Does payroll tax relief increase employment level? Evidence from Brazil

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Abstract: This paper analyses the effect of the decrease of payroll tax in job creation after a 2013 Brazilian policy changed the tax burden for several economic sectors. I employ a difference in differences identification strategy [1] using the RAIS database using firms not affected by the policy as counterfactuals. The evidence suggests that the policy had an effect between 1 and 4% compared to the control groups.

Keywords: payroll tax relief, difference in differences, labor market, "plano brasil maior".

1 Introduction

From 2009 to 2014, the brazilian government established a group of policies in order to make the brazilian economy more modern, competitive and innovative. Among them, there was one called "Plano Brasil Maior", which decreased taxes for several sectors of the economy. Before the plan, companies had to pay, apart from other taxes, 20% upon their payroll as social contribution. The plan decreased this amount to 1 or 2% according to the company sector. The question one may ask is: was it worth it?

In the mentioned period, the brazilian government realized many different interventions in the private sector, like increase of the role of state companies, control of prices, tax reliefs, public investments, among others. In 2014 this strategy started to show its limitations and, in the period from 2015 to 2016, Brazil went through one of the hardest economic crisis of its history. Since then, the country has faced a stagnation of 1% growth every year. Many economists, like Pessôa (2017), attribute this crisis to that series of interventions that occurred in the previous period. So, it remains important to economists to analyse precisely the effects of such measures and establish the possible connections these policies might have had with the crisis. This paper addresses essentially the effects of the tax reliefs in the short-term levels of employment after such measures.

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[1] The code to replicate the results can be found at: github.com/rfrade/frade2020taxRelief/

2 Previous studies

With the globalization movements of the 80s and 90s a significant part of the world manufacturing production started to shift from the developed countries to emerging economies in Asia and unemployment started to be a relevant issue. Besides the educational and training programs developed to address this issue, the effect of tax policies also became part of the debate on job creation. Institutions like the OECD (1994) began to point out the possibly harmful effects of heavy taxes upon the payroll.

Regarding the brazilian labor market, one of the main concerns is informality. The studies focused on this issue usually identify the reason for the high levels of informality as the heavy employment laws and payroll taxes. For Carneiro (1997), for instance, the tax burden and the complexity of the tax system act as an stimulus to informality.

With respect to the impact of the policy "Plano Brasil Maior", I found three researches that evaluate its impact in the employment balance. Dallava (2014) studied the short-term job creation in the sectors affected by the plan in the year 2013. She found heterogeneous effects among the different sectors. The increase in employment in the sector of Information Technology was around 14%, while for Communication there was a decrease of 9.4%.

There are two possible tax regimes for firms in Brazil: the standard one and another one called SIMPLES, which is allowed for small firms and already has some benefits. Only firms of the standard regime were included in the payroll tax relief, so the firms of the SIMPLES regime constitute a natural counterfactual. Dallava (2014) compared the treated firms with their standard counterparts, that is, she excludes the companies benefited by SIMPLES regime. To do the analysis, she employed a difference in differences controlling by fixed effects on covariates like gender, education and age of the employees.

Scherer (2015) uses the same identification model as Dallava, but as a counterfactual he uses companies of the SIMPLES regime. With this strategy, he found an average of 15% in the increase of the employment level.

Baumgartner (2017) also analysed the effect of this payroll tax relief. He employed an event study strategy with a difference in differences. Instead of using all of the sectors non benefited by the policy, he created clusters of treated and non-treated firms where, in each cluster, the counterfactual were sectors with similar characteristics. As an example, production of milk was not benefited by the policy, whereas the production of dairy products were, making them comparable. With this strategy, he found an average increase of employment of 4% in the treated firms compared in the short term (Baumgartner, 2017, p. 61).

3 Data

The three mentioned studies used a database called RAIS, which has the information of the brazilian firms and job contracts. This database contains two datasets, one with information of the contracts and the other with information on the firms. All of the three cited studies, Baumgartner, Scherer and Dallava used the job contracts dataset. This paper will use the firms dataset because it has the number of employees of each brazilian firm.

The sectors which would be benefited from the policy were established in the Brazilian law 12715 from 2012. The policy cover sectors like health industry, oil, defence, chemicals, cars and several others.

