

# 220

**DISCUSSION PAPER**

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## **IMPACTS OF OUTSOURCING ON WAGE: NEW EVIDENCE FOR THE BRAZILIAN DEBATE**

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## **IMPACTS OF OUTSOURCING ON WAGE: NEW EVIDENCE FOR THE BRAZILIAN DEBATE**

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## DISCUSSION PAPER

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## ABSTRACT

This article brings empirical evidence for outsourcing debate in Brazil. This evidence is the result of a new methodology, which uses new microdata, recently released by the Ministry of Labour. With this methodology, it is possible to gather information about: i) 3,10 million employees with medium likelihood of being outsourced; ii) 0,92 million employees with high likelihood of being outsourced. And, when comparing wages of direct and outsourced employees, it is possible to notice that outsourced (with high likelihood) face a decrease in their wages, in most of the situations examined.

**Keywords:** outsourcing; employment; wage; regulation; State.

## SINOPSE

Este artigo traz novos insumos para o debate sobre a terceirização no Brasil atual. Ele estima o número de assalariados afetados por esse fenômeno, por meio de uma nova metodologia, envolvendo registros administrativos recém-disponibilizados. Com essa metodologia, encontram-se 4,02 milhões de terceirizados, que correspondem a 11,7% do total de assalariados do setor privado urbano. E, ao comparar a remuneração dos assalariados diretos e dos terceirizados, percebe-se que há uma variação negativa da remuneração, em desfavor dos últimos.

**Palavras-chave:** trabalho; terceirização; salário; regulação; Estado.





## 1 INTRODUCTION

Nowadays, there is a lot of controversy about outsourcing. Actors like workers and companies are debating new regulations for this phenomenon (Dieese and CUT, 2011; Fiesp and Ciesp, 2015). And this debate is taking place in economic, social and political spheres.

Outsourcing has been registered in Brazil since the end of the 1960s. It has begun in the public sector, but has soon spread to the private one. It has started through wage employment outsourcing, but has quickly evolved to the self-employment modality.

The State has presented an ambiguous attitude in face of this phenomenon. In different moments, executive and legislative institutions have fostered outsourcing. In the opposite way, judiciary institutions have curbed, editing strict regulations about it.

Anyway, outsourcing may have many impacts on Brazilian labour market, especially for workers. That's why it is relevant to discuss new regulations nowadays, mainly legislative ones – judicial regulations have resulted in legal incertitude, as explained in Ipea (2015).

The Bill n. 4.330/2004 is just one of the proposals that have been discussed in parliament.<sup>1,2</sup> Nonetheless, it is the one that is far ahead in lawmaking process – the reason why it has been chosen to be studied in this article.

As it will be seen further, there are doubts whether Bill n. 4.330/04 is the best option for a legislative regulation of outsourcing. Probably, qualified impact evaluations of this phenomenon should be made, before any parliament's decision about this bill.

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1. After its approval in the House of Representatives, the Bill n. 4.330/2004 has been examined in the Senate, as Bill n. 30/2015. About this, see Campos (2015).

2. A discussion of different proposals for outsourcing regulation in Brazil can be found at SAE/PR (2009).

In the last decade, few impact evaluations of outsourcing have been developed in Brazil. And the few ones have a variety of problems. Among others, it is possible to pick the following: *i*) insufficient data (especially quantitative data); *ii*) indirect estimations of outsourced workers (there are no direct estimates); *iii*) several bias (selection and comparison bias).

Unfortunately, all those methodological problems affected the quality of outsourcing evaluations. And, without qualified evaluations, it is difficult to discuss this phenomenon in Brazil. That's why new studies should be made, before any legislative deliberation about the Bill n. 4.330/2004.<sup>3</sup>

## 2 WHAT IS OUTSOURCING?

One of the possible concepts of outsourcing is a disjunctive between juridical and economic dimensions of the labour relation. The employee actually works for one company (called the “taker”), but all the rights related to his work are connected to other – an intermediary firm (the “giver”) (Barros, 2006; Delgado, 2006).

In Brazil, as a rule, the most common labour relation (the wage employment) doesn't bear this kind of disjunctive. The employee's rights are guaranteed by the company in which he really works – in other words, the taker and the giver are the same firm in this relation, which is called ‘bilateral’.

Nonetheless, in an outsourced labour relation, those rights are not warranted by the company in which the employee actually works, but by an intermediate firm. Therefore, taker and giver are different companies, establishing a “trilateral” relation with the employee.

It is important to notice that outsourcing may take place either through wage employment or self-employment. In the first, the worker continues to be an ordinary

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3. An exception among the evaluations produced about outsourcing, which seeks to address many of the mentioned methodological problems, can be found at Stein, Zylberstajn and Zylberstajn (2015).

employee, with all the attributes of this sort of labour relationship.<sup>4</sup> In the latter, the worker is a self-employed, working through a variety of mechanisms (cooperatives, individual firms and so on).<sup>5</sup>

In both ways, outsourcing may have plenty of impacts on Brazilian labour market, which may be positive or negative. Those impacts are the main subject of this article, which presents a brief history of outsourcing, as well as of new regulations that have been discussed.

### 3 OUTSOURCING THROUGH WAGE EMPLOYMENT

The most common labour relation in Brazil is the wage employment, regulated since 1943 by the CLT. This relationship can be described as bilateral, because there are only two actors in it – the employee and the company to whom he works, which is the only responsible for his rights.

The CLT has never focused on trilateral labour relations, as the ones that result from outsourcing. Despite that, other regulations have emerged in Brazil since the end of the 1960s, dedicating attention to those trilateral relationships (Barros, 2006; Delgado, 2006).

In this way, there were Decree n. 200/1967 and Law n. 5.645/1970, which established that, whenever possible, government institutions should purchase the so-called “instrumental” services from private firms.<sup>6</sup> Examples of those services, not related to the

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4. According to Brazilian labour law (as seen in the CLT – Consolidação das Leis do Trabalho, instituted by Decree n. 5.452/1943), a worker is part of wage employment relationship when his relation with the company is personal, typical, subordinated and remunerated. According to Brazilian jurisprudence and literature, “personal” means that the worker cannot be changed or substituted without company’s acceptance, because the relation between them is *intuitu personae*. “Typical” means that worker’s activity is part of normal, regular, ordinary activities of the company. ‘Subordinated’ means that the way the worker develops his activities is defined by the company (not by the worker himself). “Remunerated” means that the worker develops his activities expecting a monetary, a financial counterpart (Barros, 2006; Delgado, 2006).

5. A lot of information about outsourcing through self-employment can be found at Costanzi (2016) and MPS (2015).

6. The definition of instrumental *versus* finalistic services has always been a difficult task in Brazilian law, jurisprudence and literature. Even official documents, produced by the TST (Tribunal Superior do Trabalho – one of the courts of judicial system, specialized in labour conflicts) –, face difficulties in characterizing those services (TST, 2014). Anyway, a common and simple definition is that finalistic services are part of normal, regular, ordinary and, mainly, essential activities developed by a company, as well as instrumental services are not (Delgado, 2006).

“finalistic” purposes of government institutions, were office cleaning, personnel transport, equipment maintenance, security services and so on.

Thus, in the beginning, outsourcing was fostered by State in the public sector, strictly to provide instrumental services to government institutions. Nevertheless, since the middle of the 1970s, the phenomenon has spread a lot, moving from public to private sector, what meant a major shift in its history.

Laws n. 6.019/1974, n. 7.102/83 and n. 8.863/1994 allowed private companies to acquire instrumental services from other firms in the market. The first law referred to temporary services of any nature, and the second and the third concerned specifically to permanent services of security.

Therefore, after de 1970s, outsourcing has been stimulated by the State not only in the public, but also in the private sector. Regarding this, it is important to stress that the Brazilian State has not behaved uniformly, properly speaking.

As legislative and executive institutions have edited several decrees and laws encouraging outsourcing (as the ones mentioned above), judiciary institutions have acted in the opposite way, restraining possibilities for this phenomenon (Artur, 2007; Biavascchi, 2013; Campos, 2009).

In the middle of the 1980's, the TST edited a kind of summary, regulating those possibilities. The Summary n. 256/1986 established that outsourcing was not allowed, except for the cases prescribed by Laws n. 6.019/1974 and n. 7.102/1983.

Later, after a harsh debate (Benedetto, 2015), the same court published a less-strict regulation. According to Summary n. 331/1993, outsourcing was forbidden, except for: *i*) cases defined by Laws n. 6.019/1974, n. 7.102/1983 and n. 8.863/1994; *ii*) cases of cleaning and conservation services; *iii*) cases of specialized services – which should be only instrumental, performed without personality and subordination; *iv*) cases of instrumental services purchased by government institutions.<sup>7</sup>

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7. In any of the cases of Summary n. 331/1993, there is a subsidiary responsibility of the taker (private companies or government institutions, as defined above). In other words, the taker has responsibility for the employee's rights, if by any chance the giver is not able to pay for them.

In sum, in respect to outsourcing through wage employment, the Brazilian State has not behaved homogeneously in the last decades. By one side, legislative and executive institutions have fostered the phenomenon; by the other, judiciary institutions have curbed it.

## 4 OUTSOURCING IMPACTS

Currently, in Brazilian parliament, there are several propositions able to enact a legislative regulation to outsourcing. Bill n. 4.330/2004 is just one of them – probably, the one far ahead in the lawmaking process.

Is this the best option for regulating outsourcing? There is a harsh debate about this, involving mainly workers' and companies' representatives.<sup>8</sup> Specifically from workers' point of view, there are some aspects that may cause a lot of apprehension.

Firstly, there are concerns about workers' *rights*. Going down in the network of firms involved in outsourcing, it is common to go from a big company to a small one, from a well-structured firm to a less-organized one. This simple fact poses challenges to workers' rights, because these tend to be broader and stronger in big/well-structured firms (Cardoso e Lage, 2007; Dieese, 2007).

