and marginal value product, but also on the basis of their expected future values. In the short run, the hiring and training costs are perceived as sunk costs. Thus, labor demand and wages for factors with relatively high degrees of fixity become less cyclical than those for factors with low degrees of fixity. More qualified workers (better educated workers) tend to embody higher levels of training costs. Accordingly, one of the main predictions of the labor hoarding hypothesis is that wage distributions will display a cyclical behavior, with differentials shrinking during booms and expanding during recessions.

In the case of Brazil, the economic slowdown that started in the early 1980's came after a period of strong and sustained growth. Expectations were that the economy would go through a brief period of adjustment after which growth would resume. Thus, consistently with the labor hoarding hypothesis, it was less skilled (less educated) workers that experienced most of the adjustment in employment and wages, leading to increased income differentials and income inequality.

In contrast to Brazil, which in this period experienced traditional business cycles, Argentina experienced an almost constant decline in economic activity during period under analysis. The economic slowdown associated with the debt crisis and the international recession of the early 1980's came after a period of stagnation rather than one of sustained growth. In such an environment labor hoarding, as a response to short run and temporary fluctuations in output no longer is an attractive alternative to firms.[26]

In an environment of economic stagnation/decline, institutional factors seem to play a more important role in influencing income differentials than in the context of a growing economy. Faced with changes in aggregate demand which do not seem to be of a transitory nature, as well as with uncertain future inflation rates, firms tend to regard the official wage policy as the main (and probably best) signal indicating the future evolution of wages. As a result,

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[26]The same reasoning should apply for the rest of eighties in Brazil, as the economic slump ceased to be perceived as short lasting. See Ramos and Trindade [1991] for some preliminary evidence on this.

policies of wage restraint, exemplified by reductions in the real value of "Salarios Basicos",[27] are generally emulated by employers in the private sector, particularly in the case of blue-collar, production workers.

The absence of economic dynamism, like the one found in Brazil throughout the 1970's, further expanded the lack of competition in the labor market in the Argentine case. The Argentine state became a central player in the distributive conflict as the wage policies it followed became an important source of change in the size distribution of income.

C. Testing Alternative Hypotheses.

We will use the non-parametric "sign" test in order to assess the explanatory power of the two hypotheses discussed above.[28] The existence of a cyclical relationship between income differentials and economic performance in the short run will be assessed testing the null hypothesis that differentials are independent of a measure of the business cycle, against the alternative that there is a negative association between them. The existence of a relationship between income differentials and the direction of the official wage policy will be assessed testing the null hypothesis that differentials are independent of changes in the minimum wage/basic wage.

Tables 10 and 11, evaluate the existence of a counter-cyclical behavior in income differentials. For the case of Brazil a measure of potential income was used. In the Argentina case no such a measure was available, and thus we used the unemployment rate, a reasonably accurate measure of activity, instead.

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[27]The "salarios basicos de convenio" are supposed to be determined by collective bargaining, for different occupations by industry. In fact, during most of the period under consideration there was no collective bargaining, and thus basic wages were adjusted on a regular basis by the government.

[28]These tests relate the direction (the "sign") of the changes in income differentials, rather than their magnitudes, to the sign of a measure of the state of the business cycle and to the direction of the changes in minimum wages.

The hypothesis of cyclical differentials performs very well for Brazil. For individuals with high-school and university education, the sign of the cyclical component of output was different from the sign of the variation in the differential in seven out of eight years. Accordingly, the associated p-value for the test is 0.035, meaning that the null hypothesis of independence between short run economic performance and the relative income of workers with higher levels of education can be rejected in favor of the hypothesis stressing a counter-cyclical pattern. The null hypothesis cannot be rejected in the case of individuals with intermediate schooling (p-value 0.145) as well as in the case of illiterates (p-value 0.965). This conforms to expectations, given an association of skill and educational level.

The hypothesis of counter-cyclical income differentials does not perform well in the case of Argentina. The p-values corresponding to the null hypothesis of no relationship between the cycle and income differentials were 0.073 for individuals with university education, 0.1938 for those with complete high-school, and 0.613 for those with primary education. The null hypothesis of independence cannot be rejected.

