Protests as Accountability Mechanism: Theory and Empirical Evidence of Brazil Mass Protests

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Preliminary Draft
February 2021

Abstract

Citizens have used mass protests in democratic countries in order to signal their preferences or even to show their general dissatisfaction with the incumbent government. We propose a theory of protests as a Bayesian persuasion mechanism and we ask what are the conditions such that protests can be an efficient tool for accountability. We think about accountability in two ways. First, we see accountability purely as persuasion, as incumbents responding to the demands from the street. Secondly, we think about accountability in the sense of citizens reelecting incumbents that are responsive to the demands of the street with higher probability. We show that protests that don't have a clear demand – and so may face a noisy communication channel, are not only less efficient, but they can be ex-ante inefficient as persuasion mechanism. Moreover, we show that less clear demands also lead to citizens replacing more the incumbent, which will be perceived as less responsive to the demands from the street. We then examine the effects of the large street protests that took place in Brazil in 2013 in both voters and federal legislators behavior. Consistent with the model, we find that there is heterogeneous effect of protests in terms of allocation of amendments related to protests demands, proposal of bills and presence in plenary sessions. Moreover, on average, protests reduced the probability of reelection of the incumbent. The data also allowed us to see interesting features of voters following the protests, such as decrease in turnout, increase in "protest votes" (null votes), and decrease in incumbents' vote share.

Keywords: Protests; Legislative Behavior; Elections; Bayesian Persuasion; Learning

JEL Classification: C72, D72, D83

1 Introduction

Political protests have spread to a large number of countries in the last decade and have become a new form of political participation by many citizens. Despite a burgeoning literature on what determines protests and how citizens coordinate to solve the collective action to mobilize, little is known about the effects of protests on politicians actions and electoral outcomes.

We study the effects of the political protests that took place in Brazil in June 2013 to analyze the consequences of these political actions. For over 2 weeks, more than 2.8 million people went out to the streets to demand changes in a huge range of areas, starting with the revocation of an increase in the bus fare, and going through education, health and prevention of corruption. Given this political context, I first analyze whether political protests can change the political equilibrium, by affecting the results of elections. That is, it is possible that voters that attended to the protests changed their political behavior as a response to the lack of effectiveness of their political action on politicians; or, besides showing political preferences of protesters, the protests could also have affected political behavior of voters that did not attend to the protests but experienced a protest in their municipalities, by influencing them to become more politically engaged.

With these mechanisms in mind, we first analyze the decision to participate in the elections. The perception of lack of response from legislators (what will be tested later on) might be a reason for people to move away from participating in the choice of political representatives. Looking at turnout rate of each municipality, I show that, on average, the protests are associated with a decrease of 1.1 percentage points in the turnout rate at the municipal level, what represents a decrease of 1.22% with respect to the mean. When we look at differential effects with respect to some municipalities' characteristics, we see that this effect comes from municipalities with high educational level and high income inequality rates. And as expected, the effect goes in the opposite direction when we look to those municipalities where youngsters are more politically engaged - that is, those who registered to vote though voting was not mandatory for their age.

Besides not participating in elections, the protest might have affected elections results through an increase in the number of "protest vote", which are the null votes.[1] The protest have a higher correlation with null votes than when compared to turnout rate: protests are associated with an increase of 2.2 percentage points in the share of null votes, what represents a increase of 24% with respect to the mean. Looking at different municipalities' characteristics, we see that this effect comes from with high Internet penetration and lower rates of youngsters' political engagement.

The effects of the protests go beyond, impacting also the vote distribution of legislators. Using data of the 2010 and 2014 elections, I compare how protests affected the vote share a legislator received at each municipality relative to total votes of the municipality in the 2014 elections. I look at the vote share of each legislator in each municipality of the state he was running for, and show that there is a correlation between protests and a decrease in the votes a legislator that run for reelection obtained. I found evidence that, on average, voters from municipalities that had at least one protest punish incumbents legislators: at these municipalities, protests are associated with a decrease of 3.5% on incumbents' vote share (with respect to the total votes of the municipality).

Moreover, I found that the electoral punishment of incumbents varies according to municipal characteristics. I considered heterogeneities related to Internet penetration, educational level, youngsters' political activism, income inequality and quality of public services. Regarding these characteristics, I show that the these electoral punishments of incumbents related to protests come from those municipalities with higher Internet penetration (above the national median) and higher

[1] In Brazil, there is a distinction between null votes, when voters choose numbers that do not exist in the electronic voting machine, and white votes, when he pushes the white button at the voting machine. we use both types of both to define as "protest votes"

educational level presented. There is no evidence of this result, however, when we look at municipalities with low Internet penetration and low educational level.

Looking at legislators' behavior, I then analyze whether political protests can make politicians' behavior more responsive to citizens' expectations. That is, we know very little about political accountability outside elections periods. Do our political institutions create the right incentives for the politicians to respond to citizens' demands not only near the elections? I focus my analysis on Brazilian legislators' behavior, using presence in plenary, proposed bills and federal budget amendments as measures of their performance. The aim of this analysis is to verify whether political protests matter in the sense that they can be an effective way to require changes in the way politicians approach relevant public issues. Considering that protesters' will has not been completely considered by politicians, because of either the lack of action or the action on the other direction, I expect each of these variables to measure the response of legislators facing the protesters' demands.

With a completely different electoral system from the United States, Brazilian open-list proportional system makes it an useful case to study. It creates a huge variation in the districts' size (the states), consequently creating variation in the electoral representation: a legislator from São Paulo State represents 456,853 voters, while a legislator from Roraima state represents 37,426 voters. In this sense, the research design presented in this paper exploits the variation in different exposure to political protests for each politician, according to the composition of their electorate. Specifically, I construct an index that uses the distribution of votes obtained by each legislator by municipality in the 2010 elections. When the protests started in June 2013, the votes of 2010 elections were taken as given and politicians were behaving accordingly to this vote distribution since the beginning of the legislature. we use a non-traditional difference-in-difference approach, comparing the performance of politicians more or less exposed to protests, before and after the demonstrations started.

Taking into account that legislators behave in order to either maximize the chances they have to be reelected, since there are no term limits for legislative positions in Brazil, or, more importantly, act accountably facing their electorate's overall discontentment with politics, I expect legislators more exposed to protests to respond more positively to it. The results show that, on average, political protests did not have an impact on all dimensions of a legislator performance. Looking at variables that represent a rent-seek behavior (presence in plenary) and variables related to the legislative duty (proposal of bills), I conclude that the protests did not have effects on these performance variables. However, with respect to the legislators' distributive behavior to the electorate, I found positive effect of protests on federal budget amendments of the median legislative (with respect to the protest exposure index), representing an increase in the share of amendments related to protesters' demands of 36% with respect to the mean.

On the other hand, I found significant effects of protests with respect to all performance variables when I look at heterogeneities with respect to legislators' characteristics. Focusing on three different characteristics, I show that there is a differential effect of protests on legislators' behavior. First, the average effect of protests on the share of federal budget amendments related to protests is positive for those legislators running for reelection. Notwithstanding, the effect of running for reelection is not positive for all legislators. For legislators more exposed to protests (75th percentile of the protest exposure index), those who run for reelection increased by 14% their federal budget amendments with respect to the mean. However, when we look at legislators less exposed to protests (25th percentile), the effect of protests on federal budget amendments, though it is small (2.6% at the mean), is negative. That is, the higher the protest exposure, the more a legislator respond positively for running for reelection.

Second, there is also a different and positive response from legislators that rank high on the

vote distribution of the coalition - that is, the ones that received more votes in the coalition which they participate in. Jumping from the bottom of the coalition ranking to the top is associated with an increase in presence in plenary for legislators more affected by the protests. However, this effect in presence rate is negative for legislators less exposed to protests. Looking at the total number of proposed bills, this change from the bottom to the top of the coalition raking is associated with a greater effect in terms of magnitude. For legislators more exposed to protests (75th percentile of protest exposure index), this effect represents an increase of 16% at the mean of total number of proposals. By contrast, when we look at legislators less exposed to protests (25th percentile) there is a decrease of 25% at the mean. Finally, there seem to be no differential effect whether the legislator is part of the federal government coalition or not.

Finally, I combine the analysis of voters and legislators' behavior. That is, we use these legislators' performance variables to test whether voters were taking them into account when they participated in the 2014 elections. Looking for differential effects of protests in the vote share of each legislator with respect to his response to protesters' demands, I found no evidence that voters are rewarding incumbents that have responded more positively to the protests. In more precise terms, there is no differential effect for legislators who have increased their presence in plenary sessions, nor for legislators who allocated more federal budget amendments related to health, education or urban development to the municipality, and neither for legislators who proposed a bill related to health, education, urban development or public security.

Moreover, I also test whether instead of punishing legislators for their individual actions voters were punishing legislators for being aligned with the federal government. That is, taking into account the sharp decrease in president Dilma Roussef's government approval among the public, which dropped 27 points in three weeks before and after the protests, voters might be punishing politicians from the Worker's Party (PT) to show their discontentment with the governing party. However, I found no evidence of this effect.

This work contributes to the study of political events that can give light to changes in the political equilibrium, seeking institutional innovations that enable the existence of a well-functioning democracy. Overall, the lack of response of legislators facing political protests might be seen as an institutional failure that gives rise to poor accountability of legislators. Although there is a huge demand of the society for changes in legislators' behavior, the political rules do not allow society to fully ensure that the preferences of citizens are reflected in politics. Hence, I conclude that the open-list proportional system does not give the right incentives for legislators to be accountable and responsive to political protests.

However, legislators should rethink their actions facing these political protests, since we see that, first, the protests are affecting elections outcomes, like turnout rate and "protests votes" (the null votes), what can certainly affect elections outcomes, by selecting different politicians to power, impacting political outcomes, such as the kind of bills that are approved. And second, incumbents are losing votes in municipalities that had at least one protest, regardless whether they responded or not to protests, what can be seen as voters using a rule-of-thumb to also show their political discontentment with politics. Maybe it is the case that politicians need to respond more in order to show that they are concerned with protesters' demands and are working to act responsively to what citizens expect.

The rest of the paper proceeds as follows. Section 2 contextualizes my research in the related literature. Section 3 provides background information on the protests and Brazilian political institutions. We then present our Model of Protests as Bayesian Persuasion in Section 4 and in Section 5 we describe our data and the estimation framework. In Section 5.3.1 we show results related to the electoral consequences of the protests and in Section 5.3.2 we show the results with respect to legislators' behavior. Section 6 concludes the findings and makes a brief discussion on these

results.

2 Related Literature

There are multiple ways that citizens or special interest groups may persuade governments via information provision. We focus on mass protests. Protests are a mechanism that allows citizens to inform an incumbent government of their preferences (Lohmann (1993)). Citizens may decide to go out on the streets to express their demand motivated by a sense of unfairness (Passarelli and Tabellini (2017)) or motivated by the sense of belonging to a group of citizens (Barbera and Jackson (2016)). But protests are not always successful. In fact, part of the literature on protests has focused on the size of protests as a measure of their success (Battaglini (2016) and Correa (2020)). We follow a different approach, modeling protests as an information mechanism and focusing on the interplay between the quality of the incumbent government to hear the demands from the street with the of the quality of the message transmitted by protests.

This paper relates to a body of empirical and theoretical research on political protests, which has expanded recently. Most of the papers on this literature refers to the causes of political protests. Research on the casual effect of these protests suggests that citizens take costly political action to signal their political preferences to leaders, which are private information (Lohmann (1993), Lohmann (1994)); or because they are unsatisfied with their income under-performance Campante and Chor (2012); or because there are no strong institutions through which citizens can participate in the political process Machado, Scartascini, and Tommasi (2011). However, there is almost no empirical work quantifying the causal effects of protests on political outcomes. It is an open question as to what extent political protests can cause political change, and in this sense I make contributions to the literature that refers to the consequences of this political phenomenon.

