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ESCOLA DE ECONOMIA DE SÃO PAULO

ANDRÉ LUIZ PEREIRA MANCHA

WAGE DIFFERENTIAL BETWEEN STATUTORY AND CLT PUBLIC EMPLOYEES

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Dissertação apresentada à Escola de Economia
de São Paulo of Fundação Getúlio Vargas como
requisito para obtenção do título de Mestre em
Economia.

Campo de Conhecimento: Econometria

Orientador Prof. Dr. Enlinson Henrique
Carvalho de Mattos

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Enlinson Henrique Carvalho de Mattos
(Orientador)
EESP-FGV

Regina Carla Madalozzo
INSPER

Vladimir Pinheiro Ponczek
EESP-FGV

*Dedicated to Dona Celina,
a sunshine in my life.*

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*“Every day you may make progress.
Every step may be fruitful.
Yet there will stretch out before you an ever-lengthening,
ever-ascending, ever-improving path.
You know you will never get to the end of the journey.
But this, so far from discouraging, only adds to the joy and glory of the climb.”
(Winston Churchill)*

Resumo

Desde o ano de 1998 coexistem na Administração Direta, Autarquias e Fundações Públicas, funcionários públicos estatutários e "celetistas". Esta situação decorre da Emenda 19, a qual alterou o artigo 39 da Constituição e permitiu que estas entidades contratassem funcionários pela CLT.

Essa situação perdurou até o ano de 2007, quando o Supremo Tribunal Federal (STF) suspendeu liminarmente (ADI 2135) a nova redação e dessa forma restaurou a situação original, válida atualmente.

Este trabalho se propõe a medir a diferença no salário entre servidores públicos estatutários e celetistas por meio de uma abordagem econométrica. Utilizando uma regressão de efeitos fixos foi analisado o impacto do regime de trabalho sobre o salário dos servidores e por meio da decomposição de Oaxaca-Blinder estimou-se quanto desta diferença decorre do regime de trabalho e quanto se deve às características dos indivíduos de cada grupo (escolaridade, experiência e outros).

Há indícios de que os celetistas recebem um salário R\$ 310.00 menor do que seus pares estatutários. Controlando os efeitos de cada profissão há um diferencial negativo para todas os celetistas exceto para os profissionais de alta qualificação os quais possuem um salário R\$ 95.98 maior do que os estatutários. Com relação aos outros grupos, os profissionais de baixa qualificação apresentam o menor diferencial de salários (R\$ 12.20) seguido por professores e pesquisadores (R\$ 85.27) e técnicos (R\$ 97.11). Na decomposição do diferencial a maior parte não decorre de diferenças nas características dos indivíduos de cada grupo.

O impacto dos salários e benefícios de funcionários públicos sobre as contas públicas é um dos principais pontos debatidos dentre as propostas que englobam o plano de ajuste fiscal do Governo Brasileiro. A percepção atual da sociedade é que além do governo contar com um contingente significativo de servidores públicos, estes recebem maiores salários quando comparados a trabalhadores em atividades semelhantes na iniciativa privada.

Nesse contexto o governo federal apresentou no final de 2017 uma série de medidas¹ para adequação dos gastos com folha de pagamento de servidores públicos, dentre elas a redução do salário inicial e elevação da contribuição previdenciária destes trabalhadores.

Palavras-chave: Paineis, Efeitos Fixos, Diferencial de Salário, Oaxaca-Blinder.

Códigos JEL: C23, H50, J31.

¹ [Reportagem do jornal O Globo de 16 de Agosto de 2017](#)

Abstract

Since 1998 in the Public Administration there are statutory workers ("estatutários") and others hired by the CLT labor regime ("celetistas"). This fact occurs due the Constitutional Amendment number 19, formulated that year, which has changed the article 39 of Brazilian Constitution. It allowed public entities to hire employees under CLT legislation.

This situation lasted until 2007 when the Supreme Court of Brazil suspended such modification and so the original understanding of the Constitution was reestablished.

This work intends to evaluate the wage differential between statutory and CLT employees by means of an econometric approach. Using a fixed effects regression we have analyzed the impact of the labor regime upon public workers wages and using the Oaxaca-Blinder decomposition we quantified how much of such differential is due the labor regime and how much is due to the individual characteristics (education, tenure and others).

There are evidences that CLT workers have in average wages R\$ 310.00 lower than statutory. Controlling by occupation we also see a negative prize to CLT worker to all groups except by the High Skilled Workers that have a salary R\$ 95.98 higher than the Statutory. Low Skilled Workers show the smallest differential (R\$ 12.20) followed by Teachers and Researchers (R\$ 85.27) and Technicians (R\$ 97.11). The Oaxaca-Blinder decomposition shows that the largest part is not explained by endowments differences.

The spending with wages and benefits to public employees is one of the main debates in the current scenario of fiscal adjustment facing the relevant increase of Public Debt in the last years. The Brazilian society has a perception that the Government has an excessive amount of workers and furthermore these ones receive higher wages without a reasonable explanation when compared to similar occupations in private companies.

At the end of 2017 the Brazilian Government presented an action plan² to reduce the spending with wages and benefits of public employees. Among the proposals there were a decrease in the initial salary of public service and an increase in the public pension plan contribution.

Key Words: Panel Data, Fixed Effects, Wage Differential, Oaxaca-Blinder.

JEL Codes: C23, H50, J31.

² ["O Globo" newspaper on August 16, 2017.](#)

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1 Introduction and Related Literature

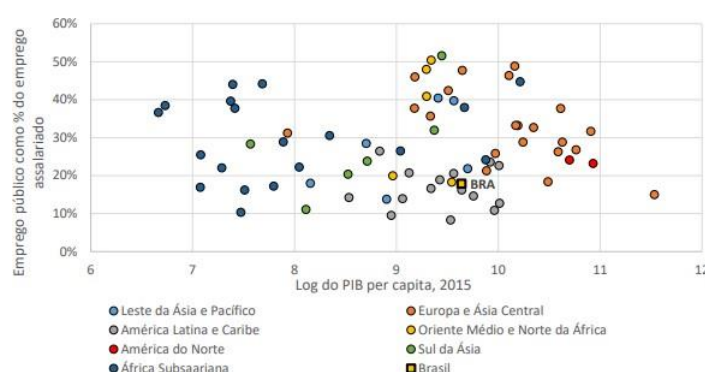
1.1 Introduction

The debate about public spending has increased in the last years because the evolution of the Public Debt. As reference the Gross Public Debt as a fraction of GDP (Gross Domestic Product) increased from 52.6% in January of 2014 to 75.3% in March of 2018.

The World Bank published in November of 2017 the Article "Um Ajuste Justo: Análise da Eficiência e Equidade do Gasto Público no Brasil" (MUNDIAL,2017) and the main conclusions were firstly (i) the Brazilian Government spends more than it can afford and, moreover, it is a bad quality spending and (ii) through the last two decades the public spending has grown consistently which jeopardizes the sustainability of Brazilian Public Debt.

The article points out that the salary mass of the public sector as a fraction of Brazilian GDP has increased from 11.6% in 2006 to 13.1% in 2015, superior than we observe in European and Developed countries such as France (13%), Portugal (11%), United States (9%), and much higher than we see in Chile (6.4%). On the other hand the ratio public employees over population in Brazil (5.6%) is higher than the average of Latin America (4.4%) but lower than the average of OCDE countries (10%). Furthermore the share of public jobs in Brazilian employment is around 18%, below the index observed in countries with similar GDP per capita. These facts together show that the salary mass of Brazilian Public workers is higher than the international standards, basically due to higher salaries and not because a huge amount of employees.

Figure 1 – Share of Public Service in Total Employment

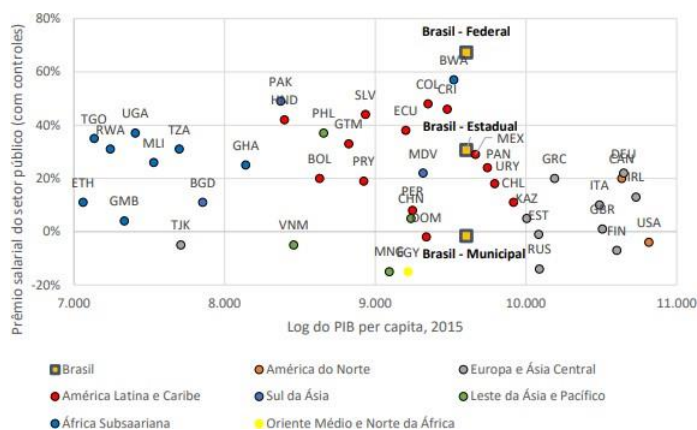


Source: Worldwide Bureaucracy Indicators, World Bank Bureaucracy Lab.