Tables 12 and 13 evaluate the existence of a negative relationship between the direction of the official wage policy and the change in returns to education. This hypothesis performs very well for Argentina. For individuals with hig school and university education, the sign of the change in basic wages was different from the sign of the variation in the differential in ten and eleven out of twelve years respectively. Accordingly, the associated p-values for the tests are 0.003 and 0.019. The null hypothesis of independence between the direction of the official wage policy and the relative income of workers with higher levels of education can be easily rejected. The same relationship is not found in the case of individuals with primary education, for whom the p-value is 0.194. This should not be a surprise given that the changes in that group's income differentials were found to be insignificant.[29]

[29]See footnote 12.

The same hypothesis was tested for Brazil with negative results. The null hypothesis that there is no relationship between changes in the minimum wage and returns to education cannot be rejected. The p-values are 0.637 for individuals with high-school and university education, 0.363 for those with intermediate schooling, and 0.856 for illiterates.

The evidence just reviewed confirms our previous finding that returns to education have behaved differently in the two countries. Income differentials associated with education appear to move counter-cyclically in Brazil, while no clear presence of such a pattern could be found for Argentina. The same evidence suggests that official wage policies in Argentina may have had an important effect on differentials, while no similar pattern is present in the Brazilian data.

4. CONCLUSIONS.

In this essay we have examined the changes that have taken place in the size distribution of income in Argentina and Brazil since the mid 1970's. The economic performance of the two countries, throughout the periods we analyzed, have been of a quite different nature. In the beginning of the 1980's, when the international debt crisis started, Argentina was already going through a process of economic stagnation while Brazil was the country where the growth rate had been the highest and steadiest in the region.

Our research has shown that the changes that took place in the Brazilian size distribution of income, most notably the reduction in returns to education until 1981 and their posterior increase, were partially associated with the fluctuations in the levels of economic activity. Thus, income inequality fell during the period of growth, and later increased as a result of the economic slowdown of the early 1980's.

In the case of Argentina, we have found that the 1980's show evidence of a continuous deterioration in the size distribution of income which started in

the 1970's, before the beginning of the international debt crisis. Our interpretation of the increased levels of inequality in the Argentine case focuses on the role played by official wage policies in the context of an economy that is experiencing an almost continuous process of decline.

We have found evidence to support the assertion that, in the Brazilian case, the macroeconomic shocks of the early 1980's and the policies they induced, were an important factor explaining the reversal of the improvements in the size distribution of income that took place in the second half of the 1970's. The deterioration in the Argentine size distribution precedes the macroeconomic crisis of the 1980's, although the latter probably deepened the original trend in income inequality.

This comparative analysis highlights the importance of studies which carefully assess the links between the economic decline of the 1980's and increased income inequality in other Latin American countries. It also indicates that both market forces and policy variables must be considered in any explanation.

TABLES AND FIGURES

Table 1:

BAMA: Distribution Among Economically Active Population

	Bottom 20%	Middle 40%	Middle High 30%	Top 10%	Gini	Theil	Theil Dec.
1974	6.8	29.0	37.4	26.8	0.344	0.221	0.190
1975	6.3	29.4	37.9	26.4	0.347	0.212	0.193
1976	7.0	27.9	37.9	27.2	0.352	0.211	0.199
1977	6.4	24.9	36.9	31.8	0.403	0.298	0.267
1978	5.6	23.9	36.7	34.0	0.434	0.352	0.312
1979	5.9	25.0	36.5	32.6	0.413	0.312	0.282
1980	6.2	24.9	37.1	31.8	0.405	0.295	0.269
1981	5.8	24.1	35.9	34.2	0.428	0.360	0.305
1982	6.0	26.0	36.2	31.8	0.402	0.311	0.265
1983	5.5	26.5	36.1	31.9	0.404	0.319	0.269
1985	6.3	25.7	36.6	31.4	0.398	0.307	0.259
1987	5.7	23.9	36.4	34.0	0.433	0.357	0.309
1988	4.9	23.3	37.2	34.6	0.452	0.382	0.335

Source: Fiszbein [1991].
Theil Dec: Theil index between deciles

Table 2:

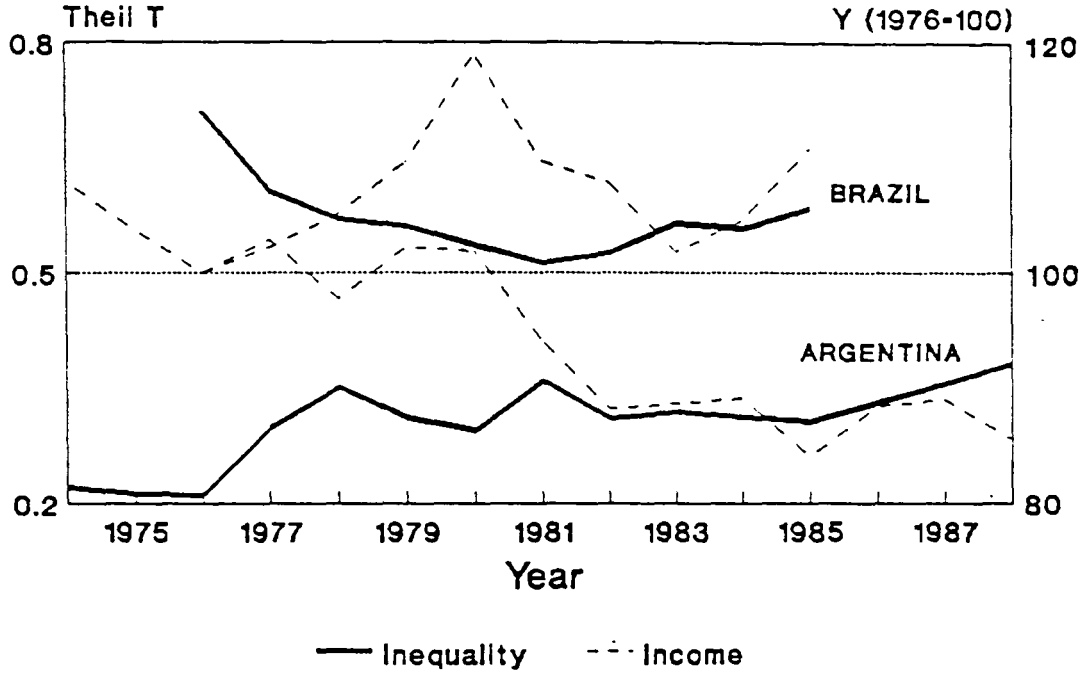
Brazil: Distribution Among Economically Active Urban Males

	Bottom 20%	Middle 40%	Middle High 30%	Top 10%	Gini	Theil	Theil Dec.
1976	3.8	17.0	32.5	46.7	0.564	0.709	0.559
1977	4.1	18.0	33.4	44.5	0.543	0.607	0.514
1978	4.2	18.5	34.0	43.3	0.531	0.571	0.490
1979	4.2	18.4	34.8	42.6	0.530	0.560	0.482
1981	4.3	19.4	34.9	41.4	0.514	0.513	0.453
1982	4.3	19.0	35.0	41.7	0.520	0.527	0.463
1983	4.0	18.1	35.5	42.4	0.534	0.565	0.486
1984	4.0	18.2	35.0	42.8	0.536	0.558	0.492
1985	3.8	17.6	35.1	43.5	0.545	0.584	0.509

Source: Ramos [1990]

Income Inequality and Income Per Capita

Argentina and Brazil



Source: Fiszbein (1991), Ramos (1990)

Table 3:

Argentina: Decomposition of changes in inequality

(% of total change)

		Income	Compos.	GC	MC*(2)	MC**(3)
1974/1980	EDUC	38.4	15.3	53.7	50.4	36.2
	POSIT	21.4	1.0	22.4	19.1	12.5
	SECTOR	4.5	3.0	7.5	---	-6.5
	EDUC + POSIT	59.5	13.3	72.8		
	EDUC + POSIT+ SECTOR	57.5	8.8	66.3		
1985/1988	EDUC	46.4	9.4	55.8	40.7	36.0
	POSIT	-1.7	2.6	0.9	---	-1.3
	SECTOR	25.2	1.2	26.4	11.3	12.2
	EDUC + SECTOR	59.6	7.5	67.1		
	EDUC + POSIT+ SECTOR	60.6	5.2	65.8		

EDUC: Education, POSIT: Position in Occupation.
GC: Gross contribution.
*MC(2) 74-80: Marginal contribution in the EDUC+POSIT model, the best performing 2-variable model.
MC(2) 85-88: Marginal contribution in the EDUC+SECTOR model, the best performing 2-variable model.
**MC(3): Marginal contribution in the 3-variable model.