Regarding the question whether political protests can change the political equilibrium, this work relates to a recent body of empirical and theoretical work that attempts to explain changes in political behavior, both from incumbents and voters. The existing political economy framework that analyzes how protests can affect voting behavior and policy was first developed by Lohmann (Lohmann (1993), Lohmann (1994)). Lohmman emphasizes the role of revealing private information to the public at large and to policymakers. In spite of being one of the main references in the protest literature, this information-driven model of the effectiveness of political activism seem to be incomplete Madestam, Shoag, Veuger, and Yanagizawa-Drott (2013). Social networks mobilization and habit formation are key missing elements in the model of political protests proposed by Lohmann.

In this context, from the standpoint of incumbents, we can use the model elaborated by Bidner and Francois (2013) to explain how the protests could have affected politicians' behavior. They developed a dynamic political agency model to explain endogenous transition from permissive to non-permissive political norms, whereby citizens punish transgressors and leaders act accountably, creating, then, a theory for the emergence of political accountability. This model identifies two types of voters, the rational and the gripped ones, and the proportion of these types verified across citizens defines the political equilibrium in which the society is. The rational ones are the voters that make a cost-benefit analysis to decide whether or not to punish incumbents who committed transgressions. By contrast, the gripped ones are voters who do not take into account the costs related to changing the incumbent - for example, the value of the incumbent's experience, or that there is uncertainty whether other politician would be a transgressor or not. They have an irrational desire to register their opposition against transgression and always punish transgres-

sors[2]. In this model, if the state changes from non-gripped to gripped, the rational politicians will cease transgressing.

Given this model, the protests can be seen as an exogenous shock on the proportion of gripped voters. That is, considering that just a small percentage of the population participated in the protests[3], the share of the population that became aware of political discontentment and strengthened their desires for a political reform is much greater than the share of citizens who participated in the protests. In this context, anticipating that voters would punish incumbents for grievance, legislators had incentives to respond positively to the protests, and, in this sense, act accountably to the electorate's expectation. That is, due to an increase in the proportion of gripped voters, politicians have incentives not to transgress, since they know they would be punished not only by the gripped voters but also by the rational ones.

On the other hand, the mechanism behind the protests is similar to the mechanism of collective action described by Yanagizawa-Drott (2014) with respect the genocide in Rwanda. In both cases, there was initially a small group of people influencing others citizens to participate in the political movement. However, the fundamental distinction is that, in Rwanda's case, the collective action was directed to illegitimate purposes, whereas regarding the protests in Brazil, the purpose was to raise awareness of political issues, and so forth were legitimate.

Related to this is the growing body of work on how people form political beliefs (Di Tella, Galiani, and Schargrodsky (2012), Hafer and Landa (2006)). In the context of the model presented by Murphy and Shleifer (2004), that describes the formation of social networks through which people persuade and influence each other, the protests could work as a space to foster social networks which discusses political issues. The more people are in a network, the stronger is its overall influence on each person's beliefs, through exchange of information and group identity. Moreover, another important aspect related to the formation of political beliefs is that the low level of awareness of specific issues can raise the susceptibility of persuasion of these beliefs Zaller et al. (1992), what can affect voters' behavior.

Facing these news debates in the social networks, I expect voters, who condition their voting decision on incumbents behavior Barro (1973), to punish legislators for indicators of poor effort, and reward the opposite. That is, the voters who experienced a protest, when facing the lack of effective responses from politicians, could have had greater discontentment and willingness for change, what was translated into an electoral punishment of incumbents. As I show in Section 5.3.2, my work contributes providing empirical evidence that voters from municipalities that had at least a protest behave differently when compared to voters that did not experienced a protest.

With regard to the effects of political protests on politicians' behavior, the paper that best relates to my research in this literature is the work of Madestam, Shoag, Veuger, and Yanagizawa-Drott (2013), who focus on the Tea Party Movement in the United States and conclude that political protests matter since they can affect policymaking and voting behavior. Using an instrumental variable approach, the authors show that incumbent representatives vote more conservatively following large protests in their district, and larger protests increase turnout in the 2010 elections, primarily favoring Republican candidates. Although Madestam, Shoag, Veuger, and Yanagizawa-Drott (2013) also analyze the behavior of the Legislative branch, the electoral system of Brazil

[2]That is, the rational voters' willingness to tolerate a transgression today depends on their belief about the likely behavior of a replacement politician, and this in turn depends on their belief about the willingness of voters to tolerate transgressions in the future. This dynamic complementarity opens up the possibility of behavioral change that is driven purely by the belief that others will change their behavior. Thus, bayesian belief updating by rational voters can lead beliefs to a level where permissive norms become inconsistent.

[3]Using the data described in Section 5, the mean of the share of the population that attended a protest at the municipal level is 1.91%.

and the US are completely different, making it vain to expand their conclusions to the Brazilian case. The change in the behavior of politicians are conditional to the kind of restrictions imposed on them, and when we analyze the behavior of legislators it is important to have in mind the electoral rules by which they won their mandate.

In this context, it may be vain to compare the consequences of political protests from two different systems. In the Brazilian case, legislators are elected on a proportional open-list scheme, whilst in the American one, they use a majoritarian voting system. In the American case, there is a direct connection between a politician and a given region, as each location elects its own and unique representative. However, there is no direct connection in systems where legislative races occur in electoral districts with large geographical dimensions and where various parties and candidates are elected within multimember districts. Regarding the differences between these two systems, Gagliarducci, Nannicini, and Naticchioni (2011) use the Italian case to confirm their theoretical prediction that legislators elected by majoritarian rules behave more accordingly to their constituencies' will, being more accountable, while on the other hand representatives elected by proportional rules behave more as rent-seekers, since they are less accountable.

The difference in behavior from american and brazilian legislators is also referred in the work of Samuels (2002). He points that political scientists have assumed that reelection motivates politicians everywhere, since this is the behavior observed in the U.S. House of Representatives. Notwithstanding, he argues that legislators in Brazil see the national legislature as a stepping-stone to "higher" office, both at the municipal level and at the state level. Using the typology created by Ames (2002) that distinguishes a legislator's electorate by two characteristics, dominance and concentration, de Carvalho (2003) affirms that the behavior of Brazilian legislators that were elected with votes from few municipalities where they are dominant will be considerably different from the behavior of legislators that were elected with votes from a huge range of municipalities. In this sense, we can expect heterogeneity in the response of legislators facing different proportions of their electorate protesting, and we use this hypothesis to identify the effect of protests on political behavior in Session 5.2.

Regarding changes in the legislators' actions, this work also relates to the literature on political accountability. First, it contributes to the growing body of research on political accountability of legislators[4]. There is an advanced body of research on accountability of American legislators (Lee, Moretti, and Butler (2004) Snyder Jr and Strömberg (2010); Nannicini, Stella, Tabellini, and Troiano (2013)). However, also regarding this aspect, the differences pointed before between the majoritarian system and the proportional one once again make it vain to expand conclusions from one case to the other. For Brazilian legislators, the Political Science literature deals with issues of career concerns, modeling what factors shape the decision to run for reelection or not (Bertholini, Fajardo, de Faveri, and Pereira (2013); Leoni, Pereira, and Renno (2004)). Nevertheless, this literature has not dealt with the instruments available to citizens to keep elected officials accountable for their actions, like the political protests I analyze in this work.

Furthermore, it is interesting to analyze accountability of legislators because accountability should be more pronounced in gubernatorial elections, where a single agent can be blamed, rather than in legislative elections where blame is harder to attribute (Besley and Case (2003)). In this sense, most of the papers that relates to Brazilian legislators' behavior focus on permanent and traditional factors that affect their behavior, such as pork barrel politics, number of terms, political influence within the party (Pereira and Rennó (2007)), and also ideology or (lack of it) (Zucco Jr and Lauderdale (2011)). Nevertheless, there is little research focusing on transitory political events that can also affect legislators' behavior, like the 2013 protests.

[4]Regarding accountability of Brazilian executive branch, see Ferraz and Finan (2008).

Completely related to the literature on political accountability is the body of research that studies the effects of media penetration. In this context, the protests can be seen as non-institutionalized forms of political participation, in line with the role media plays in affecting political outcomes (Snyder Jr and Strömberg (2010); Besley and Burgess (2002); Stromberg (2008)). Having a more informed and politically active electorate strengthens incentives for governments to be responsive (Besley and Burgess (2002)) and, in this context, it is of extreme relevance to know whether the Brazilian political system and electoral rules allow citizens to use other forms of political action beyond voting to ensure that the their preferences are reflected in politics and the laws proposed by legislators. The next section presents the background on the protests and the other sections present my empirical strategy and the estimated results.

3 Background - The 2013 Protests in Brazil

Initiated mainly by the "Movimento Passe Livre" (MPL, Free Fare Movement), a social movement that advocates for free public transportation, the demonstrations were initially organized to protest against an increase in bus and metro fare in some Brazilian cities. The protests were violently repressed by the police in São Paulo, Brazil's largest city, and what seemed to be just another series of acts among several others organized by the MPL, took nationwide repercussion and protests spread throughout the country. Between June 17th and 30th, the movement had grown to become Brazil's largest protests since the 1992's against former President Fernando Collor de Mello.

More than 775 protests happened in 433 municipalities (around 7,8% of total number of municipalities), leading at least 2.8 million individuals to the streets from all over the country. Figure 7 depicts a map of the municipalities that had at least one protest. Although the protests did not occur uniformly across the territory, they took place in every state of the country. Table 3 shows the percentage of the population from each state that lives in a municipality that had a protest. Despite being concentrated in Southeast and South regions, the state less affected by the protests had 18% of its population experiencing a protest. We can see that there is a huge variability among the brazilian states in what refers to the occurrence of protests. Disregarding Distrito Federal (DF), that has just one municipality, citizens from the state of Rio de Janeiro (RJ) are the ones that experienced more protests: over 80% of the population live in a municipality that had a demonstration.

Besides the fact that these protests were the biggest ones over the last two decades, it is interesting to notice that the protesters, composed mainly by youngsters, had a wide agenda of demands. Despite this fact, most of the demands refers to disappointment with the inadequate provision of public services and widespread corruption affecting most of Brazilian governmental institutions. Although the raise in the bus fares were revoked or postponed in several municipalities, the protests kept going for a few more days. We see in figure 8 that at the most intense day of the protests (June 20th) citizens were demonstrating in over 120 municipalities, taking more than 1.5 million people to the streets.

Most of the demands were directed to the executive branch (president Dilma Rousseff, governors and mayors) and just a couple of days after protesters have set fire in front of the Presidential Palace, the president made a public announcement of a wide set of proposed policies, contemplating themes such as public services, urban mobility, fiscal discipline and a political reform. However, there were also demands referring to the legislative competence. In Brasilia, the national capital, protesters decided to demonstrate in front of the National Congress and when the police could not hold them back anymore, they went up and took control over the rooftop of the Congress.

The demands related to the legislative branch include the revocation of a constitutional proposal that limited the power of prosecutors to conduct criminal investigations (PEC 37), the criminalization of all forms of corruption as heinous crimes, the end of the secret vote in Congress to expel a legislator, the destination of 10% of the Brazilian GDP to education and of petroleum royalties to education (75%) and Health (25%). There were also some themes that were not a consensus among the protesters, like the end of all taxes on public transport, the implementation of free public transportation to the students enrolled regularly, and the revocation of "Gay Cure" bill authorizing sexual orientation conversion therapy by psychologists.

4 The Model

4.1 Protests as Noisy Bayesian Persuasion

Our modeling strategy is to model protesters as information designers that want to persuade a benevolent, yet uninformed incumbent government, to take their preferred action. Therefore, protest is an information mechanism. While protest participants have room in order to design features of the production technology that will generate such information, they are not able to completely control the final result or even to completely manipulate the government to take their preferred action. This means that protests will generate messages that are *Bayes plausible* in the sense of Kamenica and Gentzkow (2011).[5]

Both protesters and the government share a common lack of information regarding a true state of the world that is relevant for the government's actions. Protests are taken as given and we abstract from explaining the emergence of protests. A key feature of our model is that governments differ on their capability of understanding the message designed by protesters. While high quality governments hear messages designed by protesters with no noise, low quality ones may observe a different message than the one that was actually transmitted. The noise that low quality governments may face is connected to the intrinsic quality of the protest itself.