Analyzing the wages and benefits of public employees, the World Bank study presented a huge salary differential of 67% to federal public service in comparison to workers in similar

occupations in private companies, even after controlling the characteristics of each individual such as educational level, age, experience and others. In the state level there is a positive differential of 30% in favor of public employees. These differentials are pointed out by the authors as extremely higher than the international standards. Furthermore the article evaluates in 0.9% of GDP the positive impact in the Government spending if the public service wage differential was reduced by half. The paper classifies such differential as a "prize" to public employees in comparison to similar workers in private entities.

Figure 2 – Brazilian Public Service Wage Differential in an International Comparison



Source: Worldwide Bureaucracy Indicators, World Bank Bureaucracy Lab.

The approach chosen in our work is the study of the wage differential due the labor regime (statutory or CLT) of public employees. Nowadays in Brazilian Public Administration there are basically these two labor regimes due a constitutional amendment approved in 1998 that allowed Public Entities to hire workers using the CLT legislation. This change was revoked in 2007 but there is still a significant amount of CLT workers in the Public Service occupying same positions than colleagues hired under statutory rules.

Considering the data collected in the RAIS survey between 2014 and 2016, our Fixed Effects model points out a negative prize to CLT workers in almost all occupations. The exception is a small positive differential in favor of CLT High Skilled Workers. The Oaxaca-Blinder differential decomposition indicates that the largest part is due to unexplained factors (coefficients effect).

This paper is divided into five sections, including this brief introduction. The subsection 1.2 reviews the basic literature about wage differential between public and private workers in Brazil. Section 2 presents an analysis of the data and variables used in the econometric models. Section 3 presents the methodology used to evaluate the wage differential between statutory and CLT public entities employees. Section 4 describes the results founded and finally, Section 5 summarizes the main conclusions of the study.

1.2 Related Literature

The public spending is one of the main debates of politicians, media and Brazilian society nowadays. Whereas the government revenue (taxes and contributions) is decreasing in the last years due the economic recession, the public spending keep increasing over the years. Furthermore, there is a perception that the government is inefficient providing goods and services. In general it seems that public entities have a huge amount of employees but these ones have low productivity even receiving wages higher than related positions in private companies. Moreover, in some cases public employees have stability, huge benefits and a better retirement plan than private sector employees working in similar activities.

In Brazil there is basically two legislations about labor relations that are applied to public employees, (i) Statutory Regime and (ii) CLT – "Consolidação das Leis do Trabalho". In general the labor contract of all private employees are managed by CLT while in the public sector the most of employees were hired under statutory labor rules. This trend has suffered a sensitive change when some public entities started hiring workers under CLT legislation. Nowadays in some public entities there are employees in different regimes occupying similar positions. In this perspective this work will analyze if there is any salary differential in public entities depending on the labor regime of an employee. To our knowledge there is no previous works debating specifically this wage differential controlling by occupation group. In the literature we have a lot of studies investigating salary differentials between specific groups of workers.

One of the approaches to understand the existence of a positive differential in favor of public entities workers is debated by Barbosa and Souza(2012). The authors break in two effects the wage prize seen in favor of public employees, which the study evaluated in 71.6% comparing similar occupations in private institutions to the year of 2011. The first one is the **price effect contrafactual differential**, a forecast of the salary that would be received by a public sector employee if he was working in the private sector. The second one is the **composition effect contrafactual differential** that points out differences due to the personal skills and qualifications of each employee. Using data of PNAD ("Pesquisa Nacional por Amostra de Domicílio") between 1995 and 2011 the authors concluded that the positive differential is mostly explained by the composition effect, which represents 41.7% in the total gap while the price effect is responsible for the 29.9% remaining. It is important mentioning that over the years the price effect has increased its relevance, in 1995 there was a negative differential against the public sector of 9.95% which together with a positive composition effect of 35.9% explains a 26.0% higher salary to a public sector employee in that year. In a perspective view, even the composition effect being the main driver for a higher salary, the increase in the wage differential between private and public sector employees is basically explained by the evolution of the price effect in the period of the study, i.e., the largest part of the differential is explained by the fact that public sector has workers with higher professional skills and more years of education. On the other hand, in the past few years the salaries offered by public entities are increasing faster

than that ones offered to similar positions in the private sector. Moreover the study also debated wealth concentration and inequality comparing public and private sector employees. The work shows that despite the fact of a relative stability in the share of the public sector in the total income, the wealth distribution got worse as indicated by an increase in the contribution to Gini coefficient from 13.0% in 1995 to 19.7% of total job income inequality in 2011.

The work by Belluzzo, Anuatti-Neto and Pazello (2005) estimates the differential between public and private sector salaries using Quantile Regressions as presented by Koenker and Jr (1978). The authors specify one function to each quantile conditional to the individual characteristics, such age and gender, and a dummy variable to indicate public sector employees. Furthermore the results are detailed by region (South, Southwest, North, Northwest and Midwest) and public entities level (Federal, State and City Government). The database used is the PNAD of 2001 in comparison with a previous work by Foguel et al. (2000) which used data from PNAD 1995. Such as Barbosa and Souza (2012) the authors noticed a significant difference comparing Public and Private Sector workers. Despite an improvement between 1995 and 2001 in favor of the last ones, there is still a huge wage difference in the comparison. One of the main reasons for this gap is the fact that in the public sector 35.5% employees have 12 or more years of study against 10.8% in private sector considering 2001 data. As a general result the study points out that the positive differential observed to lower quantiles disappears in higher quantiles. Furthermore this wage prize to public employees changes to a negative differential when considered the highest wages. A particular result is found to Federal Public Administration employees once to this group the study found positive differentials to all quantiles in all country regions.

The issue of sample selection bias is debated by Barbosa, Filho and Lima (2013) using a Endogenous Switching Regression Model to analyze which facts influence a choice for a job in the public sector and the impacts of them in the estimation. The authors used data obtained in PNAD 2009 and the work estimates regressions by each country region and by gender (female or male). The econometrical modelling is made in two stages, the first one is a probit model estimated with the purpose to find which variables impact the probability to work in the public sector and the second stage uses a selection term estimated in the first stage to calculate the salary equation. The work finds positive effect to education and experience over the probability to choose a job in the public sector. About regional differences, private sector positions are preferred in comparison to public jobs in South, Southwest and Midwest regions. Regarding the salary equation, in South and Southwest regions public sector employees have the highest differential in a comparison to private sector employees and women in public sector have a larger differential in comparison to men.

Souza and Medeiros (2013) apply the same technique of Barbosa, Filho and Lima (2013) to investigate after adjustments to eliminate the selection bias how the higher salaries of public employees impact on wealth inequality. The authors have not found significant differences in

their results comparing models with and without control variables such as using probit models to mitigate selection bias. Basically there are evidences that workers who are in the public sector belong to wealthy families and additionally they receive higher salaries than similar positions in private companies. Despite the fact of a small impact in the total wealth inequality the work concludes that there is a significant difference in favor of public sector employees. In other words the growing salary to this group increases the inequality in Brazil, which is seen in worst indicators of income concentration such as Gini Index.

At last Emilio, Ponczek and Botelho (2012) analyze the wage differential between public and private sectors in Brazil in a fixed effects regression based on the panel data from March 2002 to December 2004. Using information from "Pesquisa Mensal de Emprego" (Monthly Employment Survey) compiled by IBGE, the work focused on the transition of individuals between jobs available in the public and private sectors in Brazil and the authors used three samples to evaluate the wage differential between workers: (i) transitions between Statutory and CLT (public and private entities), (ii) transitions between CLT Public Employees and CLT Private Companies Employees and (iii) transitions between Private and Public Employees regardless the contract type. To the first samples the paper found a differential of 4.6% in favor of the Statutory employees using hourly wages, in the second approach the study shows an hourly wage prize of 3.9% to CLT Public Employees at the significance level of 10% and to the third sample the authors found a wage differential of 3.7% in favor of Public Employees also considering the hourly wage.

2 Data

2.1 Sources and References

One important difference of this work is the use of RAIS database to evaluate the wage differential between workers. Most papers about wages differential in Brazil use PNAD ("Pesquisa Nacional por Amostra de Domicílio") as the source of econometric models such as Barbosa, Filho and Lima(2013) and Souza and Medeiros(2013).

