17069

Number

24

Country Dept. I
Latin America Region

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Public Disclosure Authorized

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*This background paper was prepared for the World Bank report "Brazil: Stabilization, Fiscal Adjustment and Public Employment Reform", under the immediate supervision of Gautam Datta, Senior Economist, LA1C1. Ricardo Paes de Barros, Miguel Foguel, and Rosane Mendonça are at Instituto de Pesquisa Econômica Aplicada (Rio de Janeiro); Indermit Gill is at the World Bank (Washington). The views expressed here are those of the authors and should not be attributed to either the World Bank or IPEA. We would like to thank Homi Kharas, Chief, LA1C1, for useful comments.

1. INTRODUCTION

As part of the adjustment process in the Brazilian public sector, it is expected that the level of public employment will decline. In this paper we take this possibility as given, without speculating on its likelihood or desirability. The focus here is on evaluating its potential impact on the welfare of those currently employed in the public sector.

The general objectives of this paper are first, to obtain a profile of public employees and, second, to evaluate the labor market prospects of these workers if they were to move to the private sector. In other words, we answer questions such as: what is the composition of employment in Brazilian public sector? how difficult would it be for a worker displaced from the public sector to find a similar job in the private sector? and how does the cost of adjustment vary with the type of worker displaced?

To answer these questions, this paper examines employment and average earnings in the private and public sectors, the growth of the public sector wage bill in recent years, and the wage premium earned by public workers over their private sector counterparts. It decomposes this gap into a component due to differences in worker-specific and locational attributes and that which can be considered a purer premium. It also examines public-private differences in other job characteristics, primarily job security. Finally, we provide imputations of differences in pension levels and duration for public servants and private sector workers.

Trends in employment, earnings, and other indicators are analyzed using *Pesquisa Nacional por Amostra de Domicilios* (PNAD) surveys for 1981, 1985, 1990, 1992, 1993, and 1995. The latest PNAD survey (1995) is examined in greatest detail. This paper has three interrelated parts. The first constructs the profile of employment in the public sector (civil service and public enterprises), and documents private and public employment in a representative sample of states, by type of worker (e.g., age, sex, education, and occupation). The second estimates the wage gap between public and private employment by type of worker and labor market characteristic (e.g., region of residence). The third and final part is devoted to investigate other dimensions of the labor market, especially the aspect of permanency of jobs (e.g., as proxied by expected tenure). A statistical annex contains detailed tables; tables with even greater detail (e.g., state-level employment and earnings trends) are available from the authors upon request.

All the analysis was conducted both for the entire country and for selected states. In particular, public and private employment in following states were examined: Pernambuco, Bahia (Northeast), Rio de Janiero, São Paulo, Minas Gerais (Southeast), Rio Grande do Sul (South) and the Federal District.

2. EMPLOYMENT IN PUBLIC AND PRIVATE SECTORS

2.1 All-Brazil, 1981-1995

PNAD surveys indicate that total employment in Brazil was 62.5 million in September 1995 (see Table 1). Of this, public sector employment - other than public enterprises - was approximately 5.6 million (2.2 million in public administration, more than half at the municipal level, 0.6 million in the judiciary, legislature and military, and 2.9 million in the education and health sectors). The enterprise sector had 56.9 million workers (16.1 million in agriculture, 8.4 million in industry, and 28.4 million in services).

Table 1
Sectoral Shares in Employment, 1981-1995
All Brazil

	1981	1985	1990	1992	1993	1995
	EMPLOYMENT (in percent of total)					
Public Employment	**7.2**	**8.4**	**9.4**	**9.0**	**9.3**	**9.0**
Direct Administration	2.9	3.3	3.8	3.6	3.6	3.5
Federal	*0.5*	*0.4*	*0.3*	*0.3*	*0.3*	*0.3*
State	*1.4*	*1.5*	*1.5*	*1.4*	*1.4*	*1.3*
Municipal	*1.0*	*1.4*	*2.0*	*1.9*	*1.9*	*1.9*
Education & Health	3.9	4.2	4.6	4.5	4.7	4.6
Judiciary & Legislative	0.4	0.4	0.4	0.4	0.4	0.5
Military	0.6	0.5	0.6	0.5	0.4	0.4
Private Employment*	**92.8**	**91.6**	**90.6**	**91.0**	**90.7**	**91.0**
Agriculture	28.5	27.0	22.4	27.8	26.9	25.7
Industry	17.0	17.4	17.4	14.3	14.3	13.4
Services	38.3	40.8	44.4	42.4	42.9	45.4
Construction	8.1	5.7	6.1	6.1	6.4	6.1
Other private	0.3	0.5	0.4	0.5	0.4	0.4
Total (percent)	**100**	**100**	**100**	**100**	**100**	**100**
Total (millions)	**n.a.****	**n.a.****	**n.a.****	**58.8**	**59.9**	**62.5**

* Enterprise employment includes employment in public enterprises.
** Total employment figures before 1991 are not accurately estimated.
Source: Pesquisa Nacional por Amostra de Domicilios (selected years).

The share of the "public sector" - civil servants and the military - as defined above rose from about 7% to 9% of the total between 1981 and 1990, and has stayed above 9% since then. Between 1992 and 1995, the number in public administration increased from about 2.07 million to 2.16 million - almost all of this increase was accounted for by an increase in municipal employment. State employment fell by 1%, and federal employment rose about 7% over these two years. The size of the military stayed constant at about 0.27 million. Judicial, legislative, education and health sectors registered increases in employment between 1992 and 1995. Judicial and legislative staff increased from 0.26 to 0.32 million, and employment in education and health increased from 2.66 to 2.85 million.

In the enterprise sector, agricultural employment fell, employment in industry and construction stayed constant, and

employment in services (especially personal services) rose between 1992 and 1995.

Using the class of worker distinction, the share of the public sector was about 12% during the period 1992-1995 (see Table 2). This definition thus includes workers in public enterprises and autonomous agencies (*fundacoes*). In contrast to the private sector, almost all government employees are either public servants or have a signed work card. Workers in the public sector who do not fall into this category form about 1.5% of total employment in the country

Table 2
Share of workers, by contract type (percent), 1995
All Brazil

	Public Servants	Non Public Servants		Total Share
		With Card	Without Card	
Public Sector Workers				11.5
Federal	*0.9*	*0.7*	*0.1*	*1.7*
State	*3.5*	*1.1*	*0.4*	*5.0*
Municipal	*1.9*	*1.6*	*0.9*	*4.4*
Military	*0.4*			*0.4*
Private Sector Workers				88.5
Salaried		*28.9*	*21.1*	*50.0*
Selfemployed			*23.6*	*23.6*
Employers			*4.1*	*4.1*
Unpaid			*10.8*	*10.8*
Total	6.7	32.3	61.0	100

Source: Pesquisa Nacional por Amostra de Domicilios, 1995.

2.2 Employment in Selected States, 1992-1995

We analyzed employment patterns in the federal district and six states (Bahia, Minas Gerais, Pernambuco, Rio de Janeiro, Rio Grande do Sul, and Sao Paulo) to examine if there are considerable state-level differences in these patterns and trends. Other than in Rio de Janeiro, the public sector (as defined above) is about 8% of total employment. Rio de Janeiro's ratio is about 11%, and the federal district's twice that. Public administration as a ratio of total employment is highest in Pernambuco, while Rio has the highest ratios for education and health. In the private sector, agriculture has the lowest share in Rio and the federal district, and the highest in the northeastern states. São Paulo and Rio Grande do Sul have the highest ratios for industry, while Rio, the federal district and São Paulo have the highest ratio for services. These ratios did not change much between 1992-1995.

For the six states and the federal district, while the largest share of government employment is of public servants (*estatutarios*), many government workers do have contracts without guaranteed tenure. This ratio ranges from 3% of total employment in Pernambuco, to more than 6% in Bahia and the federal district. Government employees without a signed working card are about 1% overall, but are close to 2% of total employment in Bahia and the federal district. Much of this "informality" of government employment is at the municipal level. In the case of municipal employees, the two northeastern states appear to have a large number without a signed working card.

There is also considerable variation across states in the degree of formality of private employment across states. Northeastern states have largest proportions of private workers who fall into this

category. While the share of workers with a signed card in private employment is 35-50% for southern states and the federal district, it is 15-20% for the northeastern states. Minas Gerais, with a ratio of 30%, is in the middle.

Table 3
Sectoral Shares in Employment, 1995
Selected States

	Distrito Federal	Bahia	Pernam-buco	Minas Gerais	Rio Grd do Sul	Rio de Janeiro	Sao Paulo
Public Employment	**22.6**	**7.8**	**8.4**	**8.4**	**8.3**	**11.3**	**8.3**
Direct Administration	9.2	3.1	3.7	3.2	3.1	3.5	3.4
Federal	*3.9*	*0.2*	*0.2*	*0.2*	*0.2*	*0.6*	*0.2*
State	*5.2*	*1.0*	*1.5*	*0.9*	*1.1*	*1.5*	*1.2*
Municipal	*0.1*	*1.9*	*2.0*	*2.1*	*1.8*	*1.4*	*2.0*
Education & Health	7.0	4.2	3.9	4.6	4.0	5.4	4.1
Judiciary & Legislative	3.4	0.4	0.4	0.4	0.4	0.6	0.5
Military	3.0	0.1	0.4	0.2	0.8	1.8	0.3
Private Employment*	**77.5**	**92.2**	**91.6**	**91.6**	**91.7**	**88.7**	**91.7**
Agriculture	2.4	44.7	32.6	29.9	29.1	4.2	8.6
Industry	4.5	6.5	8.7	11.6	16.2	12.7	20.3
Services	62.3	35.1	44.1	42.6	41.0	62.9	55.9
Construction	8.0	5.4	5.2	7.0	4.7	8.1	6.8
Other private	0.3	0.4	1.0	0.2	0.8	0.9	0.2
Total (percent)	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total (millions)	**0.75**	**5.63**	**3.15**	**7.76**	**5.01**	**5.70**	**15.10**

* Private employment includes employment in public enterprises.
** Total employment figures before 1991 are not accurately estimated.
Source: Pesquisa Nacional por Amostra de Domicilios, 1995.

Table 4
Share of workers, by contract type (percent), 1995
Selected States

	Distrito Federal	Bahia	Pernam-buco	Minas Gerais	Rio Grd do Sul	Rio de Janeiro	Sao Paulo
Government*							
Public service	21.0	4.0	7.2	7.5	6.3	9.9	5.9
Others							
With signed card	6.0	4.2	1.8	2.3	3.7	3.6	3.5
Without signed card	1.7	2.2	1.3	1.2	0.8	0.8	0.8
Private Employment**							
With signed card	29.6	14.5	18.2	27.7	31.4	39.9	43.4
Without signed card	18.2	25.0	22.6	26.1	14.9	19.7	19.0
Selfemployed	16.9	28.8	29.3	22.6	23.9	20.7	18.5
Employers	3.8	2.5	2.7	4.8	4.9	3.9	4.8
Unpaid	2.7	18.8	16.8	8.0	14.0	1.4	3.9
Total (percent)	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Total (millions)	**0.75**	**5.63**	**3.15**	**7.76**	**5.01**	**5.70**	**15.10**

* Includes federal, state, municipal, and military personnel.
** Private employment includes employment in public enterprises.
Source: Pesquisa Nacional por Amostra de Domicilios, 1995.

3. EARNINGS AND WAGE BILL IN PUBLIC AND PRIVATE SECTORS

3.1 Earnings, 1981-1995

Average real monthly earnings by sector were computed using PNAD surveys and the INPC deflator. Between 1981 and 1995, real monthly earnings for increased about 29% for federal employees and 8% for state employees, and fell by 12% for municipal employees. Earnings for judicial and legislative employees rose by more than 40% during these years, by about 7% for the military, and stayed roughly constant for education and health workers in the public sector. In the private sector, earnings in agriculture fell by about 10%, in industry by 6%, but rose in distributive and productive services by 6%, and in personal services and construction about 16%. The largest increase in real earnings was therefore for judicial and legislative employees, and the largest fall was for municipal employees.

In absolute terms, and unadjusted for worker characteristics, earnings were highest for judicial and legislative workers in 1995, who earned almost R$1500 per month. Earnings were 25% lower than this for federal workers, 50% lower for state and military personnel, 62% lower for education and health workers, and 75% lower for municipal workers. In the private sector, earnings were highest in productive services at about R$950 per month. Earnings in distributive services and manufacturing were about 45% lower than this, those in personal services and construction about 60% lower, and those of agricultural workers about 75% lower.