In fact, when asking the question when, or if, protests are an efficient tool to persuade governments, it is also important to focus on the quality of the message that was transmitted by the protest. While some protests have a clear focus in terms of demand (costly public transportation or education, against police abuse or even against a reform of a public policy), other protests quickly expand to become a simple repudiation of the incumbent government or a general dissatisfaction with the *status quo*. Therefore, in our theoretical environment, a noisy protest is one such there is no specific clear demand.

4.2 Players, policy and state

There are two players in this economy, an incumbent government (G) and an interested group of protesters (P). There is an unknown state of the world $\omega \in \Omega = \{0, 1\}$. The incumbent is benevolent to the extend that she cares about policy $a \in A = \{0, 1\}$ that matches the state of the world. Therefore, her payoff depends on her action and on this unknown state of the world. An example of payoff function that satisfies this requirement would be $u_G = \mathbb{1}_{a=\omega}$. The incumbent has an unknown quality, $\tau \in \Gamma = \{L, H\}$. Her quality only matters for her capability of understanding the relevant information that will form her belief about the state of the world, nothing else. High ability governments interpret signals about the state of the world without any noise, while low

[5] In political terms, this also means we are thinking about protests in a democratic environment and not on protests that will lead to regime changes, as in the empirical work of Cantoni, Yang, Yuchtman, and Jane Zhang (2019), for example.

ability ones interpret signals with noise. More details of this will be explained in the information structure part below. Protesters are self-motivated and only extract utility when $a = 1, \forall \omega \in \Omega$. One may think that $a = 0$ represents a pension reform to an overly benevolent pension system and $a = 1$ represents keeping the status quo. While the government would like reform the pension system ($a = 0$) if the state of the world is such that a reform would be better ($\omega = 0$), the government would like to keep the system as it is ($a = 1$) if the state of the world is such that no reform is better ($\omega = 1$). Protesters would always want the government to keep the system as it is, i.e., $a = 1$. Therefore, the payoff function of protesters can be given by $u_P = \mathbb{1}_{a=1}$.

4.3 Information structure

Our modeling strategy is to define protesters as information designers that aim to persuade the rational incumbent to take the protester's desired action, as in the Bayesian persuasion literature, following Kamenica and Gentzkow (2011). One may think that protesters would gather to decide how they will inform the government on which action to take. Protesters are farsighted and take into account how the government will react to the protest and how likely it will be for the government to take the desired action, $a = 1$. As information designers, protesters design a signal device that will deliver signals such that the chances the government will be persuaded are maximized. In other words, protesters will design the signal structure in such a way they can choose from the set of all possible posteriors the government can form after they observe the realization of the protest.

Therefore, a protest consists of a finite realization over the space S – that define all possible signal realizations, and a family of distributions $\{\pi(s|\omega)_{\omega \in \Omega}\}$ – that define the probability attached to each signal realization. Following Kamenica and Gentzkow (2011), we restrict our attention to a specific class of signals $s \in S$, the ones that are *straightforward*, i.e., $S \in A$. This means that that $s \in S$ can be reduced to an action recommendation to the incumbent.[6] Both government and protesters have a common prior $\mu_0 = \Pr(\omega = 1)$ and $\lambda_0 = \Pr(\tau = H)$.[7] In our example of binary states that follow with signals and types that are also binary, the information structure that will be designed can be represented by a pair of probabilities for $t \in \Gamma = \{H, L\}$:

	$\pi(s = 0\|\omega, \tau = t)$	$\pi(s = 1\|\omega, \tau = t)$
$\omega = 0$	$1 - q_0^t$	q_0^t
$\omega = 1$	$1 - q_1^t$	q_1^t

Table 1: Signal structure $\pi \in \Pi : (\Omega, \Gamma) \to \Delta(S)$.

But not all governments are alike. Some high ability incumbents ($\tau = H$) may interpret with clarity the information received from the signal device of protests, while low ability types ($\tau = L$) may mistake the signal received. For the low ability case, we follow Tsakas and Tsakas (2017) adding noise to the classic Bayesian persuasion model. Differently from them, noisy can only happen when the politician is low quality. In fact, the low type of government mistakes a signal

[6] This is not without loss of generality in the environment where signals are noisy. A richer signal-space would be benefitial to protesters, as shown by Tsakas and Tsakas (2017).

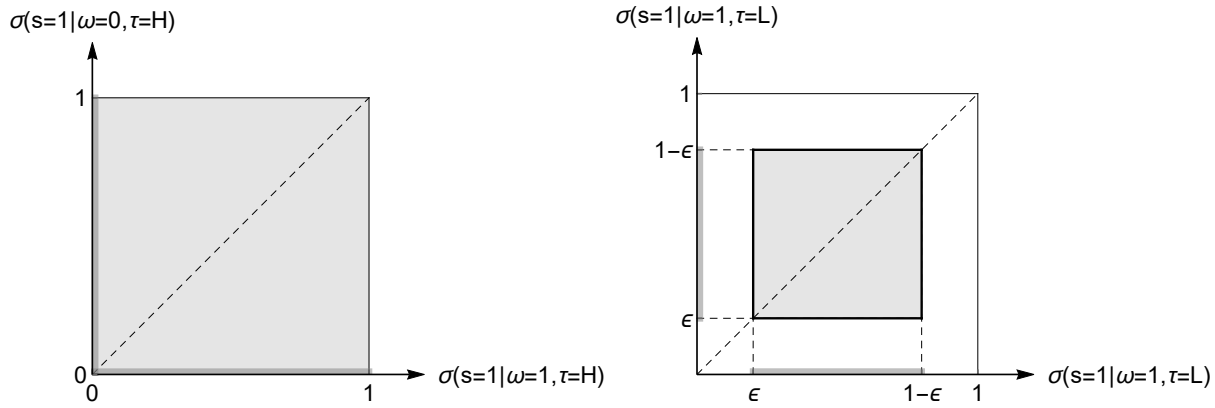
[7] The government also doesn't know her type. This is a common assumption in the literature to prevent another layer of strategic interaction between the government and the protesters.

$s = 1$ for one of $s = 0$ and a signal $s = 0$ for one of $s = 1$ with probability ϵ. We assume $\epsilon < \mu_0$ for consistency of results.

Therefore, a noisy signaling mechanism consists of a message from protesters $\pi \in \Pi : (\Omega, \Gamma) \to \Delta(S)$ optimal to the sender, and an exogenous noisy channel $p : (S, \Gamma) \to \Delta(S)$ that may distort the message that was produced by the protest. Thus, $p(s'|s, \omega)$ denotes the probability that the receiver observes s' when s has been realized by protesters. A signaling structure (π, p) induces a signal $\sigma : (\Omega, \Gamma) \to \Delta(S)$ such that

$$\sigma(s|\omega) = \sum_{t \in \Gamma} \sum_{i \in S} p(s|i, t)\pi(i|\omega, t) \tag{1}$$

The set of feasible signals is denoted by $\sum_p \subset \Pi$, for a given p. Each feasible signal $\sigma \in \sum_p$ induces a mapping from the state space $\omega \times \tau$ to $\Delta(B_p) \subset \Delta(S)$, with $B_p = \{p(.|s = 1, t), p(.|s = 2, t)\}$. We borrow from Tsakas and Tsakas (2017) an illustration of the set of feasible signals $\sum_p$ for our binary example:



(a) High quality government

(b) Low quality government.

Figure 1: The set of feasible signals $\sum_p$ for the binary channel p and for both high and low quality governments. We borrow the figure on the right from Tsakas and Tsakas (2017).

The figure above depicts the set of feasible signals for each type of government. On the left side of Figure 1, we show the the feasible message space of the high quality government, which is the entire message space. Each element of this space represents a probability is attached to $s = 1$. The low quality government $\tau = L$ receives a signal from protesters with noise. This means that the message space that is feasible is the convex hull of $B_p = \{\epsilon, 1 - \epsilon\}$ where $\sigma(s = 1|\omega, \tau = L) = 1 - \epsilon$ if $\pi(s = 1|\omega, \tau = L) = 1$ and $\sigma(s = 1|\omega, \tau = L) = \epsilon$ if $\pi(s = 1|\omega, \tau = L) = 0$.

After the protesters have designed the signaling mechanism and given a type τ and a noise mechanism ϵ, the government of type τ will update her belief about the true state of the world. For each signal realization $s \in S \cap A$ there will be a posterior belief $\mu_s^\tau \in \Delta(\Omega)$, found by Bayes rule. For each $\omega \in \Omega$

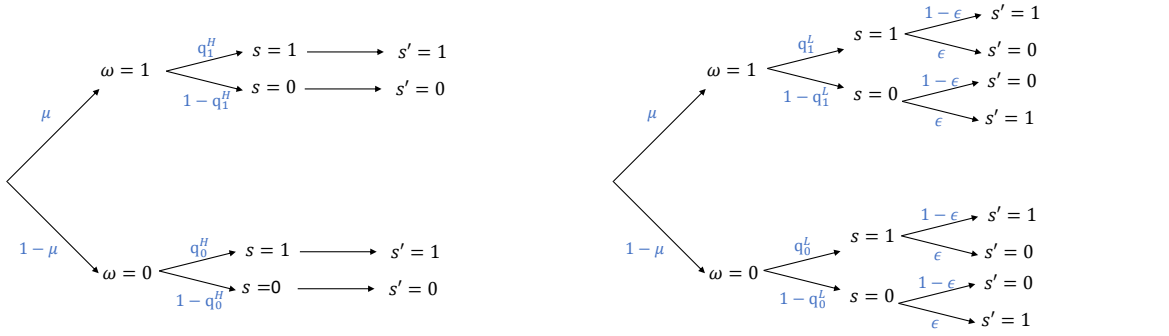
$$\mu_s^\tau(\omega) = \frac{\sigma(s|\omega)\mu_0(\omega)}{\sum_{\omega' \in \Omega} \sigma(s|\omega')\mu_0(\omega')}$$

Following, we will denote $\mu_s^\tau(\omega = 1)$ simply as μ_s^τ for the sake of clearer notation. Each signal σ induces a two-dimensional profile of posteriors $(\mu_1^\tau(\omega), \mu_2^\tau(\omega)), \forall \tau \in \{H, L\}$ – since we are

focusing on signals that are *straightforward*. Also, each posterior $\mu_s^\tau(\omega)$ happens, from an ex-ante perspective, with probability given by

$$\tau(\mu_s^\tau(\omega))) = \sigma(s|\omega)\mu_0(\omega)$$

An illustration of the probability trees that the protesters face is depicted in Figure 2 below.



(a) High quality government – probability λ_0 (b) Low quality government – probability $1 - \lambda_0$

Figure 2: The noise structure depends on the quality of the government.

Protests as persuasion mechanism

Our benchmark case is the classic Bayesian persuasion model from Kamenica and Gentzkow (2011), which corresponds to the high type $\tau = H$ incumbent. Following their result, we find that protests are an effective persuasion tool for protesters. The addition of noise, however, makes protests a less efficient tool for the protesters.

Proposition 1 *The optimal signaling structure is given by:*

$$q_1^L = q_1^H = 1$$
$$q_0^L = \frac{p - \epsilon}{(1-p)(1-2\epsilon)}$$
$$q_0^H = \frac{p}{1-p}$$

This signaling structure induces the following set of posteriors from the government:

$$\mu_1^L = \mu_1^H = \Pr(\omega = 1|s' = 1) = 0.5$$
$$\mu_0^L = \frac{\epsilon\mu_0}{1 - 2(1-\epsilon)\mu_0}$$
$$\mu_0^H = 0$$

All the proofs can be found in the Appendix A. When the state is such that $\omega = 1$, there is no incentive for protesters to deliver any other action recommendation rather than $s = 1$. Therefore, $q_1^L = q_1^H = 1$. When the state is such that $\omega = 0$, protesters have an incentive to persuade until the government is indifferent, in expected terms, between choosing $a = 0$ or $a = 1$, which delivers $q_0^L = \frac{p-\epsilon}{(1-p)(1-2\epsilon)}$ and $q_0^H = \frac{p}{1-p}$. This signal message probabilities will induce posteriors that are shown above.