Furthermore, down in the grid of companies engaged in outsourcing, it becomes more difficult to unionize and mobilize workers. This fact poses additional challenges to workers' rights that come from collective bargaining, at least in some extent. Being more difficult to attract workers to unions, as well as to stir them into action, those rights are prone to suffer (Dieese, 2007, 2012; Marcelino, 2008).

Secondly, there are worries about workers' *guarantees*. As said, going down in the net of firms entangled with outsourcing, it is expected to go from a big company to a small one, from a well-structured firm to a less-organized one. And this fact has implications in terms of labour warranties, because tiny/precarious firms face more difficulties to offer guarantees for workers' rights (Cardoso e Lage, 2007; Dieese, 2007).

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8. Even churches' representatives decided to take part in this debate, as it is possible to see in CNBB (2014).

In a nutshell, due to the list of threats described, outsourcing naturally causes a lot apprehension among workers. Some of the aspects of Bill n. 4.330/2004 may ease this worry – as those imposing controls over giver companies, as well as those defining responsibilities to giver and taker firms (Campos, 2015).

Nonetheless, perhaps it is too early to know in advance whether other features of Bill n. 4.330/2004 wouldn't provoke further anxiety among workers – as the one that allows outsourcing in any kind of services, instrumental and finalistic ones.

Probably, additional studies should be made about this, before parliament's final deliberation. After all, outsourcing may have relevant impacts on Brazilian labour market, especially for workers.

## 5 IDENTIFYING OUTSOURCING

This article offers new empirical evidence for debating outsourcing in Brazil. This includes the number and the profile of outsourced employees. This evidence is the result of a new methodology, which uses new microdata – recently released by the Ministry of Labour (MTE).<sup>9</sup>

Those microdata are basically two: *i*) Union's Official Register (CNES/MTE), in its 2013 version;<sup>10</sup> *ii*) Employees' Official Register (Rais/MTE), in its 2013 version too.<sup>11</sup> Microdata of both registers are extremely detailed and fully identified, in terms of unions (in CNES/MTE) and in terms of companies and their employees (in Rais/MTE).

A summary of the methodology utilized here is showed in Fluxogram 1, in the next page. And a complete description of it (including part of Stata programming) is presented in Appendix 1, in the end of this article.

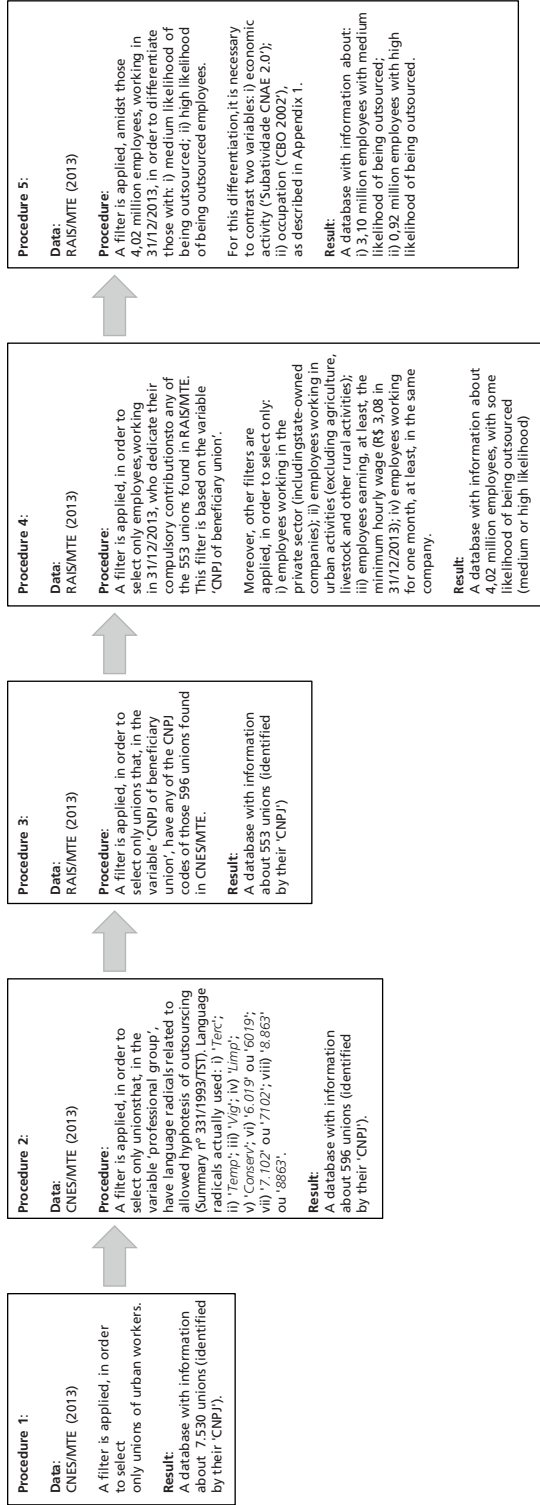
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9. MTE stands for Ministry of Labour (Ministério do Trabalho e Emprego). Detailed information about this ministry may be found at: <<http://www.mte.gov.br>>.

10. CNES stands for National Database of Unions (Cadastro Nacional de Entidades Sindicais). It is an official database with information about unions and similar institutions in Brazil. Detailed information about CNES/MTE may be found at: <<http://www3.mte.gov.br/cnes>>.

11. Rais stands for Annual Database of Wage Employment (Relação Anual de Informações Sociais). It is an official database with information about wage employees in Brazil. Specific information about Rais/MTE can be found at: <<http://portal.mte.gov.br/rais>>.

FLUXOGRAM 1  
Summary of procedures for identification of outsourced wage employees



Obs.: CNPJ — it is an official register, instituted with tributary purposes, identifying companies and other institutions in Brazil.

## 6 RESULTS

Despite the plainness of this methodology, it engenders interesting results, which can be compared to others, produced by similar methodologies, also focusing outsourcing.<sup>12</sup>

This methodology points to 4,02 million outsourced employees in 2013, which amounts to 11,7% of all urban employees in the private sector. Among them, 3,10 million have a medium probability of actually being outsourced (77,0% of the total), as well as other 0,92 million have a high probability (23,0%).<sup>13</sup>

A short profile of those 4,02 million outsourced employees is portrayed in the next subsection. And a wage comparison, between outsourced and direct employees, is depicted in the further subsection.<sup>14</sup>

### 6.1 Employment profile

Who are the 4,02 million outsourced employees, identified by the described methodology? Speaking in economic terms, 17 CNAE activities group 49,7% of them<sup>15</sup>. Considering employees according to their likelihood of being outsourced, the same 17 activities gather 35,3% of those with medium probability, as well as 97,8% of those with high probability.

What are the 17 activities that cluster almost half of outsourced employees in Brazil? They are described in table 1 and graphs 1, 2 and 3. Briefly, they refer to a variety of services, provided to private companies and governmental institutions. Sometimes, they

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12. About those methodologies, see Dieese and CUT (2011); Fiesp and Ciesp (2015); e Stein, Zylberstajn and Zylberstajn (2015).

13. Those numbers (4,02 million outsourced employees) are lower than the ones mentioned by Dieese and CUT (2011), which asserted that 10,87 million employees were outsourced in 2010. Those numbers are also lower than the ones stated by Fiesp and Ciesp (2015), which affirmed that 11,83 million employees were outsourced in 2013.

14. In this article, wage is taken as a job quality indicator of outsourced and direct employees.

15. Cnae stands for National Economic Activity Classification (Classificação Nacional de Atividade Econômica). It is an official categorization of economic activities in Brazil. Detailed information about Cnae may be found at: <<http://www.cnae.ibge.gov.br>>.



also refer to construction (building construction) and manufacturing (pork and poultry processing, plastic devices manufacturing).

Anyway, among the mentioned services, it is possible to find typical outsourcing activities, like those of general management of human resources, as well as those of hiring temporary human resources, for private firms and governmental organizations.<sup>16</sup>

Still amidst the referred services, graph 1 shows that some activities have a prominent proportion of outsourced among their employees. In this way, it is possible to highlight the following: private security services (75,8% of the employees in this activity are outsourced, with medium or high probability), building/household cleaning services (70,5%), services for buildings (62,7%), management of human resources (57,7%), hiring of employees in general (55,4%), cash transport services (55,2%), hiring of temporary employees (52,4%), waste collection services (50,3%), services to non-specified companies (37,3%), condos management services (34,4%) and office support services (32,2%).