Table 5
Average Monthly Earnings, 1981-1995
All Brazil, in constant September 1995 reals*

	1981	1985	1990	1992	1993	1995
Public Employment						
Direct Administration						
Federal	876	1155	1059	1056	1150	1126
State	675	780	783	555	621	728
Municipal	412	386	398	330	316	361
Education & Health	546	606	621	476	512	551
Judiciary & Legislative	1043	1247	1362	1058	1235	1473
Military	669	844	687	637	622	718
Private Employment*						
Agriculture	238	256	210	207	235	213
Manufacturing	557	547	483	491	518	525
Services						
Distributive	501	537	520	455	484	532
Productive	900	953	896	878	975	953
Personal & other	312	308	335	292	314	354
Construction	333	345	367	311	319	389

* The deflator used is INPC (Brazil)
** Private employment includes employment in public enterprises.
Source: Pesquisa Nacional por Amostra de Domicilios (selected years).

Considerable differences exist in average earnings in different parts of the country. In 1995, average earnings in almost all sectors were highest in the federal district and Sao

Paulo than in other states, and earnings in Pernambuco and Bahia were generally the lowest. Earnings in Minas Gerais were somewhat higher than for the two northeastern states, and earnings in Rio Grande do Sul and Rio de Janeiro higher still. Relative to salaries in the manufacturing sector, state employees received roughly 67-80% more in Bahia and Pernambuco, and 40-45% more in the other states. Municipal workers' earnings relative to private manufacturing earnings, in contrast, were highest in Rio Grande do Sul and Rio de Janeiro, somewhat lower in Minas Gerais and Bahia, and lowest in Pernambuco and São Paulo. In absolute terms, however, earnings of São Paulo's municipal workers were more than double those in Pernambuco.

In the private sector, relative earnings by sector are uniform across regions. The only exception is that in Rio Grande do Sul, earnings of agricultural workers is comparatively high. But this is hardly surprising; what is more striking is that sectoral earnings relative to those in manufacturing are similar for all states.

Table 6
Average Monthly Earnings, September 1995
Selected States, in current reals*

	Distrito Federal	Bahia	Pernam-buco	Minas Gerais	Rio Grande do Sul	Rio de Janeiro	Sao Paulo
Public Employment							
Direct Administration							
Federal	1361	842	744	1046	839	972	1436
State	1034	551	549	560	651	782	981
Municipal	-	267	204	314	453	502	444
Education & Health	1128	364	387	505	647	562	672
Judiciary & Legislative	2057	869	1189	1565	1804	1496	1349
Military	1048	576	577	708	541	719	744
Private Employment*							
Agriculture	337	156	149	278	458	281	328
Manufacturing	627	330	304	387	467	538	683
Services							
Distributive	592	356	339	474	534	514	681
Productive	1246	565	724	743	1026	947	1121
Personal & other	423	222	232	290	360	365	472
Construction	535	247	232	297	337	380	560

* The deflator used is INPC (Brazil)
** Private employment includes employment in public enterprises.
Source: Pesquisa Nacional por Amostra de Domicilios, 1995.

3.2 The Wage Bill, 1992- 1995

Using employment and average earnings for each sector, we computed the sectoral wage bill in 1995. Figure 1 graphs the relative importance of each of the subsectors in public employment. Education and health workers, who are about 50% of all government workers, absorb about 45% of the wage bill. Municipal employees are about 20% of total public employment, but absorb only 12.5% of total wages; state

employees, who are about 15% of employment, absorb about 17% of total wage. Federal and military workers are relatively small fractions of both total employment and wage bill. The most dramatic difference between these two shares is for judicial and legislative workers, who are about 5% of total employment, but almost 14% of the total wage bill. Thus, while employment of judicial/legislative workers may be relatively small, they are potentially critical for fiscal reasons.

To examine the trends in wage-related expenditures in the public sector, we computed the growth of the wage bill in the public an private sectors. Because of inaccurate weighting before 1991, wage bill figures are reliable only for the three PNAD surveys for 1992, 1993, and 1995. Figure 2 graphs the annual growth rate for employment, average earnings, and the wage bill during the period 1992-1995.

Average earnings grew in every part of the private sector, especially in personal and distributive services and construction. In contrast, industry and agriculture registered modest earnings growth, and employment actually fell in agriculture. In general, only employment growth in services exceeded the national average of about 2% during this period. In the public sector, on the other hand, employment of federal, municipal, judicial and legislative, and education and health workers rose faster than this average rate. Only state and military employment grew slower than the national average.

In the public sector, the 20% annual growth of the wage bill for judicial and legislative workers dwarfs that of other workers. This growth in personnel expenditures was due to both an increase in their number (about 7.5% annually) and increased average earnings (about 12% annually). The growth of state wage bill exceeded 9 percent, despite a small decrease in state employment. The wage bill for education and health workers increased by 7.5% annually, due to increases in both average real earnings and employment. The federal wage bill also increased by 4.5% because of both new hires and higher wages. Military employment stayed roughly constant, but earnings increased moderately.

Figure 1

FISCAL IMPORTANCE OF GOVERNMENT SUBSECTORS, All Brazil, September 1995

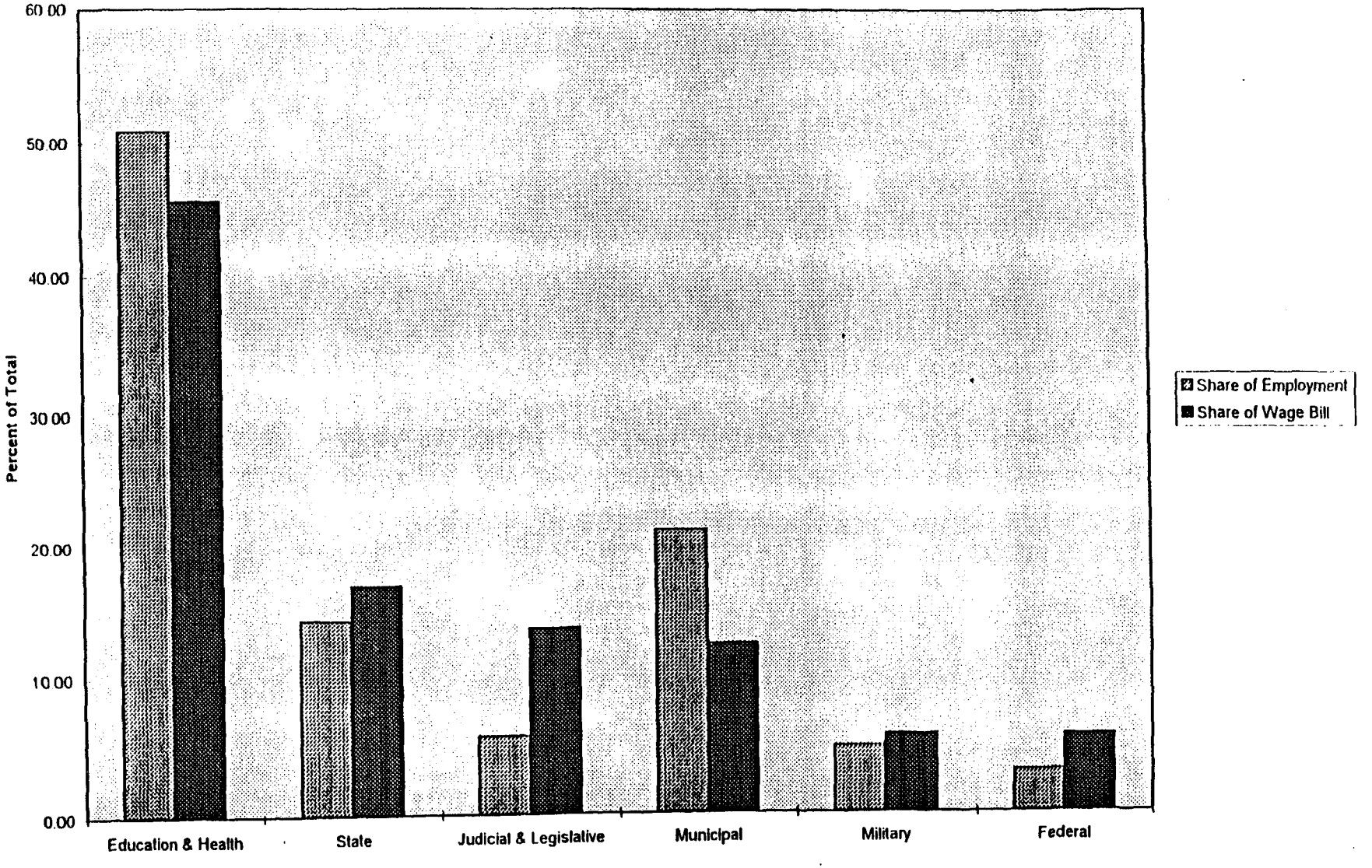
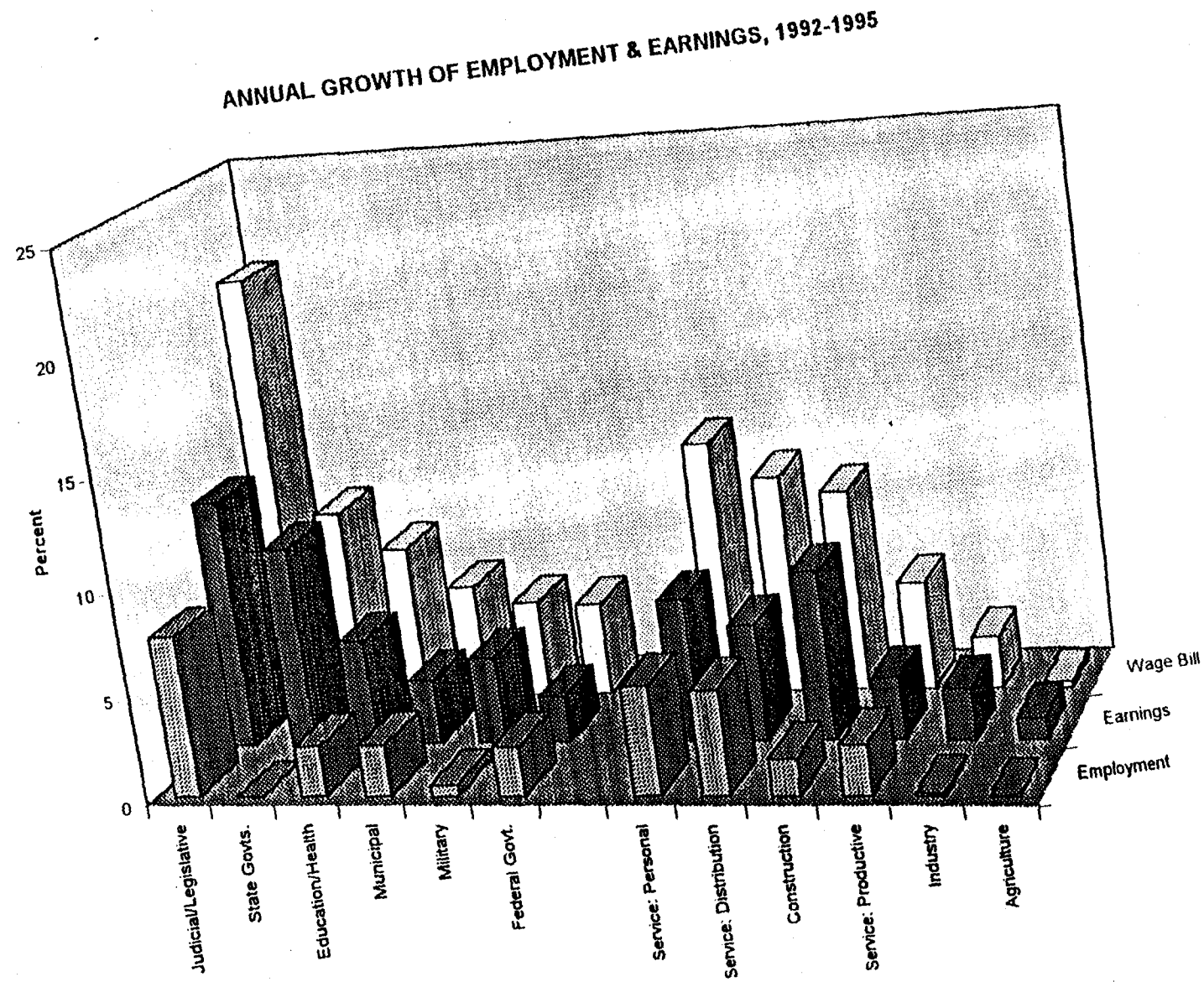


Figure 2


ANNUAL GROWTH OF EMPLOYMENT & EARNINGS, 1992-1995
Percent
0
5
10
15
20
25
Wage Bill
Earnings
Employment
Judicial/Legislative
State Govts.
Education/Health
Municipal
Military
Federal Govt.
Service: Personal
Service: Distribution
Construction
Service: Productive
Industry
Agriculture

4. THE PUBLIC-PRIVATE WAGE GAP

Without knowing what the wage gap between the public and the private sector is, however, it is difficult to determine whether earnings growth of government employees has been excessive. Thus, for example, the relatively high average earnings of judicial and legislative employees may be because of their higher skill levels relative to other public employees and workers in the private sector. And the relatively rapid growth in their earnings may be because they have been historically underpaid relative to their private sector counterparts. To examine whether or not public sector employees are under- or overpaid relative to those in the private sector, we compute the earnings gap in this section. This would help in determining whether the solution to a reducing the public sector wage bill lies in reducing public sector employment, or average earnings and benefits, or both.

