The Impact of Regional Differences in Prices and Productivity on Wages in Brazil's Metropolitan Regions

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Nominal wage gaps between regions may simply reflect regional differences in price levels or amenities which are faced by workers.

They may also compensate for different costs of production across regions. This article analyzes these issues to show that the regional differences in wages across Brazil's metropolitan regions are probably not a mere reflection of price differences, and that opportunities for arbitrage are still apparent on the supply side of the labor market. On the other hand, it provides evidence that nominal wage differences do compensate for variation in complementary factors and productivity.

Direct Price Comparisons

The existence of differences in price levels is perhaps the most common explanation given for regional wage differentials, especially in a country as large and diverse as Brazil. It is frequently argued that nominal wage differences merely reflect regional variations in the cost of living.\2

This is a more complicated claim than it appears because local variation in price formation is also affected by local factor prices, including labor. This generates a chicken-or-egg problem which is difficult to resolve. Essentially, nominal wage differences can exactly reflect cost of living differences only under rigid conditions of isolated markets with comparable differentials in returns to other factors, or coincidences by which other factors compensate for the nominal variation in wages.

Direct price comparisons across regions in Brazil are extremely difficult because of the wide variation in consumption baskets. In fact, a worker's nominal wage should ideally be deflated by an index of the cost of living faced by that particular worker in his or her region, relative to the cost of living that would be faced by the same worker if relocated to another region, adjusting for the choices that the worker would make in purchases based on a new set of relative prices. To determine a unique index for comparing price levels is, however, impossible, since the choices of base weights for comparison-- whether a particular region or a national average--are many. The choice of base weights is likely to yield widely differing estimates of relative prices, especially in a country like Brazil with high and erratic rates of inflation. Two studies which have tried to measure price level differences between regions may be found in Thomas (1982) and Rocha (1988, 1989). Table 1 shows real wage differentials by applying these indices to nominal wage differences across metropolitan regions as estimated in another study.\3

The Thomas index reported here was based on an average national food basket and expanded to incorporate non-food items by using Engels' elasticities for people at the 40th percentile in the distribution of income. It shows São Paulo and Rio de Janeiro to be the most expensive areas, while Fortaleza and Recife are the least expensive (See Table 1). Thomas used national household survey data (ENDEF) from 1974/75 to calculate this index.

Table 1
Adjustments for Differences in Cost of Living

Metropolitan Region	Controlled Nominal Wage Differentials				
	1976	1981	1983	1985	1986
Belém	-51.6%	-30.6%	-22.0%	-10.0%	-22.8%
Fortaleza	-52.5%	-33.6%	-29.1%	-23.7%	-26.5%
Recife	-39.9%	-28.5%	-24.0%	-24.6%	-35.1%
Salvador	-20.2%	-7.9%	-2.7%	-5.9%	-14.7%
Belo Horizonte	-0.5%	-2.5%	-8.4%	-6.7%	-4.9%
Rio de Janeiro	-10.7%	-8.2%	-10.9%	-14.7%	-17.1%
São Paulo	22.4%	16.0%	16.6%	17.1%	22.6%
Curitiba	-1.6%	-4.8%	-1.0%	-0.8%	0.6%
Porto Alegre	-8.0%	-3.0%	-2.6%	0.8%	-3.5%
Std. Dev.	24.0%	15.4%	13.3%	12.2%	16.2%
	Price Variation Across Regions				
Belém	-2.3%	7.9%	12.6%	10.1%	30.8%
Fortaleza	-23.8%	1.4%	-14.1%	-21.2%	-21.8%
Recife	-17.8%	3.3%	-8.4%	-6.0%	-13.2%
Salvador	-3.8%	8.1%	-3.3%	-2.1%	5.6%
Belo Horizonte	-6.0%	-10.1%	-6.2%	-3.9%	-6.4%
Rio de Janeiro	22.1%	-1.1%	4.2%	12.8%	-0.4%
São Paulo	32.5%	16.1%	27.0%	20.8%	24.5%
Curitiba	-7.5%	-26.7%	-17.4%	-18.7%	-22.0%
Porto Alegre	6.6%	1.2%	5.7%	8.2%	3.1%
Std. Dev.	16.9%	11.6%	13.2%	13.4%	17.5%
	Real Wage Differences Across Regions				
Belém	-31.2%	-27.0%	-25.3%	-12.5%	-42.3%
Fortaleza	-10.7%	-23.6%	-5.6%	5.1%	6.6%
Recife	-4.0%	-20.4%	-6.3%	-11.0%	-10.7%
Salvador	1.7%	-4.6%	9.9%	3.8%	-9.0%
Belo Horizonte	23.6%	19.1%	7.1%	4.8%	12.8%
Rio de Janeiro	-14.7%	4.3%	-5.8%	-19.9%	-5.4%
São Paulo	8.0%	11.4%	-1.0%	3.9%	9.4%
Curitiba	24.0%	33.4%	25.7%	25.5%	33.9%
Porto Alegre	3.5%	7.3%	1.1%	0.2%	4.7%
Std. Dev.	16.8%	19.4%	13.2%	12.5%	19.6%