Table 4:
Brazil: Decomposition of changes in inequality

(% of total change)

		Income	Compos.	GC	MC (3)	MC (4)
1977/ 1981	AGE	6.0	1.2	7.2	7.4	7.4
	EDUC	13.2	-7.0	6.2	26.5	18.6
	POSIT	28.6	-4.4	24.2	25.5	17.8
	SECTOR	-7.1	8.2	1.1	---	1.7
	AGE+ EDUC+ POSIT	56.6	-10.2	46.4		
	AGE+ EDUC+ POSIT+ SECTOR	48.5	-0.3	48.2		
1981/ 1985	AGE	20.0	-2.9	17.1	4.0	0.3
	EDUC	16.6	3.9	20.5	21.0	13.4
	POSIT	21.8	-0.3	21.5	21.8	16.2
	SECTOR	2.0	3.4	5.4	---	-1.7
	AGE+ EDUC+ POSIT	57.7	-3.7	54.0		
	AGE+ EDUC+ POSIT+ SECTOR	53.8	-1.5	52.3		

EDUC: Education, POSIT: Position in Occupation.
GC: Gross contribution.
MC(3): Marginal contribution in the AGE+EDUC+POSIT model.
MC(4): Marginal contribution in the 4-variable model.

Table 5:

BAMA: Distribution by level of education

(Last level completed)

		Less than Primary	Primary	Secondary	University
	ß	0.253	0.514	0.184	0.049
1974	α	0.729	0.947	1.226	2.094
	T_g	0.157	0.177	0.147	0.342
	ß	0.193	0.528	0.210	0.070
1980	α	0.666	0.839	1.280	2.301
	T_g	0.186	0.214	0.243	0.257
	ß	0.157	0.521	0.231	0.091
1985	α	0.631	0.830	1.240	1.977
	T_g	0.182	0.198	0.256	0.397
	ß	0.127	0.518	0.249	0.106
1988	α	0.545	0.759	1.254	2.122
	T_g	0.190	0.260	0.299	0.348

α: group's mean income relative to population's
ß: group's population share
T_g: Theil index for the group

Table 6:

Brazil: Distribution by level of education

		Illiterates	Elementary	Intermediate	High School	University
	ß	0.132	0.455	0.229	0.108	0.076
1977	α	0.414	0.711	0.908	1.478	3.356
	T_g	0.35	0.43	0.44	0.48	0.35
	ß	0.120	0.423	0.232	0.138	0.087
1981	α	0.431	0.685	0.860	1.334	3.153
	T_g	0.30	0.31	0.36	0.39	0.29
	ß	0.109	0.372	0.258	0.163	0.098
1985	α	0.386	0.655	0.795	1.273	3.084
	T_g	0.30	0.40	0.43	0.42	0.33

α: group's mean income relative to population's
ß: group's population share
T_g: Theil index for the group

Table 7:

Education - Synthetic Indices for Brazil and Argentina

COUNTRY	YEAR	m^t	i^t	s^t
Argentina				
	1974	0.412	0.062	0.041
	1980	0.435	0.069	0.069
	1985	0.455	0.077	0.055
	1988	0.470	0.080	0.082
Brazil				
	1977	0.301	0.180	0.197
	1981	0.317	0.186	0.186
	1985	0.333	0.187	0.198

Source: Fiszbein [1991] and Ramos [1990]