4.1. Approach

In this section, we investigate the wage gap between the private and public sectors in Brazil using PNAD data. The analysis consists of four steps:

- We begin by estimating the overall wage gap between the private and public sectors for the entire Brazilian labor market.

- In the second step, we take into account the heterogeneity within the public sector. We desegregate the public sector using two alternative procedures. In each case, we estimate the wage gap between the segments of the public sector and the overall private sector. Although these estimates for the overall wage gap represent an important starting point, they have serious limitations as a measure of the actual degree of labor market segmentation, since they do not necessarily represent the actual difference in payment between equally productive workers in the public and private sectors. In fact, the overall wage gap captures both differences in payment between equally productive workers in the two sectors and differences in the qualifications and characteristics of the labor force employed in the two sectors. On the one hand, wages may be higher in the public sector simply because the labor force in the sector is older and better educated. On the other hand, wages in the public sector may be lower due to the possible concentration of public employment in the Northeast and because women tend to be over-represented in the public sector.

- The third step is dedicated to analyze the impact of differences in the spatial location of the public and private labor force on the wage gap between the sectors. Specifically, we investigate to which extent the over-representation of public employment in the northeast tends to make overall measures of the wage gap between the public and private sectors an under-estimate of the actual gap faced by local labor markets.

- In the fourth step we estimate the wage gap between workers with identical observed characteristics in the public and private sectors. To make this analysis empirically feasible we limit the scope to the six major Brazilian Metropolitan Areas and the Federal District. Since the wage gap between the public and private sectors is likely to differ according to the type of worker, in this fourth step we also investigate how the wage gap varies with the workers' main observed characteristics.

All the empirical analysis conducted in this section is based on the *Pesquisa Nacional por Amostra de Domicílios* - PNAD - surveys for September 1995. We used two measures of labor income. The first measure is the total monthly income normally received by a worker in his/her current main job. The second measure seeks to standardized for the number of hours usually worked. It is defined as the total monthly income normally received in the main job, divided by the number of hours usually worked per week in main job and multiplied by a standard work week of 40 hours.

Since the average number of hours worked by public employees tends to be significantly smaller than the corresponding average for workers in the private sector, it does make a difference for level of the wage gap between these sectors whether a standardization for hours of work is conducted or not. To ensure that the standardized wage is a good approximation of what worker would get if they work 40 hours a week, workers working less than 20 hours per week were excluded from the analysis. We also exclude workers with zero labor income.

Before reporting the results, we present a brief methodological discussion on how the wage gap between the public and private sectors is measured in this section.

4.2. Wage-gap concepts

Empirical analysis of wage differentials commonly use wage levels, log-wages, arithmetic means and geometric means. In this section we briefly review the connection between these concepts and how they are going to be used to obtain measures for the wage gap.

We begin by reviewing the advantages and disadvantages of using differences in log-wages vis-à-vis absolute or relative differences in wages. To proceed we need to introduce some notation. Let w_a and w_b be the average wages in the public and private sectors, respectively. Using this notation, one can define the absolute wage difference (G_0), two alternative versions for the relative wage difference (G_{1a} e G_{1b}), and the log-wage difference (G_2) as follows:

$$G_o = w_a - w_b$$

$$G_{1a} = \frac{w_a - w_b}{w_a}$$

$$G_{1b} = \frac{w_a - w_b}{w_b}$$

$$G_2 = \ln(w_a) - \ln(w_b) = \ln(w_a / w_b)$$

The absolute wage difference, G_0, has a disadvantage compared to the relative difference in wages, G_{1a} and G_{1b}, and the difference in log-wages, G_2, in that it is sensitive to the unit of measurement. The other measures are not.

G_{1a} and G_{1b}, have a disadvantage relative to the differences in log-wages, G_2. To define a relative wage difference, it is necessary to select a baseline wage as reference. So this measure inherits the inconvenience of being sensitive to the choice of the baseline wage. Notice the difference between G_{1a} and G_{1b}. Thus, for instance, if the average wage in the public and private sectors are 50 and 20 monetary units respectively, then the wage gap can be expressed in relative terms as 150% of the private sector average wage or 60% of the public sector average wage. The need to constantly having to refer to the chosen baseline wage makes the use of relative wage differences cumbersome in detailed analysis of wage differentials. A way to avoid this is to use measures of wage differentials that are insensitive to the choice of a baseline

reference wage. The log-wage difference is such an alternative. In the example above, the log-wage difference between the public and private sectors will be 0.92 independently of the monetary units chosen and will not require a choice of a baseline wage for reference.

The log-wage difference, however, has a major disadvantage in that it is more difficult to interpret. One way to facilitate its interpretation is to notice that, for small variations, the log-wage difference is an approximation for the relative change in the level of wages. For instance, if the wages are 50 and 51 the relative wage variations using 50 or 51 as the baseline references are 0.0200 and 0.0196, respectively. In this case the log-wage difference is 0.0198. In the general case, if $w_a > w_b$ then

$$\frac{w_a - w_b}{w_a} \geq \ln\left(\frac{w_a}{w_b}\right) \geq \frac{w_a - w_b}{w_b}$$

or

$$G_{1a} \geq G_2 \geq G_{1b}$$

In sum, the log-wage difference has two useful properties: (a) It eliminates the need to keep track of the wage used as reference, and (b) it gives an estimate for the wage gap that is between the two natural measures for the relative difference in wages. The major disadvantage of the log-wage difference is the fact that it is difficult to interpret.

Up to now we are considering alternative methods for evaluating the relative difference between two average wages, where supposedly the average wage is simply the arithmetic mean of wages. In this case the question of using the level of wages or their logs only appears after the average wage has been already obtained. However, in many circumstances, the passage from wage levels to log-wages is conducted before taking averages. This is particularly ubiquitous to studies of wage differentials based on regression analysis, since they invariably use log-wages as the dependent variable.

When logs are taking before the averages are obtained, comparisons between the logs of the averages are not any more comparisons between the logs of two arithmetic means. The comparison becomes one between the log of two geometric means. This is a consequence of the fact that the arithmetic mean of the logs is identical to the log of the geometric mean.

Thus, there is a third commonly used technique for comparing the wages of two populations. This third possibility consists of computing the log difference between the geometric means, which is equivalent to the difference between the arithmetic mean of the logs. We refer to this measure as the ***gap in average log-wage*** and denote it by G_3. To make clear when we are using G_2 and when we are using G_3 we will always refer to G_2 as the ***gap in log-average-wages***.

To clarify the differences between these alternative measures for the wage gap between two sectors, let $\{w_{ai}: i:1,...,n\}$ and $\{w_{bi}: i:1,...,m\}$ be the wages of workers in sectors a and b, respectively. Using this notation, the three alternative measures for the wage gap introduced up to now can be expressed as:

$$G_{1a} = \frac{\frac{1}{n}\sum_{i=1}^{n} w_{ai} - \frac{1}{m}\sum_{i=1}^{m} w_{bi}}{\frac{1}{n}\sum_{i=1}^{m} w_{bi}}$$

$$G_{1b} = \frac{\frac{1}{n}\sum_{i=1}^{n} w_{ai} - \frac{1}{m}\sum_{i=1}^{m} w_{bi}}{\frac{1}{n}\sum_{i=1}^{n} w_{ai}}$$

$$G_2 = \ln\left(\frac{\frac{1}{n}\sum_{i=1}^{n} w_{ai}}{\frac{1}{m}\sum_{i=1}^{m} w_{bi}}\right)$$

and

$$G_3 = \frac{1}{n}\sum_{i=1}^{n}\ln w_{ai} - \frac{1}{m}\sum_{i=1}^{m}\ln w_{bi} = \ln\left(\frac{\left(\prod_{i=1}^{n} w_{ai}\right)^{1/n}}{\left(\prod_{i=1}^{m} w_{bi}\right)^{1/m}}\right)$$

Above we show that G_2 is always between G_{1a} and G_{1b}, but what is the connection between the level of G_3 and the level of the other measures? As a matter of fact, it is possible to relate the levels of G_2 and G_3. The connection between them is intrinsically related to the relative degree of wage inequality in the two sectors.

The simplest way to consider this question is to notice that the arithmetic mean is always greater than the geometric mean, except when all wages are the same. This fact led researchers to propose the log-difference between the arithmetic and geometric mean as a measure of wage inequality. Hence, if we define the wage inequality in these two populations by their Theil indices (T):

$$T_a = \ln\left(\frac{1}{n}\sum_{i=1}^{n} w_{ai}\right) - \ln\left(\left(\prod_{i=1}^{n} w_{ai}\right)^{1/n}\right) = \ln\left(\frac{1}{n}\sum_{i=1}^{n} w_{ai}\right) - \frac{1}{n}\sum_{i=1}^{n}\ln w_{ai}$$

$$T_b = \ln\left(\frac{1}{m}\sum_{i=1}^{m} w_{bi}\right) - \ln\left(\left(\prod_{i=1}^{m} w_{bi}\right)^{1/m}\right) = \ln\left(\frac{1}{m}\sum_{i=1}^{m} w_{bi}\right) - \frac{1}{m}\sum_{i=1}^{m}\ln w_{bi}$$

we obtain

$$G_2 = G_3 + (T_a - T_b)$$

Therefore, G_2 and G_3 will be the same if and only if the level of wage inequality, measured by the Theil index, is the same in both sectors. More generally, G_2 will be similar to G_3 if the levels of inequality are similar. When inequality is greater in sector b than in sector a, we will tend to observe values for G_3 greater than corresponding values for G_2. Unfortunately, this is precisely the situation when contrasting the public and private sectors. Wage inequality in the private sector tends to be greater, so the gap in average log-wages (G_3) is greater than the gap in log-average-wage (G_2). Annex table 1 illustrates this, presenting estimates for the wage gap between the private and public sector using all these measures. This table reveals that, as a consequence of the greater degree of wage inequality in the private sector, the wage gap between the public and private sectors tends to be much higher when measured by the gap in average log-wages (G_3).

Table 7
Measures of the Public Sector Wage Premium
Unadjusted for Sector, Region and Worker Attributes, Percent

Measure	Public-Total Private		Public-Formal Private	
	Adjusted*	Not adjusted	Adjusted	Not adjusted
Relative Wage Gap				
Baseline: Public Sector Wage	47	33	40	30
Baseline: Private Sector Wage	89	49	67	42
Logarithmic Measure of Gap**				
Log average-wages	64	40	51	35
Average log-wage	70	45	38	18

* Adjusted refers to earnings adjusted for differences in hours worked.
** These measures refer to the wage gap relative to a weighted average of the levels of wages in the two sectors, and have the advantage of being "independent" of the baseline levels

4.3 The overall wage gap

Table 7 presents estimates for the wage gap between the public and private sectors for Brazil. Average earnings tend to be much higher in the public than in the private sector. This table also shows that the wage gap between the sectors is much greater when labor income is not standardized for the number of hours worked, indicating that workers in the public sector work fewer hours per week than workers in the private sector. The non-standardized wage gap tends to be between 15% and 20% smaller than the corresponding gap in standardized wages. The results using the standardized wages indicate that the relative wage gap between the sectors is equivalent to 33% of the average wage in the public sector or 48% of the average wage in the private sector.

The results using the standardized wages indicate that the relative wage gap between the sectors is equivalent to 33% of the average wage in the public sector or 48% of the average wage in the private sector. The two log-wage gaps are close to 0.40. The gap in log-average-wage is 0.39 whereas the gap in average log-wages is 0.44. Table 7 also reports estimates of the gap between the wage of employees in the public sector and employees in the private *formal* sector, which may be the part of the private sector that those leaving government employment are more likely to seek employment in. This table reveals that this wage gap is just slightly smaller than the overall gap between the public and private sectors. More specifically, the wage gap between the public sector and the private formal sector is 30% of the public sector average wage. Hence, it is just 3 percentage points smaller than the corresponding gap between the public and the overall private sectors. Alternatively, the gap in log-average-wage is 0.35, which is just 0.05 smaller than the corresponding gap relative to the overall private sector.