Sources: See text. Rocha indices used for all years except
          1977 for which the Thomas index was used.

The measured price variation can account for some of
the nominal wage differences in 1976. Even after accounting for
price level differences, however, the resulting real wage
differences remain large and significant. The real wage level is

closer to the sample mean than the nominal wage difference in six of the nine metropolitan areas, the exceptions being Belo Horizonte, Rio de Janeiro, and Curitiba. The ranking of the nine cities is the same with the exception of Belo Horizonte and Curitiba. Exceptionally low price levels and moderate nominal wage levels yield a real wage level for these two cities which are substantially above the sample mean. In Salvador and Porto Alegre, by contrast the real wage adjustment brings the wage level to the sample mean--i.e. the nominal wage levels in those regions can be largely attributed to price differences.

Overall the real wage levels continue to diverge significantly from the mean. Real wages in Belém are still 31% below the mean. Real wage levels in Fortaleza, Recife, and Rio de Janeiro remain some 4% to 15% below the mean. The wage level in São Paulo remains above the sample mean, if only by 8%. The dispersion of estimated real wages as a summary measure of the divergence of real wages from the sample mean remains significant with a standard deviation of about 17%, but may be largely driven by the dramatically higher than average real wage levels in Belo Horizonte and Curitiba.

Rocha's studies also use the ENDEF data to provide base weights for the indices. These studies differ from Thomas, however, in two ways. First, Rocha uses region-specific basket weights for the 20th percentile of family income to construct a region-specific poverty line. Her index is a measure of cost of living held constant by a caloric intake level which can be thought of as a proxy for constant utility. This index yields a price structure which is highly comparable to Thomas' price structure in some years (1985), and less so in others. Secondly, Rocha utilized yearly average food prices as collected by IBGE to construct the indices for later years.

Rocha's index also shows that price level differences are not capable of accounting fully for the nominal wage differentials. The real wage level in São Paulo appears to be

high in 1981 and 1986, with real wage levels 9% and 11% above the sample mean. The estimates for 1983 and 1985, however, show the real wage level falling close to the sample mean. Recife and Rio de Janeiro have real wage levels which are quite low, as much as 11% and 20% below the mean in 1985, respectively. Using Rocha's index, Belo Horizonte does not have the dramatically high real wage level that resulted from the Thomas price comparison. Nevertheless, it does range consistently above the sample mean and close to or above São Paulo. The Rocha index also places Curitiba as the highest real wage area, with real wages some 25% to 30% above the mean. In 1985 and 1986, Fortaleza also comes out quite high, with real wage levels between 5% and 6%.

The ranking of real wage differentials, then, may differ from the nominal wage differentials in important ways. Workers in Fortaleza, Curitiba, and Belo Horizonte may earn substantially more in real terms than was apparent from the nominal wage estimates. On the other hand, the higher nominal wage level in São Paulo seems to overstate the advantage of workers in terms of their real earnings; the relatively low nominal earnings in Recife and Rio de Janeiro are not offset by lower than average price levels.

These estimates of real wage differences have two particular implications. First, they raise raises questions for studies which claim migration flows respond to income differentials. Areas which are typically considered to have low wages (in nominal terms) are expected to be sources of out-migration. After adjusting for price differences, however, some of these "low wage" areas may actually have high real earnings. The data above suggests that there is little reason to expect workers to move in substantial numbers out of Curitiba to São Paulo, yet the number of people moving in that direction is substantially larger than the reverse (my own tabulations showed that 151,410 residents of São Paulo in 1977 had moved there from the urban areas of Parana, including Curitiba, whereas only 35,373 residents of Curitiba had moved from urban areas of São

Paulo). Similarly it would be hard to explain substantial migration from Ceará (Fortaleza) to Rio.

