# Left for Dead:

## The Electoral Cost of Work-Related Fatalities in Brazil

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More than two million workers, according to the International Labour Organization, die every year because of work-related causes. This paper investigates the electoral effects of a sharp increase in occupational fatalities in the Brazilian labor market—one of the most dangerous labor markets in the world. I develop a theory that argues that voters evaluate the performance of government officials according to the expectations that leaders and party labels set in advance—e.g., Voters judge left parties on their success in improving labor market conditions and employment and judge conservative parties on their success in reducing inflation or fighting crime. I test this theory's central predictions by evaluating a quasi-exogenous increase on work-related fatalities on local elections. Workplace fatality shocks substantially decrease the incumbent party's vote share, vote change (from one election to the other), and re-election probability, but only for the Workers' Party.

## Motivation

According to data from the International Labour Organization (ILO), 270 million workplace accidents occur annually worldwide. Approximately 2.2 million of those result in death. In Latin America, workers face one of the highest fatality rates in the world (higher than India, the former socialist economies of Europe, and China). In Brazil, the case under investigation, 1.3 million workplace accidents are reported annually. Of those, roughly 3,000 are fatal, (a figure that is probably an underestimate—see below) making Brazil the 4th country with the highest number of work-related fatalities, surpassed only by China (14,924 deaths), the United States (5,764), and Russia (3,090). These are caused mainly by firms' failure to comply with basic security standards. In this paper/chapter, I address two relevant literatures. One is on blame attribution and democratic accountability; the other is on expectation setting and retrospective voting. This research fits well with my overall dissertation project, where I show that left parties do not enforce labor law more aggressively than other parties and that they re-direct enforcement to places with fewer workplace hazards.

## Questions

Do incumbent parties get punished by voters for work-related fatalities that happen around elections? Are left incumbent parties punished more than other parties?

## Hypothesis

Left incumbent parties will pay higher electoral costs for occupational fatalities, compared to other parties in government, especially when these happen during the electoral year.

## Argument

To a large extent, governments from both the left and the right have failed to improve labor standards in developing countries. In my dissertation, I claim that leftist incumbents reduce enforcement to garner support from two constituencies with opposing interests in the labor market—sometimes called incumbent and new entrant workers, formal and informal, or insider and outsider workers. This paper/chapter examines whether voters evaluate parties with different ideologies (conservative vs. leftist) differently, in the event of work-related fatalities. One possibility is that voters punish left parties more when left parties fail to improve working conditions because they judge parties according to the expectations that parties set in advance. On the contrary, it is also possible that, after labor market risks become evident for the general public, voters will favor candidates that run on a pro-workers platform, on the expectation that these candidates will improve working conditions, regardless of whom the incumbent is. Campaign platforms and party labels convey information to voters about candidates' likely behavior in office and voters can use this information to evaluate the performance of incumbents retrospectively.

There are two relevant literatures that I would like to address in this paper/chapter. One is on blame avoidance and democratic accountability; the other is on expectation setting and retrospecting voting. The literature suggests the following model: performance ⇒ retrospecting voting ⇒ accountability. This model needs to account also for expectation stetting and information updating processes. Politicians set expectations (e.g., Republicans will lower inflation, Democrats will lower unemployment). Voters observe a party in office (say Republican), compare its performance with the expectations they had about the party (it will lower inflation), and then punish or reward the party based on whether it delivered on its promises. That is: expectation setting ⇒ performance ⇒ retrospecting voting + updating ⇒ accountability.