One of the largest impacts of this methodological difference is that statistics of RAIS will emphasize the formal labor market once the informal workers (whose that are not hired formally by a company) will not appear in such database. In a country as Brazil where a relevant share of the population live and work in the rural area and peripheral districts we will provably see significant differences between the average wage in the two surveys once PNAD includes these informal workers.

Negri et al.(2001) compared RAIS and PNAD to the data of 1998. The main conclusion of their work is although the methodological differences between surveys there is a convergence between some variables such as age and gender. Even with differences in the average salary, both show the same data dispersion around the mean to this variable. The most relevant difference was found comparing the correlation between education and salary, which the author points out methodological differences as a probably explanation. At last the paper reinforce that RAIS is a reliable source of information to analyze the formal labor market once it allows time series and panel investigations and it covers a significant share of Brazilian territory, which can help to explore questions about wealth distribution and inequality.

In this work our focus is the analysis of the wage differential between public employees due their labor regime (CLT or Statutory). The informality in this case is not a big concern due the legal requirements imposed to public entities to hire workers. In other words the law and the regulation applied to public service requires that all employees must be hired formally, so the RAIS survey have an advantage in comparison to PNAD once in the first one we handle the population data instead an aleatory sample of that. Moreover in RAIS we can easily track the same employee over the years¹. This allow us to examine the data in a Panel Regression and explore the salary differential controlling the fixed effects of each individual.

In Table 1 we compare the relevance of Public Entities ² and employees in RAIS. Even

¹ The Ministry of Labor provides the annual RAIS Survey to public access in its website. These file do not contains any kind of employee identification. To the purpose of this work we required formally to Fundação Getúlio Vargas the access to the identified database to organize a panel with annual information to each employee of the survey. As we will see in the next pages all results are shown by groups of occupation in order to preserve the confidentiality of the data

² Public Entities are all institutions which the Government has total ownership or the majority of the shares such as

the public sector representing less than one percent of all companies in the survey it concentrates almost twenty percent of all employees. In a first view it can be explained by the size of the Brazilian public companies in comparison to the private ones. As reference the share of the government spending in the growth domestic product is around twenty percent according of Brazilian gross domestic product according IBGE data³. Furthermore in the whole period the data shows that public employees have higher wages (*Average Nominal Wage^{II}*) in comparison to the full sample (*Average Nominal Wage^I*).

Table 1 – RAIS Survey Descriptive Statistics

Year	Companies	Employees	Average Nominal Wage ^I	Public Entities	Share of Public Entities	Public Sector Employees	Share of Public Employees	Average Nominal Wage ^{II}
2005	2.724.172	33.238.617	949,50	31.063	1,14%	7.073.486	21,3%	1.533,31
2006	2.833.567	35.155.249	1.027,80	31.503	1,11%	7.467.673	21,2%	1.684,28
2007	2.935.448	37.607.430	1.049,79	32.278	1,10%	7.705.479	20,5%	1.812,17
2008	3.085.470	39.441.566	1.169,08	33.201	1,08%	8.177.401	20,7%	1.980,48
2009	3.223.514	41.207.546	1.289,56	33.438	1,04%	8.375.317	20,3%	2.182,69
2010	3.403.448	44.068.355	1.425,32	34.166	1,00%	8.551.516	19,4%	2.454,66
2011	3.590.616	46.310.631	1.615,59	34.394	0,96%	8.676.013	18,7%	2.718,91
2012	3.695.735	47.458.712	1.737,95	31.112	0,84%	8.835.577	18,6%	3.040,44
2013	3.836.771	48.948.433	1.862,33	35.501	0,93%	8.966.902	18,3%	3.287,44
2014	3.949.979	49.571.510	2.045,66	35.549	0,90%	9.185.032	18,5%	3.575,40
2015	3.971.108	48.060.807	2.234,68	35.569	0,90%	9.026.061	18,8%	3.918,43
2016	3.921.448	46.060.198	2.452,01	35.023	0,89%	8.978.942	19,5%	4.199,19

Source: Ministry of Labor. Prepared by the Author

Once we are interested in the wage differential of public employees according their labor regime, we have excluded all private companies and their workers of the sample. After that, to organize the data in a Panel we have used as individual identification the CPF ("Cadastro de Pessoa Física") of each employee to track the salary evolution of each one over the years. Brazilian legislation allows that in some cases public employees keep more than one job simultaneously. These ones receive one monthly salary to each job despite the fact of working only for one of them. These cases are not the regular standard in our sample and so, to the purpose of this work, we decided to analyze only workers with one occupation.

Due computational limitations we had to define a shorter period and a reduced number of control variables. After some adjustments in the original RAIS database we have limited the time period from 2014 to 2016 and we have selected the following variables to analyze⁴:

Table 2 summarizes the descriptive statistics of the database after all these adjustments. In the group of statutory employees there is a predominance of women whereas there are more men in the group of CLT workers in the period. Statutory employees are older than CLT in average (there is a higher share of workers over 35 year old). About education the most of

Autarquies, Public Companies, Public and Private Controlled Companies, Public Foundations and Associations, Law Courts, Parliamentary Chamber, Ministries and other Government Departments.

³ In 2017 Brazilian nominal GDP was around BRL 6.5 trillion and the Government Consumption BRL 1.3 trillion of this amount.

⁴ Some of these variables were not used in the final models due collinearity or because they were not statistically significant

Variable	Detail
Wage	Monthly salary in Brazilian Real received on December of each year. In the models we deflated this variable by the Consumer Price Index (IPCA) to evaluate the salary growth in real terms.
Education	Classification of educational eleven categories: Uneducated, Incomplete Pre School, Complete Pre School, Incomplete Primary School, Complete Primary School, Incomplete High School, Complete High School, Incomplete College, Complete College, Master Degree and PhD. To the purpose of this work we group these categories in six: Uneducated, Primary School, High School, College, Master Degree and PhD.
Age	Employees' age in years
Tenure	Employees' months of experience in a company
Gender	Female, Male or Non Informed. Optional information in RAIS forms sent by companies
Race	Indian, White, Afro-Descendant, Asian, Brown or Non Informed. Optional information in RAIS forms sent by companies
Working Hours Contractual Working Hours defined to a Week	

statutory employees have a college degree while the high school degree is the main education level of CLT workers. The average salary of CLT employees is higher in comparison to Statutory workers. This salary differential will be the focus of this work and we will analyze it with more detail controlling all the explanatory variables listed in the database such as the occupation of each individual. At last, comparing the number of observations of each group we see that the statutory regime is predominant in public entities. In the period CLT employees represented about 20 percent of the total public employees. It is important highlight that there is no race information to Statutory Employees in the period of our database whereas between CLT employees we see around 60.0% of white people in the period from 2014 to 2016.

The occupation data in RAIS follow the CBO classification ("Classificação Brasileira de Ocupações"). The regular database has more than 2.500 different jobs divided in 49 groups. Individuals with no occupation declared in the database were considered missing values in this work.

Over again due to computational limitations we reduced the number of groups from 49 to 5 according to similarity between occupations such as a skill criteria to analyze the salary differential by ability and educational level of each group. The high skilled group concentrates Directors and Managers, the low skilled group have occupations with lower ability requirements, teachers and researchers are the group with the highest educational level in the database and the technical occupations were grouped as technicians.

We have created a category called "excluded" to join occupations that do not have a significant comparison group as contra factual, for example Military, Police Force and Fire Department workers that are hired only as statutory employees due the current legislation. Table 3 summarizes the average salary to each occupation and the five groups division proposed by this work.