The second implication concerns the expectation that nominal wage differentials are mere epiphenomena, i.e. that real wages are equal and the nominal wages differ due to pure price differences. Although price differences are significant across regions, they do not appear to be large enough to account fully for the nominal wage differences. Although the rankings of the metropolitan regions are changed by the price adjustment, the overall magnitude of regional differences is not that different. The standard deviation of nominal wage differences is neither reduced nor increased significantly by the price adjustment: in 1983, nominal dispersion was 13.3% while the real dispersion was marginally reduced to 12.6%; in 1986, nominal dispersion was 16.2% and real dispersion was 18.9%.

The greatest difficulty with these findings on real wage differentials is that they rely heavily on price indices which seem to vary quite significantly, and hence may involve significant stochastic variation or measurement errors. If nominal wages were mere reflections of price differentials, then the wage-price elasticity would be one. By regressing nominal wage differentials on the available price indices, it is possible to evaluate the degree of price index errors and estimate real wage variation under the hypothesis of unit wage-price elasticities.\4 This is done in Table 2 where the 1985 regional wage differentials were regressed on all of the available price indices as well as an unweighted average. The indices from other years were converted to 1985 by utilizing annual inflation indices (INPC and IGP) of the IBGE.\5

As is evident from the table, the hypothesis of unit elasticity can be rejected in three of the six cases. Unfortunately, the test intervals are extremely wide due to the small number of observations, and hence the test is not conclusive. Of the six indices, the one that performs best in

terms of a high explained sum of squares is the updated Thomas index. It has the highest R (0.436) and the smallest standard error on the coefficient (0.195), but its measured elasticity (0.454) is below two of the other estimates.

Table 2
Regressions of Nominal Wages on Price Indices, 1985

| | Price Indices Converted to 1985 Base1 | | | | | |
	Thomas	Rocha81	Rocha83	Rocha85	Rocha86	Average
ρ'	0.454	0.006	0.592	0.464	0.390	0.615
std(ρ')	0.195	0.424	0.290	0.278	0.263	0.319
t-statistic for $\rho'=1$	2.800*	2.342*	1.403	1.928	2.323*	1.209
R-Square	0.436	0.000	0.373	0.285	0.239	0.347

Notes: 1. Price index converted to 1985 base year by deflating with IBGE price indices (INPC and IGP). "Average" is a simple average of the other 5 indices.
2. An asterisk (*) indicates that the hypothesis that $\rho=1$ can be rejected by a t-test at the 5% level of significance.

As noted previously, there is reason to expect a great deal of measurement error in the price indices due to Brazil's high and fluctuating inflation rates, as well as substantially differing regional consumption baskets. Under the hypothesis that the true elasticity is one (i.e. that nominal wage differences are caused by price level differences), we can estimate the error in the price index with the formulas for bias due to errors-in-measurement. In particular, if the nominal wage difference (w_r) is a function of the true price difference (πr):

$$w_r = \pi_r \rho + \zeta,$$

and the price level is measured with error:

$$P_r = \pi_r + \nu$$

then the elasticity (ρ') in a regression which uses the imperfect price index (Pr) is biased as:

$$\rho' = \rho / (1 + \sigma_\nu^2 / \sigma_\pi^2).$$

Knowing that the variance of the true price index is equal to the variance of the imperfect price index minus the variance of the price measurement error, and assuming that the true elasticity is one, we can calculate the implicit price measurement error as:

$$\sigma_{\nu}^{2} = \sigma_{P}^{2} \ (1 - \rho').$$

The estimates of the price error under the hypothesis of unit elasticity are shown in Table 3 for several years.

Table 3
Estimation of Price Measurement Error and Variance of Real Wages

Year of Wage Differentials	1977	1981	1985	All Years	All Years
Price Index:	Thomas75	Thomas811	Thomas851	Thomas(y)	Thomas75
ρ'	0.840	0.530	0.454	0.625	0.654
$std(\rho')$	0.269	0.179	0.195	0.058	0.065
t-statistic for ρ'=1	0.596	2.619**	2.800**	6.487**	5.327**
degrees of freedom	7	7	7	88	88
R-Square	0.582	0.555	0.436	0.570	0.534
---------------- Under hypothesis that ρ'=1 ------------------					
Price Error Variance	0.005	0.018	0.016	0.013	0.010
Price Error Std. Dev.	0.072	0.133	0.126	0.112	0.100
Variance of Residual	0.029	0.017	0.016	0.015	0.014
Std. Dev. of Residual	0.169	0.130	0.128	0.121	0.119
Variance of Wage Error	0.0004	0.0004	0.0004	0.0004	0.0004
Real Wage Variance	0.024	–	0.000	0.002	0.004
Real Wage Std. Dev.	0.154	–	0.012	0.040	0.062

Notes: 1. Price index deflated with IBGE price indices (INPC and IGP).
  2. The critical values for the t-test with 7 degrees of freedom and 5% significance level is 1.895. The critical values for the t-test with 88 degrees of freedom and 5%

significance level is approximately
1.68.