## Methods

Obviously, I cannot manipulate workplace fatalities and these clearly do not happen as-if randomly: some municipalities have stronger unions that work along workers and firm managers to improve health and safety conditions; some municipalities are more wealthy and have better enforcement agencies, health systems, and the like. The strategy presented here uses a difference-in-differences design, using fixed effects for year/municipality, combined with a plausibly exogenous "shock" in the number of accidents, comparing fatal accidents during an election year with fatal accidents in the years before the election. As one inspector noted during my fieldwork in Brazil, "every accident has multiple causes. One day, something changes, the wind, the rain, the operator who is a little tired, the machine with a certain problem. It is not one single cause, but a succession of problems and mistakes." This means that, although some places may have better labor conditions than others, the timing of accidents, after controlling for overall working conditions and time trends, may be exogenous to both the overall level of working standards and political conditions. In all specifications I use OLS with standard errors clustered at the municipality level. Below I present balance tests for municipalities with/without a shock.

## Case Study

Brazil has 5,564 municipalities. Municipal governments play a central role in governance: they are in charge of collecting taxes and providing several public goods and services, including education and health services. Although the federal government is formally responsible for enforcing labor law, several studies show that municipal governments play a central role in shaping labor standards (Almeida; Coslovsky; Feierherd; Pires; Tendler). In addition, all businesses and firms must register with the municipal tax agency and obtain an operation permit. Municipal governments also supervise the operation of particular sectors. For instance, they supervise construction projects: they examine

practical and installation aspects, issue equipment-operating permits, and oversee that the construction conforms to municipal legislation, zoning laws, and the municipal building code.

Mayors are elected by popular vote. Elections typically take place the second week of October. If the district has more than 200,000 voters, then the election is held under a runoff system (this also applies to state and national executive elections). Otherwise, mayors are elected through plurality rule. All executive offices are elected every four years. Elections for the president, governors, and national legislators take place simultaneously, while municipal elections are staggered by two years. In Brazil, parties at the local level are typically portrayed as weak, patronage-oriented, and personalistic organizations, with the Workers' Party (PT) being the exception. By all accounts, the PT is the archetypal strong organization—a party with a coherent program for social change, a disciplined membership, and deep roots in civil society. The PSDB, in turn, is best described as a "loosely organized federation of regional leaders" that relies on these leaders' personal popularity (Samuels and Zucco 2013, p. 4), much like the other major parties in Brazil. In this memo, I focus on these two parties, which have a broad participation in local elections and have relatively consistent ideological stances, with the PT tilting to a pro-workers left and the PSDB tilting to a technocratic right.

## Data

The analysis below uses data on accidents from the Brazilian Social Security Agency (INSS). The data is available for every year at the municipal level and covers accidents suffered by insured workers, mostly in the formal sector (both private and public, under de Consolidação das Leis do Trabalho system). About half of workers are informal (either self-employed or in informal jobs) and thus are not counted for social security benefits. Therefore, the number of accidents (even when they involve fatal deaths) is clearly underestimated. This tally also includes commuting deaths, which have less to do with worksite conditions and more with overall levels of infrastructure (although workers rushing to work can be considered a labor market problem).

Giufridda et al. (2003) make two calculations for 1998, when 3,800 deaths at the workplace were formally recorded. Their conservative estimates assumes that a) this number constituted 100% of the deaths in the formal sector; and b) the formal sector accounted for a third of total exposures; and c) the average riskiness of the two sectors were equal. Then, it would be reasonable to triple the number of deaths reported, to 11,400. Their "less conservative" estimate, in turn assumes that a) only 50% of formal sector deaths were reported and b) that the true risk in the informal sector was 50% higher than in the formal sector. Those assumptions would generate an estimated total for Brazil in 1998 of 7,600 in the formal sector. Then the informal sector would be assumed to have two times as many workers and a rate 50% higher, for a total of 3 times as many deaths, or 22,800. Thus the high estimate for Brazil as a whole in 1998 would be 30,400. Still, there are challenges to calculating an accurate total, as underscored by a RAND report: "underreporting of fatalities is less extreme [than non-fatal accidents], but the magnitude is still difficult to pin down."

Besides underreporting issues, the data is aggregated at the year level. As mentioned, elections typically occur in the second week of October; therefore, counting workplace accidents for the whole year may create additional issues.