Table 2 – Descriptive Statistics - Selected Cases

	2014		2015		2016	
	Statutory	CLT	Statutory	CLT	Statutory	CLT
Gender						
Female	56.8%	43.3%	56.9%	43.0%	56.9%	42.8%
Male	43.2%	56.7%	43.1%	57.0%	43.1%	57.2%
Race						
Indian	0.0%	0.2%	0.0%	0.2%	0.0%	0.2%
White	0.0%	62.6%	0.0%	61.8%	0.0%	61.7%
Afro-Descendant	0.0%	4.6%	0.0%	4.7%	0.0%	4.7%
Asian	0.0%	1.5%	0.0%	1.6%	0.0%	1.4%
Brown	0.0%	21.5%	0.0%	21.8%	0.0%	22.1%
Non Informed	100.0%	9.6%	100.0%	10.1%	100.0%	9.8%
Year						
10-24 years old	3.2%	5.9%	2.4%	4.7%	1.7%	3.5%
25-34 years old	21.0%	25.7%	19.0%	24.1%	16.7%	21.9%
35-44 years old	30.0%	26.5%	29.7%	27.1%	29.6%	28.0%
45-54 years old	30.0%	26.7%	30.6%	26.4%	31.2%	26.3%
Over 55 years old	15.8%	15.2%	18.3%	17.6%	20.8%	20.2%
Education						
Uneducated	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Primary School	16.0%	14.5%	15.4%	14.1%	15.2%	13.8%
High School	38.2%	45.9%	38.1%	45.5%	37.5%	44.9%
College	44.2%	38.1%	44.6%	38.9%	45.3%	39.4%
Master Degree	1.1%	1.1%	1.2%	1.1%	1.3%	1.4%
PhD	0.4%	0.3%	0.5%	0.3%	0.6%	0.4%
Working Hours						
0-10 weekly hours	0.6%	0.9%	0.6%	0.9%	0.6%	0.9%
10-20 weekly hours	0.8%	0.2%	0.8%	0.2%	0.8%	0.2%
20-30 weekly hours	9.9%	2.8%	10.1%	2.9%	9.5%	2.9%
30-40 weekly hours	18.7%	21.9%	18.7%	22.3%	19.2%	22.7%
Over 40 weekly hours	70.0%	74.1%	69.8%	73.7%	70.0%	73.3%
Tenure (in months)						
	155.67	116.55	166.92	127.09	177.46	136.37
Average Salary (in R\$)						
	3,934.52	4,388.95	4,381.42	4,872.37	4,739.21	5,370.56

Source: Ministry of Labor. Prepared by the Author

Table 3 – Average Salary by CBO Group (in nominal terms)

CBO Group	Description	Group	2014		2015		2016	
			Statutory	CLT	Statutory	CLT	Statutory	CLT
11	Public Entity Director	High Skilled	R\$ 6,037.13	R\$ 2,806.52	R\$ 6,407.07	R\$ 4,351.82	R\$ 6,916.34	R\$ 4,907.66
12	Company Director		R\$ 3,862.95	R\$ 7,972.71	R\$ 4,268.84	R\$ 8,900.87	R\$ 4,669.36	R\$ 8,687.15
13	Services Co. Manager	n = 1,448,562	R\$ 4,325.80	R\$ 4,836.82	R\$ 5,036.53	R\$ 5,369.67	R\$ 5,437.43	R\$ 5,746.97
14	Managers (General)		R\$ 5,876.12	R\$ 6,349.11	R\$ 6,071.52	R\$ 6,803.53	R\$ 6,869.60	R\$ 7,909.37
61	Farmer (Producer)	Low Skilled	R\$ 1,115.07	R\$ 1,143.98	R\$ 1,244.16	R\$ 1,017.68	R\$ 1,403.73	R\$ 1,597.37
63	Fishing		R\$ 1,387.65	R\$ 1,150.51	R\$ 1,492.27	R\$ 1,315.41	R\$ 1,677.79	R\$ 1,414.63
64	Agribusiness Tech.	n = 1,310,801	R\$ 1,762.56	R\$ 2,281.97	R\$ 1,919.98	R\$ 2,469.92	R\$ 2,094.06	R\$ 2,643.91
71	Building		R\$ 1,670.92	R\$ 2,401.58	R\$ 1,821.92	R\$ 2,584.68	R\$ 2,048.38	R\$ 2,829.11
72	Metallurgy		R\$ 2,461.47	R\$ 2,926.43	R\$ 2,687.42	R\$ 3,174.99	R\$ 2,863.68	R\$ 3,480.27
78	Multitask Ind.		R\$ 2,107.46	R\$ 2,199.61	R\$ 2,288.07	R\$ 2,504.27	R\$ 2,550.85	R\$ 2,734.51
79	Cratwork		R\$ 1,019.94	R\$ 1,234.91	R\$ 1,183.35	R\$ 1,562.18	R\$ 1,291.60	R\$ 1,292.86
95	Facilities		R\$ 2,404.65	R\$ 3,423.31	R\$ 2,636.48	R\$ 3,671.82	R\$ 2,919.12	R\$ 4,193.26
99	Maintenance		R\$ 1,209.72	R\$ 1,341.61	R\$ 1,306.35	R\$ 1,475.47	R\$ 1,505.22	R\$ 1,611.86
20	Reseachers	Teachers and	R\$ 12,315.30	R\$ 11,125.98	R\$ 13,523.81	R\$ 13,379.75	R\$ 14,366.75	R\$ 15,036.52
21	Applied Sciences	Researchers	R\$ 8,993.02	R\$ 13,695.25	R\$ 9,697.86	R\$ 15,181.52	R\$ 10,520.31	R\$ 16,657.71
22	Biology		R\$ 6,289.77	R\$ 7,309.52	R\$ 6,883.94	R\$ 8,011.09	R\$ 7,396.00	R\$ 8,869.31
23	Education	n = 4,197,869	R\$ 4,150.28	R\$ 3,531.83	R\$ 4,654.96	R\$ 3,846.74	R\$ 5,136.39	R\$ 4,313.25
24	Law		R\$ 17,169.84	R\$ 11,015.64	R\$ 19,598.39	R\$ 12,284.75	R\$ 20,551.55	R\$ 13,715.17
25	Human Science		R\$ 9,588.33	R\$ 8,662.58	R\$ 10,373.74	R\$ 9,557.79	R\$ 10,975.93	R\$ 10,411.62

CBO Group	Description	Group	2014		2015		2016	
			Statutory	CLT	Statutory	CLT	Statutory	CLT
26	Art and Communication	Technicians	R\$ 4,820.14	R\$ 6,570.16	R\$ 5,431.72	R\$ 7,454.41	R\$ 5,825.11	R\$ 8,568.36
27	Cooking	n = 12,454,886	R\$ 1,319.02	R\$ 1,860.81	R\$ 1,357.07	R\$ 2,120.91	R\$ 1,494.32	R\$ 2,304.14
30	Technicians (General)		R\$ 3,922.56	R\$ 9,635.52	R\$ 4,307.40	R\$ 10,930.57	R\$ 4,692.05	R\$ 11,801.05
31	Applied Sciences Tech.		R\$ 3,611.73	R\$ 7,811.69	R\$ 4,040.96	R\$ 8,532.73	R\$ 4,454.11	R\$ 9,292.61
32	Biology Tech.		R\$ 2,891.51	R\$ 2,821.36	R\$ 3,352.27	R\$ 3,094.46	R\$ 3,653.30	R\$ 3,461.79
33	High School Teachers		R\$ 2,654.46	R\$ 2,156.17	R\$ 2,921.16	R\$ 2,405.84	R\$ 3,241.19	R\$ 2,664.16
34	Logistic Tech.		R\$ 3,890.16	R\$ 6,454.50	R\$ 4,268.60	R\$ 7,278.79	R\$ 4,412.34	R\$ 7,808.23
35	Human Sciences Tech.		R\$ 6,009.72	R\$ 4,412.92	R\$ 6,615.22	R\$ 5,033.04	R\$ 7,014.85	R\$ 5,813.68
37	Sports and Culture Tech.		R\$ 2,133.76	R\$ 2,809.34	R\$ 2,264.88	R\$ 3,068.23	R\$ 2,402.77	R\$ 3,995.54
39	Technicians (Others)		R\$ 4,511.21	R\$ 5,911.96	R\$ 5,000.84	R\$ 6,389.18	R\$ 5,332.33	R\$ 6,899.61
41	Bookkeeper		R\$ 3,586.28	R\$ 4,673.31	R\$ 3,967.00	R\$ 5,158.86	R\$ 4,300.12	R\$ 5,653.32
42	Public Service Clerk		R\$ 2,193.03	R\$ 2,213.69	R\$ 2,431.14	R\$ 2,395.77	R\$ 2,166.88	R\$ 2,620.11
51	Service Provider		R\$ 1,911.45	R\$ 1,683.51	R\$ 2,144.17	R\$ 1,865.16	R\$ 2,345.16	R\$ 2,044.63
62	Farmer (Employee)		R\$ 1,873.20	R\$ 2,666.64	R\$ 2,032.04	R\$ 2,889.34	R\$ 2,250.55	R\$ 2,971.78
84	Food and Beverage		R\$ 1,523.61	R\$ 1,492.59	R\$ 1,650.48	R\$ 1,634.98	R\$ 2,031.60	R\$ 1,777.35
86	Manufactory Ops.		R\$ 2,293.83	R\$ 4,470.65	R\$ 2,460.31	R\$ 4,872.26	R\$ 2,820.34	R\$ 5,391.01
91	Mechanic Repair		R\$ 2,280.49	R\$ 3,438.24	R\$ 2,483.27	R\$ 3,731.21	R\$ 2,743.92	R\$ 4,032.43
0	Missing Values	Excluded	R\$ 4,858.53	R\$ 4,467.46	R\$ 5,332.71	R\$ 2,228.29	R\$ 5,704.11	R\$ 3,529.49
1	Military	n = 2,009,712	R\$ 4,267.66	R\$ 2,685.28	R\$ 4,973.64	R\$ 2,713.59	R\$ 5,474.64	R\$ 3,488.51
2	Police Force		R\$ 4,372.93	R\$ 9,226.70	R\$ 5,148.33	R\$ 5,203.79	R\$ 5,507.09	R\$ 5,064.40
3	Fire Dpt.		R\$ 5,646.13	R\$ 2,046.28	R\$ 6,535.56	R\$ 2,596.17	R\$ 6,852.11	R\$ 2,388.39
52	Sellers		R\$ 1,515.79	R\$ 1,430.68	R\$ 1,701.95	R\$ 1,532.47	R\$ 2,092.46	R\$ 1,645.48
73	Electronics Ind.		R\$ 3,735.30	R\$ 5,148.20	R\$ 4,063.96	R\$ 5,602.83	R\$ 4,593.51	R\$ 5,989.74
74	Measurements Ind.		R\$ 2,059.64	R\$ 2,083.08	R\$ 2,238.92	R\$ 2,533.82	R\$ 2,229.73	R\$ 2,442.70
75	Ceramics		R\$ 2,286.83	R\$ 1,355.75	R\$ 2,366.72	R\$ 1,525.96	R\$ 2,632.37	R\$ 1,659.36
76	Textile Ind.		R\$ 2,466.00	R\$ 1,688.33	R\$ 2,742.87	R\$ 1,556.19	R\$ 2,970.53	R\$ 1,693.74
77	Furniture Ind.		R\$ 2,469.14	R\$ 1,594.33	R\$ 2,656.21	R\$ 1,714.53	R\$ 2,834.46	R\$ 1,813.82
81	Process Mgmt.		R\$ 3,169.62	R\$ 14,272.64	R\$ 3,416.10	R\$ 16,261.71	R\$ 3,888.32	R\$ 16,636.22
82	Steel Industry		R\$ 1,568.20	R\$ 1,659.54	R\$ 1,677.61	R\$ 1,814.55	R\$ 1,714.18	R\$ 1,937.77
83	Paper Industry		R\$ 3,319.95	R\$ 1,553.51	R\$ 3,378.05	R\$ 1,655.54	R\$ 3,499.08	R\$ 1,764.47