The intuition for the result of Proposition 1 can be found below. If there are no protests, the probability that the government behaves accordingly to protesters interest, that is to take $a = 1$, is given by their prior probability μ_0 as shown in the dashed black line. When protests happen and all governments are high type ($\tau = H$) – meaning there is no noise in the communication channel, protesters are an effective persuasion tool, doubling the probability that the government delivers the preferred action of protesters – as shown in the garment solid line with circles. When all governments are of low type ($\tau = L$), protesters are less efficient. When all governments are high type ($\tau = H$), this probability can be reached from $\mu_0 > 0.25$ on – the intersection between the gray dashed line and the garment solid line with circles. However, then all governments are low type ($\tau = L$), this can only be achieved from the point $\mu_0 > 0.42$ on – the intersection between the gray dashed line and the blue solid line with squares. In this case, if protesters face a noisy communication channel, unless we start from a point in which governments are pretty inclined to already deliver $a = 1$, protesters are less likely to be an effective persuasion mechanism.

It is ex-ante optimal for the government to choose $a = 1$ if and only if her posterior $\mu_s(\omega) \geq 0.5$. While $\mu_1(1) = 0.5$, it is easily shown that $\mu_0(1) < 0.5$ for $\epsilon < 0.5$ – a reasonable assumption.[8]

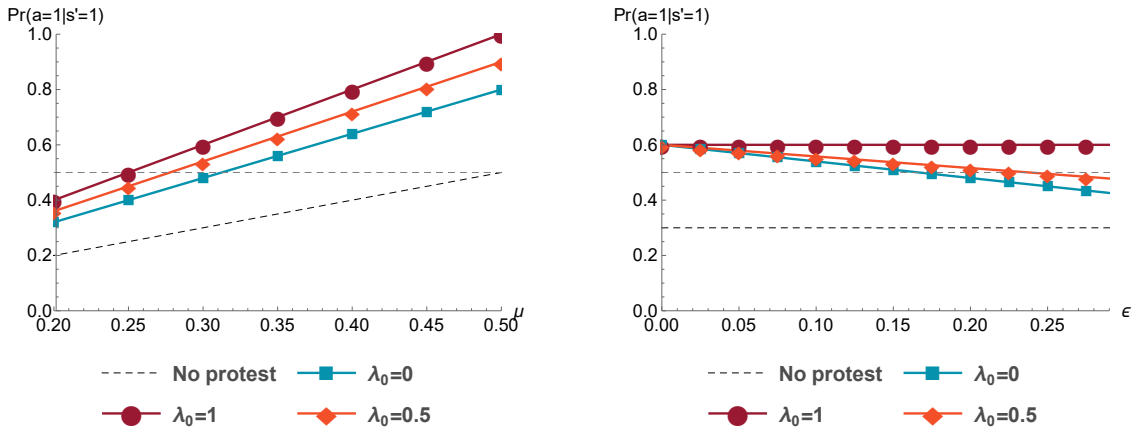
In fact, we could think that protesters would like to persuade the government until, from an ex-ante perspective, she is indifferent between taking $a = 1$ or $a = 0$, which would be at the point in which $\Pr(a = 1|s) = 0.5$ – represented by the gray dashed line above. We formalize how noise can reduce the efficiency of protesters as a persuasion mechanism for different levels of λ_0, the prior probability that the government is high type.

Corollary 1 *And the following action behavior from the government:*

$$\Pr(a = 1|s' = 1) = 2\mu_0 \left(1 - \epsilon(1 - \lambda_0)\right)$$
$$\Pr(a = 1|s' = 0) = 0$$

Since the government will choose $a = 1$ if and only if her posterior is higher than 0.5 and this happens only when $s' = 1$, the probability that the government will choose $a = 1$ is the same as the one that $s' = 1$ is delivered. Therefore, we can think about the effectiveness of protests is measure by the probability that protesters persuade the government, i.e., the probability that the government chooses $a = 1$, or that $s' = 1$ is delivered. How this signaling mechanism will impact this effectiveness will depend on (i) the size of the noise (ϵ) and on the mass of governments that are low type (λ_0). This can happen when protesters intended to say that, i.e., $s = 1$ and there was no noise in the communication channel, or when protesters said $s = 0$ but there was noise in the communication:

[8] One could think that $\epsilon \geq 0.5$. This would mean the mistake is so significant that there are higher chances that the message sent my protesters will be misunderstood by the government. If that is common knowledge – as it is the case in our environment, the protesters would take into account and would choose a signal device that would take this into account, swapping the optimal signaling structure we saw above.



(a) Efficiency of protests for μ_0 and $\epsilon = 0.1$.

(b) Efficiency of protests for ϵ_0 and $\mu_0 = 0.3$.

Figure 3: How protests are efficient depend on initial prior and noise size.

From the right plot depicted in Figure 3, we can see that the probability that the protest is efficient is decreasing with the size of the error ϵ and also with the probability that the government is high type λ_0, an intuitive result. Since our measure of ex-ante efficiency is such that the probability that the government takes the preferred actions of protesters $a = 1$ at least with probability $\frac{1}{2}$, we plot below the whole parameter space of ϵ and λ_0 such that protests are ex-ante inefficient:

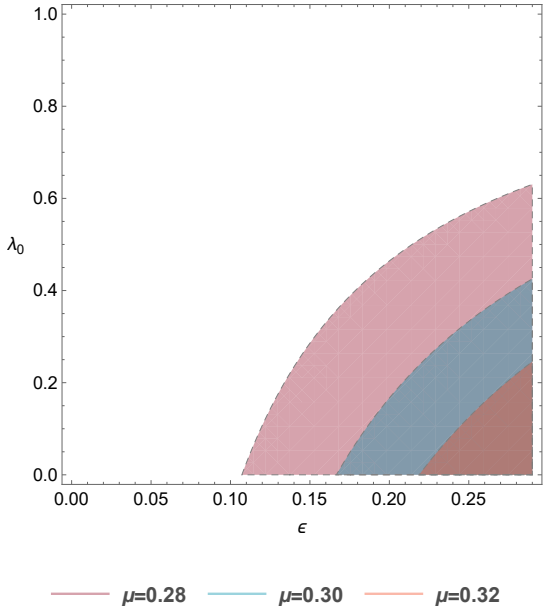


Figure 4: Efficiency of protests for pairs of ϵ and λ_0 and for selected priors μ_0.

Persuasion, anti-stablishment bias and accountability

So far in our analysis we have asked how protests could be a useful persuasion tool. We have seen that they are more efficient the less noisy they are in message channel they face. Now, we focus on how protests can change the perception of the electorate regarding the quality of the government. In order to do that, we have added a third player to this game, a citizen (C) that wants

a high quality government and that shares the common priors μ_0 and λ_0. The citizen observes the action of the incumbent a and updates her prior belief on the quality of the government λ_0. If the posterior probability that the incumbent is high quality ($\lambda_1 = \Pr(\tau = H|a)$) is higher than the probability from an opponent from the common pool of candidates – that are high quality with probability λ_0 – the incumbent is reelected. Otherwise, the incumbent is replaced.

Corollary 2 *The updated belief of the citizen after observing the action of the government a is given by:*

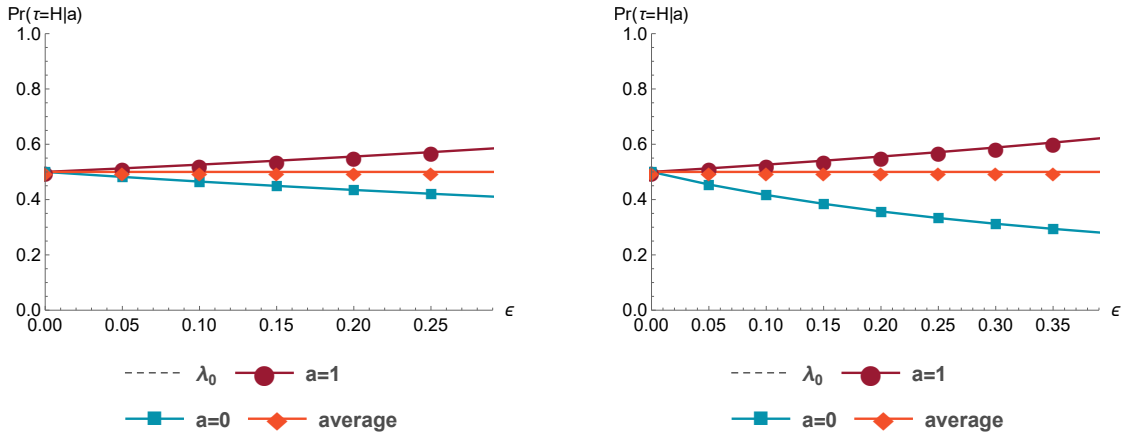
$$\Pr(\tau = H|a = 1) = \frac{\lambda_0}{1 - \epsilon(1 - \lambda_0)}$$
$$\Pr(\tau = H|a = 0) = \frac{(1 - 2\mu_0)\lambda_0}{1 - 2(1 - \epsilon(1 - \lambda_0))\mu_0}$$

The ex-ante posterior equals the prior, i.e.

$$\lambda_1 = \Pr(\tau = H|a = 1)\Pr(a = 1) + \Pr(\tau = H|a = 0)\Pr(a = 0) = \lambda_0$$

The result still holds ex-post if there is no noise in the communication channel, $\lambda_1 = \lambda_0$. When there is noise, however, $\lambda_1 > \lambda_0$ if $a = 1$ – and the incumbent is reelected, and $\lambda_1 < \lambda_0$ if $a = 0$ – and the incumbent is replaced.

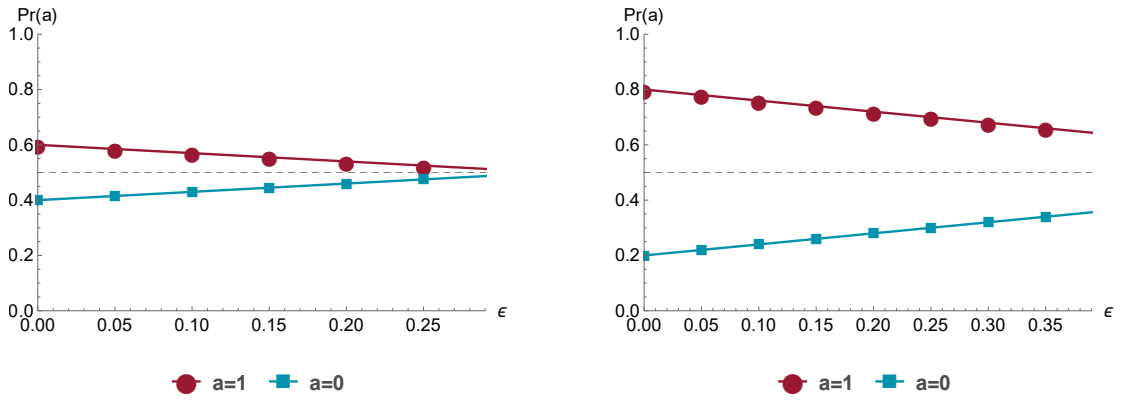
The intuition from Corollary 2 can be better given in the set of Figures 5 and 6. In the absence of noise, $\epsilon = 0$, regardless of the action a taken by the government, $\lambda_1 = \lambda_0$, as we can see by the initial point of the garment line with circles and the blue line with squares in both plots on Figure 5. When noise increases, λ_1 increases if $a = 1$ and decreases if $a = 0$, showing that, conditioning on the action taken by the government, the citizen will update her believes on the quality of the government.



(a) λ_1 for $\mu_0 = 0.3$ and $\lambda_0 = 0.5$.

(b) λ_1 for $\mu_0 = 0.4$ and $\lambda_0 = 0.5$.

Figure 5: How protests are efficient depend on initial prior and noise size.



(a) $\Pr(s')$ for $\mu_0 = 0.3$ and $\lambda_0 = 0.5$.