Yet this is the best data available. I have also collected monthly death tallies at the municipal level since 1996 from death certificates (SIM). The data is recorded by doctors, who must report health agencies about the death causes. There are more than 1,000 categories, and it might be possible to use this data to single out work-related fatalities, since it has a code that identifies work-related accidents. However, the municipal-level correlation of these two datasets (INNS and SIM) for work-related deaths is .7. When I use this data, more than 50% of my observations are coded differently, compared to the coding with the INNS data. Therefore, I have decided to stick with the INNS dataset. Epidemiologists, public health specialists, and economist all agree that this dataset is the most reliable. According to the RAND report cited earlier, "The alternative sources of data include death certificates, reports from hospitals and clinics (the SINAN system), police reports, newspaper reports, and

the accident investigations conducted by the safety inspectors (...) SIM dramatically undercounted fatalities because they usually omitted information pertaining to work-relatedness... the numbers of work deaths reported in SIM were considerably less than half of those reported to INSS". There are two possible options: trying to identify work-related deaths by looking at the causes of death and/or checking the SINAN system and police reports.

## Dependent variables

For each party $i$ (the PT and the PSDB), I construct three dependent variables: the vote share of the party in the municipal election (for municipalities where the incumbent does not run, I code the electoral outcome as zero); whether the party wins the next election (again, when the party does not run, I code the variable as zero—i.e., the party looses); and the change in the vote share of the party in the current election, with respect to the following election (e.g., if the party does not run in either election, the variable takes a value of zero; if the party wins 50 per cent of the vote in each election, the variable also takes the value of zero.).

## Independent variables

I include a variable indicating whether the incumbent mayor belongs to party i or not. This variable is interacted with a "shock" indicator. I build three different shock indicators. The first one compares the number of workplace accidents in the election year with the mean number of accidents in the three years before the election year. Municipalities that double the number of work-related deaths during an election year are coded as one; those with less than double are coded as zero; all the rest are coded as missing.

$$\text{Shock1}_{i,t4} = \begin{cases} 1 & \text{if } Fatalities_{i,t4} > 2 \cdot (Fatalities_{i,t1} + Fatalities_{i,2} + Fatalities_{i,t3})/3 \\ 0 & \text{if } Fatalities_{i,t4} < 2 \cdot (Fatalities_{i,t1} + Fatalities_{i,2} + Fatalities_{i,t3})/3 \\ . & \text{if } else \end{cases}$$

The second indicator compares the number of fatalities in the election year with fatalities in the previous year. Those with more fatalities during the election year are coded with a one; those with less, with a zero; municipalities where the number of fatalities did not change are coded as missing.

$$\text{Shock2}_{i,t4} = \begin{cases} 1 & \text{if } Fatalities_{i,t4} > Fatalities_{i,t3} \\ 0 & \text{if } Fatalities_{i,t4} < Fatalities_{i,t3} \\ . & \text{if } Fatalities_{i,t4} = Fatalities_{i,t3} \end{cases}$$

The third and last indicator calculates the rate of workplace fatalities over the number of accidents during the electoral year and rate of workplace fatalities in the previous year.

$$\text{Shock3}_{i,t4} = \begin{cases} 1 & \text{if } Fatalities_{i,t4}/Accidents_{i,t4} > Fatalities_{i,t3}/Accidents_{i,t3} \\ & \text{and} \quad Accidents_{i,t4} \neq 0 \quad \text{and} \quad Accidents_{i,t3} \neq 0 \\ 0 & \text{if } Fatalities_{i,t4}/Accidents_{i,t4} < Fatalities_{i,t3}/Accidents_{i,t3} \\ & \text{and} \quad Accidents_{i,t4} \neq 0 \quad \text{and} \quad Accidents_{i,t3} \neq 0 \\ . & \text{if } Fatalities_{i,t4}/Accidents_{i,t4} = Fatalities_{i,t3}/Accidents_{i,t3} \\ & \text{or} \quad Accidents_{i,t4} \neq 0 \quad \text{or} \quad Accidents_{i,t3} \neq 0 \end{cases}$$