Source: Ministry of Labor. Prepared by the Author

Table 4 summarizes by group the average of each variable used in the models of this work. Technicians is the largest group in the sample. Teachers and Researchers is the group with the largest participation of women and the highest Average Salary and Education Level. Low Skilled is the oldest group in average and also the group with the highest Working Hours level. High Skilled group presented the highest level of tenure measured in months of experience.

Table 4 – Descriptive Statistics Summary by Group

Group	N	% of Women	Average Salary	Age	Working Hours	Education	Tenure
High Skilled	1,448,562	54.8%	6,261.29	45.08	35.95	7.70	171.53
Low Skilled	1,310,801	17.9%	2,267.71	46.19	40.63	5.62	156.20
Technicians	12,454,886	59.8%	3,535.85	44.34	37.57	7.11	158.02
Teachers & Researchers	4,197,869	67.2%	7,003.63	44.61	34.13	8.90	159.34

Source: Ministry of Labor. Prepared by the Author

Table 5 shows the average of each variable by group and labor regime. CLT workers present higher wages than Statutory to all groups except to the High Skilled workers. Statutory employees are older and they have in average more months of experience than CLT workers. To all groups CLT workers presented a higher level of weekly working hours. About the educational level Statutory are less educated in average to all groups except by the High Skilled workers.

Table 5 – Descriptive Statistics by occupation and labor regime

Average Salary		
Group	Statutory	CLT
High Skilled	6,296.54	5,893.42
Low Skilled	2,096.33	2,627.56
Technicians	3,314.34	4,268.09
Teachers & Researchers	6,597.81	9,676.97

Age		
Group	Statutory	CLT
High Skilled	45.21	43.70
Low Skilled	47.24	43.98
Technicians	44.87	42.55
Teachers & Researchers	44.68	44.13

Working Hours		
Group	Statutory	CLT
High Skilled	35.52	40.43
Low Skilled	40.02	41.90
Technicians	37.23	38.67
Teachers & Researchers	33.84	36.10

Education		
Group	Statutory	CLT
High Skilled	7.70	7.66
Low Skilled	5.55	5.76
Technicians	7.06	7.28
Teachers & Researchers	8.88	8.99

Tenure		
Group	Statutory	CLT
High Skilled	176.24	122.41
Low Skilled	174.17	118.47
Technicians	167.35	127.17
Teachers & Researchers	161.30	146.45

Source: Ministry of Labor. Prepared by the Author

2.2 Panel Data Transition Matrix

In order to evaluate if a Fixed Effects Model will capture a different effect in comparison to a simple OLS Regression we can check if there is a relevant transition between occupations and labor regime in the period from 2014 to 2016. Basically if all workers stay in the same occupation and labor regime in the entire period analyzed, a Pooled OLS regression would not reach results significantly different.

Our transition matrix shows the mobility of employees from statutory to CLT such as to other occupation group (Excluded, High Skilled, Low Skilled, Teachers & Researchers and Technicians).

Table 6 shows the matrix organized with the data of RAIS survey from 2014 to 2016. All groups presented changes in the period, assuming the sample of 7,140,610 public employees.

The High Skilled CLT employees presented the largest transition index once only 80.88% of these workers remained in the same occupation and labor regime in the period analyzed, 9.98% of them migrated to a statutory position in the same group and the rest of them moved to other occupations.

The lowest migration happened in the Excluded Group, considering workers hired as statutory. The data shows that 98.66% of these workers stayed in the same position from 2014 to 2016, that makes sense once the occupations in this group are majority statutory such as Military and Police Force positions and it is not often see a transition from these kind of professions to others.

Between occupations the largest transition occurred from High Skilled group to Technicians group once 4.44% of the statutory employees and 4.43% of the CLT employees of that group became Technicians in the period analyzed in our sample.

At last the transition matrix show to all occupations a larger migration from CLT to Statutory than otherwise. For example 1.60% of Teacher and Researchers moved from CLT to Statutory while only 0.11% made the opposite change. These facts reinforce the idea that probably there is a better financial perspective to statutory employees in comparison to CLT which stimulates "celetistas" to look for a opportunity as statutory in the public service.

Table 6 – Occupation Groups Transition Matrix

		Excluded		High Skilled		Low Skilled		Teachers & Researchers		Technicians		
		Statutory	CLT	Statutory	CLT	Statutory	CLT	Statutory	CLT	Statutory	CLT	Total
Excluded	Statutory	98,66	0,04	0,21	0,00	0,02	0,03	0,17	0,01	0,78	0,07	100,00
	CLT	0,16	93,10	0,02	0,74	0,02	1,40	0,04	0,57	0,14	3,82	100,00
High Skilled	Statutory	0,45	0,00	92,68	0,03	0,35	0,00	2,01	0,02	4,44	0,03	100,00
	CLT	0,06	0,52	9,98	80,88	0,02	0,37	0,57	2,80	0,39	4,43	100,00
Low Skilled	Statutory	0,07	0,00	0,26	0,00	97,69	0,15	0,07	0,00	1,74	0,01	100,00
	CLT	0,03	0,71	0,02	0,12	1,03	95,78	0,02	0,03	0,10	2,16	100,00
Teachers & Researchers	Statutory	0,12	0,00	1,77	0,00	0,02	0,00	95,66	0,11	2,30	0,02	100,00
	CLT	0,01	0,05	0,04	0,56	0,01	0,04			0,13	1,21	100,00
								1,60	96,35			
Technicians	Statutory	0,08	0,00	0,45	0,00	0,15	0,00	0,91	0,01	98,24	0,15	100,00
	CLT	0,02	0,27	0,02	0,43	0,01	0,25	0,04	0,42	1,11	97,42	100,00
Total		8,40	0,97	6,29	0,57	4,15	1,96	16,89	2,59	44,74	13,43	100,00

Source: Ministry of Labor. Prepared by the Author

3 Methodology

3.1 Fixed Effects Panel Regression

This work differs from others in the literature by the use of RAIS information in a panel database to estimate the wage differential between groups of workers.

There are relevant benefits using a Panel Data as highlighted in the first chapter of Baltagi (2008) such as controlling for individual heterogeneity, more informative data, more variability, less collinearity, more degrees of freedom and more efficiency.