(b) $\Pr(s')$ for $\mu_0 = 0.4$ and $\lambda_0 = 0.5$.

Figure 6: Probability that each signal is delivered.

5 Empirical Evidence

5.1 The data

With respect to the protests, we use information available at a news website of Brazil, G1, which is one of the biggest news site in the country. Few days after a police brutality at a protest in São Paulo, the website created a special session to cover issues related to protests that started taking place all over the country. The data compiled at the website contains information on whether a municipality had a protest or not, how many people attended it according to police estimates and how many days with protests a municipality had during our period of interest. The website covered the protests that happened between June 17th and June 30th.

Although it is relevant to know not only if there was a protest but the intensity of it, in terms of percentage of the population that participated in it, we use a binary variable reflecting whether there was at least one protest at the municipality instead of using the number of protesters. The reason is lack of precision on data about the intensity, since the protest attendance was measured by different sources, usually local police departments, and the access to the methodologies used to compute how many people showed up in each protest is limited. Thus, my analysis will be based on protest incidence, rather than protest intensity.

Regarding the analysis of the electoral consequences of protests, we use data from the Superior Electoral Court (Tribunal Superior Eleitoral), which is the highest judicial body of the Brazilian electoral system, responsible for organizing and publicizing information relative to elections. From this database, I constructed two panel. First, using data on turnout and null votes at the municipal level, I construct a panel with 3 periods referring to 2006, 2010 and 2014 elections. Second, I constructed a panel of the legislators' vote share in each municipality in 2010 and 2014 elections. That is, I look at the vote share a legislator obtained in a municipality with respect to the total votes of the municipality[9]. I also use data from TSE to construct the municipality turnout rate and the youngster's registration rate at both election. To test for heterogeneity on protests' effects, we use mainly data from 2010 census. Access to Internet refers to the share of households in a municipality with at least one computer with access to Internet. Education level uses information

[9] we use this variable instead of using the vote share relative to the total votes of the legislator, since the variation in the treatment is at the municipal level.

on the share of citizens with at least 10 years of age that are literate. I also use data from IDEB and IDSUS, which are indexes constructed to test quality of public education and health systems.

Regarding politicians' behavior, I extracted information on two different performance variables from the Chamber of Deputies' website: presence in plenary sessions and proposed bills. Also, I accessed data on the legislators' federal budget amendments from the Federal Senate's website. I have data on 642 legislators that had a seat between 2011-2014, but I restrict my analysis to the 513 legislators who exercised their mandate during the protests' period. First, I look at the frequency of presence of the legislator in all the plenary sessions by week. The period considered February 2013 to December 2013[10]. Table 4 presents the summary statistics of all variables, where we see that the mean of the presence rate is 0.82.

Second, the other variable I look at is related to what is known in American politics as pork barrel politics. With data on the federal budget amendments from 2011 to 2013, we use the share of the total amount of these amendments made by each legislator that relates to the protesters' demands. To classify an amendment as related to protests, I analyzed which ministry was assigned as the responsible for implementing the amendment. Amendments assigned to the Ministry of Health, of Education, of Transports, and of Cities[11] were classified as related to the protests. Table 4 shows that on average, 57% of all individual amendments were related to the protesters' demands.

Furthermore, the main goal of the protesters was to get changes in substantial matters, such as the creation of new bills, like the one that reserves 10% of the GDP to education, and the repeal of laws, like PEC 37 discussed earlier. Given this context, besides using the total number of bills proposed by each legislator by quarter, I also look at the amount of these bills that relates to the protesters' demands and use a dummy whether the legislator proposed one. To classify a proposal of bill as related to protests, I identified for which commission in the Chamber of Deputies the proposal was assigned. If it was assigned to the Commission of Education, of Social Security, of Urban Development, and of Public Security, I classified it as a proposal related to protests. Between February 2011 and September 2014, legislators proposed 8.151 bills: 949 (12%) related to health, 319 (4%) to education, and 437 (5%) to urban development or public security.

5.2 Empirical Framework

To examine whether protests can affect the political equilibrium, I estimate regressions of the political outcomes discussed before at the municipal level on a dummy whether the municipality had a protest or not. As we see in table 5, municipalities that had a protest are considerably different from those that had not: they are bigger, have higher income per capita, more years of schooling, and greater share of urban population. Certainly these characteristics on which they differ affect not only the probability of having a protest but also other variables we are interested in analyze the effect on. I mitigate this problem by adding municipal fixed-effects to the estimations, taking advantage of the panel with 3 different periods (2006, 2010 and 2014 elections).

First, I test whether the protests affected the participation in elections, using turnout rate at the municipal level to estimate the following equation:

$$Turnout_{mt} = \alpha_t + \gamma_m + \delta Post_t + \theta Post_t \times Protest_m + \varepsilon_{mt} \tag{2}$$

[10] Although I have information from the beginning of the legislature, there were a change in the rules of the Chamber in October 2012, by which presence in plenary were mandatory from Tuesday till Thursday, instead of from Monday till Friday. This might have changed the dynamics of presence rate and, thus, I consider the legislatice year of 2013

[11] Which in Brazil is the federal department responsible for urban development.

where $Turnout_{mt}$ is the number of votes casted in municipality m at election in t, divided by the total population aged between 15 and 70 years (to approximate the population who is obligated to vote), α_t controls for time fixed effects, γ_m controls for municipal fixed effects, $Post_t$ refers to the 2014 elections, and $Protest$ is a dummy whether municipality m had a protest. Through this equation, I test the hypothesis that the fact of experiencing a protest might change the political behavior of voters. The coefficient of interest, θ, estimates whether voters are participating more or less in the elections due to exposure to the political protests. In all the regressions using data from elections at the municipal level, I weight the observations by the number os voters who participated in the 2014 elections, to take into account that I am aggregating individual voting behavior by municipalities what implies that I need to give higher weigh in the estimation to those municipalities where there are more voters. With regard to the estimation of the standard errors, I calculate it clustering by municipalities, since I have a panel where observations from the same municipality might be correlated across time.

Using Equation 2 as base line, I test whether there are differential effects of protests conditional on municipalities' characteristics. To do so, I reestimate equation (2) separately for two groups, depending whether or not they are above or below certain threshold, which is the national median of the variable being tested. Based on the social unrest literature (Madestam, Shoag, Veuger, and Yanagizawa-Drott (2013); Campante and Chor (2012); Passarelli and Tabellini (2017)), I look at municipal characteristics that influence protest incidence and might affect other political outcome variables, such as media penetration (share of population with access to Internet), educational level (literacy rate), youngsters' political activism (share of youngster to whom voting is not mandatory (16 and 17 years old) that registered to vote in the 2014 elections) and income inequality (Gini index).

I then look at the "protest votes". I estimate a similar equation as equation (2), using share of null votes with respect to total number of voters:

$$Null\ votes_{mt} = \alpha_t + \gamma_m + \delta Post_t + \theta Post_t \times Protest_m + \varepsilon_{mt} \tag{3}$$

Next, I analyze whether voters who experienced a protest voted differently from voters who did not. By looking at vote share of each legislator in each municipality, I examine whether they were punished in those municipalities where protests took place. I estimate the following equation:

$$Vote\ share_{dmt} = \alpha_d + \gamma_m + \beta Post_t + \theta Post_t \times Protest_m + \delta W_{dm} + \varepsilon_{dmt} \tag{4}$$

where the dependent variable is the vote share of municipality m that refers to legislator d at election t, α_d control for time-invariant legislators' characteristics, γ_m controls for municipal fixed effects, $Post_t$ refers to the 2014 elections[12], and $Protest$ is a dummy whether municipality m had a protest. Additionally, the vector W_{dm} includes the following controls: a dummy whether legislator d was from the same party of the mayor of m; the amount (log) of federal budget amendments per capita from legislator d directed to municipality m; a dummy whether municipality m is the hometown of legislator d; and the number of legislators running at the state, divided by total population of municipality m. It is important to control for legislators' characteristics that are time-invariant and that affect their vote distribution, like the fact that some legislators are more charismatic than others or that they have stronger alliances along the state.

Through this equation, I test the hypothesis that the fact of experiencing a protest might change the political behavior of voters. By including legislator and municipality fixed-effects, I expect that

[12]Since I consider only two periods, the $Post\text{-}protest_t$ dummy controls for time fixed-effects.

the interaction of a dummy of post-protest period ($Post_t$) with a dummy whether the municipality had a demonstration ($Protest_m$) to capture the effect of the protests on the legislators' vote share. In other words, the coefficient of interest, θ, estimates whether voters are punishing or not incumbents. I hypothesize that the underlying mechanism for this effect is that a lack of response on legislators' behavior after the protests shifted the electorate toward more gripped voters (Bidner and Francois (2013)), which ultimately changed their political behavior.

In a similar way to respect to the turnout analysis, I test for heterogeneities in municipal characteristics, by reestimating equation 4 separately for two groups. Based on the social unrest literature (Madestam, Shoag, Veuger, and Yanagizawa-Drott (2013); Campante and Chor (2012); Passarelli and Tabellini (2017)), I look at municipal characteristics that influence protest incidence and might affect political outcome variables. Similarly to the previous analysis of turnout and null votes, I test for heterogeneity regarding access to Internet, level of education, youngsters' political engagement and income inequality, but I also test for two more heterogeneities, related to quality of provision of public health and education systems.

Now, taking into account that rational politicians may expect that the protests in the street may be translated into dissatisfaction also during the elections, whereby voters would punish politicians that did not respond to their demands, I now look at data from the Chamber of Deputies to measure whether legislators were acting accordingly or not to protests' demands. I expect legislators more or less exposed to protest to respond differently to protests and, in this sense, in order to test whether politicians respond to political protests, I need variation in a variable that represents how much each legislator was affected by the protests. I construct an index for each legislator that measures protest exposure using information about the votes he received in the 2010 elections. Yet, exposure here does not refer to the share of a legislator's electorate that protested. As pointed before, information on the number of protesters is not reliable, and, thus, we use a dummy to indicate the municipalities that had at least one protest. That is, the index was created according to the following equation, which in words represents the share of the legislator's electorate that lives in a municipality that had at least one protest:

$$\text{Protest Exposure Index}_d = \sum_{1}^{M} \lambda_{md}.\mathbb{1}_{protest_m} \tag{5}$$

where $\mathbb{1}_{protest}$ is an indicator function whether municipality m had at least one protest; λ_{md} is the weight giving to each municipality, that is, the vote share accordingly to the participation of municipality m in the total votes to legislator d; and M refers to all municipalities of the state he was running for. This index was built having in mind that the legislators behave accordingly either to maximize the chances they have to be reelected[13], since there are no term limits for legislative positions in Brazil, or, more importantly, to act accountably facing his electorates' overall discontentment. In this sense, legislators have incentives to act accordingly to meet their electorates' expectations. Using the variation in the legislators' share of voters that live in a municipality that had a protest, which is exogenous to protests from the legislator standpoint, the index captures the influence of the protests over the legislators.

Thus, to estimate the effect of the protests on legislators I begin by estimating the following OLS specification:

$$Performance_{dt} = \delta Post_t + \theta Post_t \times Protest\ Index_d + \alpha_d + \gamma_t + \varepsilon_{dt} \tag{6}$$

where $Performance_{dt}$ refers to one of the four performance variables I analyze, $Post_t$ is a dummy equal to 1 if period t is after the first week of protests, and $Protest\ Index_d$ is the variable capturing

[13]Or to maximize the chances when running run for higher positions (Leoni, Pereira and Rennó 2004)

protest exposure for legislator d. Furthermore, α_d controls for legislators' time-invariant characteristics and γ_t controls for time fixed effects, and ε_{dt} is a random error term for the legislator d at period t. In all regressions, I cluster standard errors by legislator. Clustering at the legislator level allows the estimation of the standard errors to take into account that observations from the same legislator are correlated across time.

My identification strategy relies on the fact that since legislators were elected, they have been taking into account their electorate's preferences. In this sense, my index is exogenous conditional on past behavior, since legislators were not expecting it to happen. After the protests, then, the only reason why a legislator behaves differently conditional on his protest exposure index is because he responds to protests. Thus, this equation identifies whether the protests affected the legislators' behavior by the estimation of θ. If after the protests there was a difference in the behavior of those legislators whose electorate protested more, that is, if θ is statistically significant, then we can conclude that politicians responded to political protests.