Table 1 provides summary statistics for the three independent variables. As mentioned, the models also include year and municipality fixed effects. Results are robust to

including the mean number of fatalities in the municipality during the three years before the election as a control variable. (Results not shown.)

| | $\text{Shock1}_{i,t4}$ | $\text{Shock2}_{i,t4}$ | $\text{Shock3}_{i,t4}$ |
|---|---|---|---|
| Min | 0.00 | 0.00 | 0.00 |
| Max | 1.00 | 1.00 | 1.00 |
| Median | 0.00 | 1.00 | 0.00 |
| Mean | 0.27 | 0.51 | 0.50 |
| SD | 0.44 | 0.50 | 0.50 |
| NA | 10,525 | 12,426 | 12,098 |

Table 1: Summary statistics: Fatality shocks.

## Results

Table 2 through 4 show difference-in-differences models for the three shock measures. Models 1-3 show results for the PT; models 4-6 show results for the PSDB. As mentioned, all specifications include municipality and year fixed effects and clustered-robust standard errors. The coefficient of interest is the interaction between party $i$ incumbency and experiencing a shock in work-related fatalities during the electoral year.

Table 2 shows that the PT fared worse in municipalities governed by a PT mayor that experienced a shock in the following election: the PT vote share decreased in more than 9% points, its probability of being reelected decreased in 12.5%, and the party got less than 14% of votes compared to the previous election. The PSDB did not experience similar effects: coefficients are negative but closer to zero and statistically insignificant (despite lower standard errors in models 5 and 6).

Table 2: The effect of $\text{Shock1}_{i,t4}$ on municipal electoral outcomes.

| | $PTshare_{t+1}$ | $PTmayor_{t+1}$ | $PTchange_{t+1}$ | $PSDBshare_{t+1}$ | $PSDBmayor_{t+1}$ | $PSDBchange_{t+1}$ |
|---|---|---|---|---|---|---|
| | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
| $PTmayor_t$ | 1.642 | −0.222*** | −33.290*** | | | |
| | (1.510) | (0.034) | (2.377) | | | |
| $PSDBmayor_t$ | | | | −1.221 | −0.253*** | −43.950*** |
| | | | | (1.434) | (0.023) | (1.791) |
| $\text{Shock1}_{i,t4}$ | 2.299 | −0.005 | −0.243 | 2.997 | 0.020 | −0.263 |
| | (1.699) | (0.011) | (0.827) | (2.069) | (0.013) | (1.074) |
| PT x $\text{Shock1}_{i,t4}$ | −9.237*** | −0.125* | −14.290*** | | | |
| | (2.891) | (0.069) | (4.816) | | | |
| PSDB x $\text{Shock1}_{i,t4}$ | | | | −4.671 | −0.046 | −0.174 |
| | | | | (3.042) | (0.050) | (3.205) |
| N | 2356 | 6063 | 6260 | 2139 | 6063 | 6260 |
| R-squared | 0.011 | 0.054 | 0.189 | 0.010 | 0.076 | 0.266 |
| Adj. R-squared | 0.004 | 0.025 | 0.089 | 0.003 | 0.035 | 0.126 |

***p < .01; **p < .05; *p < .1

Table 3 shows similar results to those shown in table 2, but for the $\text{Shock2}_{i,t4}$ measure. The main difference is that the coefficient of interest in model 2 fails to achieve statistical significance. Table 4 shows results for the $\text{Shock3}_{i,t4}$ measure. Again, results for the coefficient of interest are negative and statistically significant, with the exception of model 2.