This table reveals that this wage gap is smaller than the overall standardized gap between the public and private sectors. At this stage of the analysis, it is very difficult to interpret these large wage gaps. Three factors complicate such a comparison: first, there are large differences in average earnings within the public (e.g., between municipal and legislative workers) and private sectors (e.g., between agricultural and service sector workers); second, there are regional differences in average earnings (e.g., between state employees in Pernambuco and São Paulo); and third, there are large differences across workers by individual attributes (e.g., workers in the public sector tend to be better educated and older). Henceforth, only wage gaps adjusted for hours worked will be discussed and

reported in the paper. Readers can find results for unadjusted differences in the tables at the end of the paper.

The natural next step is to estimate the wage gap between workers in the public and private sectors with identical observed characteristics. Nevertheless, before we proceed in this direction, we dedicate the next section to the analysis of the degree of wage heterogeneity within the public sector.

4.4. Heterogeneity in the public sector

Thus, the natural next step is to estimate the wage gap between workers in the public and private sectors with identical observed characteristics. Nevertheless, before we adjust for worker-specific characteristics, we examine the degree of wage heterogeneity within the public sector. To do this, we use two alternative decompositions. The first uses a desegregation based on the sector of economic activity where we distinguish between the three levels of public administration (federal, state, and municipal), public health and education, and the legislative and judiciary activities. This desegregation of the public sector is not exhaustive since it cannot distinguish employment in public enterprises from private employment. The second decomposition, which is based on information on both the type of labor contract and on the level of government, is exhaustive and permits decompose the employment at each level of government into public servants and employees with and without a signed work card.

Table 8 presents estimates for the wage gap between segments of the public sector and the overall private sector. This table uses both desegregation procedures for the employment in the public sector. The results indicate a great level of heterogeneity within the public sector, with the average wage being much higher in certain segments of the public sector than in others. Wages are particularly higher in federal administration, in particular, in the legislative and judiciary sectors. In these sectors, average wages are between 150% and 250% higher than the average for the private sector. At the other extreme, workers in health and education, in particular those at the municipal level, have earnings that are close to the average for the private sector or even below it. The average wage in municipal administration is 16% lower than the average in the private sector. For state administration and military personnel, wages are close to 70% above the average in the private sector.

Similar results are obtained using the alternative desegregation of the public sector based on the nature of labor contracts and level of government. Wages are particularly high among federal public servants, and employees in federal enterprises. (For simplicity we identify workers in the public sector with signed working card with employees in public enterprises.) In both cases the wage gap is greater than 150% of the average wage in the private sector. For military personnel, state public servants and employees of state enterprises, the average wage gap is about 75% to 100% of the average wage in the private sector. The average wage of municipal public servants and employees of municipal enterprises is below the average for the private sector, with the wages of employees in municipal enterprises being particularly low.

Overall, the average wages in all segments of the public sector tend to be above those paid in the private sector, the only exceptions are the wages paid by municipal administrations and enterprises. But these comparisons also reveal a large degree of heterogeneity in wages among subsectors within the public sector, with the average wage in federal administration being more than 200% higher than the corresponding average paid in municipal administrations.

Table 8
Measures of the Public Sector Wage Premium
Unadjusted for Region and Worker Attributes

Measure	Relative Wage Gap(%):		Logarithmic Measure of Gap**:	
	Baseline: Public Wage	Baseline: Private Wage	Log average -wage	Average log -wage
By Sector of Activity:				
Federal Administration	61.9	162.5	1.0	1.2
State Administrations	41.1	69.9	0.5	0.7
Municipal Administrations	-18.8	-15.8	-0.2	-0.0
Judicial & Legislative	69.8	231.0	1.2	1.3
Military	41.1	69.9	0.5	0.7
Education and Health	16	18	0.2	0.2
By Class of Worker:				
Federal Public Servants	67.4	207.0	1.1	1.4
Federal other, with signed card	62.5	166.4	1.0	1.2
Federal other, no signed card	40.5	68.2	0.5	0.4
State Public Servants	37.7	60.5	0.5	0.7
State other, with signed card	48.8	95.3	0.7	0.8
State other, no signed card	-1.2	-1.1	-0.0	0.1
Municipal Public Servants	-2.9	-2.8	-0.0	0.1
Municipal other, with signed card	-48.8	-32.8	-0.4	-0.2
Municipal other, no signed card	-71.4	-41.7	-0.5	-0.7
Military	41.8	71.7	0.5	0.7

* All estimates are for earnings adjusted for differences in hours worked.
** This measure is the wage gap relative to a weighted average of the levels of wages in the two sectors

4.5 Regional differences in the public-private wage-gap

In previous sections, we considered the magnitude of the overall wage gap between the public and private sectors. This overall gap, however, captures both intrinsic differences in wages between these sectors and differences in the characteristics of workers in the two sectors. In this section we consider the role of spatial differences in the distribution of public and private employment. More specifically we investigate three topics: first, we investigate whether public employment is over-represented in the poorest states; second, we investigate how the uneven distribution of public employment across states affects the overall level of the wage gap between the public and private sectors; and finally we investigate how the within-state wage gap between the public and private sectors varies across states. In this subsection we only consider the hours-standardized measure for wages.

As far as differences in the spatial distribution of the labor force are concerned, Annex Table 1 reveals that public employment tends to be only marginally over-represented in areas with lower average wage (the northeastern states). In fact, public employment is over-represented in the Federal District and in Rio de Janeiro, which are among the states with the highest average wage. Employment in the public sector is slightly over-represented in the poorer areas: 49% of public employment and 46% of private employment are in states with average wage below the national average. The results indicate that the gap in average log-wage would increase from 44% to 46% if public employment had the same spatial distribution as private employment, i.e., public employment has a "locational disadvantage" of only 2%.

Annex Table 2 presents alternative measures for the wage gap for the entire country and for the states and metropolitan areas included for study in this report. This table reveals that the wage gap tends to be considerably higher for the metropolitan areas than for the corresponding states. This is especially true in the northeastern states of Pernambuco and Bahia, and in the State of Minas Gerais. São Paulo is the only state where the wage gap for the metropolitan area is smaller than for the corresponding gap for the entire state.

The average gap between the public and private sectors is much higher in Brasília than in any state. The average wage gap tends to be high in the northeast. and lower in the more developed states in the South and Southeast of Brazil, particularly in São Paulo, Paraná and Santa Catarina. But it is also very low in a few poor states like Ceará and Alagoas (see tables in Statistical Annex).

4.6 Role of differences in worker characteristics

In this section we examine the role of differences in the characteristics of workers between the public and private sectors in explaining the wage gap between the two sectors. The fundamental question being answered is: What fraction of the wage gap between the two sectors is simply due to sectoral differences in the characteristics of the labor force employed in the two sectors?

To investigate this question we consider the labor market of the major six Brazilian metropolitan areas and Brasília. The restriction of the analysis to these seven well-defined local labor markets is useful to isolate the wage gap between the public and private sectors from possible spatial differences among local markets. This restriction, however, also has some important disadvantages. The major disadvantage is the fact that the nature of public employment in large metropolitan areas is likely to be different from smaller urban areas. The contribution of federal and state employment is likely to be greater. Moreover, municipal jobs in metropolitan areas are more likely to be better paid. As a consequence, the wage gap estimated for these areas is likely to over-estimate the gap for the entire urban labor market in the respective state.

4.6.1. Methodology

The basic methodology consists of estimating the wage gap between workers with identical observed characteristics in the public and private sectors. This wage gap, which will referred as the ***controlled wage gap***, is taken as an estimate of the wage advantage faced by workers in the public sector. The difference between this gap and the overall ***gross wage gap*** is a measure of the impact of sectoral differences in the composition of their labor force on the overall wage gap between the sectors.

The basic set of observed characteristics includes *gender, race, schooling,* and *age*. We also work with a version of this set that includes *tenure at the current job*. Workers in the public sector tend, on average, to have been in their current job for a longer period of time. Since to a considerable extent this is not a result of any differential merit between employees in the public and private sectors, but one of the major advantages of jobs in the public sector, it is unclear whether we should control for this characteristic. Hence, we present all results including and excluding tenure from the analysis.

The methodology used to compare the wage of observably identical workers in the public and private sectors consists of three steps. In the first, we regress the log-wages of workers on their characteristics and on an indicator of whether they are in the public or in the private sector. In the second step, based on the results of these regressions, we compute what would be the average wage of public employees if they

were in the private sector, given their personal characteristics. Finally, we obtain the wage gap between workers with identical observed skills as the difference between the actual average log-wage in the public sector and the average log-wage they would receive if they were in the private sector, as estimated in the second step.

We implement this procedure using both the standardized and the non-standardized measure for wages. In both cases, two alternative specifications for the log-wage regressions are used. To describe the specification of these regressions, we concentrate the attention to the regressions that include tenure, the other regressions are obtained simply by omitting tenure.

We begin by establishing some notation. Thus, let w denote the wage and denote by h the regression function of log-wages on gender (g), race (r), schooling (e), age (a), tenure (t), and an indicator for the public sector (p), i.e.,

$$E[\ln(w)/g, r, e, a, t, p] = h(g, r, e, a, t, p)$$

Then, the specification of the regressions can be seen as a series of hypothesis about the functional form of h. Our basic assumption is that the regression function is separable on gender, race, schooling, age, and tenure, but not necessary on the indicator for the public sector, i.e.,

$$h(g, r, e, a, t, p) = f_1(g, p) + f_2(r, p) + f_3(e, p) + f_4(a, p) + f_5(t, p)$$

To allow for the regression function to be non-separable on p, the indicator for the public sector, is central to the analysis in this study. This non-separability is a necessary condition for the wage advantage of workers in the public sector to vary with their characteristics. If the regression function were separable in p the wage advantage would be identical for all types of workers.

To further simplify the empirical analysis, we assume that the dependency on schooling and tenure are linear and the dependency on age is quadratic, i.e., we assume that

$$f_3(e, p) = a_3(p).e$$

$$f_5(t, p) = a_5(p).t$$

and that

$$f_4(a, p) = a_4(p).a + b_4(p).a^2$$

Moreover, we can, without any loss of generality, write the functions on gender and race also as linear functions, since they are dichotomous variables, i.e., we can, without any loss of generality, write

$$f_1(g, p) = a_1(p).g$$

and

$$f_2(r, p) = a_2(p).r$$

Collecting these results, we can express the log-wage regression function as

$$h(g, r, e, a, t, p) = a_0(p) + a_1(p).g + a_2(p).r + a_3(p).e + a_4(p).a + b_4(p).a^2 + a_5(p).t$$

This expression is our first specification, and will be referred as the ***general model***. We also estimate and analyze a simplified version of this model, that will be referred as the ***basic model***. To obtain the basic model we further assume that the regression is also separable on p, the indicator for the public sector. This hypothesis is equivalent to assume that the impact of all personal characteristics on the level of wages is the same in the public and private sector. That is, we assume that all coefficients except the intercept are common to both sectors. In this case the regression model becomes

$$h(g, r, e, a, t, p) = a_0(p) + a_1.g + a_2.r + a_3.e + a_4.a + b_4.a^2 + a_5.t$$

Since p is also a dichotomous variable, without any loss of generality we can express the function a_0 as a linear function, i.e.,

$$h(g, r, e, a, t, p) = \alpha + a_0 p + a_1.g + a_2.r + a_3.e + a_4.a + b_4.a^2 + a_5.t$$

In terms of estimation, the ***general model*** is estimated running regressions of log-wages on gender, race, schooling, age and tenure for the public and private sectors separately. As already mentioned, this specification has the advantage of permitting to evaluate how the wage gap between the public and private sectors varies with worker's characteristics. The ***basic model*** assumes that the wage gap is the same for all types of workers. It is estimated by regressing log-wages on gender, race, schooling, age, tenure and an indicator for public employment in a sample pooling together the public and private labor force.

In the case of the ***general model***, the average log-wage in the public sector is:

$$a_0(1) + a_1(1).\mu(g/1) + a_2(1).\mu(r/1) + a_3(1).\mu(e/1) + a_4(1).\mu(a/1) + b_4(1).\mu(a^2/1) + + a_5(1).\mu(t/1)$$

where, $\mu(x/1)$ denotes the average of the characteristic x in the public sector. Based on the same model the average log-wage that would prevail in the private sector if the labor force in the sector had the same characteristics as those of the public sector is given by

$$a_0(0) + a_1(0).\mu(g/1) + a_2(0).\mu(r/1) + a_3(0).\mu(e/1) + a_4(0).\mu(a/1) + b_4(0).\mu(a^2/1) + + a_5(0).\mu(t/1)$$

Therefore, the estimate of the log-wage gap between workers with identical observed characteristics is given by

$$(a_0(1)-a_0(0)) + (a_1(1)-a_1(0)).\mu(g/1) + (a_2(1)-a_2(0)).\mu(r/1) + (a_3(1)-a_3(0)).\mu(e/1) + + (a_4(1)-a_4(0)).\mu(a/1) + (b_4(1)-b_4(0)).\mu(a^2/1) + (a_5(1)-a_5(0)).\mu(t/1)$$

In the case of the ***basic model*** the average log-wage in the public sector is given by

$$\alpha + a_0 + a_1.\mu(g/1) + a_2.\mu(r/1) + a_3.\mu(e/1) + a_4.\mu(a/1) + b_4.\mu(a^2/1) + a_5.\mu(t/1)$$

and the average log-wage that would prevail in the private sector if the labor force in the sector had the same characteristics as those of the public sector labor force is given by

$$\alpha + a_1.\mu(g/1) + a_2.\mu(r/1) + a_3.\mu(e/1) + a_4.\mu(a/1) + b_4.\mu(a^2/1) + a_5.\mu(t/1)$$

As a consequence, the log-wage gap between workers with identical observed characteristics is given simply by a_0.