With regard to $Performance_{dt}$, first, I look at the frequency of presence of the legislator in all the plenary sessions by week. Following Nannicini, Stella, Tabellini, and Troiano (2013), we use this variable to measure rent-seeking behavior. Legislators receive a salary and what it is minimally expected from them is participation in the parliamentary debate so as to contribute to the legislative procedure of elaborating relevant laws. Otherwise, if they are not contributing to the legislative activities, albeit being paid by society, then they are allocating their time in other personal activities that might be not related to a legislator's duty. The period considered February 2013 to December 2013[14].

Second, the other variable I look at is related to what is known in American politics as pork barrel politics. In Brazil the executive has the prerogative to elaborate the annual budget proposal and legislators are allowed to amend the budget bill and propose individual amendments that transfer funds – which normally favor their electoral strongholds (Leoni, Pereira, and Renno (2004)). They can propose a limited number of amendments, that can go up to a total of R$ 15 million per year (nearly US$5.8 million). Indeed, the Congress merely authorizes the budget. It is the executive branch, however, who decides if and when to disburse the funds. In this regard, I look at data on the federal budget amendments proposed by each legislator – considering that looking at the amendments that were actually implemented by the Executive could bias the analysis. The idea is that legislators might have used these amendments as political tools to please voters from municipalities that had protests.

Although there is evidence that there is no direct link between pork and electoral success, Samuels (2002) shows that instead of trading pork for votes, Brazilian legislators trade pork for money, what then affects their electoral prospects. Albeit the link is indirect, we can still expect legislators to use pork and barrel to respond to protesters' demands. Moreover, Firpo, Ponczek, and Sanfelice (2015) find that politicians tend to favor municipalities that represents a bigger share of the votes obtained by politicians. Also, they provide evidence that voters support candidates who have brought resources to their localities, what explains why should legislators use pork barrel to fulfill protesters' demands.

Finally, I look to two variables related to the legislative duty of proposing bills. we use the total number of bills proposed by each legislator by quarter and the share t of these bills that relates to the protesters' demands. It is worthy pointing that elaborating more or less bills, in terms of number of bills, does not necessarily mean that protesters had their requests answered. Deputies

[14] Although I have information from the beginning of the legislature, there were a change in the rules of the Chamber in October 2012, by which presence in plenary were mandatory from Tuesday till Thursday, instead of from Monday till Friday. This might have changed the dynamics of presence rate and, thus, I consider the legislative year of 2013

may introduce legislation with no intention of ensuring that their bills are passed. Legislators submit bills, the Chamber registers them, and printed versions are sent to constituents as proof of legislative effort from the legislator (Novaes (1994)). In this sense, even in the case where the protests did not get real changes, the fact that legislators are putting effort in proposing a bill just to show it at his bailiwick is an evidence that they want to show that they respond positively when his electorate demonstrates.

Due to the different nature of the three dimensions of legislators' performance, t will refers to different time periods depending on the variable used as dependent variable. For presence in plenary rate, I aggregated data weekly, for the federal budget amendments we use data annually and for the proposed bills I did it quarterly. This is due to the difference response time a legislator can have relating to these different variables. Changing their behavior with respect to attend a plenary session is much less demanding than elaborating a new bill.

It is important to highlight that even if I estimate a statistically significant coefficient of $Post_t$, I can not conclude from it that the protests were a relevant factor for altering the legislators' behavior. That is, the legislators' electorate protested all at the same time and I can not disentangle the effects of the protests from other events that occurred after June 2013 and that might have affected all legislators similarly, likewise the 2014 elections. The identification strategy relies on the hypothesis that a legislator responds differently according to a higher or lower level of protest exposition. This limits my findings if, instead of responding accordingly to their electorate, all legislators responded similarly regardless of the behavior of their electorate.

Although the comparison between legislators more or less exposed to protests identifies the average impact of protests on performance outcomes, it does not capture the fact that these effects might depend on legislators' characteristics. To test whether there is a differential effect, I estimate a model that includes an interaction of the variable capturing the effect of the protests with different characteristics of legislators.

$$\begin{aligned} Performance_{dt} = {} & \alpha_d + \gamma_t + \delta Post_t + \theta Post_t \times Protest\ Index_d \\ & + \beta_0 Post_t \times X_d + \beta_1 Post_t \times Protest\ Index_d \times X_d \\ & + \varepsilon_{dt} \end{aligned} \tag{7}$$

where X_d is one of the characteristics I hypothesize that may have an heterogeneous effect related to protests response[15]. In this model, the parameter β_1 estimates the casual impact of the protests, conditional on the legislator's characteristic X_d. I am interested in testing heterogeneity related to three different characteristics. First, one may expect that, due to reelection incentives (Gagliarducci, Nannicini, and Naticchioni (2011); Pereira and Rennó (2007)), a legislator more exposed to protests will respond more than a legislator whose electorate did not protest, as the protests demonstrate discontentment of the electorate.

Second, there might be a differential effect related to the legislator's position in the vote distribution of the coalition. Brazil's electoral rules allow parties to make, at the state level, coalitions among legislators so as to run together in the open-list proportional system. This implies that votes go not directly to the legislator but rather to the coalition and the number of seats a party gets depends on the total number of votes the coalition obtained relative to the other coalitions in the state. As a consequence, the legislator is elected depending if he ranks above the number of seats the coalition obtained[16]. Therefore, I expect a differential behavior from legislators at the

[15]The interaction term $Protest\ Index_d \times X_d$ is included in the α_d.

[16]This different aspect of Brazil's electoral system allowed 89 legislators, around 18% of the total, to be elected even though they received less votes and ranked below other legislators in the state ranking regarding total votes. That is, they were elected just because their coalition got a lot of votes, but not because voters voted directly on them.

top and legislators at the bottom of that ranking. I hypothesize that legislators at the bottom of the coalition ranking respond more positively to the protests, since they are the ones near the threshold to obtain a seat. Hence, these legislators can not assure a margin of votes to win the next election, having more uncertainty about reelection, what motivates them to respond more to protests.

Finally, I test whether being part of the federal government coalition has a differential effect on a legislator's behavior. Although there were demands related to the legislative branch, most of the protesters' demands were directed to the president. Because the executive in Brazil controls most pork-barrel programs, good relations with the president are primordial to succeed in getting funds to a legislator's bailiwick (Ames (2002)). Due to informal arrangements between the executive and the legislative, by which the president bargains support in the Congress making use of high level positions in the federal administration (Ames (2002)), it is expected that a legislator that participates in the federal government coalition will act more responsively to protests[17].

To end up, I go back to data from the elections and test whether legislators who responded more positively to protests were less punished in the 2014 elections, I estimate the following equation:

$$\begin{aligned} Vote\ share_{dmt} = \alpha_d + \gamma_m + \beta_0 Post_t + \theta Post_t \times Protest_m + \\ + \beta_1 Post_t \times Z_{dm} + \beta_2 Post_t \times Protest_m \times Z_{dm} \\ + \beta_3 Z_{dm} + \delta W_{dm} + \varepsilon_{dmt} \end{aligned} \tag{8}$$

where Z_{dm} refers to the legislators' actions related to the variables we used before. More precisely, I look at the difference of mean in presence rate and in share of federal budget amendments related to protests, before and after them, and also at whether the legislator proposed a bill related to protesters' demands after the protests to test whether voters considered incumbents' actions when they voted in the 2014 elections. Through the estimation of β_2, I test whether legislators who responded more positively to the protests were less punished than legislators who did not respond or responded negatively. Furthermore, I also test whether there is a differential effect of being from the Worker's Party[18]. The next section presents the results from the estimation of the equations presented previously. Section 5.3.2 presents findings with regard to the effects of protests on legislators' behavior, and section 5.3.1 discusses the results of the electoral consequences of protests.

5.3 Results

5.3.1 Electoral consequences of protests

I begin this section presenting the results of the average effects of the protests on turnout rate by estimating equation (2). Table 6 shows, in column (1), that the protests are related to a decrease of 1.07 percentage points in turnout rate at the municipal level, a small decrease of 1.22% with respect to the mean. The rest of the columns show that these estimated effect comes from municipalities with better educational level and worse index of income inequality. That is, when we divide the sample in regard to educational level, we see in columns (4) and (5) that there is a differential effect of the protest in the turnout rate between those municipalities with high and low educational level. In those municipalities with higher level of literacy the protests are related to a decrease in turnout,

[17] Besides PT, the president's party, I consider legislators from PCdoB, PDT, PMDB, PP, PR and PRB as allies. These are the parties that hold a cabinet position in the period after the protests.

[18] Z_{dm} may refers to a variable that varies just at the legislator level, like the legislator's party, and difference in mean of the presence rate, and in this case there is no β_3 to be estimated, since Z_d is captured by α_d.

while in those municipalities with lower educational level, the effect is twice as large and goes in the opposite direction. When we look to access to Internet, there seem to have no differential effect of protests and turnout rate in high and low Internet penetration municipalities. However, as one may expect, there is a positive correlation of protests and turnout rate among those municipalities where a higher share of youngsters registered to vote (column (6)). Finally, column (8) shows that turnout from municipalities with higher rates of income inequality are negatively correlated to protest, while there is no similarly effect on more equal municipalities.

When we look at the null votes, we found more interesting results regarding the effects of protests. First, column (1) shows that, on average, protests are associated with an increase in the share of null votes for legislators. These votes are considered "prostest votes" since voters abdicate to choose a valid option and define who will be their representatives. The effect is of 2.2 percentage points, what represents an increase of 24% with respect to the mean. When we look to municipal characteristics, we see that this effect comes from municipalities with high Internet penetration and low literacy rate. With regard to youngsters' political engagement, there is a positive correlation between protests and nulls votes in those municipalities where youngsters are less engaged , what is not found in municipalities where they are more engaged. In respect to income inequality, there is no differential effect of the protests on the share of null votes.

With respect to turnout rate and share of nulls votes, I test the robustness of the previous findings by reestimating two other specifications. First, I shorten my panel, to include just two periods, 2010 and 2014 elections (which are the elections before and after the protests.) Second, we use the three periods panel, but I now include a linear trend by state to take into account that the pre-trends of the municipalities where protests took place may be different from those municipalities that did not experience a protest. With respect to turnout, we see in tables A.1 and A.2 in the appendix that the only result that is not robust is the one for the total sample when we include a linear trend by state. Looking at the null votes, tables A.3 and A.4 show that the results are robust to these two different specifications.

Next, I analyze whether there is a correlation between protests and legislators punishment at the 2014 elections, that occurred one year after the protests. In this section I restrict my sample to those legislators that ran for reelection at the 2014 elections. Tables 8 to 14 present the results, where the observation unit is vote share of legislator d at municipality m at time t election, with respect to total votes of municipality m[19]. I begin by testing whether voters who experienced a protest, based in a widespread feeling of discontentment, use a rule-of-thumb and punish incumbents regardless of individual actions towards the protesters' demands. In this sense, column (1) of table 8 shows that, on average, the protests are correlated to a decrease of 0.057 in the vote share of a legislator in the 2014 elections, when compared to municipalities that did not have any protest. This represents a decrease of 3.5% at the mean (1.64). This effect seems small if we consider just one municipality. However, we need to consider that the legislators are elected by voters from many municipalities - indeed, on average, a legislator obtains votes from 273 different municipalities.

Moreover, one can expect that this effect of protests on electoral outcomes varies depending on municipal characteristics. The remaining columns of table 8 test this for some important municipal characteristics that are related both to the incidence of protests and the electoral behavior of voters. To test for this heterogeneities, I separate the sample in two groups, using the median of the municipal characteristic being tested as threshold. First, I test whether there is heterogeneity with respect to access to Internet. As with protests going on in other countries, like Egypt,

[19]Because the mean of dependent variable was too small (0.0164), we used the variable in 0-100 scale.