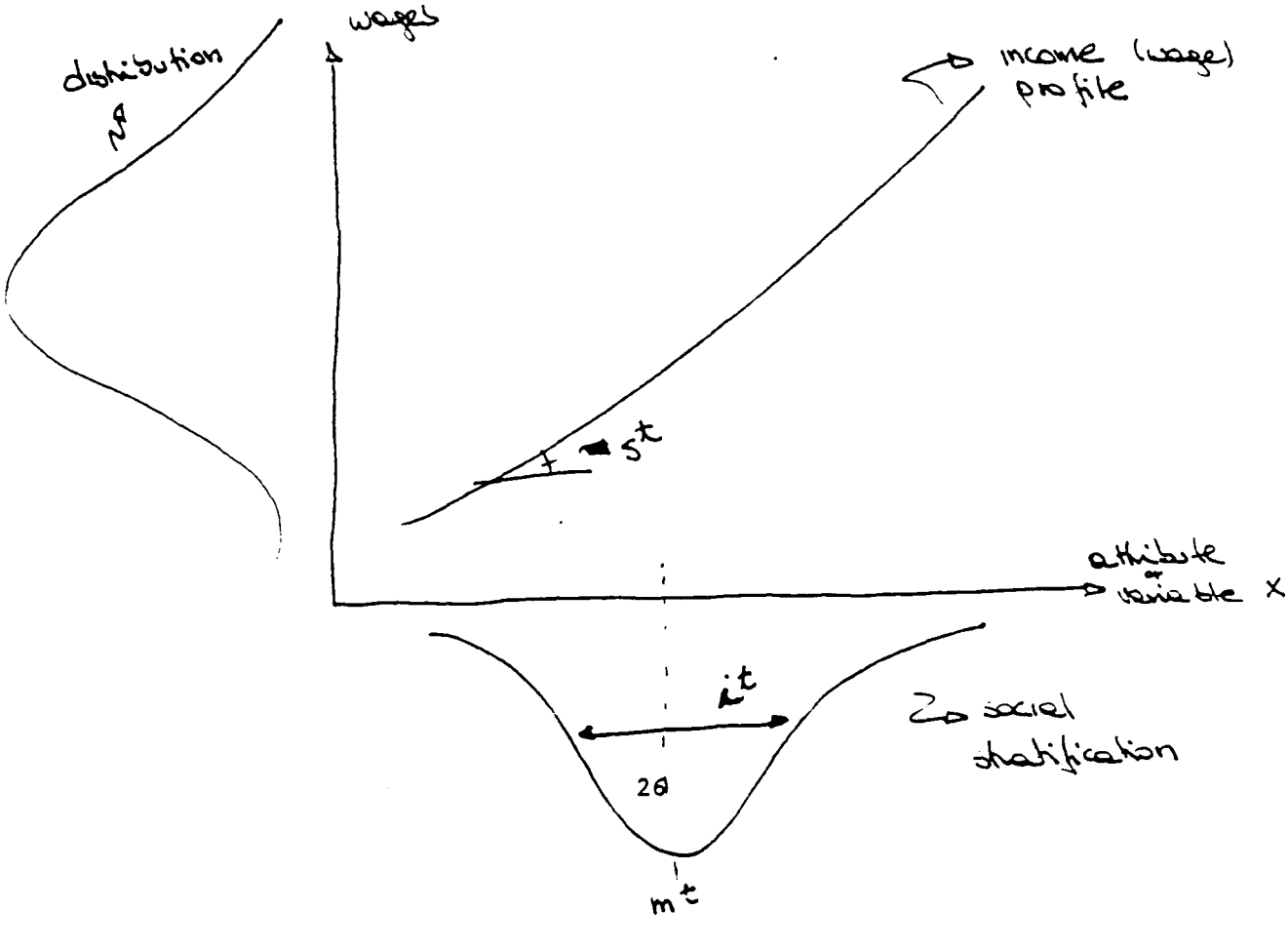


TABLE 8:
Estimated Income Differentials Associated with Education
(% over group with less than Primary Education)

	PRIMARY	SECONDARY	HIGHER
1974	27.6	78.7	144.7
1975	27.5	75.4	121.6
1976	20.8	72.0	147.9
1977	23.0	83.3	187.6
1978	29.8	103.6	233.2
1979	29.5	105.9	226.8
1980	25.5	97.0	199.6
1981	33.4	117.0	256.9
1982	26.8	87.7	155.5
1983	28.0	80.4	176.7
1985	26.2	91.2	183.7
1987	31.1	93.5	196.8
1988	29.7	113.3	220.8

Source: Fiszbein [1991]

TABLE 9:

Brazil: Estimated Income Differentials Associated with Education
(% over the group with elementary education)

	ILLITERATES	INTERMEDIATE	HIGH SCHOOL	UNIVERSITY
1976	-28.8	32.7	103.0	340.2
1977	-28.2	32.8	97.0	308.8
1978	-28.9	32.0	97.6	301.9
1979	-30.0	31.5	96.4	298.7
1981	-28.8	28.3	87.4	281.5
1983	-31.4	26.6	90.6	281.1
1984	-30.0	30.0	91.7	283.4
1985	-30.6	29.8	93.5	295.1

Source: Ramos [1990]