4.6.2. Results

Annex tables 3a and 3b present, for each metropolitan area and concept of wage, estimates of the log-wage gap between workers with identical observed characteristics (excluding and including tenure on current job, respectively).

These tables reveal that differences in the composition of the labor force are a major explanatory factor of the log-wage gap between the public and private sector. Overall these differences in the composition of the labor force are responsible for the average log-wage in the public sector being from 0.5 to 0.8 higher than in the private sector. As a consequence, these differences explain almost all the wage gap between the public and private sectors, revealing that most of the overall wage gap between the public and private sector just reflects differences in the composition of their labor force. Therefore, we reach the conclusion that overall measures for the wage gap that does control for differences in the characteristics of the labor force are bounded to be very misleading indicators of the actual wage advantage of workers in the public sector.

In terms of the individual contribution of each characteristic, around 70% of the difference is explained by the higher educational level of the labor force in the public sector. The remaining 30% is explained by the fact that public employees tend to be older and have longer tenure, with each of these two factors being responsible for 10 to 20% of the differential. The impact of the differences in the composition by gender and race is small. Differences in race composition between the private and public sectors are small and, as a consequence, they have a negligible impact on the wage gap. Contrary to the other characteristics, gender has a small negative impact, since women have lower wages and are over-represented in the public sector.

In sum, differences in the sectoral composition of the labor force are a major reason for the wage gap between the public and private sector. One of the consequences is that once the differences in composition have been eliminated, the rather high wage gap between the two sectors, becomes rather small, with Brasilia being the notable exception.

The methodology used to compare the wage of observably identical workers in the public and private sectors consists of three steps. In the first, we regress the log-wages of workers on their characteristics and a dummy variable for whether they are in the public or in the private sector. In the second step, based on the results of these regressions, we compute what would be the average wage of public employees if they were in the private sector, given their personal characteristics. Finally, we obtain the wage gap between workers with identical observed skills as the difference between the actual average log-wage in the public sector and the average log-wage they would receive if they were in the private sector, as estimated in the second step.

Annex table 4 reveals that differences in the composition of the labor force are a major explanatory factor of the log-wage gap between the public and private sector. A large fraction of the overall wage gap between the public and private sector just reflects differences in the skill composition of their labor force. Therefore, overall measures for the wage gap that do not control for differences in the characteristics of the labor force are misleading indicators of the actual wage advantage of workers in the public sector.

About 70% of the gross wage gap is explained by the higher educational level of the labor force in the public sector. The remaining 30% is explained by the fact that public employees tend to be older and have longer tenure, with each of these two factors being responsible for 10% to 20% of the differential. The impact of the differences in the composition by gender and race is small. Differences in race composition between the private and public sectors are small and, as a consequence, they have a negligible impact on the wage gap. The impact of gender differences is also small because though women have lower wages than men in either sector, they tend to be over-represented in the public sector which pays higher wages.

In sum, differences in the sectoral composition of the labor force are a major explanation for the wage gap between the public and private sector. Once the differences in worker attributes have been eliminated, the high wage gap between the two sectors becomes smaller but remains considerable for most states:

- In Brasilia, the wage gap declines to a still very large public-private wage gap of 63% among workers with identical observed characteristics.
- In Recife and Salvador, workers in the public sector receive salaries that are 32% and 21% higher respectively.

- The public-private wage gap is 17% in Belo Horizonte, 14% in Porto Alegre, and 12% in Rio de Janeiro.
- Only in São Paulo is the pattern reversed: among equally qualified workers, workers in the public sector receive salaries that are 13% lower than private sector salaries.

4.7 Controlled wage gaps by sector and class of worker

In this section we estimate the wage gap between each segment of the public sector and overall private sector controlling for differences in worker attributes. This is perhaps the best estimate of the "pure" premium enjoyed by public sector employees over what they would have earned had they held private sector jobs. Table 9 presents these estimates for the country as a whole.

The table reveals large differences among segments of the public sector with respect to their wage advantage. The wage advantage, measured by the controlled log-wage gap, is larger at the federal level for both among public servants and among employees in public enterprises. For these groups the average salaries are 35% to 65% higher than for comparable workers in the private sector. At the state level, the wage advantage is close to zero for public servants; for employees in public enterprises the wage advantage is positive and between 10% and 22%. At the municipal level, public servants and employees in public enterprises get lower wages than workers with similar observed characteristics. Overall, the evidence corroborates the existence of significant wage advantage of some segments of the public sector relative to the private sector.

Table 9
Measures of the Public Sector Earnings Premium, September 1995
Adjusted for Worker Characteristics*, by Sector/Class, Percent

Measure	Monthly**	Hourly**
By Sector of Activity:		
Federal Administration	23.1	28.9
State Administrations	-7.8	-3.8
Municipal Administrations	-31.9	-22.4
Judicial & Legislative	43.9	55.9
Military	2.3	5.7
Education and Health	-31.1	-15.6
By Class of Worker:		
Federal Public Servants	40.8	46.3
Federal other, with signed card	27.0	36.3
State Public Servants	-15.4	-5.5
State other, with signed card	10.3	18.0
Municipal Public Servants	-30.5	-17.9
Municipal other, with signed card	-31.5	-20.9
All workers without signed card	-42.6	-19.7
Military	3.6	7.2

* Workers characteristics adjusted for are age, sex, race, tenure, and education.
** Monthly earnings premia are not adjusted for differences in hours worked. Hourly earnings comparisons are adjusted for differences in hours worked.

As mentioned earlier, the main advantage of the general model relative to the basic model is to allow an analysis of variations in the controlled log-wage gap

across different types of workers. In this section we explore this further. We investigate how the controlled log-wage gap varies with the educational level of workers, with their age and tenure, and with their race and gender. The methodology consists of two steps: first, we compute the log-wage gap for a baseline type of workers, and second, we vary each characteristic in turn and estimate how the wage gap changes as these characteristics change.

The "standard" or baseline worker is assumed to be a white male with 8 years of schooling, who is 35 years old and has worked 5 years in his current job. This is the prototypical worker in the private sector in metropolitan Brazil. The controlled log-wage gap for this type of worker is presented in Annex tables 6a and 6b. This table also indicates how this gap varies with race and gender, with the level of schooling, age and tenure.

Except for the fact that the wage advantage of women in the public sector is clearly greater than that for men, all other results are not robust across regions. Annex tables 7a and 7b illustrate this conclusion. In this table we indicate which groups have greater wage advantage in the public sector in each region. This table reveals no general patterns. The profile of the groups with greater wage advantage seems to be completely region-specific.

5. PUBLIC-PRIVATE DIFFERENCES IN PENSIONS

The calculation of public private differentials is somewhat complicated, and we present the technique only in outline here, focusing the discussion on results instead. To estimate differences in pensions for public servants and those receiving social security benefits from the INSS Time of Service and Old Age schemes, we use the following technique:

- First, using 1995 PNAD survey data for the seven metropolitan areas used in this report, we estimate the profile of monthly earnings for male and females, divided further into four worker categories (public servants, private *com carteira*, private *sem carteira*, and private selfemployed) and three education groups (0-8 years, 9-11 years, and 12+ years of schooling).

- Second, using these estimated earnings profiles, and assuming that all males retire after 35 years of service, and all women after 30 years, we estimate the average pension levels for each group. For public servants, we use the 36th year's salary in the 36th year as the estimated monthly pension (because pensions for public servants are based on the last month's salary). For *com carteira* salaried workers and the selfemployed, we use the 34th year's salary as the estimated pension level (because INSS time of service benefits are based on salary levels in the last 36 months of service). Note that we make the assumption that selfemployed workers do actually contribute to and receive social security. For *sem carteira* workers, we assume that these workers will receive minimum pensions from other INSS programs: their pension levels are assumed to be equal to one minimum wage in 1995, which we assume to be R$100.

- Third, we make adjustments for the fact that INSS pensions are capped at 10 minimum wages. This results in pensions for *com carteira* men with 12+ years of education being restricted to equal 1000.

- Fourth, using weights obtained from nationwide PNAD data for 1995 on the shares of *com carteira* and *sem carteira* employees, and selfemployed workers, we compute the average expected pensions for private sector men and women. We do not consider pensions from the complementary social security system (i.e., closed or company funds).

- Finally, these numbers are compared with expected monthly pensions for public servants with the same education level. Table 10 reports the results of these estimations.

The results show that due to the nature of the estimated profiles and differences in rules (basically the pension ceiling of 10 minimum salaries), public-private differences are greater for men than for women, and greatest for the most educated male workers. Thus, the average *CLTista* male worker with 0-8, 9-11, and 12+ years of schooling will receive, respectively, 75%, 72% and 50% of the monthly pension level of his *estatutario* counterpart. The corresponding numbers for women are 73%, 73%, and 71%. The findings on private pay and pension differences, combined with the fact that pension contribution rates are 0-2% for public servants but range between 8-11% for CLTistas, have important implications for the structure of optimal severance packages, and the likely success and full costs of current voluntary severance programs.

Table 10
Estimated Monthly Pensions, September 1995 Reais

Gender/Education	Public	Private			
		With Card	*Without Card*	*Selfemployed*	*Total**
Males					
0-8 years schooling	447	430	100	407	335
9-11 years schooling	772	758	100	686	558
12+ years schooling	1747	1793**	n.a.	n.a.	1000
Females					
0-8 years schooling	264	226	100	213	190
9-11 years schooling	448	447	100	362	326
12+ years schooling	927	995	100	832	655

Source: PNAD Surveys, IPEA-World Bank calculations. Men are assumed to retire after 35 years of service, and women after 30 years.
* Using weights derived from nationwide PNAD employment distribution data.
** Capped at 10 times the minimum monthly salary level, assumed to be R$100 in September 1995
n.a. signifies that the sample was too small to permit reliable estimation of experience-earnings profiles.

5. PUBLIC-PRIVATE DIFFERENCES IN JOB SECURITY

Table 11 presents the average tenure on the current job in months, for the seven metropolitan areas. The table presents the average tenure in the public and private sectors, the "raw" gap in average tenure, and then the gap controlling for differences in worker-specific attributes. Not surprisingly, it appears that public sector workers have more job security, as measured by the tenure at the current job, adjusting for characteristics such as age, education, and gender. This is only a crude measure of job

security, because it does not measure *expected* tenure. Nevertheless, it suggests that public sector workers, besides earning higher wages in all states except São Paulo, also have jobs that are more secure. Estimates of public-private gaps in job security range between 50% for the federal district and 20-35% in the six states.

This advantage of public sector workers is strengthened by their lower unemployment rates, classified by sector of previous employment. But this pattern is reversed when worker-specific attributes are controlled for. Combined with the finding for average tenure differences, this may indicate that while public sector workers are less likely to lose their jobs, they are more likely to stay unemployed if in fact they do.

Table 11
Measures of the Public-Private Tenure and Unemployment Gap, By State, in September 1995

Metropolitan Region	Public	Private	Gap	Controlled Gap*
	Average Tenure (Months)			
Distrito Federal	119	57	63	46
Pernambuco	119	93	27	27
Bahia	108	96	12	16
Minas Gerais	104	78	26	18
Rio de Janeiro	132	68	64	49
São Paulo	114	66	48	31
Rio Grande do Sul	123	89	34	31
	Average Unemployment Rates (Percent)			
Distrito Federal	1.0	4.9	-3.9	2.9
Pernambuco	1.2	5.2	-4.0	3.6
Bahia	1.8	5.4	-3.6	2.7
Minas Gerais	1.7	4.1	-2.5	1.2
Rio de Janeiro	1.1	3.7	-2.7	1.8
São Paulo	1.5	5.2	-3.7	2.0
Rio Grande do Sul	2.3	5.0	-2.7	1.7

* Estimates are for differences for workers with identical characteristics..