The standard deviation of the implicit price
measurement error, assuming that nominal wages reflect price
level differences with unit elasticity, ranges from 7.2% to
13.3%. The estimated price error is lowest for the 1977 regional
wage differentials regressed on the 1974/75 Thomas index. The
implicit error is greater for 1981 and 1985, where the hypothesis
of unit elasticity is easily rejected by a t-test at the 5%
level. The final two columns of the table show results from
regressing the regional wage differentials estimated for 1977 to
1987 (excluding 1980) upon the updated Thomas index (Thomas(y))
and the original 1974/75 index (Thomas75). In these cases, the
larger number of observations makes it possible to easily reject
the hypothesis of unit elasticity. Since the early year (1977)
is so strongly related to the (perhaps correctly measured) Thomas
index, one might argue that the poor results in later years
reflect a systematic problem in updating the Thomas index.

Continuing with the hypothesis that nominal wages
reflect price differences, we can estimate what the real wage
variation would be. This would be calculated as:

$$\text{Var}(\omega_r) = \text{Var}(w_r - P_r) - \text{Var}(\epsilon) - \text{Var}(\zeta),$$

where $\text{Var}(\epsilon)$ is the variance of the nominal wage
differential estimates (generally less than 0.0004) and $\text{Var}(\zeta)$
which is the estimated variance of the error in price
measurement. The resulting standard deviation for the regional
wage differentials is shown in the final row of Table 3.

For 1977, the adjustment yields an estimated regional
dispersion of real wages equal to 15.4%, roughly comparable to
the measured dispersion of nominal wages. Using the updated
Thomas index for later years, however, suggests that real wage
dispersion could be minimal-- zero in 1981 and only 1.2% in 1985.
Considering the entire ten-year period as a whole, with either

the Thomas index or the updated Thomas index, the estimated real dispersion is considerably less than for 1977 and significantly smaller than for the nominal wage dispersion. Except for 1977, the estimate of real wage dispersion is never greater than 7.6%. It is entirely possible, then, that the increasing integration of the Brazilian economy (See Savedoff, 1992, Chapter 3) has led to a narrowing of real wage differences across regions as of the early 1980s. This conclusion must be qualified, however, by recognizing that the implicit price error rises sharply, from 7.2% in 1977 to over 12% in the later years. Hence, the low estimates for real wage dispersion could be an artifact of attributing greater measurement error to the price index when, in fact, the degree of error may be constant.

Real wage differentials, then, may have disappeared as of the early 1980s, but firm conclusions are not possible due to the degree of suspected error in the price indices. If on the other hand real wage differences exist, the degree of price measurement error makes it impossible to determine which areas lie substantially above or below the mean in terms of real wages. In either case, it is probable that real wage differentials are substantially smaller than nominal wage differentials across the major cities.

These tests indicate that price level differences are generally smaller than the nominal wage variation and support hypotheses concerning undifferentiated net migration flows (Buarque de Holanda 1989, Meneghetti 1988, Merrick and Graham 1979) which argue that migrants move to areas with higher income levels. It therefore questions Singer's contention that population flows and spatial distribution follow a dynamic independent of economic growth and income (Singer 1982).

In combination with the simple cost model above, the real wage data also implies very different pricing behavior across regions independent of nominal wage differences and in the presence of highly integrated product markets. This may reflect

variation in market competitivity--regional segmentation of product markets being greater than suggested by the evidence--or a greater importance of non- tradeables in local price levels. Regardless of the explanation, the divergence between nominal and real wages has important implications. For example, it appears that social policy could encourage firms to relocate to Curitiba from São Paulo and thereby reduce nominal labor costs without reducing workers' welfare. This assumes, of course, that individuals would be better off in Curitiba with comparable real wages, ignoring other regional factors that affect well-being.