Moreover, Panel Data are more appropriated to study the dynamics of adjustments and identify effects that are simply not detectable in a cross-section or time-series data. This approach allow us to test more complicated behavioral models than purely cross-section or time series data.

On the other hand, there are some limitations in this approach such design and data collection problems (coverage, nonresponse, frequency of interviewing and others), measurement errors (unclear questions, memory errors and inappropriate informants, selectivity problems (self-selectivity, nonresponse and attrition) and the short time-series dimension.

We considerer that the advantages obtained using Panel Data are higher than the costs and possible failures. Holding employees characteristics constant over the time we will be better equipped to reach the main purpose of this work, which is to determine whether the labor regime (CLT or Statutory) impacts wages of public employees and by how much.

Some of the problems listed are mitigated by the fact that firms have the legal responsibility to send to Ministry of Labor the RAIS form filled with informations about all workers legally hired. About that, the main weakness of the survey are possible errors in some variables as education level that in some times are not immediately updated by the employer.

Another problem that is not so relevant to the specific case of public companies is the impact of informality in self-selectivity. In Brazil we have a significant amount of people working without a legal job contract and due that there is a significant number of employees that are not listed in RAIS. But once we are focused in the workers of public companies we are assuming that informality has no significant impact due the legal restrictions imposed by the government to hire workers in these institutions.

So using the definition presented by Baltagi(2008) we assume the following specification of a panel data regression to evaluate the wage differential between CLT and Statutory workers in public entities:

$$\begin{aligned}
y_{it} = & \alpha + X_{it}^j \beta + \delta_1 CLT_{it} + \delta_2 Low_Skilled_{it} + \delta_3 Teacher_Researchers_{it} + \delta_4 Technicians_{it} \\
& + \delta_5 High_Skilled_{it} + \delta_6 Low_Skilled_{it} * CLT_{it} + \delta_7 Teacher_Researchers_{it} * CLT_{it} \\
& + \delta_8 Technicians_{it} * CLT_{it} + \delta_9 High_Skilled_{it} * CLT_{it} + u_{it}
\end{aligned} \tag{3.1}$$

$$u_{it} = \mu_i + \lambda_t v + v_{it} \tag{3.2}$$

$$i = 1, \dots, N; \quad t = 2014, 2015, 2016$$

with i denoting workers listed in RAIS and t denoting the the period of our sample. The i subscript represents the cross-section dimension whereas t denotes the time-series dimension, α is a scalar, β is $\mathbf{K} \times 1$ and X_{it} is the i th observation on \mathbf{K} explanatory variables.

Furthermore we included dummy variables to evaluate the wage differential by labor regime and occupation. As base group we choose statutory employees and so the dummy CLT takes the value one if the labor regime of an employee is CLT and it takes the value zero otherwise. To analyze the occupation impact we have used two kinds of dummy variables, the first ones represents the five groups shown at table3 and the second ones are interaction dummies between occupation and the labor regime (represented by dummy CLT). As benchmark to the occupation effect we have chosen the workers of the *Excluded* group and so these dummies are omitted in the equation 3.1 to avoid perfect collinearity.

The term μ_i denotes the unobservable individual effect of each employee selected in RAIS, λ_t denotes the unobservable time effect to the years 2014, 2015 and 2016 and v_{it} the remainder stochastic disturbance term. We have assumed μ_i and λ_t as fixed parameters to be estimated and the remainder stochastic disturbance term $v_{it} \sim \mathbf{IID}(0, \sigma_v^2)$ and so 3.2 represents a two-way fixed effects error component model. The X_{it}^j are assumed independent of the v_{it} for all i and t . Under these specifications our inference is conditional on the employees of our database and over the period from 2014 to 2016.

3.2 Oaxaca-Blinder decomposition of mean wages differentials

This section is based on the paper of Jann et al. (2008). The author describe the STATA¹ implementation of the mean wages differentials decomposition presented by Oaxaca (1973) and Blinder (1973). In our work we present the same equations and terms considered by Jann.

¹ Stata is a general-purpose statistical software package created in 1985 by StataCorp. Most of its users work in research, especially in the fields of economics, sociology, political science, biomedicine and epidemiology.

The Oaxaca-Blinder decomposition divides the wage differential between (i) an "explained" part by specific group characteristics (education, work, experience, age and others) and (ii) a residual or "unexplained" part that can not be accounted by the difference in such characteristics.

Assuming two groups (A and B), a outcome variable (Y) and a set of predictors the methodology analyze how much of the mean outcome difference is accounted by group differences in the predictors. In this our comparison groups are CLT and Statutory public employees. We use the nominal wage (as of December of each year) as the outcome variable and education, experience, age, working hours, race and gender as predictors and controlling variables.

Oaxaca-Blinder decomposition assumes a basic linear model:

$$Y_l = X_l^j \beta_l + s_l, \quad E(s_l) = 0 \quad l \in (A, B) \quad (3.3)$$

where X is the vector containing the predictors and a constant, β contains the slope parameters and the intercept, and s is the error.

The mean outcome difference is expressed by:

$$R = E(Y_a) - E(Y_b) \quad (3.4)$$

where $E(Y)$ denotes the expected value of the outcome variable.

So the mean outcome difference can be expressed as the difference in the linear prediction at the group-specific means of the regressors, that is:

$$R = E(Y_a) - E(Y_b) = E(X_a)^j \beta_a - E(X_b)^j \beta_b \quad (3.5)$$

because

$$E(Y_l) = E(X_l^j \beta_l + s_l) = E(X_l^j \beta_l) + E(s_l) = E(X_l)^j \beta_l \quad (3.6)$$

where $E(\beta_l) = \beta_l$ and $E(s_l) = 0$ by assumption.

The Equation 3.5 can be rearranged to identify the contribution of group difference in the predictors to the overall outcome difference as follows:

$$R = \{E(X_a) - E(X_b)\}^j \beta_b + E(X_b)^j (\beta_a - \beta_b) + \{E(X_a) - E(X_b)\}^j (\beta_a - \beta_b) \quad (3.7)$$

After the rearrangement, the Equation 3.7 shows the outcome difference divided into three parts:

$$R = E + C + I$$

The first part,

$$E = \{E(X_a) - E(X_b)\}'\beta_b \quad (3.8)$$

represents the "endowments effect", that is the differential due to group differences in the predictors. The second part,

$$C = E(X_b)'\beta_a - E(X_b)'\beta_b \quad (3.9)$$

evaluates the contribution of differences in the coefficients and the intercept. And the third part,

$$I = \{E(X_a) - E(X_b)\}'(\beta_a - \beta_b) \quad (3.10)$$

is the interaction between endowments and coefficients once the differences in both exist simultaneously in the groups A and B.

At last it is important to notice that the decomposition shown in Equation 3.7 was made from the perspective of group B. So E measures the expected change in group B's mean wage if they had group A's endowments and the coefficients effect C is weighted by group B's endowments and it represents the expected change in group B's mean wage if they had group A's coefficients. The differential can also be expressed from the perspective of group A, yielding the reverse threefold decomposition:

$$R = \{E(X_a) - E(X_b)\}'\beta_a + E(X_a)'\beta_a - E(X_a)'\beta_b + \{E(X_a) - E(X_b)\}'(\beta_a - \beta_b) \quad (3.11)$$

In this work we will apply in a Panel Data the specification of Oaxaca-Blinder Decomposition shown in Equation 3.11 assuming statutory workers as reference group.

4 Results

4.1 Regression Results

In order to evaluate the impact of CLT labor regime upon wages, this paper used a Fixed Effects Panel Regression in comparison to a Pooled OLS regression. In the Fixed Effects approach we have controlled the unobservables individual and time effect presented in the sample from 2014 to 2016 besides the set of predictors (education, age, experience, gender, race and dummies to indicate labor regime and occupation). The Pooled OLS is basically the Ordinary Last Squared technique applied to a Panel Database controlling only the observable variables.

Table 7 shows the results of different specifications of Fixed Effects and Pooled regressions. As highlighted in this section 3.1 all results assume the occupation group *excluded* as reference. So all coefficients show a positive or negative difference in comparison to this reference group. The positive coefficients of education, age, working hours and experience means a positive return of these variables in the monthly wage of an worker.