7. CONCLUSIONS

In this paper, we have documented public-private differentials in employment and pay at both aggregate and disaggregated levels. This helps in identifying where public employment is relatively high and where, alternatively, the problem of high public payroll costs is the result of private-public differentials in compensation.

- Using PNAD surveys, we examined public-private employment differences in ***selected states*** (Pernambuco, Minas Gerais, São Paulo, Rio de Janeiro, and Rio Grande do Sul) and federal district.
- For the country as a whole, and for each of these states (and the federal district), we examined the share of public employment at ***different levels of government*** - federal, state, and municipal, and public enterprises.
- For the country as a whole, and for these selected states, we examined public and

private employment by ***type of contract*** (e.g., *com carteira*, or *sem carteira*).

Under the constraints imposed by the 1988 Constitution, state and federal governments have relied largely on incentives to tenured public employees to voluntarily leave government employment (see Carneiro and Gill, 1997). In most cases, the size of "optimal" severance packages required for employees to leave depends not only on the level of public earnings, but on public-private *differences* in earnings, pensions, job stability, and other benefits. Much of the discussion surrounding fiscal adjustment, however, has focussed only on the former. This paper's results can assist in shifting the focus to the latter:

- Based on nationwide household surveys, we compute public-private differences in monthly ***earnings***, adjusting for worker characteristics such as education, age, tenure, sex, and race.
- Using experience-earnings profiles, and rules for determining pensions, we compute public-private differentials in ***pensions***.
- Using tenure in current job, we estimate public-private differentials in ***job stability***.

This approach lends itself easily to policy discussions. Labor market reforms that reduce the cost of labor and raise the demand for labor (e.g., by lowering payroll tax rates), or social security reforms that make INSS pension benefits conform more closely with contributions, or reforms that lower artificially high turnover rates and increase private sector job stability (e.g., social security reforms that lower the informality of employment or a redesign of the *fundo garantia por tempo de servico* - FGTS) would reduce private-public differentials in earnings, pensions, and job stability respectively, and make it easier to reduce civil service employment. Similarly, an administrative reform bill for the public sector that enforces longer working hours, requires civil servants to make contributions for pensions at the same rate as for INSS benefits, or eliminates tenure, would also reduce public-private differentials in earnings, pensions, and job stability and make it easier to reduce public employment.

Focussing on public-private *differentials* also helps to illustrate that there is more than one way to achieve the same objective. Thus, the incentives for public sector employees to give up government jobs can be made stronger by reducing ***public*** sector earnings, pensions, and job stability; or by increasing ***private*** earnings, formality of employment, or job stability.

Finally, the analysis can also be used to distinguish the effects of policy measures that require constitutional reforms, and those that are feasible under current legislative conditions. Thus, the severance packages that are necessary ***and sufficient*** to compensate workers for possible losses in earnings and pensions can be estimated.

REFERENCES

Carneiro, Francisco G., and Indermit S. Gill. 1997. "Effectiveness and Financial Costs of Voluntary Severance Programs in Brazil: 1995-1997." Economic Note no. 25, Country Department I, Latin America Region, The World Bank, Washington, DC, USA.

Annex Table 1: The spatial distribution of the labor force, average wage and log-wages

State	Share of public sector	Share of private sector	Average wage		Log-wages		Relative wage gap between public and private sectors			
			Public sector (Wa)	Private sector (Wb)	Public sector ln(Wa)	Private sector ln(Wb)	baseline: Wage in public sector (G1a)	baseline: Wage in private sector (G1b)	Gap in log-average-wages (G2)	Gap in average-log-wages (G3)
Acre	0.54	0.14	647.62	463.26	5.95	5.58	0.28	0.40	0.34	0.37
Alagoas	2.05	1.48	440.74	254.61	5.32	4.94	0.42	0.73	0.55	0.38
Amazonas	1.63	0.98	496.76	399.07	5.69	5.49	0.20	0.24	0.22	0.20
Amapa	0.43	0.13	643.56	393.87	6.15	5.57	0.39	0.63	0.49	0.58
Bahia	7.04	7.21	407.43	243.05	5.40	4.92	0.40	0.68	0.52	0.48
Ceara	3.90	3.93	453.16	217.68	5.24	4.81	0.52	1.08	0.73	0.43
Distrito Federal	2.80	1.02	1278.80	531.92	6.80	5.74	0.58	1.40	0.88	1.06
Espirito Santo	1.76	1.83	673.80	364.07	6.02	5.36	0.46	0.85	0.62	0.66
Goias	2.93	3.06	517.03	325.79	5.64	5.27	0.37	0.59	0.46	0.37
Maranhao	2.75	2.93	385.49	165.55	5.22	4.50	0.57	1.33	0.85	0.72
Minas Gerais	10.06	11.45	544.77	356.48	5.80	5.29	0.35	0.53	0.42	0.51
Mato Grosso do Sul	1.49	1.29	574.65	385.16	5.89	5.40	0.33	0.49	0.40	0.49
Mato Grosso	1.71	1.53	577.06	381.56	5.92	5.45	0.34	0.51	0.41	0.47
Para	2.14	1.66	578.72	313.76	5.72	5.24	0.46	0.84	0.61	0.48
Paraiba	2.74	1.69	489.01	220.80	5.42	4.82	0.55	1.21	0.80	0.60
Pernambuco	3.95	4.20	468.04	255.00	5.51	5.02	0.46	0.84	0.61	0.49
Piaui	1.90	1.30	411.03	163.02	5.31	4.54	0.60	1.52	0.92	0.77
Parana	5.70	6.08	610.80	436.67	5.93	5.51	0.29	0.40	0.34	0.42
Rio de Janeiro	10.42	9.42	748.31	468.98	6.16	5.61	0.37	0.60	0.47	0.55
Rio Grande do Norte	2.20	1.41	525.48	214.76	5.53	4.87	0.59	1.45	0.89	0.66
Rondonia	0.96	0.49	796.50	463.24	6.24	5.55	0.42	0.72	0.54	0.69
Roraima	0.34	0.09	507.97	554.52	5.98	5.86	-0.09	-0.08	-0.09	0.12
Rio Grande do Sul	6.70	6.85	674.54	452.47	6.11	5.57	0.33	0.49	0.40	0.54
Santa Catarina	2.62	3.67	701.70	482.64	6.12	5.70	0.31	0.45	0.37	0.42
Sergipe	1.17	0.82	438.94	231.66	5.44	4.92	0.47	0.89	0.64	0.52
Sao Paulo	20.04	25.35	760.47	610.52	6.22	5.92	0.20	0.25	0.22	0.30
Brazil	99.97	100.01	623.44	417.08	5.88	5.43	0.33	0.49	0.40	0.45
Counter-factual public (	...	...	621.97	...	5.89	...	0.34	0.58	0.44	0.46
Counter-factual private	...	...	...	403.91	...	5.39	0.36	0.63	0.47	0.48

Source: Constructed based on information of Pesquisa por Amostra de Domicilios (PNAD) - 1995.

Note (1) - Counter-factual simulation: Overall gap if the spatial distribution of public employment were identical to the spatial distribution of private employment (using spatial private shares as weights).

(2) - Counter-factual simulation: Overall gap if the spatial distribution of private employment were identical to the spatial distribution of public employment (using spatial public shares as weights).

Annex Table 2: Alternative measures for the states and metropolitan areas - 1995

	Average wage		Log-wages		Relative wage gap between public and private sectors			
	Public sector (Wa)	Private sector (Wb)	Public sector ln(Wa)	Private sector ln(Wb)	baseline: Wage in public sector (G1a)	baseline: Wage in private sector (G1b)	Gap in log-average-wages (G2)	Gap in average log-wages (G3)
Brazil	623.44	417.08	5.88	5.43	0.33	0.49	0.40	0.45
Distrito Federal	1278.80	531.92	6.80	5.74	0.58	1.40	0.88	1.06
Metropolitan area								
Pernambuco								
State	468.04	255.00	5.51	5.02	0.46	0.84	0.61	0.49
Metropolitan area (Recife)	650.61	323.16	5.96	5.25	0.50	1.01	0.70	0.71
Bahia								
State	407.43	243.05	5.40	4.92	0.40	0.68	0.52	0.48
Metropolitan area (Salvador	662.41	381.24	5.92	5.26	0.42	0.74	0.55	0.66
Minas Gerais								
State	544.77	356.48	5.80	5.29	0.35	0.53	0.42	0.51
Metropolitan area (Belo Hor	798.66	443.45	6.21	5.56	0.44	0.80	0.59	0.65
Rio de Janeiro								
State	748.31	468.98	6.16	5.61	0.37	0.60	0.47	0.55
Metropolitan area (Rio de J	816.36	511.19	6.27	5.70	0.37	0.60	0.47	0.56
Sao Paulo								
State	760.47	610.52	6.22	5.92	0.20	0.25	0.22	0.31
Metropolitan area (Sao Pau	838.70	730.46	6.33	6.11	0.13	0.15	0.14	0.22
Rio Grande do Sul								
State	674.54	452.47	6.11	5.57	0.33	0.49	0.40	0.54
Metropolitan area (Porto Al	884.18	557.38	6.37	5.78	0.37	0.59	0.46	0.59

Source: Constructed based on information of Pesquisa por Amostros de Domicilio (PNAD) - 1995.

Annex Table 3a: Estimates or iog wage-gap controlled for defferences in observed characteristics composition effects

Region	Standardized		Non-Standardized		Standardized		Non-Standardized	
	General (1)	Basic (2)	General (3)	Basic (4)	General (1)	Basic (2)	General (3)	Basic (4)
Distrito Federal								
Gender	0.00	0.00	0.00	0.00	0.28	0.22	0.41	0.33
race	0.02	0.02	0.02	0.02	2.76	2.57	2.63	2.44
education	0.54	0.54	0.50	0.52	79.28	77.91	77.13	76.19
age	0.12	0.13	0.13	0.14	17.68	19.30	19.83	21.05
total	0.68	0.69	0.65	0.68	100.00	100.00	100.00	100.00
Recife								
Gender	-0.03	-0.03	-0.04	-0.04	-4.46	-4.40	-6.60	-6.48
race	0.01	0.01	0.01	0.01	1.67	1.70	2.46	2.25
education	0.50	0.52	0.49	0.50	88.32	87.87	87.70	87.26
age	0.08	0.09	0.09	0.10	14.47	14.83	16.44	16.97
total	0.57	0.59	0.56	0.58	100.00	100.00	100.00	100.00
Salvador								
Gender	-0.04	-0.04	-0.06	-0.06	-7.01	-6.99	-10.50	-10.32
race	0.04	0.04	0.04	0.04	6.36	6.45	6.40	6.28
education	0.47	0.47	0.43	0.44	78.36	78.29	76.81	76.68
age	0.13	0.13	0.15	0.16	22.30	22.25	27.28	27.35
total	0.60	0.06	0.56	0.57	100.00	100.00	100.00	100.00
Belo Horizonte								
Gender	-0.06	-0.05	-0.08	-0.08	-9.13	-8.48	-14.25	-13.39
race	0.03	0.03	0.03	0.03	5.36	5.00	5.26	4.82
education	0.51	0.53	0.48	0.49	83.35	83.28	84.75	84.44
age	0.13	0.13	0.14	0.14	20.42	20.21	24.24	24.12
total	0.61	0.63	0.57	0.59	100.00	100.00	100.00	100.00
Rio de Janeiro								
Gender	-0.01	-0.01	-0.01	-0.01	-1.18	-1.19	-1.96	-1.95
race	0.01	0.01	0.01	0.01	2.12	2.09	2.04	2.03
education	0.45	0.44	0.43	0.43	85.31	85.15	84.63	84.46
age	0.07	0.07	0.08	0.08	13.75	13.96	15.29	15.46
total	0.52	0.52	0.50	0.50	100.00	100.00	100.00	100.00
Sao Paulo								
Gender	-0.06	-0.06	-0.09	-0.09	-11.82	-12.08	-20.09	-20.07
race	0.01	0.01	0.01	0.01	1.13	1.12	1.20	1.18
education	0.39	0.39	0.37	0.37	83.48	83.69	87.45	87.23
age	0.13	0.13	0.13	0.14	27.20	27.27	31.44	31.66
total	0.47	0.47	0.43	0.43	100.00	100.00	100.00	100.00
Porto Alegre								
Gender	-0.03	-0.03	-0.05	-0.05	-5.31	-5.25	-9.32	-9.00
race	0.00	0.00	0.00	0.00	0.05	0.05	0.07	0.07
education	0.52	0.52	0.50	0.50	93.18	92.66	94.11	93.37
age	0.07	0.07	0.08	0.08	12.08	12.54	15.15	15.57
total	0.56	0.56	0.53	0.54	100.00	100.00	100.00	100.00

Source: Constructed based on information of Pesquisa por Amostra de Domicilio (PNAD) - 1995.