Table 3: The effect of $\text{Shock2}_{i,t4}$ on municipal electoral outcomes

| | $PTshare_{t+1}$ | $PTmayor_{t+1}$ | $PTchange_{t+1}$ | $PSDBshare_{t+1}$ | $PSDBmayor_{t+1}$ | $PSDBchange_{t+1}$ |
|---|---|---|---|---|---|---|
| | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
| $PTmayor_t$ | 4.446* | −0.196*** | −27.190*** | | | |
| | (2.464) | (0.055) | (3.467) | | | |
| $PSDBmayor_t$ | | | | 1.008 | −0.239*** | −41.220*** |
| | | | | (2.550) | (0.039) | (2.847) |
| $\text{Shock2}_{i,t4}$ | 1.580 | −0.025** | 0.443 | 3.912* | 0.012 | −1.434 |
| | (1.632) | (0.012) | (0.947) | (2.337) | (0.016) | (1.164) |
| PT x $\text{Shock1}_{i,t4}$ | −5.245* | −0.045 | −11.360** | | | |
| | (3.161) | (0.074) | (4.715) | | | |
| PSDB x $\text{Shock1}_{i,t4}$ | | | | −3.003 | −0.007 | 0.661 |
| | | | | (3.632) | (0.053) | (3.726) |
| N | 1731 | 4265 | 4383 | 1533 | 4265 | 4383 |
| R-squared | 0.008 | 0.046 | 0.166 | 0.009 | 0.064 | 0.240 |
| Adj. R-squared | 0.002 | 0.018 | 0.066 | 0.002 | 0.025 | 0.096 |

***p < .01; **p < .05; *p < .1

Table 4: The effect of $\text{Shock3}_{i,t4}$ on municipal electoral outcomes

| | $PTshare_{t+1}$ | $PTmayor_{t+1}$ | $PTchange_{t+1}$ | $PSDBshare_{t+1}$ | $PSDBmayor_{t+1}$ | $PSDBchange_{t+1}$ |
|---|---|---|---|---|---|---|
| | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
| $PTmayor_t$ | 4.117* | −0.174*** | −29.750*** | | | |
| | (2.158) | (0.048) | (3.101) | | | |
| $PSDBmayor_t$ | | | | 0.798 | −0.235*** | −41.220*** |
| | | | | (2.114) | (0.032) | (2.409) |
| $\text{Shock3}_{i,t4}$ | 2.140 | −0.015 | 0.046 | 4.382** | 0.013 | −0.401 |
| | (1.419) | (0.012) | (0.877) | (1.987) | (0.014) | (1.066) |
| PT x $\text{Shock1}_{i,t4}$ | −5.725** | −0.089 | −7.611* | | | |
| | (2.853) | (0.066) | (4.204) | | | |
| PSDB x $\text{Shock1}_{i,t4}$ | | | | −3.250 | −0.032 | −2.972 |
| | | | | (3.206) | (0.048) | (3.345) |
| N | 1936 | 4608 | 4734 | 1692 | 4608 | 4734 |
| R-squared | 0.008 | 0.047 | 0.167 | 0.012 | 0.069 | 0.262 |
| Adj. R-squared | 0.003 | 0.021 | 0.077 | 0.003 | 0.031 | 0.120 |

***p < .01; **p < .05; *p < .1

## Exogenous shocks?

The key identifying assumption is that, within municipalities, an increase in work-related fatalities during an electoral year (compared to the previous year or the mean of work deaths for the three years prior to the election) is effectively random. The difference-in-differences approach controls for within-municipality variation for all time-invariant municipal-level characteristics and also controls for factors that change over time but remain constant within municipalities. Although the timing of work-related accidents seems highly idiosyncratic (as suggested by the inspector's quote above), this does not imply that fatality shocks happen by chance.

Figures 1 to 3 show that the fatality shocks are uncorrelated with a wide variety of pre-treatment covariates capturing demographic, socioeconomic, and political outcomes. The shocks seem to be unrelated to the number of inspections received by a municipality in the year the mayor took office, the number of labor fines received by firms, the municipal-level GDP, population, size of the service and industrial sector in the local economy, and the taxes collected by the local government (ss1, ss2). For the $\text{Shock1}_{i,t4}$ measure, none of the 12

variables is significant at the .05 level. Yet figures 2 and 3 do show some imbalance. This will require further investigation.