To contrast with the previous studies of this policy, I use two counterfactuals. The firms of the SIMPLES regime of the same sectors of the benefited firms will serve as the first counterfactual. And the other counterfactual will be standard firms of the other sectors not affected by the policy. Besides, I will also consider the possibility that the firms anticipated the effects of the policy and started hiring new employees in 2012, right before the policy would start to be valid.

Since the SIMPLES regime is established for firms that have income up to R\$ 3,600,000 per year (around US\$ 700,000 in 2020), for them to serve as a proper counterfactual, I decided to compare firms of the SIMPLES regime with more than 10 and less than 100 employees to firms of the standard regime with the number of employees in the same interval.

Table 1: Data description of the number of jobs in the year 2013 (RAIS)

	Min	Max	Mean	Number of records
Standard treated	11	20387	108.1	37721
Standard non-treated	11	27140	70.2	309063
SIMPLES non-treated, but of treated sectors	11	914	25.2	38123
SIMPLES of other sectors	11	7983	22.6	194617

Since the magnitude of the number of jobs of the treated firms and both counterfactuals are very different, in order to evaluate if the parallel pre-trends holds, I decided to compare the evolution of jobs of the treated firms with a subsample of the counterfactuals. When I selected the subsample, sometimes it was parallel to the terated group, sometimes not. So, I used a subsampling technique to get the overall balance of employment. I generated 1000 subsamples of size 35000 each from the counterfactual populations and took the average this subsamples. These generated subsamples is what can be seen in blue in Figure 1 and Figure 2.

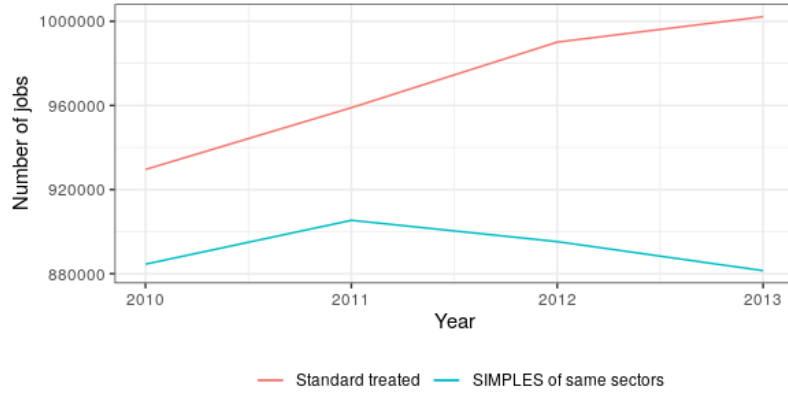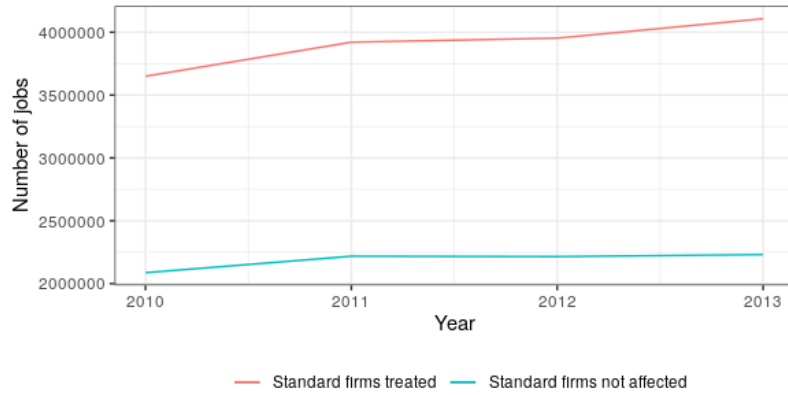Figure 1: Treated firms compared to SIMPLES firms of the same sectors (RAIS)

Figure 2: Treated firms compared to standard firms of the all other sectors (RAIS)

4   Model and Results

The model choosen is the following:

$$log(formaljobs) = year + treated + year * treated + \epsilon$$

where formaljobs indicate the sum of formal jobs of all firms of the group; year is a dummy variable that has the value of 1 in the treated years, so it is 1

Table 2: Diff in Diff results (RAIS)