Compensating Costs in Production: Demand Side Arbitrage

The existence of nominal wage differentials suggests that firms have incentives to move to or expand in the metropolitan regions with lower wages. However, since the late 1930s, employment growth has continued to be strongest in cities with higher wages, especially in São Paulo. Wages and labor costs, though, are only one part of total costs. It is entirely possible that firms are uninterested in moving from one location to another in search of lower labor costs because lower labor costs in those areas may be more than offset by higher costs of other kinds.

Hansen (1989) provides evidence for the state of São Paulo showing that wages decline as one moves farther from the center of São Paulo, but that productivity advantages also decline by a comparable margin. Hansen estimates that:

A doubling of distance from São Paulo City is associated with an 8.9% decline in plant productivity and an 8.7% decline in labor costs. Because of the slim difference between these figures, it appears that entrepreneurs can be indifferent in choosing where to locate their plant. (p. 157-8).

In interviews with businesses in Rio de Janeiro and Recife,\6 lowering labor costs was not generally considered a high priority relative to financial costs, input costs, and

availability of public infrastructure.

The low priority given to reducing labor costs was apparent from a surprising willingness to make wage concessions. This willingness to raise wages had various motivations. First, the interviewed business people were all willing to voice opinions that pay is abysmally low. Wages in Brazil are extremely low relative to costs of living. The minimum wage which was established in 1943 to support a typical working family is currently less than one-third of that level.\7 Secondly, labor costs were a small share of total costs for all firms, even those usually considered intensive in labor. For example, clothing manufacturers expressed as little concern for labor costs as the chemical firms which were interviewed. Considera (1986) argues that labor costs are a small and declining share of *costs* in manufacturing, falling from 20% in the 1950s to around 12% in the 1980s. Thirdly, with high and accelerating inflation, conceding real wage gains today has little impact on real wages tomorrow. Inflation of over 10% per month with annual wage negotiations and quarterly wage indexation meant that real wage levels were easily and quickly eroded. By contrast financial costs are indexed daily, and input prices can change monthly, daily, or weekly, depending on agreelgnts with suppliers.

In Rio de Janeiro, and especially Recife, the concern with non-labor costs was apparent from the interviewees preoccupation with infrastructure (water, energy, transportation) and financial costs. In several firms, self-sufficiency in terms of in-house generators, water storage, and repair shops was undertaken as an effort to insulate themselves from the poor provision of public infrastructure and local services. Every firm mentioned that cutting financial costs (and concurrently liberating cash for application in the profitable overnight market) was the key priority. Reducing labor costs, then, through moving or expanding elsewhere, was not a key concern.

Although direct interviews were not conducted in São

Paulo, several telephone conversations and discussions with visiting business people indicated the degree to which São Paulo's non- labor cost advantages are seen as far outweighing its higher labor costs. In these cases, the business people talked about the difficulties of making interstate telephone calls, the importance of having their major suppliers nearby, easy access to key financial institutions, etc. With low labor costs already, they were more interested in cutting major non-labor costs and taking advantage of productivity gains in their current area.

Dependence of Productivity on Wages In addition to compensating non-labor costs, firms may be relatively insulated from market pressures if organizational and institutional factors are a more important influence upon their wages. This can occur whenever the wage level or pay scale affects labor productivity independently of the observable qualities of the workers who have been hired. Moving to lower wage regions in such a case would not reduce labor costs. The firm might have to pay the same wage regardless of location, or relocating might not yield savings in labor costs per unit of output due to reduced productivity.

In my interviews with Brazilian business people, certain firms used high wages as a strategy for improving productivity. It was not uncommon to find firms with an explicit policy of paying 25% to 50% more than the wage floor negotiated by the union and the employer's association. Higher wages reduced turnover and, although training times were generally short, firms found the turnover in entry level jobs to be costly--in materials, time of training personnel, and the resources expended in selecting new employees. The greatest advantage of higher than market-clearing wages, however, was motivational: lower absenteeism, greater attentiveness, more effort. One informant argued emphatically that improving wages was the only way to improve labor productivity, but that such a policy must be accompanied by "conscientizaa^o". The term comes from the popular movements connected to the progressive Church in Brazil

and indicates the process by which people become socially and politically aware. For this informant, however, the term signified making workers aware of the advantages the firm conceded relative to other firms. He planned to begin a monthly newsletter which, among other things, would regularly publish the difference between wage rates in his factory and those in surrounding firms. In addition, firms with high-wage strategies effectively improved their pool of candidates, frequently allowing them to attract workers who had developed their skills and become adept in smaller, lower-paying firms.