Annex Table 3b: Estimates of log wage-gap controlled for defferences in observed characteristics

Region	Standardized		Non-Standardized		Standardized		Non-Standardized	
	General (1)	Basic (2)	General (3)	Basic (4)	General (1)	Basic (2)	General (3)	Basic (4)
Distrito Federal								
Gender	0.00	0.00	0.00	0.00	0.24	0.19	0.35	0.28
race	0.02	0.02	0.02	0.02	2.29	2.26	2.15	2.10
education	0.54	0.53	0.50	0.51	69.68	69.91	67.21	67.45
age	0.10	0.11	0.11	0.12	13.47	14.81	15.09	15.84
Tenure	0.11	0.10	0.11	0.11	14.33	12.82	15.20	14.32
Total	0.77	0.76	0.74	0.76	100.00	100.00	100.00	100.00
Recife								
Gender	-0.03	-0.03	-0.04	-0.04	-3.98	-3.90	-5.83	-5.69
race	0.01	0.01	0.01	0.01	1.45	1.49	2.13	1.96
education	0.50	0.51	0.49	0.50	79.26	78.88	77.61	77.18
age	0.07	0.07	0.08	0.08	11.32	11.42	12.70	12.87
Tenure	0.08	0.08	0.08	0.09	11.95	12.11	13.38	13.68
total	0.63	0.65	0.63	0.65	100.00	100.00	100.00	100.00
Salvador								
Gender	-0.04	-0.04	-0.06	-0.06	-5.88	-6.00	-8.96	-8.96
race	0.04	0.04	0.04	0.04	5.43	5.63	5.52	5.50
education	0.46	0.46	0.43	0.43	66.58	67.62	65.88	66.66
age	0.11	0.11	0.13	0.13	15.45	15.63	20.17	20.39
Tenure	0.13	0.12	0.11	0.11	18.42	17.03	17.39	16.41
Total	0.70	0.69	0.65	0.65	100.00	100.00	100.00	100.00
Belo Horizonte								
Gender	-0.05	-0.05	-0.08	-0.08	7.96	-7.35	-12.08	-11.32
race	0.03	0.03	0.03	0.03	4.75	4.47	4.50	4.18
education	0.50	0.51	0.47	0.48	73.30	72.92	71.77	71.30
age	0.11	0.11	0.12	0.12	16.24	15.63	18.44	17.91
Tenure	0.09	0.10	0.11	0.12	13.67	14.34	17.37	17.93
Total	0.68	0.71	0.66	0.68	100.00	100.00	100.00	100.00
Rio de Janeiro								
Gender	-0.01	-0.01	-0.01	-0.01	-0.94	-0.96	-1.56	-1.58
race	0.01	0.01	0.01	0.01	1.68	1.70	1.58	1.63
education	0.44	0.43	0.42	0.41	70.22	70.98	68.68	69.49
age	0.06	0.06	0.06	0.06	9.62	9.72	10.63	10.70
Tenure	0.12	0.11	0.13	0.12	19.42	18.55	20.67	19.76
Total	0.62	0.61	0.61	0.60	100.00	100.00	100.00	100.00
Sao Paulo								
Gender	-0.05	-0.05	-0.08	-0.08	-9.54	9.76	-17.19	-16.18
race	0.00	0.00	0.00	0.00	0.91	0.92	0.93	0.93
education	0.38	0.38	0.36	0.36	71.41	71.53	72.49	72.22
age	0.11	0.11	0.11	0.11	20.43	20.28	22.71	22.67
Tenure	0.09	0.09	0.10	0.10	16.78	17.03	20.06	20.36
Total	0.54	0.53	0.50	0.50	100.00	100.00	100.00	100.00
Porto Alegre								
Gender	-0.03	-0.03	-0.05	-0.05	-4.09	-4.09	-7.38	-7.20
race	0.00	0.00	0.00	0.00	0.04	0.04	0.06	0.06
education	0.51	0.50	0.48	0.48	76.93	77.03	76.42	76.46
age	0.06	0.06	0.07	0.07	9.03	9.28	11.36	11.62
Tenure	0.12	0.12	0.12	0.12	18.09	17.74	19.54	19.07
Total	0.66	0.65	0.63	0.63	100.00	100.00	100.00	100.00

Source: Constructed based on information of Pesquisa por Amostra de Domicilio (PNAD) - 1995.

Annex Table 4a: Estimates of the log wage-gap controlled for differences in observed characteristics

	Standardized		Non-standardized			
	General (1)	Basic (2)	General (3)	Basic (4)	(3)-(1)	(4)-(2)
Distrito Federal	0.50	0.49	0.42	0.40	-0.08	-0.09
Recife	0.28	0.27	0.15	0.14	-0.13	-0.13
Salvador	0.19	0.19	0.09	0.08	-0.10	-0.11
Belo Horizonte	0.16	0.14	0.05	0.03	-0.11	-0.11
Rio de Janeiro	0.11	0.11	0.05	0.05	-0.06	-0.06
Sao Paulo	-0.14	-0.14	-0.22	-0.21	-0.08	-0.07
Porto Alegre	0.13	0.13	0.05	0.05	-0.08	-0.08

Source: Constructed based on information of Pesquisa por Amostros de Domicilio (PNAD) - 1995.

Annex Table 4b: Estimates of the log wage-gap controlled for differences in observed characteristics

	Standardized		Non-standardized			
	General (1)	Basic (2)	General (3)	Basic (4)	(3)-(1)	(4)-(2)
Distrito Federal	0.41	0.42	0.33	0.32	-0.08	-0.10
Recife	0.22	0.20	0.08	0.07	-0.14	-0.13
Salvador	0.09	0.10	0.00	0.00	-0.09	-0.10
Belo Horizonte	0.09	0.07	-0.04	-0.06	-0.13	-0.13
Rio de Janeiro	0.01	0.02	-0.05	-0.04	-0.06	-0.06
Sao Paulo	-0.21	-0.20	-0.29	-0.28	-0.08	-0.08
Porto Alegre	0.04	0.04	-0.05	-0.04	-0.09	-0.08

Source: Constructed based on information of Pesquisa por Amostros de Domicilio (PNAD) - 1995.

Annex Table 5a: Direct comparison of public and private jobs
The results of the counter-factuals

	Standardized			Non-Standardized		
	Public	Private	Wage-Gap	Public	Private	Wage-Gap
Distrito Federal	0.45	-0.10	0.55	0.46	-0.02	0.48
Recife	-0.29	-0.58	0.29	-0.40	-0.55	0.15
Salvador	-0.15	-0.36	0.21	-0.25	-0.34	0.09
Belo Horizonte	-0.07	-0.23	0.16	-0.14	-0.19	0.05
Rio de Janeiro	-0.15	-0.25	0.10	-0.17	-0.22	0.05
Sao Paulo	0.00	0.14	-0.14	0.00	0.22	-0.22
Porto Alegre	-0.02	-0.18	0.16	-0.04	-0.12	0.08

Source: Constructed based on information of Pesquisa por Amostros de Domicilio (PNAD) - 1995.

Annex Table 5b: Direct comparison of public and private jobs
The results of the counter-factuals

	Standardized			Non-Standardized		
	Public	Private	Wage-Gap	Public	Private	Wage-Gap
Distrito Federal	0.43	-0.04	0.47	0.43	0.05	0.38
Recife	-0.31	-0.55	0.24	-0.42	-0.51	0.09
Salvador	-0.17	-0.29	0.12	-0.27	-0.28	0.01
Belo Horizonte	-0.10	-0.18	0.08	-0.17	-0.12	-0.05
Rio de Janeiro	-0.17	-0.19	0.02	-0.20	-0.16	-0.04
Sao Paulo	0.00	0.21	-0.21	0.00	0.29	-0.29
Porto Alegre	-0.04	-0.11	0.07	-0.05	-0.04	-0.01

Source: Constructed based on information of Pesquisa por Amostros de Domicilio (PNAD) - 1995.

Annex Table 6a: The controlled log-wage gap for the workers* in private sector in metropolitan Brazil
Standardized

Region	Education				Age				Tenure			
	0 years	4 years	8 years	11 years	30 years	35 years	40 years	42 years	1 year	2 years	5 years	10 years
Distrito Federal	0.42	0.40	***0.38***	0.37	0.32	***0.38***	0.43	0.47	0.43	0.42	***0.38***	0.33
Recife	0.12	0.19	***0.25***	0.30	0.20	***0.25***	0.28	0.29	0.25	0.25	***0.25***	0.25
Salvador	0.16	0.17	***0.18***	0.19	0.18	***0.18***	0.18	0.18	0.23	0.22	***0.18***	0.13
Belo Horizonte	-0.30	-0.21	***-0.12***	-0.05	-0.10	***-0.12***	-0.13	-0.14	-0.15	-0.15	***-0.12***	-0.07
Rio de Janeiro	0.07	0.06	***0.05***	0.04	0.05	***0.05***	0.05	0.06	0.08	0.07	***0.05***	0.02
Sao Paulo	-0.14	-0.16	***-0.19***	-0.21	-0.15	***-0.19***	-0.22	-0.25	-0.21	-0.20	***-0.19***	-0.17
Porto Alegre	0.09	0.08	***0.06***	0.05	0.01	***0.06***	0.11	0.16	0.09	0.08	***0.06***	0.02

Source: Constructed based on information of Pesquisa por Amostra do Domicilio (PNAD) - 1995.

Note. "Typical worker": white male with 8 years of schooling, who is 35 years old and worked at 5 years in his current job.

Annex Table 6a: Controlled log-wage gap (cont'd)
Standardized

Region	Sex		Race		Sex and race
	male	female	white	non-white	female and non-white
Distrito Federal	***0.38***	0.40	**0.38**	0.37	0.67
Recife	***0.25***	0.19	**0.25**	0.30	0.17
Salvador	***0.18***	0.17	**0.18**	0.19	0.14
Belo Horizonte	***-0.12***	-0.21	**-0.12**	-0.05	0.07
Rio de Janeiro	***0.05***	0.06	**0.05**	0.04	0.04
Sao Paulo	***-0.19***	-0.16	**-0.19**	-0.21	-0.22
Porto Alegre	***0.06***	0.08	**0.06**	0.05	0.12

Annex Table 6b: The controlled log-wage gap for the workers* in private sector in metropolitan Brazil
Non-standardized

Region	Education				Age				Tenure			
	0 years	4 years	8 years	11 years	30 years	35 years	40 years	42 years	1 year	2 years	5 years	10 years
Distrito Federal	0.16	0.19	***0.21***	0.22	0.15	***0.21***	0.26	0.30	0.23	0.23	***0.21***	0.18
Recife	-0.03	0.02	***0.07***	0.11	0.01	***0.07***	0.12	0.14	0.07	0.07	***0.07***	0.07
Salvador	-0.04	-0.01	***0.03***	0.05	0.00	***0.03***	0.04	0.06	0.06	0.05	***0.03***	-0.01
Belo Horizonte	-0.40	-0.32	***-0.25***	-0.19	-0.24	***-0.25***	-0.25	-0.24	-0.28	-0.27	***-0.25***	-0.21
Rio de Janeiro	-0.01	-0.03	***-0.04***	-0.06	-0.04	***-0.04***	-0.03	-0.01	-0.02	-0.02	***-0.04***	-0.08
Sao Paulo	-0.22	-0.26	***-0.31***	-0.35	-0.28	***-0.31***	-0.33	-0.35	-0.33	-0.33	***-0.31***	-0.29
Porto Alegre	-0.04	-0.06	***-0.07***	-0.09	-0.13	***-0.07***	-0.02	0.04	-0.04	-0.05	***-0.07***	-0.12

Source: Constructed based on information of Pesquisa por Amostra do Domicilio (PNAD) - 1995.

Note. "Typical worker": white male with 8 years of schooling, who is 35 years old and worked at 5 years in his current job.