TABLE 1  
Number of employees, according to Cnae activities

	Direct employees	Outsourced employees (med.prob.)	Outsourced employees (hig.prob.)	Outsourced employees (total)	Employees (total)
Building/household clean. servs.	168.047	237.043	165.298	402.341	570.388
Private security services	124.619	32.795	357.301	390.096	514.715
Condos management services	346.484	181.522	0	181.522	528.006
Servs.to non-specified companies	241.961	59.134	84.752	143.886	385.847
Hiring of temporary employees	115.865	0	127.603	127.603	243.468
Road freight transport	715.852	104.481	0	104.481	820.333
Building support services	42.854	41.966	30.055	72.021	114.875
Building construction	903.103	68.801	0	68.801	971.904
Office support services	137.805	48.739	16.779	65.518	203.323
Management of human resources	45.527	0	62.176	62.176	107.703

(Continues)

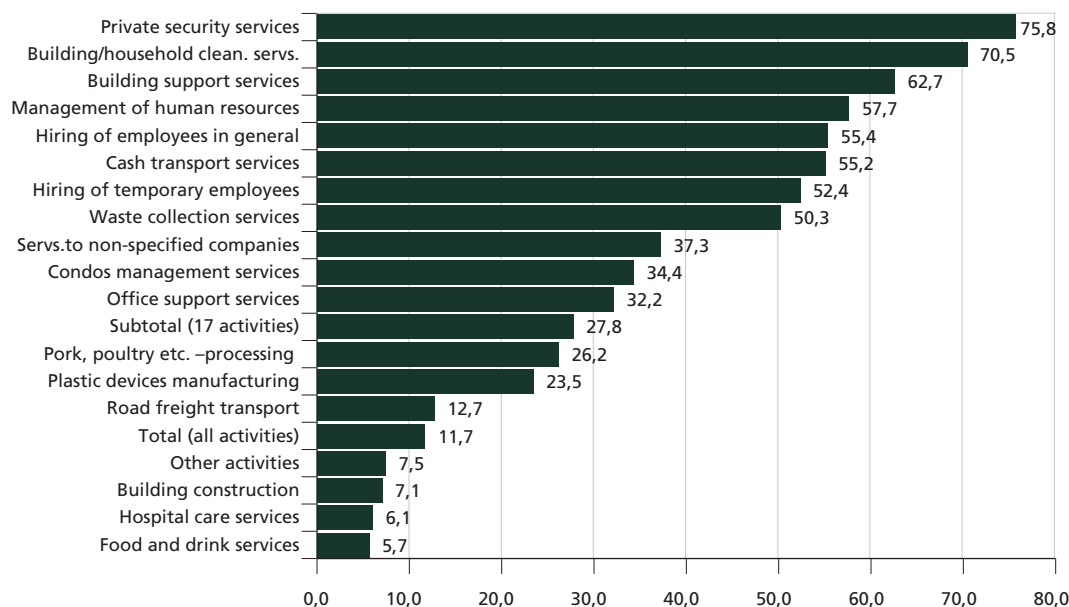
16. In Brazil, the hiring of temporary human resources is specifically regulated by Law n. 6.019/1974.

(Continued)

	Direct employees	Outsourced employees (med.prob.)	Outsourced employees (hig.prob.)	Outsourced employees (total)	Employees (total)
Food and drink services	1.023.793	61.345	0	61.345	1.085.138
Hiring of employees in general	48.881	0	60.782	60.782	109.663
Pork, poultry etc. – processing	163.507	58.158	0	58.158	221.665
Hospital care services	868.282	56.180	0	56.180	924.462
Waste collection services	53.876	54.615	0	54.615	108.491
Plastic devices manufacturing	145.293	44.593	0	44.593	189.886
Cash transport services	34.957	43.000	0	43.000	77.957
Subtotal (17 activities)	5.180.706	1.092.372	904.746	1.997.118	7.177.824
Other activities	25.101.550	2.004.714	20.403	2.025.117	27.126.667
<b>Total (all activities)</b>	<b>30.282.256</b>	<b>3.097.086</b>	<b>925.149</b>	<b>4.022.235</b>	<b>34.304.491</b>

Source: Rais-2013/MTE.  
Elaborated by the author.

**GRAPH 1**  
**Proportion of outsourced employees (medium or high probability), according to Cnae activities**  
(In %)

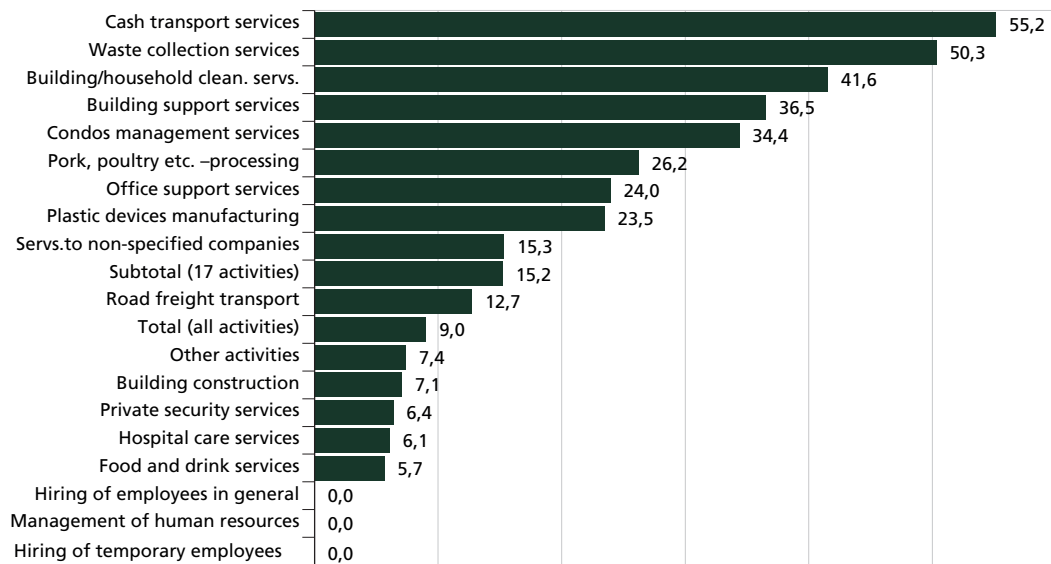


Source: Rais-2013/MTE.  
Elaborated by the author.

GRAPH 2

**Proportion of outsourced employees (medium probability), according to Cnae activities**

(In %)

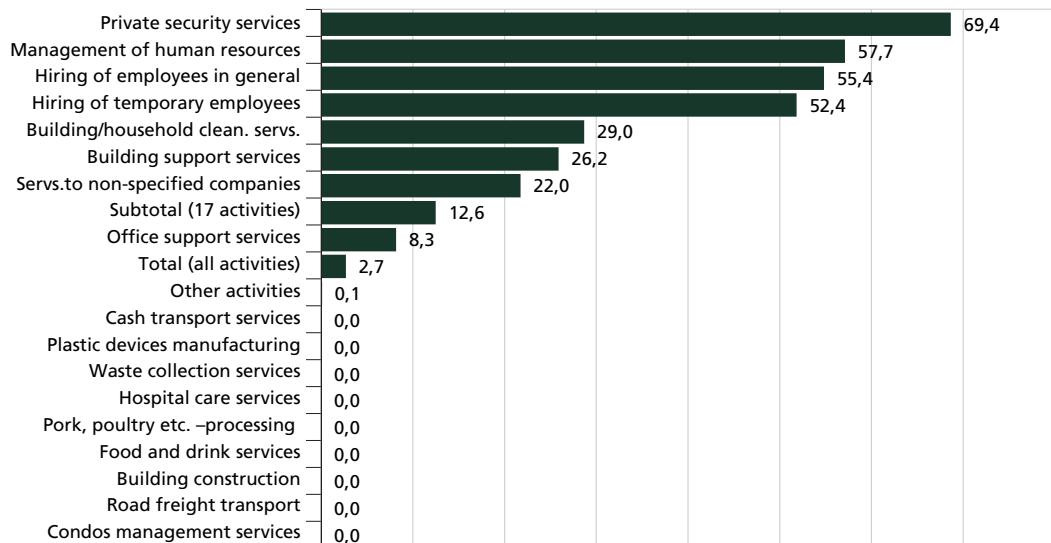


Source: Rais-2013/MTE.  
Elaborated by the author.

GRAPH 3

**Proportion of outsourced employees (high probability), according to Cnae activities**

(In %)



Source: Rais-2013/MTE.  
Elaborated by the author.

Speaking in occupational terms, only 15 CBO categories concentrate 49,9% of the 4,02 million outsourced employees in Brazil.<sup>17</sup> Specifically among those with medium likelihood of being outsourced, they amass 38,6% of them. Moreover, amidst those with high probability, they cluster 87,8% of them.

As described in table 2 and in graphs 4, 5 and 6, those 15 categories refer basically to service activities, rendered to private firms and governmental institutions. Furthermore, they refer to commerce (like retail seller, for example), construction (like construction assistant) and manufacturing (production line employee).

Regarding services provided to private companies and governmental organizations, the following occupations must be highlighted: guard, cleaner, building doorman, office assistant, administrative assistant, hostess, building caretaker, truck driver, watchman and cook. Besides, regarding only services basically afforded to governmental institutions, other occupations are prominent: public conservation employee and street sweeper.

As may be seen in graph 4, some of all those occupations have a pronounced proportion of outsourced among their employees. In this fashion, it is possible to mention the following: street sweeper (71,3% of the employees in this category are outsourced, with medium or high probability), guard (69,0%), building doorman (46,4%), cleaner (36,7%), building caretaker (32,5%), public conservation employee (32,1%) and watchman (24,2%).