Tunisia[20] and Ukraine[21], social media has played an important role in helping protesters to organize their political act (Howard and Hussain (2011); Lotan, Graeff, Ananny, Gaffney, Pearce, et al. (2011); Tufekci and Wilson (2012); Srinivasan and Fish (2011)). From organizing public outcries to teaching how to defend yourself against tear-gas, media was a primordial driver of the movements throughout the country. Social media was used to promote demonstrations by inviting others through Facebook, and to live broadcasting the protests on Twitter and Youtube for those who could not attend.

On the other hand, this same social media serves as source of information to voters. Snyder Jr and Strömberg (2010) provide evidence that, in the USA, better informed voters are more likely to recall their representatives' name and to rate them. In this sense, I expect voters from municipalities with high Internet penetration and who experienced a protest to punish incumbents more when compared to voters that had not experienced a protest, since they have more access to information and know that legislators responses to protests were not as expected. We see in columns (2) and (3) of table 8 that this is what happens: voters who experienced a protest and that have more access to Internet, on average, seem to give less votes for incumbents in the 2014 elections when compared to voters that did not experience a protest. This effect in the vote share (-0.12) is equivalent to a decrease of 9% at the mean (1.34). Regarding municipalities with low Internet penetration, there is no correlation between protests' incidence and legislators' vote share.

Regarding municipalities' educational level, Glaeser, Ponzetto, and Shleifer (2007) provide cross-country evidence of a positive correlation between levels of education and the extent of democratization. Presenting a model that explain the correlation between education and democracy, the authors argue that schooling teaches people to interact with others and raises the benefits of civic participation, including voting and organizing. In this sense, by increasing the citizens support for democracy, I expect education to affect voters to punish incumbents that did not respond to the protests. As a result, I expect voters from municipalities with high educational level to punish incumbents more than voters from municipalities with low levels of education. Looking at the literacy rate (2010 census), columns (4) provides evidence that this is the case, showing that the protests are associated with a decrease of 0.112 (8% compared to the mean) in a legislator's vote share in municipalities with higher rates of education. By contrast, we see in column (5) that this effect is not statistically significant in municipalities with lower educational level.

Table 9 presents the effect of the protests on electoral outcomes for more four heterogeneities. Columns (6) and (7) contrast municipalities based on the share of youngster to whom voting is not mandatory (16 and 17 years old) that registered to vote, relative to all youngsters. Since schools socialize young people and political involvement is one form of socialization (Glaeser et al. 2007), I expect incumbents to be more punished in municipalities with higher rates of youngsters' political engagement. The results show, however, that there is no differential effect in municipalities that youngsters are more politically engaged. Actually, there is evidence of a negative and statistically significant effect in municipalities with lower registration rates, a decrease of 7% with respect to the mean.[22] Regarding income inequality, columns (8) and (9) show that there is no evidence of heterogeneous effects among equal and unequal municipalities.

Finally, columns (10) to (13) use a different approach to distinguish municipalities in two groups. Instead of comparing municipalities above and below the national median, I compare municipalities with respect to the mean of the state. The idea is that, in contrast to municipal characteristics mentioned before, voters can compare the quality of the public services provided

[20] Al Jazeera: "Taking power through technology in the Arab Spring", published on 26 oct 2012

[21] The Huffington Post: "Tweeting the Revolution: Social Media Use and the #Euromaidan Protests", published on 21 feb 2014

[22] This result is robust to using the registration data of the 2010 elections instead of the 2014's.

at their municipalities with the quality of these services in other municipalities from the state. This means that voters perceive the quality of public education and health system in relative terms to the state, and can have a perception of unfairness if they are behind other municipalities. Consequently, considering that they elect legislators to represent their state, voters can get aggrieved and punish legislators for falling behind the mean of the state with respect to quality of public health and education systems. It is worthy pointing that although education and health are executive competitions, the legislators can take action by allocating federal budget amendments to the municipalities with worse educational and health quality.

In this regard, to test for heterogeneity with respect to dissatisfaction to quality of public health, we use the municipal average of IDEB and present in column (10) municipalities that are above the mean of the state and, in column (11), municipalities that are below the mean. Similarly, with respect to education, we use the municipal average of IDSUS.[23] We see in these columns that, in municipalities with lower quality of public services, the protests are associated with a decrease in a legislators' vote share. This effect represents an decrease of 5% with respect to the mean at low quality of education municipalities, and of 4% when looking at public health quality. Looking at municipalities that are better relative to the mean of the state, I found no correlation between protests and legislators' vote share. That is, although the effect is small, there is evidence that voters who felt aggrieved with respect to quality of public services punish incumbents, when compared to voters who had access to better quality public services.

5.3.2 Effects of protests on legislators' behavior

I begin this section presenting the results of the average effects of the protests on legislators' behavior by estimating equation (6). Table 10 presents the results of the four performance variables mentioned in Section 5.2, each column presenting the coefficients of a regression that has a different performance variable as the dependent variable. The coefficient of interest is the one of the interaction between the post period dummy and the protest exposure index. Except for column (2), the results in columns (1), (3) and (4) suggest that the protests did not have, on average, a significant effect on legislators' behavior regarding presence in plenary and proposed bills. By contrast, the protests had a positive average effect on the federal budget amendments. For legislators at the median of the protest exposure index distribution, the protests increased the share of amendments related to protesters' demands by 0.20, what represents an increase of 36% at the mean (0.57).

Notwithstanding, the effect of protests on the amendments are negatively correlated with the protest exposure index. For instance, a legislator at the 75th percentile of the protest exposure index (71,2%) made 5.8 percentage points less amendments related to protests after the protests when compared to a legislator at the 25th percentile (22,9%). This represents a differential effect of 10% at the mean. Though the effect of protests on federal budget amendments is positive for all legislators, this negative relation of the protest exposure is not expected taking into account a model where we expect politicians to be accountable and respond positively to political protests.

Consider now that, since presence in plenary and proposed bills are measured in more periods than federal budget amendments, there is the possibility that instead of having an effect on all the periods after the protests, the effect was concentrated in the periods (week for presence rate and

[23] IDEB is an index by each school constructed through the multiplication between a performance indicator, the average grades in Math and Reading in a national exam, and the average school's pass rate, and is has a 0-10 scale. we use information of 2007, because of missing data on the 2011 index. IDSUS combines 24 indicators to measure covering access and efficacy conditions of the public health system, like the fraction of the population covered by the primary attention system and proportion of deaths in ICU admissions.

quarter for the proposed bills) just after the protests. Taking this into account, I analyze whether there was a short-run effect for this two variables by constructing a graphic to test whether there was a difference in the mean of these variables, before and after the protests. Figure 9 presents the result for presence in plenary, where I plot the mean of the presence rate by week and make a lowess regression before and after the protests, separating the legislators that were more exposed to protests (above the median of the index) from the ones less exposed to it (below the median). The scattered line refers to the legislators that were less exposed to the protests (that is, that are below the median of the protest exposure index) and the other refers to legislators more exposed to the protests. We see, then, that there is a jump at the threshold for both groups. Legislators more exposed to protests had higher presence rates even before the protests when compared to legislators less exposed to protests. This difference, though, had a slightly increase in the first weeks after the protests, although it did not last for long.

Thus far, I found evidence that, on average, the protests did not affect all important dimensions of the legislators' performance. One can expect, however, that this effect might have affected legislators differently according to individual characteristics. In this regard, I now test whether there were heterogeneous effects of the protests in the following three tables. First, as discussed in section 5.2, due to reelection incentives, one can expect that a legislator that decided to run for reelection (or for a higher position, like senator, governor or vice-governor) has more incentives to be concerned about the protesters' demands, considering that his political success depends on his electorate's votes.[24] We see in column (4) of table 11 that there is a differential effect for legislators running for reelection on the federal budget amendments. This effect is positive and more pronounced for legislators more exposed to protests. For legislators at the 75th percentile of the protest exposure index, running for reelection increases the share of amendments related to protests to 0.08 p.p., what represents an increase of 14% at the mean (0.57). On the other hand, considering legislators less exposed to protests, that are at the 25th of the index, the differential effect is a decrease of 0.02 p.p on the share of amendments related to protests in the period after the protests (decrease of 3.5 % relative to the mean).

Second, considering the distorted incentives an open-list proportional electoral system might create, I test in table 12 whether ranking high or low at the coalition vote share distribution can produce different effects of the protests on legislators' behavior. To do so, I add an interaction including the legislator's percentile at the coalition vote share distribution, measuring then his relative position at the coalition. The higher the value of the variable $Ranking\ in\ coalition_d$, more votes a legislator received. We see in column (2) that, contradicting what I expected, there is a positive and statistically significant effect of the protests on legislators' behavior. In regard to presence in plenary, the effect of jumping from the bottom of the coalition ranking (10th percentile of the vote distribution) to the top of the ranking (90th percentile) represents an increase of 0.03 in the presence rate for those legislators more exposed to protest (75th percentile of the protest exposure index), an increase in 4% at the mean (0.82). By contrast, looking at this effect for legislators less affected by the protests (25th percentile), the effect on the period after the protests is negative: there is a decrease in 0.01 on the presence rate (1.2% relative to the mean).

Although these effects have a small magnitude, it is strikingly that legislators at the top of the coalition responded more to the protests than those at the bottom. This might be a consequence of the open-list proportional system. Afterward, legislators at the top-ranking are the ones that obtained more votes, which might be a proxy for being best known by the electorate, what implies that they have more people to be accountable to. On the other hand, legislators at the bottom of the ranking are the ones who received the lowest amount of votes, but could be elected counting

[24] Since they are facing same or greater reelection incentives (Samuels (2003), Leoni, Pereira and Rennó (2004)).

on the votes the coalition received. In this sense, they were elected not because of his electorate's votes, but because they were favored by the votes of legislators ranking high in the vote distribution of the coalition, what may give them incentive to be less accountable relative to legislators at the top of the ranking.

Column (6) also shows that there is heterogeneity with respect to ranking in coalition on to the total number of proposed bills. For a legislator more affected by the protests (75th percentile of the protest exposure index), jumping from the bottom of the coalition ranking (10th percentile of the vote distribution) to the top of ranking (90th percentile) represents an increase of 0.15 in the number of bills presented after the protests, representing an increase of 15% compared to the mean (0.97). Looking at legislators less affected by the protests (25th percentile), the difference between being at the bottom or at the top of the coalition is of -0.23, what represents a decrease in the number of bills presented after the protests of 24% with respect to the mean. There is no evidence, however, of this differential effect on the probability of presenting a bill that relates to protesters' demands.

Finally, I investigate whether the protests' effect varies according to being part or not of the federal government coalition. The results are presented in table 13. As discussed in section 5.2, we expect that legislators that are aligned to the government to respond positively facing a higher exposure to protests, as the president was highly interested in "hearing to the voice of the streets" and should have pressured her allies.[25] We see in columns (2), (4), (6) and (8) that there is no evidence of this effect, legislators aligned and not aligned seems to respond in the same manner.

Furthermore, I test the robustness of the previous findings. I reestimate the models presented in tables 10 to 13 controlling for variables that might be correlated both with protest incidence and the performance variables. That is, to rule out the possibility that the effects found might come instead from confounders, I add variables referring to electorate's characteristics, like urban population, years of schooling and access to Internet. At each regression, I include interactions similar to the triple interaction on equation (7), but replacing the index by each of these characteristics of the electorate. Tables A.5 to A.8 in the Appendix show that all heterogeneous effects found in previous estimations are robust to the inclusion of these controls.

I have shown that, on average, the protests did not affect all dimensions of a legislator performance. Although I found a positive effect with respect to the distributive behavior of legislators, there is no evidence of protests affecting presence in plenary (which, as discussed in section 5.2, we use as a measure of the rent-seeking behavior of legislators) and proposed bills (both total number and share related to protests). Now, turning back to elections data, I analyze whether the electoral punishment of legislators in the 2014 elections can be explained by voters punishing those legislators who did not respond to the protesters' demands. Since I expect voters to condition their voting decision on incumbents' behavior, I test whether legislators who responded more positively to protests were less punished in the 2014 elections.