Table 10: Cyclical patterns: Argentina

YEAR	PRIMARY	HIGH SCHOOL	UNIVERSITY	UNEMPLOYMENT
1975	-	-	-	+
1976	-	-	+	-
1977	+	+	+	+
1978	+	+	+	+
1979	-	+	-	+
1980	-	-	-	+
1981	+	+	+	-
1982	-	-	-	+
1983	+	-	+	+
1985	-	+	+	-
1987	+	+	+	-
1988	-	+	+	-

Unemployment: (+) means the unemployment rate in BAMA was below the average for the period 1969-1988. Source: INDEC, several publications.

p-value 0.61 0.19 0.093

Table 11: Cyclical patterns: Brazil

YEAR	ILLIT-ERATES	INTER-MEDIATE	HIGH SCHOOL	UNIVERSITY	CYCLE
1977	+	+	-	-	+
1978	-	-	+	-	+
1979	-	-	-	-	+
1981	+	-	-	-	+
1982	-	+	+	+	-
1983	-	+	+	-	-
1984	-	+	+	+	-
1985	-	-	+	+	-

CYCLE: (+) means GNP is below its potential level (see Ramos [1990]).

p-value 0.97 0.15 0.035 0.035

Table 12:
Minimum wages and returns to education: Argentina

YEAR	PRIMARY	HIGH SCHOOL	UNIVERSITY	WAGES
1975	-	-	-	+
1976	-	-	+	-
1977	+	+	+	-
1978	+	+	+	-
1979	-	+	-	+
1980	-	-	-	+
1981	+	+	+	-
1982	-	-	-	+
1983	+	-	+	+
1985	-	+	+	-
1987	+	+	+	-
1988	-	+	+	-

Wages (+): Means an increase in real value of "Salarios Basicos de Convenio" (average). Source: INDEC, several publications.

p-value 0.194 0.029 0.003

Table 13:
Minimum wages and returns to education: Brazil

YEAR	ILLIT-ERATES	INTER-MEDIATE	HIGH SCHOOL	UNIVERSITY	WAGES
1977	+	+	-	-	+
1978	-	-	+	-	+
1979	-	-	-	-	-
1981	+	-	-	-	+
1982	-	+	+	+	+
1983	-	+	+	-	-
1984	-	+	+	+	-
1985	-	-	+	+	+

WAGES: (+) means real minimum wages increased. Source: elaborated from Ramos (1990)

p-value 0.86 0.36 0.64 0.64

APPENDIX 1

The Buenos Aires Household Survey is undertaken twice a year by the Argentine National Institute of Statistics and Census (INDEC). Buenos Aires represents approximately one half of the country's urban population. All the results in the paper were basen on the surveys corresponding to the months of October. Information on income was not available for 1984 and 1986.

The Brazilian householde surveys, called Pesquisas Nacionais por Amostra de Domicílios (PNADs), have been yearly conducted since the late sixties, with the exception of the census years. During this period the survey has passed through several changes, both in terms of geographical and informational range, but it has essentially kept its present form since 1976. Some conformation work has to be done at times, but the richness of its data for sure enables one to carry out consistent analysis of the Brazilian income distribution from then on.

For the purpose of the decomposition analysis, in the case of the Argentine data, individuals in the sample were grouped according to three characteristics: level of education, sector, and position in occupation. Four levels of education were considered: individuals that had not completed their primary education (which involves seven years of schooling), individuals that completed their primary education but not their secondary education (five additional years), individuals that completed their secondary education but not their tertiary education, and individuals with complete tertiary education. The three positions in occupation are: employer, employee, and self-employed. Seven sectors were considered: light manufacturing, heavy manufacturing, construction, trade and transportation, financial services, social services, and personal services. For the estimation of educational income differentials three additional variables were used: age (less than 24 years old, 25 to 34 years old, 35 to 44 years old, 45 to 54 years old, and 55 to 65 years old), gender, and hours worked per week.

In the case of Brazil, individuals were classified, both for the decomposition and the regression analysis, according to education, age, position in occupation, and region. Classification according to education involved five categories: illiterates (less than one year of schooling), elementary school (one to four years of schooling), intermediate school (five to eight years of schooling), high school (nine to eleven years of schooling), and college education (twelve or more years of schooling). Five age groups were considered: 18 to 24 years old, 25 to 34 years old, 35 to 44 years old, 45 to 54 years old, and 55 to 65 years old. Nine sectors of economic activity were considered: light manufacturing, heavy manufacturing, construction, trade, transportation, financial services, public administration, and agriculture. Finally, five regions were considered: south, southeast, north, northeast, and center.