TABLE 2  
Number of employees, according to CBO occupation

	Direct employees	Outsourced employees (med.prob.)	Outsourced employees (hig.prob.)	Outsourced employees (total)	Employees (total)
Guard	180.469	55.554	347.023	402.577	583.046
Cleaner	563.411	99.459	227.671	327.130	890.541
Building doorman	255.261	153.041	67.922	220.963	476.224
Office assistant	1.516.061	140.687	28.332	169.019	1.685.080
Administrative assistant	980.542	110.892	29.379	140.271	1.120.813

(Continues)

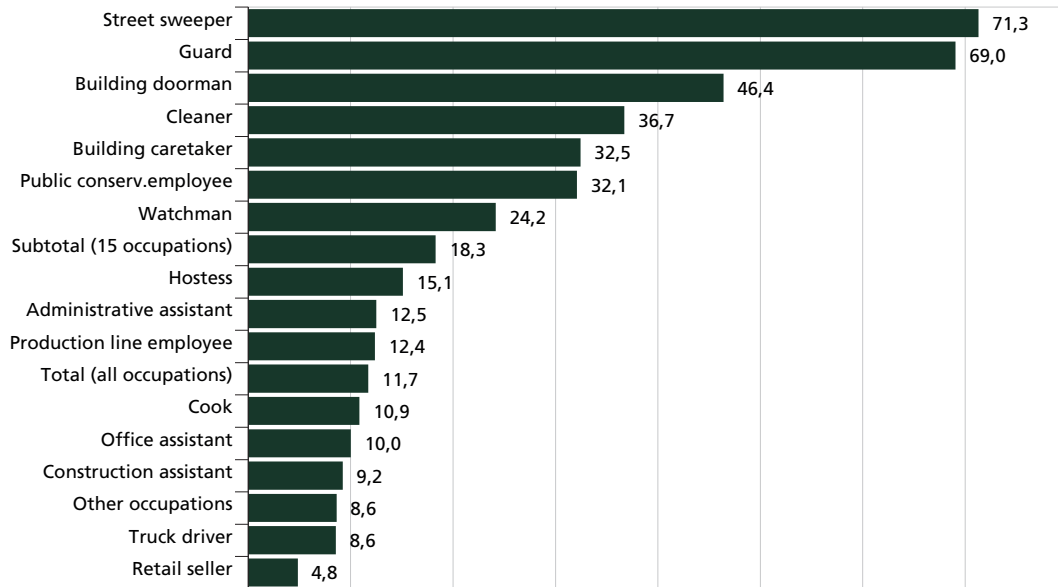
17. CBO stands for Brazilian Occupational Classification (Classificação Brasileira de Ocupações). It is an official categorization of occupation in Brazil. Specific information about CBO can be found at: <<http://www.mtecbo.gov.br/cbsite/pages/home.jsf>>.

(Continued)

	Direct employees	Outsourced employees (med.prob.)	Outsourced employees (hig.prob.)	Outsourced employees (total)	Employees (total)
Public conserv.employee	247.364	88.413	28.559	116.972	364.336
Production line employee	740.182	92.876	11.628	104.504	844.686
Retail seller	1.970.229	98.482	1.679	100.161	2.070.390
Hostess	402.381	49.180	22.371	71.551	473.932
Building caretaker	143.258	54.108	14.735	68.843	212.101
Construction assistant	665.496	65.027	2.692	67.719	733.215
Truck driver	714.052	66.666	242	66.908	780.960
Watchman	160.842	33.007	18.251	51.258	212.100
Street sweeper	20.561	46.086	4.994	51.080	71.641
Cook	395.672	41.392	6.842	48.234	443.906
Subtotal (15 occupations)	8.955.781	1.194.870	812.320	2.007.190	10.962.971
Other occupations	21.326.475	1.902.216	112.829	2.015.045	23.341.520
<b>Total (all occupations)</b>	<b>30.282.256</b>	<b>3.097.086</b>	<b>925.149</b>	<b>4.022.235</b>	<b>34.304.491</b>

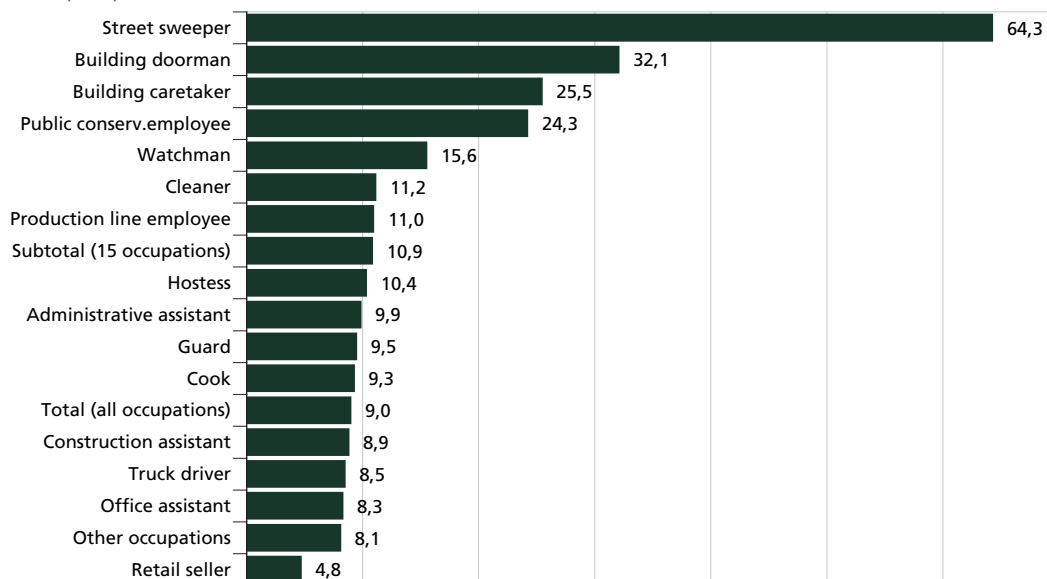
Source: Rais-2013/MTE.  
Elaborated by the author.

GRAPH 4  
Proportion of outsourced employees (medium or high probability), according to CBO occupations  
(In %)



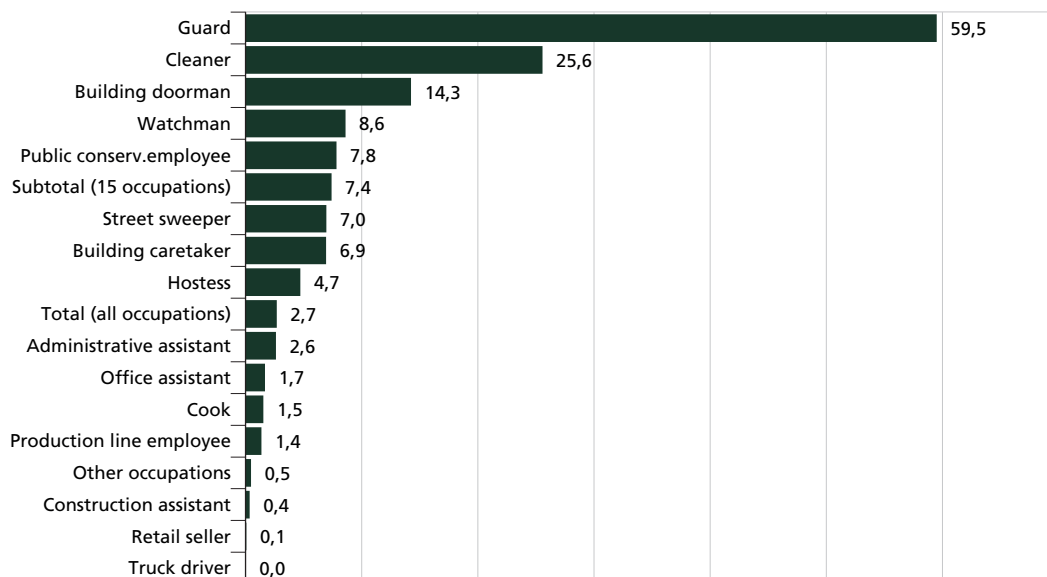
Source: Rais-2013/MTE.  
Elaborated by the author.

**GRAPH 5**  
**Proportion of outsourced employees (medium probability), according to CBO occupations**  
 (In %)



Source: Rais-2013/MTE.  
 Elaborated by the author.

**GRAPH 6**  
**Proportion of outsourced employees (high probability), according to CBO occupations**  
 (In %)



Source: Rais-2013/MTE.  
 Elaborated by the author.

## 6.2 Wage comparison

Is there any difference regarding the wages of outsourced (with medium or high probability) and direct employees? This subsection brings some evidence that may help to answer this question. This evidence is based on a kind of “controlled comparison” of wages, using a multiple linear regression modelling.

The wages considered in this article are directly paid to employees, in monetary units, in December of 2013. They are standardized by the working time, considering the normal and the extra time in this specific month. And, at some extent, they are taken as a proxy of the “quality” of the jobs occupied by outsourced (with medium or high probability) and direct employees.

The comparison of wages is controlled for a number of observable attributes, of the employees and also of their companies.<sup>18</sup> Those characteristics, surveyed by RAIS/MTE, are prone to influence employees’ wages and include the following:

- The location of firms in Brazilian territory;
- The size of firms, in terms of number of employees;
- The age of employees;
- The sex of employees;
- The level of education of employees;
- The type of hiring of employees, in terms of previous work experience;
- The type of hiring of employees, in terms of permanent hiring;
- The time of employment of employees;
- The union membership of the employees;
- If the employees are outsourced, with medium or high likelihood.

Using a multiple linear regression modelling, it is possible to measure the influence of each of those attributes in employees’ wages, always keeping the others fixed (a *ceteris paribus* analytical effect). Thus, in this modelling, the wage is the response variable, and the characteristics mentioned above are the predictor variables.

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18. This comparison of wages, controlled for attributes of employees and their firms, using a multiple linear regression, makes this article rather different from other studies, which perform only a non-controlled comparison of wages of outsourced and direct employees – like Dieese and CUT (2011).

It is important to stress some of the (empirical and theoretical) limitations of this investigative approach, including the following:

- It only takes into account registered employees in Rais/MTE, leaving aside non-registered employees, as well as self-employed workers, individual entrepreneurs, cooperative workers and others – who are involved in different kinds of outsourcing, not studied in this article;
- It only considers some of the observable attributes (of employees and of their firms) that can affect employees’ wages, putting aside non-observable characteristics (fixed or not) that may also affect those wages;
- It only takes into account the wages directly paid to employees, in monetary units (neither in goods, nor in services), leaving aside indirect-wages, often paid as ‘fringe benefits’ – like subsidized meals, health insurance, vehicles for transport and so on.

In spite of those limitations, chart 1 brings a description of the modelling adopted in this article, in order to make a controlled comparison of wages of outsourced and direct employees. This modelling is a multiple linear regression, with forced entry of predictor variables, which entered in just one stage. Moreover, those variables are considered only in their principal effects, putting aside any possible combined-effects. Finally, the coefficients of those variables are estimated by the most-common method – the ordinary least square, with a previous check of Gauss-Markov requirements.