Table 7 – Models Comparison

Variable	FE Model I	POLS I	POLS II
<i>education</i>	23.91***	841.60***	843.02***
<i>age</i>	88.85***	38.42***	39.00***
<i>age</i> ²	-1.02***	-0.081***	-0.083***
<i>working hours</i>	10.39***	81.56***	81.64***
<i>experience</i>	0.55***	9.67***	9.70***
<i>dummy_clt</i>	-32.66*	505.22***	507.24***
<i>dummy_low_skilled</i>	137.52***	-1942.85***	-1944.94***
<i>dummy_low_skilled*clt</i>	20.46	293.00***	292.55***
<i>dummy_teachers_researchers</i>	251.33***	78.52***	72.60***
<i>dummy_teachers_researchers*clt</i>	-52.60***	2186.79***	2186.20***
<i>dummy_technicians</i>	174.08***	-1731.22***	-1734.12***
<i>dummy_technicians*clt</i>	-64.44***	523.51***	522.31***
<i>dummy_high_skilled</i>	329.64***	492.97***	490.41***
<i>dummy_high_skilled*clt</i>	128.65***	-683.42***	-688.98***
<i>year</i>			
2015	Yes	-	-125.95***
2016	Yes	-	-202.36***
<i>dummy_female</i>	-	-	-
<i>dummy_race</i>	-	-	-
<i>_cons</i>	-	-7389.38***	-7316.68***
N	21.421.830	21.421.830	21.421.830
r ²	0.967	0.239	0.240
r ² _a	0.951	0.239	0.240

legend: * p<0.05; ** p<0.01; ***p<0.001

Source: Prepared by the Author

The FE MODEL I is our baseline scenario which we control year and occupation fixed

effects. On the other hand the POLS I shows the results without controlling these fixed effects as a counterfactual of FE MODEL I. The Model POLS II is an estimation of a Pooled Regression with dummies to each year.

We are particularly interested in the impact upon wages due the CLT labor regime in each occupation group. This effect is compounded by two components, the first one is the differential due the labor regime measured by the *dummy clt* and another part is due the interaction between the previous one and each occupation dummy. Table 8 and Table 9 resume the Total Effect of the CLT Labor Regime to Fixed Effect Model I and Pooled OLS Model I by occupation group.

All variables in the models are in level and so the difference is a monthly wage prize measured in brazilian reais. As previously mentioned in this section 2.1 the wages were deflated by the consumer price index ("IPCA") to the levels of 2014.

In the FE Model I only the High Skilled CLT workers present a positive monthly wage prize of R\$ 95.98. Technicians (R\$ 97.11), Teachers and Researchers (R\$ 85.27) and Low Skilled (R\$ 12.20) CLT workers presented a negative wage differential. To Low Skilled Workers it is important mentioning that the Interaction Effect is not statistically significant so we can assume a negative prize still higher.

Table 8 – Wage Differential By Occupation - FE Model I

	Low Skilled	Teachers and Researchers	Technicians	High Skilled
CLT Effect	-32.66*	-32.66*	-32.66*	-32.66*
Interaction Effect	20.46	-52.60***	-64.44***	128.65***
Total Effect	-12.20	-85.27	-97.11	95.98

* p<0.05; ** p<0.01; ***p<0.001

Source: Ministry of Labor. Prepared by the Author

In the POLS Model I only the High Skilled CLT workers present a negative monthly wage prize of R\$ 178.19. Technicians (R\$ 1028.74), Teachers and Researchers (R\$ 2629.02) and Low Skilled (R\$ 798.22) CLT workers presented a positive wage differential. In this model all dummies are statistically significant.

Table 9 – Wage Differential By Occupation - POLS Model I

	Low Skilled	Teachers and Researchers	Technicians	High Skilled
CLT Effect	505.22***	505.22***	505.22***	505.22***
Interaction Effect	293.00***	2186.79***	523.51***	-683.42***
Total Effect	798.22	2692.02	1028.74	-178.19

* p<0.05; ** p<0.01; ***p<0.001

Source: Ministry of Labor. Prepared by the Author

The opposite signs of the wage differential comparing Fixed Effects and Pooled OLS regression is an important evidence that there are non observable year and individual effects

that are captured only by the Fixed Effects modeling and they impact the wages over the years. Furthermore the size of the wage prize is higher in the Pooled OLS in comparison to the Fixed Effects approach. At last it is important mentioning that the fixed effect framework does not allow us to include variables that are constant over time, such as gender and race.

4.2 Oaxaca-Blinder Decomposition Results

4.2.1 Fixed Effects Model

Table 10 presents the decomposition results made to FE Model I ¹. There is a prize of R\$ 309.93 in favor of statutory employees (*dummy CLT* = 0) and the largest part of that is explained due the Coefficients Effect (R\$ 283.34). The Endowments differences between groups explains only R\$ 3.09 of the wage differential and the interaction between Coefficients and Endowments represents R\$ 23.49 of the total difference.

Analyzing the small Endowments Effect we see a negative sign to the variable Working Hours reflecting that CLT employees work more than Statutory (once the coefficient of this variable is positive as we saw in Table 7). All the other variables are positive ² which indicates that Statutory workers have in average higher education level, tenure and age. Once the coefficient of all occupation dummies are positive, the positive or negative impact depends on the relative participation of each occupation in CLT and Statutory groups. For example High Skilled and Teachers & Researchers positive endowments effect indicates that there is a higher proportion of these categories in the Statutory group and the opposite occurs to Low Skilled and Technicians workers.

Education, Age and Tenure coefficients impact positively in favor of statutory. On the other hand Working Hours is negative to them. It indicates that the Statutory workers have higher coefficients than CLT workers to all variables except by Working Hours. About the occupation dummies the idea is similar, being a worker of Low Skilled, Teachers & Researchers and Technicians group generates a higher return in the wage to Statutory Workers whereas the dummy High Skilled shows a higher return to CLT workers.

¹ The predictions to each group were made considering only the explanatory variables without a constant term. Because of that the Average Salaries to Statutory and CLT workers are lower than we observe in the real data to each population.

² The impact of age must be analyzed as the sum of age and age² which captures the concavity on remuneration

Table 10 – Oaxaca-Blinder Decomposition to FE Model I

Blinder-Oaxaca Decomposition						
1: Statutory (dummy CLT = 0)						
2: CLT (dummy CLT = 1) obs = 21,421,830						
Differential	Coef.	Std. Err.	z	P>z	[95% Conf.Interval]	
Avg. Salary Statutory (Prediction 1)	2679.83	64.75	41.39	0.000	2552.92	2806.74
Avg. Salary CLT (Prediction 2)	2369.91	98.19	24.14	0.000	2177.45	2562.36
Difference	309.93	117.62	2.63	0.009	79.39	540.46
Decomposition	Total	Std. Err.	z	P>z	[95% Conf.Interval]	
Endowments	3.09	5.29	0.58	0.562	-7.29	13.46
Coefficients	283.34	152.15	1.86	0.063	-14.88	581.57
Interaction	23.49	6.35	3.70	0.000	11.05	35.94
Total	309.93	152.38	2.03	0.042	11.27	608.59
Endowments $[E(X_1)-E(X_2)]'\beta_2$	Total	Std. Err.	z	P>z	[95% Conf.Interval]	
education	0.52	0.13	4.10	0.000	0.27	0.77
age	136.33	4.04	33.75	0.000	128.41	144.25
age ²	-126.34	2.46	-51.46	0.000	-131.16	-121.53
working hours	-28.39	0.83	-34.34	0.000	-30.01	-26.77
tenure	3.40	1.44	2.36	0.018	0.57	6.23
dummy_high_skilled	24.19	0.54	44.95	0.000	23.13	25.24
dummy_low_skilled	-7.50	0.53	-14.06	0.000	-8.55	-6.46
dummy_teachers_researchers	12.45	0.94	13.25	0.000	10.61	14.29
dummy_technicians	-11.57	1.19	-9.68	0.000	-13.91	-9.23
Coefficients $[E(X_2)'(\beta_1-\beta_2)]$	Total	Std. Err.	z	P>z	[95% Conf.Interval]	
education	144.02	13.43	10.72	0.000	117.70	170.35
age	-355.68	141.23	-2.52	0.012	-632.49	-78.86
age ²	410.84	51.72	7.94	0.000	309.46	512.22
working hours	-101.35	15.38	-6.59	0.000	-131.49	-71.21
tenure	69.54	5.59	12.43	0.000	58.57	80.50
dummy_high_skilled	-4.55	0.44	-10.37	0.000	-5.41	-3.69
dummy_low_skilled	4.01	1.63	2.46	0.014	0.82	7.20
dummy_teachers_researchers	18.82	1.94	9.71	0.000	15.02	22.62
dummy_technicians	97.68	8.59	11.38	0.000	80.86	114.51
Interaction $[E(X_1)-E(X_2)]'(\beta_1-\beta_2)$	Total	Std. Err.	z	P>z	[95% Conf.Interval]	
education	1.52	0.14	10.64	0.000	1.24	1.81
age	-12.10	4.80	-2.52	0.012	-21.52	-2.68
age ²	22.56	2.84	7.94	0.000	16.99	28.13
working hours	5.85	0.89	6.59	0.000	4.11	7.60
tenure	22.02	1.77	12.43	0.000	18.55	25.49
dummy_high_skilled	-7.04	0.68	-10.37	0.000	-8.37	-5.71
dummy_low_skilled	-1.95	0.79	-2.46	0.014	-3.51	-0.40
dummy_teachers_researchers	11.46	1.18	9.71	0.000	9.15	13.77
dummy_technicians	-18.83	1.66	-11.37	0.000	-22.07	-15.58

Source: Prepared by the Author.