	Dependent variable:			
	Formal Jobs			
	SIMPLES 12	SIMPLES 13	Standard 12	Standard 13
	(1)	(2)	(3)	(4)
Year	-0.01^{***}	-0.02^{***}	0.01^{***}	0.02^{***}
	(0.004)	(0.003)	(0.002)	(0.002)
Treated	0.26^{***}	0.27^{***}	0.31^{***}	0.32^{***}
	(0.003)	(0.003)	(0.004)	(0.003)
Year.Treated (ATE)	0.03^{***}	0.04^{***}	0.01^{**}	0.02^{***}
	(0.01)	(0.01)	(0.01)	(0.01)
Intercept	3.04^{***}	3.03^{***}	3.43^{***}	3.44^{***}
	(0.002)	(0.002)	(0.001)	(0.001)
Observations	197,896	265,094	966,425	1,313,209
R^2	0.05	0.05	0.01	0.01
Adjusted R^2	0.05	0.05	0.01	0.01
Residual Std. Error	0.58	0.57	0.98	0.99
F Statistic	$3,456.27^{***}$	$5,050.76^{***}$	$3,412.63^{***}$	$4,752.16^{***}$

Note: *p<0.1; **p<0.05; ***p<0.01

for 2012 in the models that consider 2012 as initial year and 0 for 2012 and 1 for 2013 in the models that consider 2013 as the initial year; and treated is the dummy variable indicating the firms affected by the policy. So, when I am comparing treated standard firms to SIMPLES firms, treated standard firms receive a value of 1 and SIMPLES firms a value of 0 and when I am comparing treated standard firms to non-treated standard firms, the former receive a value 1 and the later 0.

The policy was announced in the middle of 2012 and it would start to be valid in the beginning of 2013. So, to test for the possibility that agents had anticipates the benefits of the policy to the end of 2012, I tried four models, two for each counterfactual: one considering the start of the treatment in 2012 and the other in 2013. So, in the following table, "SIMPLES 12" compares the treated firms with SIMPLES firms as counterfactual and the initial year of the treatment as 2012. Likewise, "SIMPLES 13", uses SIMPLES firms as control group but initial year as 2013. "Standard 12" compares treated firms having standard firms of other sectors as counterfactuals, considering the initial year as 2012. The same logic applies to "Standard 13".

The average treatment effect is measured by the coeficient of the interaction variable named "Year.Treated (ATE)". We can see that, with respect to SIMPLES firms, the treated firms had a growth of 3% in 2012 and 4% in 2013. We can then conclude that the economic agents anticipated the effects of the policy to 2012 and increased the number of formal employments. The same can be said to the standard firms that were treated and the standard firms that were not. With respect to the non-treated, the standard treated firms had and increase of 1% in 2012 and 2% in 2013. The fact that the effect was greater in the treated firms compared to SIMPLES, maybe related to other stimulus policies made by the brazilian government, that usually benefited big firms.

5   Conclusion

As we could see, this policy had a small impact in formal employment compared to the counterfactuals just before it was implemented, because agents anticipated it, and also after one year in force.

With "Brasil Maior" plan and similar policies from 2009 to 2014, the Brazilian government tried to stimulate and modernize the brazilian economy. As mentioned before, many economists attribute the economic crisis that started in 2015 to this set of policies. This actions indeed stimulated the short-run economic activity, but they costed a significant part of the government budget. From 2015 Brazil faced a budget deficit crisis that, if it were not the root of it's recent crisis, at least it had a substantial influence. In the following graphs we can see that both the productivity and employment had a deep decline since 2014.

With respect to the identification strategy, it could be complemented by the study of the profit and investment of the treated firms, since part of the payroll tax relief may have been used to different purposes other than hiring new workers.

Figure 3: Formal employment in Brazil as share of working force (tradingeconomics.com)

Figure 4: Productivy of the brazilian economy in base points (tradingeconomics.com)
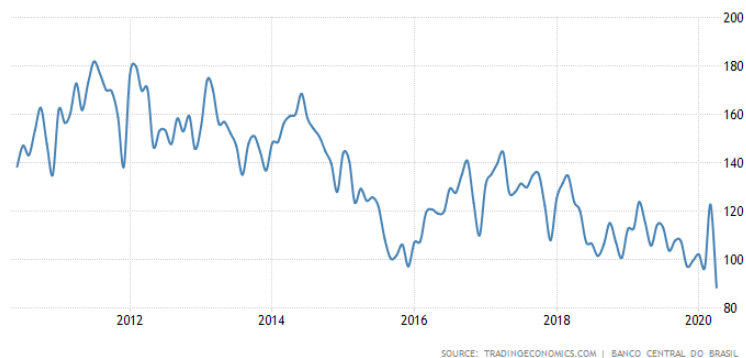
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