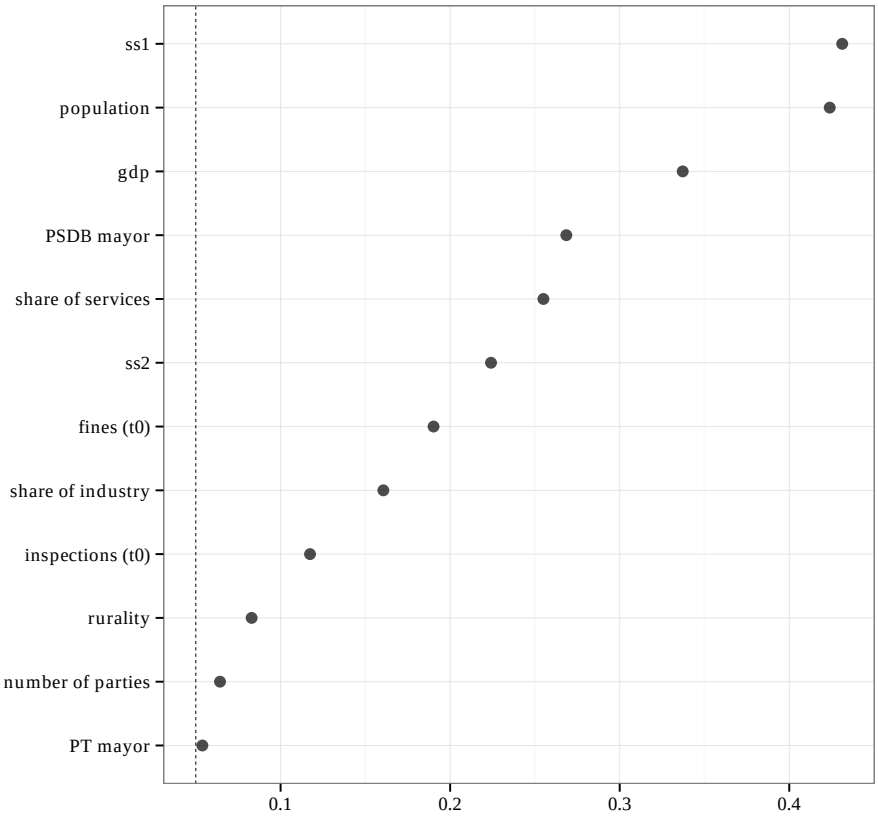


Figure 1: p-values for pre-treatments variables on Shock1$_{i,t4}$. All specifications include municipality and year fixed effects, and are estimated using OLS.