4.2.2 Pooled Ordinary Last Squared

The Oaxaca-Blinder decomposition made to POLS Model I shows a positive prize of R\$ 490.88 in favor of CLT workers, a opposite result in comparison to the same decomposition in the FE Model I. It reinforces the relevant impact of controlling by individual and year unobservable characteristics.

The positive differential in favor of CLT employees is basically due to the Coefficients Effect, which represents a prize of R\$ 505.22 in favor of this group. Education, Age and Tenure coefficients are higher to CLT workers whereas Statutory workers have a higher return to Working Hours. Being a High Skilled worker provides a return of R\$ 40.47 to Statutory Workers while there is a positive prize to CLT workers to all others occupation dummies as Low Skilled (R\$ 52.30), Teachers & Researchers (R\$ 95.63) and Technicians (R\$ 13.21).

The endowments effect of R\$ 14.33 in favor of Statutory workers indicates that they are in average more qualified than CLT workers. Education, Age and Tenure are positive and Working Hours is negative in the composition of this amount.

Table 11 – Oaxaca-Blinder Decomposition to POLS Model I

Blinder-Oaxaca Decomposition						
1: Statutory (dummy_clt=0)						
2: CLT (dummy_clt=1)			obs	=	21,421,830	
Differential	Coef.	Robust Std. Error	z	P>z	95% Conf. Interval	
Avg. Salary Statutory (Prediction 1)	3976.48	1.13	3516.34	0.000	3974.26	3978.69
Avg. Salary (Prediction 2)	4467.37	2.47	1807.44	0.000	4462.52	4472.21
Difference	-490.88	2.71	-180.6	0.000	-496.21	-485.56
Endowments $E[(X_1)-E(X_2)]'\beta^*$						
education	65.45	0.79	82.77	0.00	63.90	67.00
age	55.77	1.15	48.09	0.00	53.49	58.04
age ²	-8.77	1.02	-8.54	0.00	-10.79	-6.76
working hours	-183.09	0.41	-446	0.00	-183.89	-182.28
tenure	387.71	0.79	490.59	0.00	386.16	389.26
dummy_low_skilled	95.20	0.33	281.97	0.00	94.54	95.86
dummy_teachers_researchers	6.28	0.29	21.25	0.00	5.70	6.86
dummy_technicians	229.57	0.53	429.16	0.00	228.52	230.62
dummy_high_skilled	22.99	0.26	87.19	0.00	22.48	23.51
Total	14.33	12.31	1.16	0.245	-9.80	38.47
Coefficients $E(X_1)'(\beta_1-\beta^*)+E(X_2)'(\beta^*-\beta_2)$						
education	-2287.49	10.85	-210.82	0.00	-2308.76	-2266.22
age	-3444.54	63.54	-54.2	0.00	-3569.09	-3319.98
age ²	1887.23	35.68	52.89	0.00	1817.29	1957.16
working hours	3501.71	14.47	241.91	0.00	3473.34	3530.08
tenure	-627.44	4.00	-156.48	0.00	-635.30	-619.58
dummy_low_skilled	-52.30	1.21	-43.14	0.00	-54.68	-49.93
dummy_teachers_researchers	-95.63	2.18	-43.73	0.00	-99.91	-91.34
dummy_technicians	-13.21	8.35	-1.58	0.11	-29.59	3.16
dummy_high_skilled	40.47	0.63	63.78	0.00	39.23	41.72
_cons	-70.82	35.79	-1.98	0.04	-140.97	-0.66
Total	-505.22	12.65	-39.92	0.00	-530.03	-480.41

Source: Prepared by the Author.

4.2.3 Models Comparison

As we saw in the previous sections there are significant differences between the Oaxaca-Blinder Decomposition applied to Fixed Effects and POLS regressions. The total variation between both results is R\$ 800.82 once in the FE Model I we have a prize of R\$ 309.93 to Statutory workers and the POLS Model I presented a prize of R\$ 490.89 to CLTworkers.

Table 12 compares both regressions decomposition by occupation dummy. To Low Skilled Workers and Teachers and Researchers groups we have opposite signs in each model and to Technicians and High Skilled workers the positive differential increases.

Assuming the FE Model as baseline the largest positive difference was found to Statutory Teachers and Researchers (R\$ 132.08). Statutory Low Skilled (R\$ 48.35), Technicians (R\$ 149.07) and High Skilled Workers (R\$ 50.86) presented a lower occupation prize in comparison to the results founds in the POLS modeling.

Table 12 – Oaxaca-Blinder Decomposition Comparison

FE MODEL I					
Decomposition	Low Skilled	Teachers and Researchers	Technicians	High Skilled	Total
Endowments	-7.50 (0.53)	12.45 (0.94)	-11.57 (1.19)	24.19 (0.54)	3.09 (5.29)
Coefficients	4.01 (1.63)	18.82 (1.94)	97.68 (8.59)	-4.55 (0.44)	283.34 (152.15)
Interaction	-1.95 (0.79)	11.46 (1.18)	-18.83 (1.66)	-7.04 (0.68)	23.49 (6.35)
Total	-5.45	42.73	67.29	12.60	309.93
POLS MODEL I					
Decomposition	Low Skilled	Teachers and Researchers	Technicians	High Skilled	Total
Endowments	95.20 (0.33)	6.28 (0.29)	229.57 (0.53)	22.99 (0.26)	14.33 (12.31)
Coefficients	-52.30 (1.21)	-95.63 (2.18)	-13.21 (8.35)	40.47 (0.63)	-505.22 (35.79)
Total	42.90	-89.35	216.36	63.46	-490.89
DIFFERENCE					
Decomposition	Low Skilled	Teachers and Researchers	Technicians	High Skilled	Total
Endowments	-102.70	6.17	-241.14	1.20	-11.24
Coefficients	56.31	114.45	110.89	-45.02	788.56
Interaction	-1.95	11.46	-18.83	-7.04	23.49
Total	-48.35	132.08	-149.07	-50.86	800.82

*standard deviations in parenthesis

Source: Prepared by the Author

5 Conclusions

This work has proposed to evaluate to Brazil the wage differential between public employees by labor regime. Due constitutional changes over the last few years, nowadays we have in the public service workers hired in different labor regimes occupying similar positions. In this scenario the main question analyzed in this paper was an analysis of a possible prize in favor one of these groups.

The results of a Fixed Effects Regression controlling non observable individual and time influences show that there is a positive monthly wage differential of R\$ 309.93 in favor of Statutory workers. By occupation the largest wage prize is received by Technicians (R\$ 97.11) followed by Teachers and Researchers (R\$ 85.27) and Low Skilled Workers (R\$ 12.20). Only High Skilled Statutory workers presented a negative prize (R\$ 95.98) in comparison to similar CLT positions.

The Oaxaca-Blinder decomposition indicates that this positive differential over the time are due mainly to unexplained factors (coefficients effect) once the specific characteristics of each group (endowments effect) explain a small part of the total differential.

One question that was not debated in this work is the cause of the differential due the labor regime. This question is particularly interesting once the endowments difference between groups explains a very small share of the total differential in the Oaxaca-Blinder decomposition, which indicates that there are unexplained factors responsible by such salary prize in favor of Statutory employees.

Another point that can also be focused as an extension of this work is the analysis of regional differences to identify if some states have higher differentials than others or even no wage differential between statutory and "celetistas".

Additionally the use of only three years to generate a Panel Database and other adjustments required due computational limitations can also be a focus of improvement in a future work.

At last, it is important highlight the significance of the variables tested and the explanatory power of the Fixed Effects model. The differences observed in comparison to a POLS regression using the same database reinforce that probably there are individual and time unobservable factors that are critical in an analysis of wage differentials over the years.

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