Differences-in-Differences Analysis of SIMPLES Tax Expansion

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Event Study of Firms by Sector From 2011 to 2015

sheet	year	firms_real	firms_presumed	firms_simples	firms_waived	firms_total	sector	treat	post
4	11	567	1392	589	123	2671	1.1	0	0
4	12	545	1553	634	123	2855	1.1	0	0
4	13	542	1727	646	114	3029	1.1	0	0
4	14	543	2168	785	122	3618	1.1	0	1
4	15	576	2329	829	168	3902	1.1	0	1
7	11	39	150	898	46	1133	1.2	0	0

Table 2: Description of Variables Used in This Study

Code	Definition and Source
sheet	Excel sheet that this sector corresponds to.
year	The year that corresponds to this observation that ranges from 2011 to 2015.
firms_real	Number of firms in real tax regime in a given year.
firms_presumed	Number of firms in presumed tax regime in a given year.
firms_simples	Number of firms in simples tax regime in a given year.
firms_waived	Number of firms in waived tax regime in a given year.
firms_total	Number of firms in total tax regime in a given year.
sector	The sector identification number according to Brazilian CNAE classification.
treat	Indicator (0/1) for whether the sector is treated with SIMPLES in 2014.
post	Indicator (0/1) for whether this observation is 2014 or after.
treat.post	Indicator (0/1) for whether this observation is treated and after 2014.

The regression specification I will employ first is as follows:

$$Y_{st} = \alpha + \beta * TREAT_s + \gamma * POST_t + \delta_{rDD} * (TREAT_s \times POST_t) + \epsilon_{st}$$

In addition, I can also use year (ϕ_t) and sector (σ_s) fixed effects to estimate the DiD estimate:

$$Y_{st} = \alpha + \delta_{rDD} * (TREAT_s \times POST_t) + \sigma_s + \phi_t + e_{st}$$

Lastly, I will confirm my Difference-in-Differences estimate results from the regression specification and complement it with a set of visualizations of DiD in action.

Table 3: DiD using Treat and Post Indicators

	Dependent variable:				
	firms_simples	firms_real	firms_presumed	firms_waived	firms_total
	(1)	(2)	(3)	(4)	(5)
treat	−12,219.850***	194.557	789.670	4,982.317***	−6,253.305
	(4,000.181)	(131.655)	(779.742)	(663.436)	(4,355.711)
post	2,423.425	−1.457	148.138	−116.557	2,453.548
	(2,595.660)	(85.429)	(505.963)	(430.494)	(2,826.359)
I(treat ∗post)	−1,501.044	−22.838	418.772	−2,842.929***	−3,948.037
	(6,324.842)	(208.165)	(1,232.880)	(1,048.984)	(6,886.984)
Constant	14,358.630***	487.478***	2,874.837***	212.878	17,933.830***
	(1,641.640)	(54.030)	(319.999)	(272.268)	(1,787.546)
Observations	1,425	1,425	1,425	1,425	1,425
R^2	0.013	0.002	0.002	0.044	0.004
Adjusted R^2	0.010	0.0002	−0.0001	0.042	0.002
Note:					*p<0.1; **p<0.05; ***p<0.01

Table 4: DiD with Year and Sector Fixed Effects

	Dependent variable:				
	firms_simples	firms_real	firms_presumed	firms_waived	firms_total
	(1)	(2)	(3)	(4)	(5)
treat.post	−1,501.044***	−22.838**	418.772**	−2,842.929***	−3,948.037***
	(474.321)	(10.412)	(180.590)	(463.942)	(678.276)
Constant	−678.070	552.481***	1,712.479***	185.741	1,772.635
	(1,478.694)	(32.459)	(562.989)	(1,446.337)	(2,114.523)
Observations	1,425	1,425	1,425	1,425	1,425
R^2	0.996	0.998	0.983	0.851	0.992
Adjusted R^2	0.994	0.997	0.979	0.813	0.990
Note:					*p<0.1; **p<0.05; ***p<0.01

Figure 1: Difference-in-Differences Visualization for Each Tax Regime

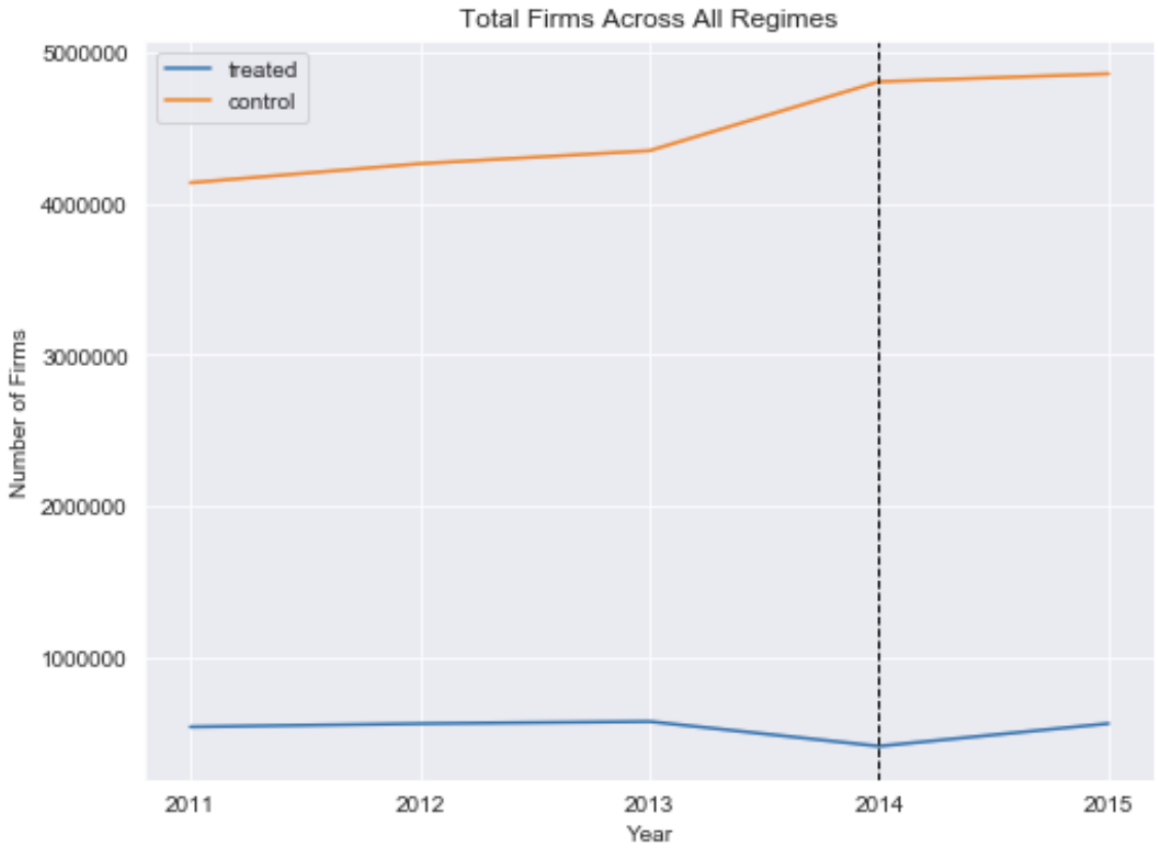

Figure 2: Difference-in-Differences Visualization for All Tax Regimes Combined