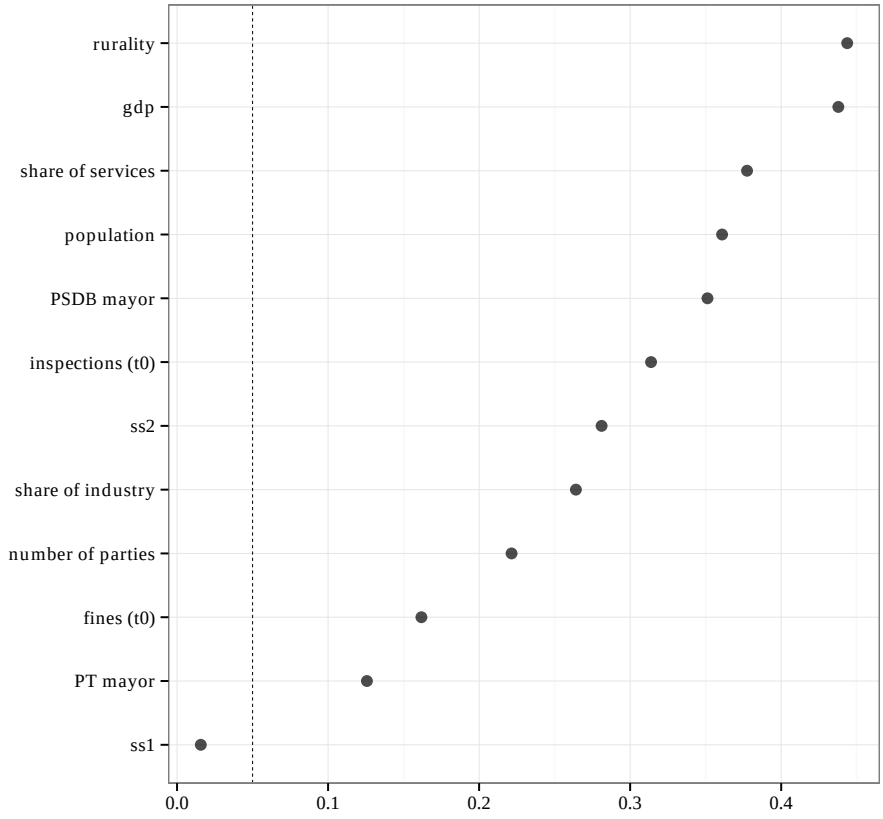


Figure 2: p-values for pre-treatments variables on Shock1$_{i,t4}$. All specifications include municipality and year fixed effects, and are estimated using OLS.

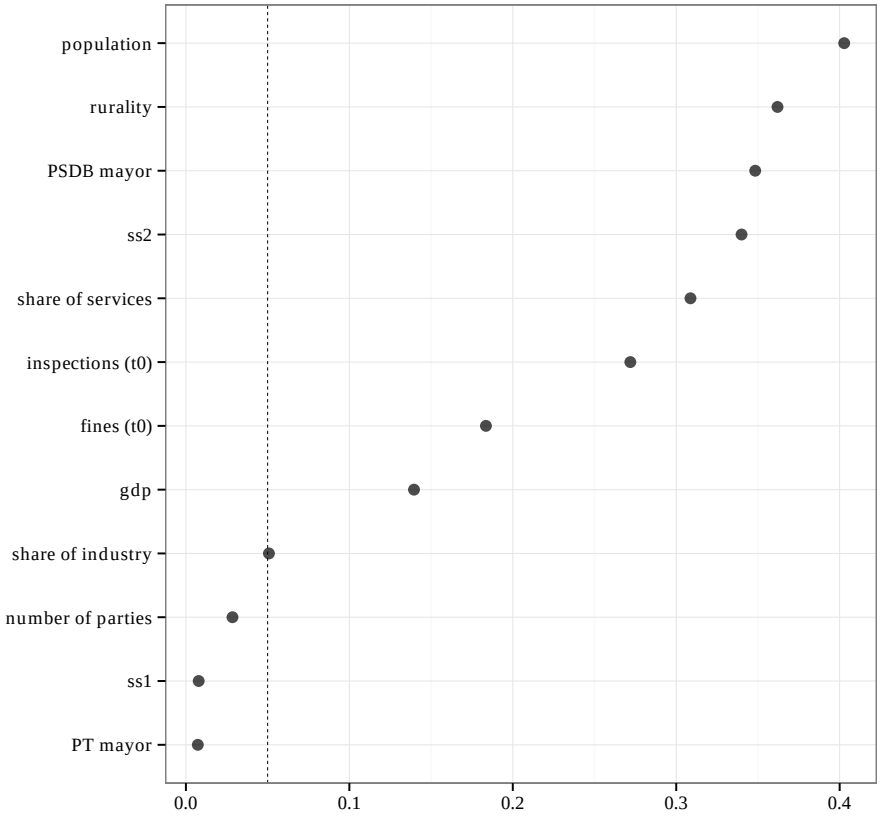


Figure 3: p-values for pre-treatments variables on Shock1$_{i,t4}$. All specifications include municipality and year fixed effects, and are estimated using OLS.