**CHART 1**  
**Summary of regression model**

Model: Multiple linear regression. Predictor variables: forced entry in one stage, only main effects (and not combined effects). Parameter estimation method: ordinary least squares.	
$\ln(\text{wage}) = \beta_0 + \delta_1(\text{region} - \text{northeast}) + \delta_2(\text{region} - \text{southeast}) + \delta_3(\text{region} - \text{south}) + \delta_4(\text{region} - \text{midwest}) + \beta_1 \ln(\text{no. employees}) + \beta_2 \ln(\text{age}) + \delta_5(\text{sex} - \text{male}) + \delta_6(\text{high school} - \text{incompl./compl.}) + \delta_7(\text{college} - \text{incompl. or more}) + \delta_8(\text{type of hiring} - \text{with previous experience}) + \delta_9(\text{type of hiring} - \text{permanent}) + \beta_3 \ln(\text{employment period}) + \delta_{10}(\text{unionized} - \text{yes}) + \delta_{11}(\text{outsourced} - \text{medium probability}) + \delta_{12}(\text{outsourced} - \text{high probability})$	
Variables	Params.
$\ln(\text{wage})$ = response variable, in natural-log format, corresponding to employee’s wage in December, standardized by working time (normal and extra working time).	
(region – northeast) = predictor variable, in binary format, corresponding to company’s location in the Northeast region of Brazil.	$\delta_1$
(region – southeast) = predictor variable, in binary format, corresponding to company’s location in the Southeast region of Brazil.	$\delta_2$
(region – south) = predictor variable, in binary format, corresponding to company’s location in the South region of Brazil.	$\delta_3$
(region – midwest) = predictor variable, in binary format, corresponding to company’s location in the Midwest region of Brazil.	$\delta_4$
$\ln(\text{no. employees})$ = predictor variable, in natural-log format, corresponding to company’s number of employees.	$\beta_1$
$\ln(\text{age})$ = predictor variable, in natural-log format, corresponding to employee’s age.	$\beta_2$
(sex - male) = predictor variable, in binary format, corresponding to employee’s sex (male).	$\delta_5$

(Continues)



(Continued)

Model: Multiple linear regression. Predictor variables: forced entry in one stage, only main effects (and not combined effects). Parameter estimation method: ordinary least squares.	
$\ln(\text{wage}) = \beta_0 + \delta_1(\text{region} - \text{northeast}) + \delta_2(\text{region} - \text{southeast}) + \delta_3(\text{region} - \text{south}) + \delta_4(\text{region} - \text{midwest}) + \beta_1 \ln(\text{no. employees}) + \beta_2 \ln(\text{age}) + \delta_5(\text{sex} - \text{male}) + \delta_6(\text{high school} - \text{incompl./compl.}) + \delta_7(\text{college} - \text{incompl. or more}) + \delta_8(\text{type of hiring} - \text{with previous experience}) + \delta_9(\text{type of hiring} - \text{permanent}) + \beta_3 \ln(\text{employment period}) + \delta_{10}(\text{unionized} - \text{yes}) + \delta_{11}(\text{outsourced} - \text{medium probability}) + \delta_{12}(\text{outsourced} - \text{high probability})$	
Variables	Params.
(high school – incompl./compl.) = predictor variable, in binary format, corresponding to employee’s level of education (high school – incomplete or complete).	$\delta_6$
(college – incomp. or more) = predictor variable, in binary format, corresponding to employee’s level of education (college – incomplete, complete or more).	$\delta_7$
(type of hiring – with previous experience) = predictor variable, in binary format, corresponding to employee’s type of hiring (with previous work experience).	$\delta_8$
(type of hiring – permanent) = predictor variable, in binary format, corresponding to employee’s type of hiring (permanent hiring).	$\delta_9$
$\ln(\text{employment period})$ = predictor variable, in natural-log format, corresponding to employee’s time of employment.	$\beta_3$
(unionized – yes) = predictor variable, in binary format, corresponding to employee’s union membership.	$\delta_{10}$
(outsourced – medium probability) = predictor variable, in binary format, corresponding to the employee’s probability of being outsourced (medium probability).	$\delta_{11}$
(outsourced – high probability) = predictor variable, in binary format, corresponding to the employee’s probability of being outsourced (high probability).	$\delta_{12}$

Source: Rais-2013/MTE.  
Elaborated by the author.

This modelling is not indistinctly applied to all employees registered in Rais/MTE, but only to those registered in each of the 15 occupations (CBO) described above. Those occupations include the following employees:

- i) guards;
- ii) cleaners;
- iii) building doormen;
- iv) office assistants;
- v) administrative assistants;
- vi) public conservation employees;
- vii) production line employees;
- viii) retail sellers;
- ix) hostesses;
- x) building caretakers;
- xi) construction assistants;
- xii) truck drivers;

- xiii) watchmen;
- xiv) street sweepers;
- xv) cooks.

As seen before in the descriptive subsection, those 15 occupations concentrate almost half of all outsourced employees in Brazil. Thereby, they allow us to understand how wages vary, according to each of attributes already mentioned – for example, location and size of firms, as well as sex, age and education of employees.<sup>19</sup>

What about the results of this multiple linear regression modelling? They can be examined in graphs 7 and 8, just ahead, as well as (with greater detail) in table 3 in Appendix 2, in the end of this article.

As a summary of those results, comparing employees' wages, standardized by working time and controlled by the described observable characteristics, it is possible to notice some differences between: *i*) direct employees; *ii*) outsourced ones (with medium probability); *iii*) outsourced ones (with high likelihood).

Regarding specifically those employees with medium probability, the results show that the fact of being outsourced doesn't affect much their wages, in most of the 15 analyzed occupations.<sup>20</sup> Other variables (as location of companies or, alternatively, sex, education and time of employment of employees) seem to influence wages in a greater degree.

By the other side, specifically among those employees with high probability, the fact of being outsourced does affect their wages, in the majority of the 15 occupations.<sup>21</sup> Just as an example, it is possible to mention: retail sellers (with a decrease of 49,0% in their wages, strictly due to the fact of being outsourced), cooks (18,4%), administrative assistants (17,8%), construction assistants (16,8%), office assistants (13,9%),

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19. At some extent, applying the model only to employees in each of the 15 occupations (CBO) is equivalent to consider those occupations as another predictor variable in the regression (beyond all the predictors already described).

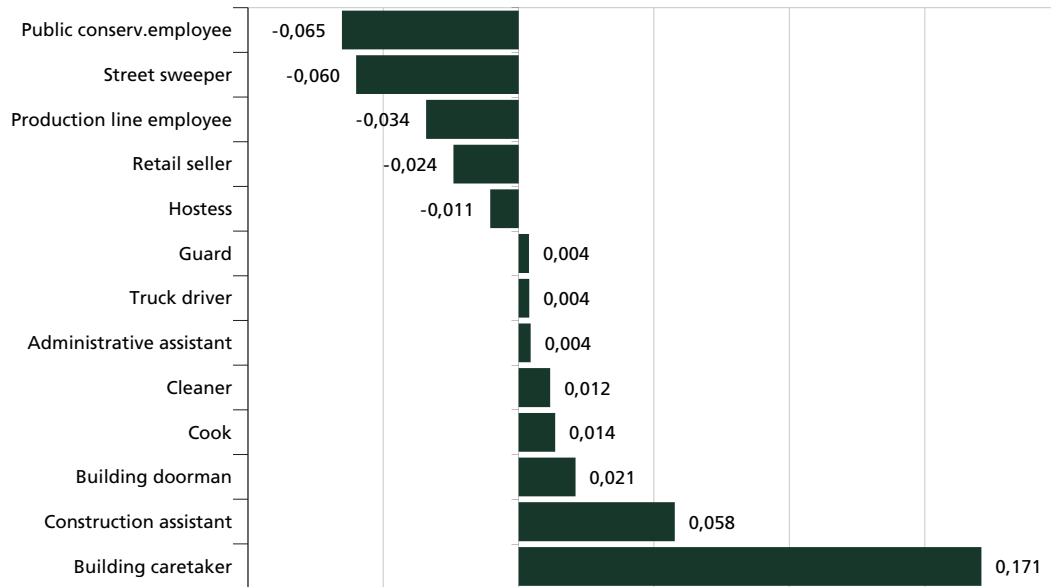
20. Furthermore, as seen in graph 7, when being outsourced affects employees' wages, it occurs in different ways (sometimes increasing the wages, other times decreasing).

21. Moreover, as noticed in graph 8, when being outsourced affects employees' wages, it occurs almost always in the same way (decreasing the wages).

truck drivers (12,2%), public conservation employees (11,6%) and hostesses (11,5%). In fact, with the sole exception of building caretakers, all the other occupations have a decrease in their wages, strictly due to outsourcing.