The high wage strategies appeared to be restricted to large firms operating in protected markets--protected by brand names and product differentiation, or by government import quotas and tariffs. On the other hand, imperfect competition was not a sufficient condition for high-wage strategies. In several cases firms which adopted these strategies were otherwise indistinguishable from those which did not--whether in terms of their markets, technology, investment, or profitability. This was clearest in the case of two women's lingerie manufacturers. One followed a practice of paying at least 25% over the average wage level for seamstresses, while the other cut wages as sharply as it could. The former had few problems with workers, while the latter was being legally processed for subjecting employees to body searches--to make sure they weren't stealing the firm's products. In spite of these differences, however, both firms were equally profitable and expanding their production for both domestic and foreign markets.

These strategies do appear to vary systematically across regions. I encountered more firms in Rio de Janeiro which used high-wage strategies to improve labor productivity, reduce turnover, and improve applicant pools than I did in Recife. The literature on São Paulo indicates that the proportion of firms using such strategies is even larger (Morley 1979). When comparing the interviews, it was apparent that businesses in Recife were more polarized than those in Rio de Janeiro. The

largest firms followed similar employment and pay practices as their peers (or parent companies) in the Southeast. Even among the large firms, however, there seems to be much less interest in introducing labor management programs. Most of the industries in Recife were content to let the State-Wide Industrialist Association (FIEPE) represent them in labor negotiations, rather than deal directly with unions themselves. This was much less common in Rio de Janeiro.

An individual who was regularly involved in labor negotiations as an advisor and representative for industrial firms provided useful insights into geographical differences within the state of Rio de Janeiro. For example, in the cities of Nova Friburgo and Petr"polis where the industrialists are generally European immigrants or first generation Brazilians, this representative said the negotiations rarely end up in the labor courts--agreements are regularly reached with the unions. This indicates that the firms accept the bargaining process and use strategies which are less adversarial. In the city of Rio itself and in neighboring Niteroi, he characterized the firms as more belligerent, treating workers miserably, pushing the annual contract into the labor courts (a signal of intransigence), and regularly winning. The concentration of industrial plants around the steel complex of Volta Redonda are disposed to come to agreements, but face a much more highly mobilized and militant labor movement, and so have a mixed strategy of negotiation, bluff, and belligerence. If firms' strategies vary this clearly across space within the state of Rio de Janeiro, it seems reasonable to expect variation across Brazil's regions, as well.

Consequently, it may be reasonable to argue that many firms are not highly sensitive to wages and labor costs in these major metropolitan areas. Although pay scales and wage levels are affected by local labor market conditions, wage policies contained provisions setting wages above what could be considered the market-clearing wage frequently enough to indicate important organizational and institutional influences on wages. None of

the firms using such high-wage strategies indicated any desire to relocate in search of lower wages because the higher productivity associated with higher wages compensated for the higher hourly labor costs.

Conclusion

Real wage differences between the major cities of Brazil may have converged in recent decades as a consequence of the increasing integration of the national economy. Direct price comparisons and tests of real wage dispersion show that there may be real wage gaps between the major cities, but that these differences are probably substantially smaller than the nominal wage differences and may be insignificant. These findings, however, must be qualified because the accuracy of the price indices is notably poor.

On the demand side of the labor market, it appears that nominal wage differences are substantial and that they may be offset by compensating non-labor factor costs. This has to do with the low level of wages, which make labor costs a small share of total costs, and the productivity advantages in certain regions (e.g. São Paulo) which may offset the higher wage levels. It also may indicate the degree to which wages reflect the organizational and institutional aspects of employment practices at the firm level which aim to increase worker productivity rather than market-clearing signals.

Endnotes

1. *This* paper is based on Chapter 7, "Cost-of-Living, Local Amenities and Compensating Costs" in Savedoff, 1992.

2. Thomas (1982) suggests that nominal wage differences themselves be used as an index of cost-of-living differences, minimizing the possibility of real wage differences.

3. Nominal wage differences were estimated in Savedoff (1992) by doing a cross-sectional estimation of earnings equations with dummy variables for the metropolitan regions and including controls for personal and job characteristics.

4. The following discussion benefitted greatly from comments and suggestions by Kevin Lang.

5. The indices used to deflate the price comparisons are discussed and presented in Savedoff, 1992, Appendix A.

6. See Savedoff, 1992, Appendix B for a description of these interviews.

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