Table A1:

Argentina: Basic Statistics by Variable

Will be ready soon.

Table A2:

Brazil: Basic Statistics by Variable

will be ready soon

APPENDIX 2

The Theil index of inequality (T) can be written in the following way:

$$T=\left(\frac{1}{N}\right)\sum_{i=1}^{N}\left(\frac{Y_i}{Y}\right)\ln\left(\frac{Y_i}{Y}\right) \tag{1}$$

where Y_i is the income of the i-th individual, Y is the average income, and N is the population size.

If the population is divided into G groups with n_g observations each, it is then possible to write T as:

$$T=\sum_{g=1}^{G}\left(\frac{n_g}{N}\right)\sum_{i=1}^{n_g}\left(\frac{Y_{ig}}{Y}\right)\ln\left(\frac{Y_{ig}}{Y}\right) \tag{2}$$

where Y_{ig} is the income of the i-th individual of the g-th population subgroup.

If we now define $\beta_g=n_g/N$ and $Z_g=Y_g/K$, where Y_g is the average income of the g-th group and K is a reference income, it is possible to show, after some algebraic manipulation, that T can be expressed as:

$$T=\left(\frac{1}{k}\right)\sum_{g=1}^{G}\beta_g Z_g\ln Z_g-\ln k+\left(\frac{1}{k}\right)\sum_{g=1}^{G}\beta_g Z_g T_g \tag{3}$$

where $k=\Sigma\beta_g Z_g$ and T_g is the Theil index for the g-th group. The first two terms on the right hand side of (3) correspond to the between group inequality, and the third one to the within group inequality.

Choosing the mean income as the reference income (we make $Z_g=\alpha_g=Y_g/Y$), expression (3) simplifies to:

$$T=\sum_{g=1}^{G}\alpha_g\beta_g\ln\alpha_g+\sum_{g=1}^{G}\alpha_g\beta_g T_g \tag{4}$$

The first term in (4) is said to be the between group inequality, and the second term the within group inequality.

Totally differentiationg (4) we have:

$$dT=\sum_{g=1}^{G}\frac{\partial T}{\partial\beta_g}d\beta_g+\sum_{g=1}^{G}\frac{\partial T}{\partial\alpha_g}d\alpha_g+\sum_{g=1}^{G}\frac{\partial T}{\partial T_g}dT_g \tag{5}$$

where the first term on the right hand side is the composition or allocation effect (changes in T caused exclusively by population shifts), the second term is the income effect (changes in T induced exclusively by changes in standardized mean incomes), and the third one is the internal effect (changes in T caused by changes in internal dispersion).

It can be shown that:

$$\frac{\partial T}{\partial\beta_g}=\alpha_g\ln\alpha_g-\alpha_g\sum_{g=1}^{G}\alpha_g\beta_g(1+\ln\alpha_g)+\alpha_g T_g-\alpha_g\sum_{g=1}^{G}\alpha_g\beta_g T_g \tag{6}$$

$$\frac{\partial T}{\partial \alpha_g} = \beta_g(1+\ln\alpha_g) - \beta_g \sum_{g=1}^{G} \alpha_g \beta_g (1+\ln\alpha_g) + \beta_g T_g - \beta_g \sum_{g=1}^{G} \alpha_g \beta_g T_g \tag{7}$$

$$\frac{\partial T}{\partial T_g} = \alpha_g \beta_g \tag{8}$$

Replacing (6), (7), and (8) into (4) and simplifying we obtain:

$$dT = \sum_{g=1}^{G} \alpha_g (\ln\alpha_g + T_g - T - 1)\, d\beta_g + \sum_{g=1}^{G} \beta_g (\ln\alpha_g + T_g - T)\, d\alpha_g + \sum_{g=1}^{G} \alpha_g \beta_g \tag{9}$$

where the three terms on the right hand side of (9) correspond to the allocation, income, and internal effects respectively.

For estimation purposes, equation (9) must be approximated. The convention used in the empirical exercises was to evaluate the expression at the middle points. In all cases, the error margin of the approximation was less than 1%.

APPENDIX 3

Table A3

Argentina: The Earnings Differentials

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Table A4

Brazil: The Earnings Differentials

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