It is true that, amidst employees with high probability of being outsourced, other variables (as location of companies or, alternatively, sex, education and time of employment of employees) also influence employees' wages. Even so, almost all regression coefficients concerning this specific group of employees show that outsourcing (considered by itself) has some relevant effects.<sup>22</sup>

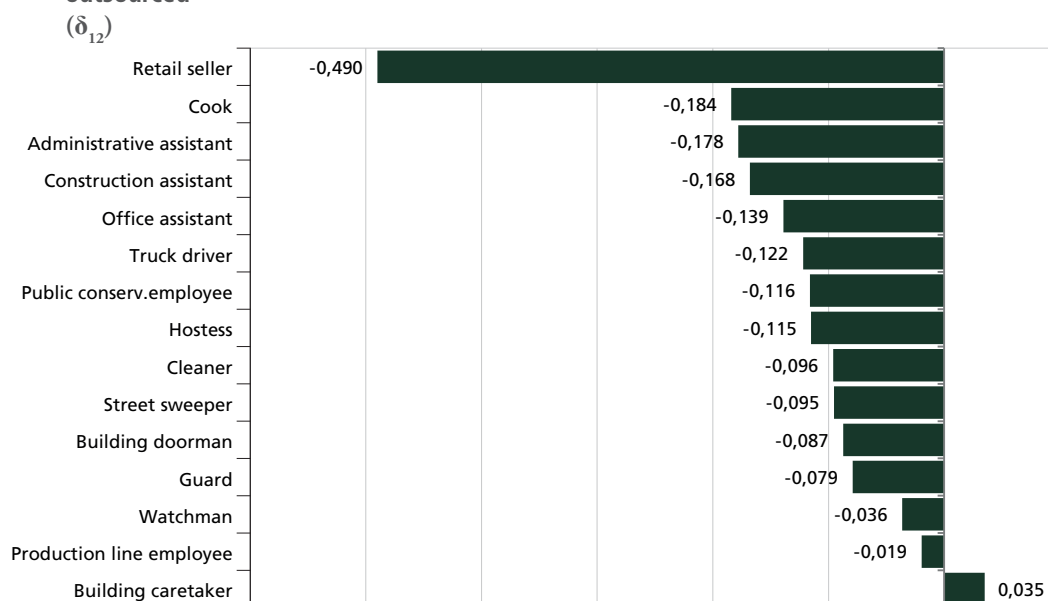
GRAPH 7  
Regression coefficients – predictor variable: employees with medium probability of being outsourced ( $\delta_{11}$ )



Source: Rais-2013/MTE.  
Elaborated by the author.  
Obs.: Only coefficients significant at 0,05.

22. Although outsourcing has relevant effects in the wages of employees with high likelihood of being outsourced, it is important to notice that they seem rather different from the effects pointed by Dieese and CUT (2011). These institutions assert that there is an average difference of 27,1%, between wages of direct and outsourced employees, in disfavor of the latter group. According to coefficients in graph 8, the median difference between wages of direct and outsourced employees, amidst the 15 occupations, is "only" of 11,5%, also in disfavor of the latter group. By several reasons, both percentages are not directly comparable. Nonetheless, they point to rather different magnitudes of effects, regarding the impacts of outsourcing on employees' wages – although those effects go in similar direction: when outsourced, employees see a decrease in their wages.

GRAPH 8  
**Regression coefficients – predictor variable: employees with high probability of being outsourced**



Source: Rais-2013/MTE.

Elaborated by the author.

Obs.: Only coefficients significant at 0,05.

## 7 FINAL REMARKS

This article brings empirical evidence for outsourcing debate in Brazil. This evidence is the result of a new methodology, which uses new microdata (CNES/MTE and RAIS/MTE), recently released by the Ministry of Labour. This methodology is rather simple, but it engenders interesting results, which can be compared to others, produced by similar methodologies, also focusing the outsourcing phenomenon.

The total amount of outsourced employees estimated in this article is 4,02 million (11,7% of all urban employees in the private sector), distributed as follows: *i*) 3,10 million with medium probability of being outsourced (77,0% of the 4,02 million); *ii*) 0,92 million with high likelihood of being outsourced (23,0%).

This amount of outsourced employees (4,02 million) is inferior to the one stated by Dieese and CUT (2011), which appraises that 25,5% of the employees registered in RAIS/MTE are outsourced (10,87 million). Moreover, this amount is also inferior

to the one asserted by Fiesp and Ciesp (2015), which estimates that the number of outsourced employees in RAIS/MTE is equivalent to 11,83 million.<sup>23</sup>

Anyway, regarding the profile of outsourced employees identified in this article (especially in terms of economic activities and occupational categories), there are many similarities with the profile drawn by other methodologies, as may be seen in Fiesp and Ciesp (2015) and in Stein, Zylberstajn and Zylberstajn (2015).

Furthermore, comparing wages of direct and outsourced employees (with high probability of being outsourced), there are several similarities with the results achieved by other methodologies, as those mentioned just above. Compared to direct employees, outsourced (with high likelihood) face a decrease in their wages, in most of the situations examined.

Beyond outsourcing, other variables also influence employees' wages. The location of companies in the territory, by one side, and the sex, the education and the time of employment of employees, by the other, are examples of those variables. Despite that, outsourcing (considered by itself) has a relevant influence over employees' wages (at least amidst the group with high probability of being outsourced).

However, this influence appears to be less strong than the one pointed out by Dieese and CUT (2011), which states that the average difference of wages between direct and outsourced employees is 27,1%, in disfavor of the latter group. According to data presented in this article, the median difference between wages of direct and outsourced employees, among the 15 occupations studied, is 'only' 11,5%, also in disfavor of the latter group.<sup>24</sup>

It is important to add that, whether the comparison of wages could take into account non-observable attributes (of the employees and of their companies, fixed or non-fixed attributes), this median difference would probably be lower than 11,5%. About this specific aspect, there are several interesting evidences in Stein, Zylberstajn and Zylberstajn (2015).

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23. The reference of analysis for Dieese and CUT (2011) is the year 2010. By the other side, the reference of analysis for Fiesp and Ciesp (2015) is the year 2013.

24. As previously explained, both percentages are not directly comparable, even though they point to different magnitudes of effects, regarding specifically the effects of outsourcing on employees' wages.

In fact, this is a kind of warning, about the limitations of the methodology adopted in this article. Among them, it is possible to cite: *i*) it only analyzes registered employees in RAIS/MTE – leaving aside other workers, involved in different kinds of outsourcing; *ii*) it only focus some of the observable attributes (of employees and of their firms) that can affect wages – putting aside non-observable characteristics; *iii*) it only studies the wages directly paid to employees, in monetary units – leaving aside indirect-wages, often paid as ‘fringe benefits’.

In face of those limitations, additional studies should be made, to investigate possible impacts of outsourcing in Brazil (mainly the one that occurs through wage employment). Recapping the debate in the beginning of this article, before any deliberation about outsourcing (in particular, any legislative deliberation in the parliament), it is worth to invest in new studies. After all, as mentioned above, outsourcing may have relevant impacts on Brazilian labour market, especially for workers.

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## APPENDIX

## METHODOLOGY

To estimate the number and to outline the profile of employees affected by outsourcing, five sequential procedures were applied, using microdata of CNES/MTE and of RAIS/MTE. Initially, using CNES/MTE, the following procedures were performed:

*Procedure 1* – Application of a filter in the following variables, in search of the following categories: *i*) variable ‘degree’ = category ‘union’; *ii*) variable ‘geoeconomic area’ = category ‘urban’; *iii*) variable ‘group’ = category ‘worker’. After this filter, only 7.530 unions of urban employees remained in CNES/MTE (unions that are directly involved with the representation of outsourced employees).

*Procedure 2* – Application of a filter in the variable ‘professional group’ in CNES/MTE, in order to select only unions that, in this variable, had language radicals related to allowed hypothesis of outsourcing (Summary n. 331/1993/TST).<sup>25</sup> In this filter, the following possibilities of language radicals were adoptable (with the cells in gray in chart A.1 highlighting the possibilities effectively adopted):

CHART A.1

**Language radicals for selection in variable “professional group” of CNES-2013/MTE, as well as number of selected cases**

Radical	Terceiriza	Terceiriz	Terceiri	Terceir	Tercei	Terce	Terc	Ter	Te
Number selected cases	44	45	45	91	91	93	104	1.093	3.169
Radical	Tempor	Tempo	Temp	Tem	Te				
Number selected cases	37	39	58	192	3.169				
Radical	Vigilan	Vigila	Vigil	Vigi	Vig	Vi			
Number selected cases	48	48	133	214	221	3.261			

(Continues)

25. An updated version of Summary n. 331/1993/TST can be found at: <<http://goo.gl/wBo5u2>>.



(Continued)