Annex Table 6b: Controlled log-wage gap (cont'd)
Non-standardized

Region	Sex		Race		Sex and race
	male	female	white	non-white	female and non-white
Distrito Federal	***0.21***	0.52	***0.21***	0.23	0.54
Recife	***0.07***	0.03	***0.07***	0.11	0.07
Salvador	***0.03***	0.02	***0.03***	0.04	0.03
Belo Horizonte	***-0.25***	-0.09	***-0.25***	-0.19	-0.03
Rio de Janeiro	***-0.04***	-0.02	***-0.04***	-0.05	-0.03
Sao Paulo	***-0.31***	-0.26	***-0.31***	-0.30	-0.24
Porto Alegre	***-0.07***	0.04	***-0.07***	-0.02	0.09

Annex Table 7a: Estimates for the Internal Composition of the Public Sector *

Region	Standardized					Non-standardized				
	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***
Distrito Federal				0.15	0.03				0.12	0.02
Public Servants - Federal	0.66	1.77	8.54			0.61	6.93	8.54		
Non Public Servants with a signed working card - Federal	0.41	1.52	3.47			0.31	6.63	3.47		
Public Servants - State	0.54	1.65	10.32			0.42	6.74	10.32		
Non Public Servants with a signed working card - State	0.50	1.61	2.64			0.40	6.72	2.64		
Public Servants - Municipal	0.00	1.11	0.00			0.00	6.32	0.00		
Non Public Servants with a signed working card - Municipal	0.00	1.11	0.00			0.00	6.32	0.00		
Non Public Servants without a signed working card - Federal, State, Municipal	0.27	1.37	1.75			0.06	6.39	1.75		
Military Personnel	0.07	1.18	2.61			0.06	6.38	2.61		
Recife				0.04	0.02				0.02	0.01
Public Servants - Federal	0.63	1.28	1.54			0.60	6.42	1.54		
Non Public Servants with a signed working card - Federal	0.72	1.37	0.96			0.68	6.50	0.96		
Public Servants - State	0.28	0.93	4.98			0.15	5.97	4.98		
Non Public Servants with a signed working card - State	0.37	1.02	1.05			0.28	6.10	1.05		
Public Servants - Municipal	0.04	0.69	2.03			-0.13	5.69	2.03		
Non Public Servants with a signed working card - Municipal	0.00	0.65	1.11			-0.20	5.62	1.11		
Non Public Servants without a signed working card - Federal, State, Municipal	0.04	0.69	1.50			-0.18	5.64	1.50		
Military Personnel	0.32	0.97	0.82			0.27	6.09	0.82		
Salvador				0.03	0.01				0.01	0.00
Public Servants - Federal	0.66	1.55	1.53			0.58	6.63	1.53		
Non Public Servants with a signed working card - Federal	0.64	1.53	1.45			0.60	6.65	1.45		
Public Servants - State	-0.02	0.87	5.28			-0.12	5.93	5.28		
Non Public Servants with a signed working card - State	0.11	1.00	2.16			0.08	6.13	2.16		
Public Servants - Municipal	0.11	1.01	1.30			0.00	6.05	1.30		
Non Public Servants with a signed working card - Municipal	0.11	1.00	1.76			-0.04	6.01	1.76		
Non Public Servants without a signed working card - Federal, State, Municipal	0.17	1.07	1.30			-0.12	5.93	1.30		
Military Personnel	0.56	1.45	0.44			0.52	6.57	0.44		
Belo Horizonte				0.02	0.01				0.00	0.00
Public Servants - Federal	0.42	1.43	1.33			0.34	6.52	1.33		
Non Public Servants with a signed working card - Federal	0.37	1.38	0.83			0.29	6.47	0.83		
Public Servants - State	0.09	1.10	4.55			-0.04	6.14	4.55		
Non Public Servants with a signed working card - State	0.28	1.29	1.55			0.26	6.44	1.55		
Public Servants - Municipal	0.06	1.07	1.74			-0.06	6.12	1.74		
Non Public Servants with a signed working card - Municipal	-0.04	0.97	0.83			-0.10	6.09	0.83		
Non Public Servants without a signed working card - Federal, State, Municipal	-0.05	0.96	0.88			-0.30	5.89	0.88		
Military Personnel	0.09	1.09	0.28			0.05	6.23	0.28		

Annex Table 7a (continued): Estimates for the Internal Composition of the Public Sector *

Region	Standardized					Non-standardized				
	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***
Rio de Janeiro				0.02	0.00				0.01	0.00
Public Servants - Federal	0.38	1.31	2.59			0.48	6.70	2.59		
Non Public Servants with a signed working card - Federal	0.34	1.28	1.30			0.27	6.49	1.30		
Public Servants - State	0.06	0.99	3.64			-0.10	6.12	3.64		
Non Public Servants with a signed working card - State	0.29	1.23	1.05			0.31	6.53	1.05		
Public Servants - Municipal	-0.15	0.79	2.42			0.05	6.27	2.42		
Non Public Servants with a signed working card - Municipal	-0.39	0.54	0.94			-0.18	6.04	0.94		
Non Public Servants without a signed working card - Federal, State, Municipal	0.08	1.02	0.77			-0.21	6.01	0.77		
Military Personnel	0.17	1.10	1.93			-0.14	6.08	1.93		
São Paulo				-0.01	-0.01				-0.02	-0.02
Public Servants - Federal	0.36	1.71	0.39			0.22	6.78	0.39		
Non Public Servants with a signed working card - Federal	0.03	1.39	0.43			-0.08	6.48	0.43		
Public Servants - State	-0.16	1.19	3.63			-0.23	6.34	3.63		
Non Public Servants with a signed working card - State	0.05	1.41	1.34			-0.01	6.55	1.34		
Public Servants - Municipal	-0.25	1.10	1.72			-0.32	6.25	1.72		
Non Public Servants with a signed working card - Municipal	-0.15	1.21	0.88			-0.21	6.36	0.88		
Non Public Servants without a signed working card - Federal, State, Municipal	-0.41	0.95	0.69			-0.55	6.02	0.69		
Military Personnel	-0.45	0.90	0.16			-0.46	6.10	0.16		
Porto Alegre				0.02	0.01				0.01	0.00
Public Servants - Federal	0.50	1.50	0.99			0.48	6.70	0.99		
Non Public Servants with a signed working card - Federal	0.37	1.37	1.88			0.27	6.49	1.88		
Public Servants - State	-0.01	0.99	3.29			-0.10	6.12	3.29		
Non Public Servants with a signed working card - State	0.36	1.36	1.77			0.31	6.53	1.77		
Public Servants - Municipal	0.16	1.16	1.94			0.05	6.27	1.94		
Non Public Servants with a signed working card - Municipal	-0.07	0.93	1.47			-0.18	6.04	1.47		
Non Public Servants without a signed working card - Federal, State, Municipal	-0.09	0.91	1.33			-0.21	6.01	1.33		
Military Personnel	-0.18	0.82	0.46			-0.14	6.08	0.46		

Source: Constructed based on information of *Pesquisa por Amostra de Domicílio (PNAD) - 1995*.

Note: * Estimates obtained not using tenure as independent variable.

** Using the own region public sector employment shares (proportions) as weights.

*** *Using São Paulo public sector employment shares (proportions) as weights.*

Annex Table 7b: Estimates for the Internal Composition of the Public Sector *

Region	Standardized					Non-standardized				
	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***
Distrito Federal				0.12	0.03				0.09	0.02
Public Servants - Federal	0.57	1.66	8.54			0.51	6.81	8.54		
Non Public Servants with a signed working card - Federal	0.32	1.41	3.47			0.21	6.51	3.47		
Public Servants - State	0.48	1.57	10.32			0.35	6.65	10.32		
Non Public Servants with a signed working card - State	0.44	1.52	2.64			0.33	6.63	2.64		
Public Servants - Municipal	0.00	1.09	0.00			0.00	6.30	0.00		
Non Public Servants with a signed working card - Municipal	0.00	1.09	0.00			0.00	6.30	0.00		
Non Public Servants without a signed working card - Federal, State, Municipal	0.27	1.36	1.75			0.07	6.37	1.75		
Military Personnel	-0.09	1.00	2.61			-0.11	6.19	2.61		
Recife				0.03	0.02				0.01	0.00
Public Servants - Federal	0.55	1.18	1.54			0.51	6.32	1.54		
Non Public Servants with a signed working card - Federal	0.64	1.27	0.96			0.58	6.39	0.96		
Public Servants - State	0.20	0.84	4.98			0.07	5.87	4.98		
Non Public Servants with a signed working card - State	0.29	0.93	1.05			0.20	6.00	1.05		
Public Servants - Municipal	-0.03	0.61	2.03			-0.21	5.60	2.03		
Non Public Servants with a signed working card - Municipal	-0.03	0.61	1.11			-0.23	5.57	1.11		
Non Public Servants without a signed working card - Federal, State, Municipal	0.05	0.69	1.50			-0.17	5.64	1.50		
Military Personnel	0.26	0.89	0.82			0.20	6.00	0.82		
Salvador				0.02	0.00				0.00	-0.01
Public Servants - Federal	0.53	1.42	1.53			0.47	6.51	1.53		
Non Public Servants with a signed working card - Federal	0.54	1.42	1.45			0.51	6.56	1.45		
Public Servants - State	-0.15	0.73	5.28			-0.24	5.81	5.28		
Non Public Servants with a signed working card - State	0.03	0.92	2.16			0.01	6.05	2.16		
Public Servants - Municipal	0.03	0.92	1.30			-0.08	5.97	1.30		
Non Public Servants with a signed working card - Municipal	0.07	0.96	1.76			-0.07	5.97	1.76		
Non Public Servants without a signed working card - Federal, State, Municipal	0.21	1.09	1.30			-0.09	5.95	1.30		
Military Personnel	0.45	1.33	0.44			0.42	6.46	0.44		
Belo Horizonte				0.01	0.00				-0.01	-0.01
Public Servants - Federal	0.33	1.33	1.33			0.23	6.41	1.33		
Non Public Servants with a signed working card - Federal	0.27	1.28	0.83			0.17	6.35	0.83		
Public Servants - State	0.00	1.00	4.55			-0.15	6.03	4.55		
Non Public Servants with a signed working card - State	0.19	1.19	1.55			0.15	6.33	1.55		
Public Servants - Municipal	0.02	1.03	1.74			-0.11	6.07	1.74		
Non Public Servants with a signed working card - Municipal	-0.11	0.89	0.83			-0.19	5.99	0.83		
Non Public Servants without a signed working card - Federal, State, Municipal	-0.04	0.96	0.88			-0.29	5.89	0.88		
Military Personnel	-0.04	0.96	0.28			-0.10	6.07	0.28		

Annex Table 7b (continued): Estimates for the Internal Composition of the Public Sector *

Region	Standardized					Non-standardized				
	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***	Log wage-gap	Log Level	Proportions (%)	Log wage-gap **	Log wage-gap ***
Rio de Janeiro				0.00	0.00				-0.01	-0.01
Public Servants - Federal	0.26	1.18	2.59			0.26	6.36	2.59		
Non Public Servants with a signed working card - Federal	0.24	1.16	1.30			0.24	6.34	1.30		
Public Servants - State	-0.04	0.88	3.64			-0.13	5.97	3.64		
Non Public Servants with a signed working card - State	0.20	1.12	1.05			0.21	6.31	1.05		
Public Servants - Municipal	-0.22	0.70	2.42			-0.35	5.75	2.42		
Non Public Servants with a signed working card - Municipal	-0.43	0.49	0.94			-0.49	5.61	0.94		
Non Public Servants without a signed working card - Federal, State, Municipal	0.10	1.02	0.77			-0.07	6.03	0.77		
Military Personnel	0.08	1.00	1.93			0.05	6.15	1.93		
São Paulo				-0.02	-0.02				-0.03	-0.03
Public Servants - Federal	0.31	1.64	0.39			0.17	6.71	0.39		
Non Public Servants with a signed working card - Federal	-0.06	1.27	0.43			-0.19	6.35	0.43		
Public Servants - State	-0.24	1.09	3.63			-0.31	6.23	3.63		
Non Public Servants with a signed working card - State	-0.03	1.30	1.34			-0.10	6.44	1.34		
Public Servants - Municipal	-0.33	1.00	1.72			-0.41	6.13	1.72		
Non Public Servants with a signed working card - Municipal	-0.15	1.18	0.88			-0.21	6.33	0.88		
Non Public Servants without a signed working card - Federal, State, Municipal	-0.40	0.93	0.69			-0.54	6.00	0.69		
Military Personnel	-0.50	0.83	0.16			-0.52	6.01	0.16		
Porto Alegre				0.01	0.00				-0.01	-0.01
Public Servants - Federal	0.38	1.37	0.99			0.36	6.57	0.99		
Non Public Servants with a signed working card - Federal	0.26	1.24	1.88			0.16	6.37	1.88		
Public Servants - State	-0.13	0.86	3.29			-0.22	5.99	3.29		
Non Public Servants with a signed working card - State	0.20	1.19	1.77			0.15	6.36	1.77		
Public Servants - Municipal	0.08	1.07	1.94			-0.03	6.18	1.94		
Non Public Servants with a signed working card - Municipal	-0.10	0.89	1.47			-0.21	6.00	1.47		
Non Public Servants without a signed working card - Federal, State, Municipal	-0.06	0.93	1.33			-0.18	6.03	1.33		
Military Personnel	-0.26	0.72	0.46			-0.23	5.98	0.46		

Source: Constructed based on information of Pesquisa por Amostra de Domicílio (PNAD) - 1995.

Note: * Estimates obtained using tenure as another independent variable.

** Using the own region public sector employment shares (proportions) as weights.