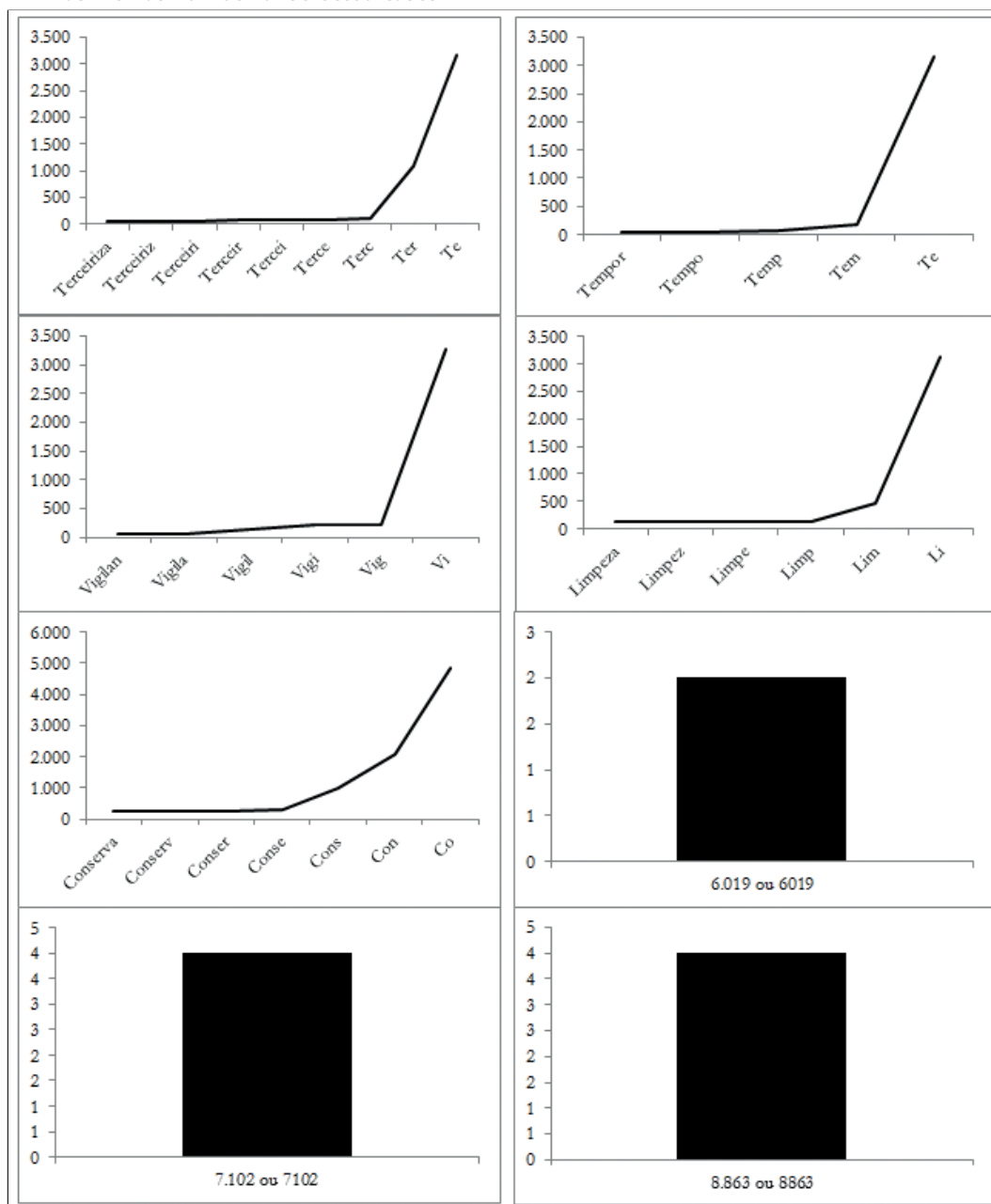
Radical	Limpeza	Limpez	Limpe	Limp	Lim	Li			
Number selected cases	131	131	132	135	473	3.128			
Radical	Conserva	Conserv	Conser	Conse	Cons	Con	Co		
Number selected cases	246	246	272	314	969	2.075	4.837		
Radical	6.019 ou 6019								
Number selected cases	2								
Radical	7.102 ou 7102								
Number selected cases	4								
Radical	8.863 ou 8863								
Number selected cases	4								

Source: CNES-2013/MTE and Summary n. 331-1993/TST.  
Elaborated by the author.

As it is possible to check in graph A.1, the language radicals adopted in the filter were those in which the ‘curve’ bent sharply. Or, alternatively, those that made it difficult to confound with other very common words (as is the case of “conser”, “conse” etc.). Anyway, after this filter, only 596 unions of urban employees remained in CNES/MTE – unions that, according to the description of their ‘professional category’, could represent outsourced employees in 2013.<sup>26</sup>

26. Unions with their CNPJ code (as stated before, CNPJ is an official register, instituted with tributary purposes, identifying companies and other institutions in Brazil).

GRAPH A.1  
**Language radicals for selection in variable “professional group” of CNES-2013/MTE,  
as well as number of selected cases**



Source: CNES-2013/MTE and Summary n. 331-1993/TST.

Elaborated by the author.

Publisher's note: Figure displayed in low resolution due to the technical characteristics of the original files.

From this point, using the data from the Rais/MTE, the following procedures were performed:

*Procedure 3* – Application of a filter in the variable “CNPJ of the beneficiary union”, which identifies unions that benefit themselves from social contributions, compulsorily collected among employees.<sup>27</sup> This filter has been in search of the CNPJ code of the 596 unions that could represent outsourced employees. After this filter, only 553 unions (among the 596) remained in Rais/MTE.

*Procedure 4* – Identification of employees who are represented by those 553 unions, through the application of a filter to select only employees: *i*) working in 31/12/2013; *ii*) working in private activities (including state-owned companies); *iii*) working in urban activities (excluding therefore agriculture, livestock etc.); *iv*) with wage equivalent at least to the minimum wage/hour (R\$ 3,08 in December of 2013); *v*) with at least a month working in their companies. After this filter, only 4,02 million employees remained in Rais/MTE.

*Procedure 5* - Application of a filter in order to define, among the 4,02 million employees, those with medium and with high likelihood of being outsourced. Instead of a binomial categorical variable, indicating whether employees could be outsourced or not, the idea was to create a trinomial categorical variable, “ranking” probabilities of being outsourced. This filter was applied through a contrast between variables: employees’ occupations (CBO) and their companies’ activities (Cnae).

Just as an example, the creation of this trinomial categorical variable, in the case of a group of employees that has historically being outsourced (as the guards), occurs as follows: *i*) employees identified in Rais/MTE with guards’ CBO, contributing to unions identified in Cnes/MTE by language radical “Vig”, employed in companies identified in Rais/MTE by the Cnae of surveillance, constitute a group most likely to be outsourced; *ii*) employees identified in Rais/MTE with guards’ CBO, contributing to unions identified in Cnes/MTE by language radical “Vig”, employed in firms identified in Rais/MTE

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27. In Brazil, unions are historically funded by different social contributions. But the most relevant of them is one compulsorily collected among employees (the so-called “contribuição sindical”). Contrary to other social contributions, this one is necessarily declared in Rais/MTE.

by other Cnae (distinct from surveillance code), constitute a group less likely to be outsourced. Similar contrast is applied to other employees – who are frequently outsourced (cleaning employees, temporary employees etc.).

After those five procedures, 4,02 million outsourced employees were identified in Rais/MTE (11,7% of all employees in the urban private sector). Among them, 3,10 million with medium probability (77,0% of all outsourced), as well as another 0,92 million with high probability of actually being outsourced (23,0%).

## ADDITIONAL COMMENTS ON PROCEDURE 5

As stated in the description of the methodology, for the creation of a trinomial categorical variable, ranking probabilities of outsourcing for employees (medium or high probabilities), was performed a contrast between employees' occupations (CBO) and their companies' activities (Cnae). The Stata programming used in the creation of this variable is quite simple, as can be seen below:

```

generate terceirizado_1 = terceirizado
replace terceirizado_1 = 2 if ((terceirizado == 1) & ((sub_cnae20 == 78108) | (sub_cnae20 == 78205) | (sub_cnae20 == 78302)))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 517330) & (sub_cnae20 == 80111))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 517330) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514320) & (sub_cnae20 == 81214))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514320) & (sub_cnae20 == 81290))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514320) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 517410) & (sub_cnae20 == 81117))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 517410) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 411005) & (sub_cnae20 == 82113))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 411005) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 411010) & (sub_cnae20 == 82113))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 411010) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514225) & (sub_cnae20 == 81290))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514225) & (sub_cnae20 == 81303))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514225) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 422105) & (sub_cnae20 == 82113))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 422105) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514120) & (sub_cnae20 == 81117))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514120) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 517420) & (sub_cnae20 == 80111))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 517420) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514215) & (sub_cnae20 == 81290))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514215) & (sub_cnae20 == 81303))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 514215) & (sub_cnae20 == 82997))
replace terceirizado_1 = 2 if ((terceirizado == 1) & (cbo2002 == 513205) & (sub_cnae20 == 82997))

```

Where:

```

. Variable 'terceirizado': (categorical and binomial) is the outcome of the procedure 4 of the methodology – and indicates only if the employee is outsourced or not.
. Variable 'terceirizado_1': (categorical and trinomial) is the result of the procedure 5 of the methodology – and indicates whether the employee: i) is not outsourced; ii) is outsourced with a medium probability; iii) is outsourced with high probability.
. Variable 'cbo2002': indicates employee' occupation code in the CBO.
. Variable 'sub_cnae20': indicates companies' activity code in the CNAE.

```

Finally, the codes used in variables '*cbo2002*' and '*sub\_cnae20*' are the following:

CHART A.2  
Codes used in variables 'cbo2002' and 'sub\_cnae20'

Variable 'CBO2002'	Variable 'Sub_CNAE20'
'411005' = Office assistant	'78108' = Hiring of employees in general
'411010' = Administrative assistant	'78205' = Hiring of temporary employees
'422105' = Hostess, in general	'78302' = Management of human resources
'513205' = Cook, in general	'80111' = Private security services
'514120' = Building caretaker	'81214' = Building/household cleaning services
'514215' = Street sweeper	'81290' = Non-specified cleaning activities
'514225' = Public conservation employees	'81303' = Landscape activities
'514320' = Cleaner	'82113' = Office support services
'517330' = Guard	'82997' = Services to non-specified companies
'517410' = Building doorman	-
'517420' = Watchman	-

Source: Rais-2013/MTE.  
Elaborated by the author.

## REGRESSION RESULTS

Next, in table A.1, it is possible to find the multiple linear regression results, comparing wages of direct and outsourced employees (according to their probability of being outsourced). Those results refer to each of the 15 occupations (CBO) described above, which group almost half of outsourced employees identified in Rais/MTE.

TABLE A.1  
Regression coefficients – several occupations (CBOs)

Occupations (CBO Code)	Guard (517330)	Cleaner (514320)	Building doorman (517410)	Office assistant (411005)	Administrative assistant (411010)	Public conservation employee (514225)	Production line employee (784205)	Retail seller (521110)
Location of the company – northeast region	-0,246*** (0,00159)	-0,0429*** (0,00128)	-0,144*** (0,00214)	-0,129*** (0,00174)	-0,153*** (0,00260)	-0,0519*** (0,00170)	-0,125*** (0,00180)	-0,117*** (0,00155)
Location of the company – southeast region	-0,000288 (0,00152)	0,143*** (0,00116)	0,191*** (0,00207)	0,101*** (0,00160)	0,159*** (0,00243)	0,175*** (0,00160)	0,231*** (0,00161)	0,122*** (0,00149)
Location of the company – south region	0,0338*** (0,00164)	0,226*** (0,00129)	0,177*** (0,00235)	0,137*** (0,00169)	0,101*** (0,00253)	0,242*** (0,00185)	0,202*** (0,00163)	0,188*** (0,00160)
Location of the company – midwest region	0,0634*** (0,00204)	0,0744*** (0,00142)	0,0423*** (0,00244)	0,0627*** (0,00195)	0,0971*** (0,00299)	0,123*** (0,00200)	0,0291*** (0,00191)	0,179*** (0,00193)
Number of employees in the company (Ln)	0,0179*** (0,000304)	-0,00393*** (0,000128)	-0,0250*** (0,000177)	0,0555*** (0,000154)	0,0539*** (0,000205)	0,00600*** (0,000217)	0,0446*** (0,000183)	0,115*** (0,000217)
Age of the employee (Ln)	0,0302***	-0,00145	-0,0162***	0,249***	0,428***	0,00967***	0,0876***	0,156***

(Continues)

(Continued)

Occupations (CBO Code)	Guard (517330)	Cleaner (514320)	Building doorman (517410)	Office assistant (411005)	Administrative as- sistant (411010)	Public conserva- tion employee (514225)	Production line employee (784205)	Retail seller (521110)
	(0,00165)	(0,000903)	(0,00130)	(0,00120)	(0,00179)	(0,00154)	(0,00115)	(0,00110)
Sex of the employee (male)	0,0918***	0,0650***	0,0814***	0,0846***	0,122***	0,120***	0,175***	0,105***
	(0,00122)	(0,000611)	(0,00126)	(0,000664)	(0,000951)	(0,000955)	(0,000640)	(0,000657)
Employee's level of education (high school – incomplete or complete)	0,0456***	0,00921***	-0,00477***	0,0982***	0,118***	0,0246***	0,0985***	0,147***
	(0,000867)	(0,000536)	(0,000801)	(0,00103)	(0,00198)	(0,000904)	(0,000696)	(0,000797)
Employee's level of education (college – incomplete, complete or more)	0,211***	0,0568***	0,0195***	0,325***	0,456***	0,322***	0,255***	0,504***
	(0,00532)	(0,00401)	(0,00325)	(0,00132)	(0,00210)	(0,00686)	(0,00362)	(0,00182)
Employee's type of hir- ing (with previous work experience)	-0,0233***	0,0255***	-0,00580***	0,0678***	0,0369***	0,0304***	0,0713***	0,128***
	(0,00244)	(0,000732)	(0,00148)	(0,000802)	(0,00139)	(0,00122)	(0,000891)	(0,000703)
Employee's type of hir- ing (permanent hiring)	0,00279	-0,0164***	-0,0466***	0,108***	0,118***	-0,0514***	0,0104***	0,211***
	(0,00498)	(0,00254)	(0,00536)	(0,00112)	(0,00220)	(0,00461)	(0,00211)	(0,00244)
Time of employment of the employee (Ln)	0,0591***	0,0476***	0,0655***	0,103***	0,110***	0,0602***	0,0875***	0,0567***
	(0,000437)	(0,000232)	(0,000318)	(0,000311)	(0,000416)	(0,000389)	(0,000310)	(0,000285)
If the employee is mem- ber of a union (yes)	0,0437***	0,0603***	0,00251	0,162***	0,103***	0,0785***	0,0843***	0,0426***
	(0,00119)	(0,00136)	(0,00164)	(0,00197)	(0,00213)	(0,00219)	(0,00112)	(0,00180)
If the employee is outsourced – yes, with medium probability	0,00387**	0,0117***	0,0210***	0,00149	0,00448***	-0,0653***	-0,0342***	-0,0241***
	(0,00162)	(0,000903)	(0,000884)	(0,00107)	(0,00139)	(0,00115)	(0,00101)	(0,00148)
If the employee is outsourced – yes, with high probability	-0,0791***	-0,0960***	-0,0873***	-0,139***	-0,178***	-0,116***	-0,0194***	-0,490***
	(0,00111)	(0,000686)	(0,00108)	(0,00277)	(0,00289)	(0,00144)	(0,00317)	(0,0106)
Constant	1,495***	1,186***	1,506***	-0,0490***	-0,548***	1,065***	0,500***	0,0803***
	(0,00818)	(0,00420)	(0,00749)	(0,00424)	(0,00623)	(0,00731)	(0,00479)	(0,00446)
Number observations	583.046	890.540	476.221	1.685.072	1.120.811	364.336	844.685	2.070.387
R-squared	0,189	0,175	0,345	0,329	0,380	0,240	0,341	0,289
F	8.261,35***	12.117,18***	15.697,94***	35.659,22***	41.135,35***	6.430,81***	24.498,85***	46.381,46***

Occupations (CBO Code)	Hostess (422105)	Building caretaker (514120)	Construction assistant (717020)	Truck driver (782510)	Watchman (517420)	Street sweeper (514215)	Cook (513205)
Location of the company – northeast region	-0,0849***	-0,121***	-0,0545***	-0,133***	-0,108***	-0,0528***	-0,120***
	(0,00215)	(0,00242)	(0,00110)	(0,00225)	(0,00273)	(0,00544)	(0,00246)
Location of the company – southeast region	0,134***	0,379***	0,170***	0,0472***	0,161***	0,0733***	0,0835***
	(0,00207)	(0,00284)	(0,00109)	(0,00207)	(0,00264)	(0,00517)	(0,00236)
Location of the company – south region	0,168***	0,258***	0,175***	0,0457***	0,161***	0,126***	0,144***
	(0,00226)	(0,00255)	(0,00128)	(0,00212)	(0,00297)	(0,00650)	(0,00244)
Location of the company – midwest region	0,112***	0,0919***	0,124***	-0,0239***	0,0747***	-0,0198***	0,0656***
	(0,00260)	(0,00311)	(0,00170)	(0,00236)	(0,00349)	(0,00569)	(0,00275)
Number of employees in the company (Ln)	0,0347***	-0,00781***	0,0391***	0,0631***	0,0112***	0,0305***	0,0215***
	(0,000199)	(0,000309)	(0,000172)	(0,000182)	(0,000401)	(0,000596)	(0,000265)
Age of the employee (Ln)	0,100***	0,0195***	0,00727***	0,0972***	-0,0394***	-0,00318	0,0649***
	(0,00159)	(0,00254)	(0,000946)	(0,00137)	(0,00232)	(0,00288)	(0,00156)
Sex of the employee (male)	0,0871***	0,182***	0,104***	0,0709***	0,0626***	0,0744***	0,174***
	(0,00138)	(0,00147)	(0,00145)	(0,00374)	(0,00337)	(0,00169)	(0,00112)

(Continues)

(Continued)

Occupations (CBO Code)	Hostess (422105)	Building caretaker (514120)	Construction assistant (717020)	Truck driver (782510)	Watchman (517420)	Street sweeper (514215)	Cook (513205)
Employee's level of education (high school – incomplete or complete)	0,0760*** (0,00151)	0,0166*** (0,00143)	0,0207*** (0,000629)	0,00601*** (0,000731)	0,0281*** (0,00138)	0,0431*** (0,00188)	0,0336*** (0,000901)
Employee's level of education (college – incomplete, complete or more)	0,208*** (0,00218)	0,173*** (0,00954)	0,136*** (0,00706)	0,0617*** (0,00473)	0,172*** (0,00972)	0,181*** (0,0154)	0,150*** (0,00514)
Employee's type of hiring (with previous work experience)	0,0533*** (0,00112)	0,00299 (0,00197)	0,0202*** (0,000963)	0,0423*** (0,00147)	0,0410*** (0,00259)	-0,00398* (0,00239)	0,0362*** (0,00124)
Employee's type of hiring (permanent hiring)	-0,0334*** (0,00365)	-0,00565 (0,00663)	0,0351*** (0,00173)	0,0499*** (0,00359)	0,00106 (0,00591)	0,00217 (0,00692)	0,0291*** (0,00441)
Time of employment of the employee (Ln)	0,0643*** (0,000427)	0,0667*** (0,000581)	0,0475*** (0,000362)	0,0367*** (0,000310)	0,0753*** (0,000552)	0,0824*** (0,000870)	0,0488*** (0,000378)
If the employee is member of a union (yes)	0,0458*** (0,00263)	0,0425*** (0,00289)	0,0718*** (0,00144)	0,0281*** (0,00147)	0,0938*** (0,00284)	0,107*** (0,00292)	-0,00719*** (0,00214)
If the employee is outsourced – yes, with medium probability	-0,0105*** (0,00147)	0,171*** (0,00185)	0,0577*** (0,00110)	0,00395*** (0,00127)	0,00349* (0,00187)	-0,0600*** (0,00247)	0,0135*** (0,00199)
If the employee is outsourced – yes, with high probability	-0,115*** (0,00205)	0,0350*** (0,00236)	-0,168*** (0,00453)	-0,122*** (0,0250)	-0,0362*** (0,00246)	-0,0953*** (0,00311)	-0,184*** (0,00250)
Constant	0,711*** (0,00673)	1,006*** (0,0112)	0,926*** (0,00433)	1,082*** (0,00750)	1,360*** (0,0114)	0,980*** (0,0138)	0,894*** (0,00744)
Number observations	473.929	212.101	733.213	780.959	212.097	71.641	443.905
R-squared	0,232	0,476	0,231	0,203	0,204	0,381	0,180
F	7.938,25***	11.300,88***	13.001,42***	12.557,51***	3.538,77***	2.914,01***	6.676,81***

Source: Rais-2013/MTE.

Elaborated by the author.

Notes: Statistical significance: \*\*\* p&lt;0,01; \*\* p&lt;0,05; \* p&lt;0,1. Robust standard error: in parentheses.





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