To do so, we use the variables analyzed previously as measures of whether the legislator responded to protests or not. In column (3) of table 14, Δ *Presence rate*$_d$ refers to the difference between the mean of presence rate at plenary sessions before and after the protests. I also test for legislators' response related to federal budget amendments and proposed bills. In column (4), Δ *Budgetary amendments*$_{dm}$ refers to the difference between the mean of the share of federal budget amendments from legislator d directed to municipality m that are related to health, education, urban development and transportation, before and after the protests. Column 5 includes a dummy whether the legislator proposed a bill after the protests that relates to health, education, urban development and transportation. In all these three columns, we see that the coefficient of the triple

[25] Term used by President Dilma Rouseff at a public speech on television few days after the beginning of protests.

interaction is not statistically significant: that is, voters are not taking into account legislators' response to protests when taking their vote decision.

By way of concluding, in column (6) I test whether the punishment were directed to those legislators from the same party as the president (PT - Workers' Party) . That is, it might be the case that instead of punishing legislators for their individual behavior, voters punished members of PT since they are aligned to the federal government. Winters and Weitz-Shapiro (2014), using two surveys to examine the effects of the protests on mass partisanship, found that the protests led to an increase in nonpartisanship and a decrease in attachment to PT among the public as a whole. Nevertheless, results in column (6) do not support this finding of rejection to PT in what refers to votes to legislators.

6 Conclusion

Protests can be a mechanism of accountability in the sense they can work as an informational channel of the preferences of the electorate do the government and also as a device that can provide more information about the type of the incumbent. Protests that face multiple demands can be perceived as facing a noisy communication channel. In this case, protests not only have their efficiency reduced, but they can be ex-ante inefficient. Moreover, noise creates a ex-post separation of types of incumbents. When incumbents agree to the demands of the street, they are perceived as high quality with higher probability and therefore, reelected. The opposite holds true for incumbents that to not deliver.

In contemporary democracies, citizens are searching for other means beyond voting to assure that their will is reflected in politics. In this context, the political protests appear as a widespread movement all over the world serving as an alternative form of political action through which citizens participate in the political process. It is relevant to know, then, whether the protests can affect politics by affecting not only politicians but also voters. First, the analysis of the electoral consequences of the protests shows that there is a correlation between less participation in the 2014 elections and the incidence of protest in a municipality. These effect come mostly from municipalities with higher educational level and worse income inequality indexes. Second, protests are also associated with an increase in the share of "protest votes". These two results combined can be interpreted as voters getting less engaged in the political process, abdicating in choosing their political representatives.

Moreover, the protests are associated with voters punishing incumbents, besides their response facing protesters' demands. Given the results of differential effects regarding these electoral punishments when we look to municipal characteristics, one can expect protesters to be more effective in places with higher Internet penetration and educational level. That is, considering that legislators after being punished (or observing others being punished) updated their beliefs regarding the protests, they become more responsive to other forms of political action beyond voting. Also, voters punished incumbents because of dissatisfaction with regard to public services quality: legislators are more punished in municipalities that are below the mean of the state with respect to quality of public health and education systems. That is, taking into account that public health and education are duties of the executive branch, voters are punishing incumbents even though they are not the main responsible for it.

Also, this work aims to answer whether politicians respond to political protest, focusing on legislators. We used presence in plenary, proposed bills and federal budget amendments as measures of their performance to verify whether political protests matter in the sense that they can be an effective way to require changes in the way politicians approach relevant public issues. Us-

ing the Brazilian case, this paper show that, on average, protests did not affect all dimensions of legislators' performance. Regarding their rent-seeking behavior and their performance related to the legislative duty, on average, there is no response. However, I found evidence that the protests affected positively their distributive behavior: for the average legislators in terms of protest exposure, there was an increase in 36% at the mean with respect to the share of federal budget amendments related to protesters' demands.

Furthermore, there is evidence of the effects of protests on legislators' behavior when we test for heterogeneous effects regarding legislators' characteristics. Due to reelection incentives, there is a positive relation between more protest exposure and higher shares of federal budget amendments related to protesters' demands, what reaffirms that reelection incentives strengthen citizens' capabilities of punishing politicians (Pereira and Rennó (2007)). More interesting, I found a puzzling differential effect for legislators ranking at the bottom or at the top of the coalition vote share distribution with respect to presence in plenary and proposal of bills: legislators in the top percentiles respond more when facing more protest exposure. Although the magnitude of this effect is small, this can be seen as a consequence of the electoral system rules, that, through the coalition composition, allow legislators to be elected even though they received less votes than other legislators from other coalition who were not elected. The open-list proportional system weaken the ties between voters and legislators (Ames (2002)) and seems to give distorted incentives to legislators regarding accountability to citizens.

In short, although I expected legislators to respond positively to protests - since they would face elections one year ahead - and they had possibilities to take action concerning protesters' demands, through proposing bills or allocating federal budget amendments to protest-related issues, the protests effects were heterogeneous and did not affect all relevant dimensions of the legislators' performance. In this regard, I make one important remark. That is, it is possible that the lack of responses from the legislators is due to timing of the protests: it might be the case that legislators are concerned with citizens' will just at the time of elections, which is antagonistic to the idea of representative democracy itself.

To conclude, as Lohmann (1993) proposes, maybe it is the case that citizens need to demonstrate more so as to affect legislators' behavior in a more significant way. In this sense, the new waves of protests, such the one that begun in Brazil on March 2015, seem to be a demonstration of an increase in society's democratic capital (Persson and Tabellini (2009)) and might have relevant political consequences.

References

Ames, B. (2002). *The deadlock of democracy in Brazil*. University of Michigan Press.

Barbera, S. and M. O. Jackson (2016). A Model of Protests, Revolution, and Information. Technical report.

Barro, R. J. (1973). The control of politicians: an economic model. *Public choice*, 19–42.

Battaglini, M. (2016). Public Protests and Policy Making. Technical report.

Bertholini, F., B. G. Fajardo, D. de Faveri, and C. Pereira (2013). Does legislative work help reelection? ambition, reelection and legislative performance at the subnational level in brazil. In *American Political Science Association 2013 Annual Meeting*.

Besley, T. and R. Burgess (2002). The political economy of government responsiveness: Theory and evidence from india. *The quarterly journal of economics 117*(4), 1415–1451.

Besley, T. and A. Case (2003). Political institutions and policy choices: evidence from the united states. *Journal of Economic Literature 41*(1), 7–73.

Bidner, C. and P. Francois (2013). The emergence of political accountability. *Quarterly Journal of Economics 128*(3), 1397–1448.

Campante, F. R. and D. Chor (2012). Schooling, political participation, and the economy. *Review of Economics and Statistics 94*(4), 841–859.

Cantoni, D., D. Y. Yang, N. Yuchtman, and Y. Jane Zhang (2019). Protests as strategic games: Experimental evidence from Hong Kong's antiauthoritarian movement. *Quarterly Journal of Economics 134*(2), 1021–1077.

Correa, S. (2020). Persistent Protests. Technical report.

de Carvalho, N. R. (2003). *E no início eram as bases: geografia política do voto e comportamento legislativo no Brasil*. Editora Revan.

Di Tella, R., S. Galiani, and E. Schargrodsky (2012). Reality versus propaganda in the formation of beliefs about privatization. *Journal of Public Economics 96*(5-6), 553–567.

Ferraz, C. and F. Finan (2008). Exposing corrupt politicians: the effects of brazil's publicly released audits on electoral outcomes. *The Quarterly journal of economics 123*(2), 703–745.

Firpo, S., V. Ponczek, and V. Sanfelice (2015). The relationship between federal budget amendments and local electoral power. *Journal of Development Economics 116*, 186–198.

Gagliarducci, S., T. Nannicini, and P. Naticchioni (2011). Electoral rules and politicians' behavior: a micro test. *American Economic Journal: Economic Policy 3*(3), 144–74.

Glaeser, E. L., G. A. Ponzetto, and A. Shleifer (2007). Why does democracy need education? *Journal of economic growth 12*(2), 77–99.

Hafer, C. and D. Landa (2006). Deliberation and social polarization. *Available at SSRN 887634*.

Howard, P. N. and M. M. Hussain (2011). The upheavals in egypt and tunisia: The role of digital media. *Journal of democracy 22*(3), 35–48.

Kamenica, E. and M. Gentzkow (2011). Bayesian Persuasion. *American Economic Review 101*(6), 2590–2615.

Lee, D. S., E. Moretti, and M. J. Butler (2004). Do voters affect or elect policies? evidence from the us house. *The Quarterly Journal of Economics 119*(3), 807–859.

Leoni, E., C. Pereira, and L. Renno (2004). Political survival strategies: Political career decisions in the brazilian chamber of deputies. *Journal of Latin American Studies*, 109–130.

Lohmann, S. (1993). A Signaling Model of Informative and Manipulative Political Action. *American Political Science Review 87*(2), 319–333.

Lohmann, S. (1994). Information aggregation through costly political action. *The American Economic Review*, 518–530.

Lotan, G., E. Graeff, M. Ananny, D. Gaffney, I. Pearce, et al. (2011). The arab spring— the revolutions were tweeted: Information flows during the 2011 tunisian and egyptian revolutions. *International journal of communication 5*, 31.

Machado, F., C. Scartascini, and M. Tommasi (2011). Political institutions and street protests in latin america. *Journal of Conflict Resolution 55*(3), 340–365.

Madestam, A., D. Shoag, S. Veuger, and D. Yanagizawa-Drott (2013). Do political protests matter? evidence from the tea party movement. *The Quarterly Journal of Economics 128*(4), 1633–1685.

Nannicini, T., A. Stella, G. Tabellini, and U. Troiano (2013). Social capital and political accountability. *American Economic Journal: Economic Policy 5*(2), 222–50.

Novaes, C. A. M. (1994). Dinâmica institucional da representação: individualismo e partidos na câmara dos deputados. *Novos estudos CEBRAP 38*(March), 99–147.

Passarelli, F. and G. Tabellini (2017). Emotions and Political Unrest. *Journal of Political Economy 125*(3), 903–946.

Pereira, C. and L. Rennó (2007). O que é que o reeleito tem? o retorno: o esboço de uma teoria da reeleição no brasil. *Brazilian Journal of Political Economy 27*(4), 664–683.

Persson, T. and G. Tabellini (2009). Democratic capital: The nexus of political and economic change. *American Economic Journal: Macroeconomics 1*(2), 88–126.

Samuels, D. J. (2002). Pork barreling is not credit claiming or advertising: Campaign finance and the sources of the personal vote in brazil. *The journal of Politics 64*(3), 845–863.

Snyder Jr, J. M. and D. Strömberg (2010). Press coverage and political accountability. *Journal of political Economy 118*(2), 355–408.

Srinivasan, R. and A. Fish (2011). Revolutionary tactics, media ecologies, and repressive states. *Public Culture 23*(3 (65)), 505–510.

Stromberg, D. (2008). How the electoral college influences campaigns and policy: the probability of being florida. *American Economic Review 98*(3), 769–807.

Tsakas, E. and N. Tsakas (2017). Noisy Persuasion. *SSRN Electronic Journal*.

Tufekci, Z. and C. Wilson (2012). Social media and the decision to participate in political protest: Observations from tahrir square. *Journal of communication 62*(2), 363–379.

Yanagizawa-Drott, D. (2014). Propaganda and conflict: Evidence from the rwandan genocide. *The Quarterly Journal of Economics 129*(4), 1947–1994.

Zaller, J. R. et al. (1992). *The nature and origins of mass opinion*. Cambridge university press.

Zucco Jr, C. and B. E. Lauderdale (2011). Distinguishing between influences on brazilian legislative behavior. *Legislative Studies Quarterly 36*(3), 363–396.

Appendices

A Proofs

Proof of Proposition 1

Proof. Fix $\mu = \Pr(\omega = 1) \in (0, 0.5)$ and $a = 1$ the action protesters would prefer the government to choose. The protesters will choose the fourthuple $(q_0^L, q_1^L, q_0^H, q_1^H)$ of probabilities:

	$\pi(s=0\|\omega, L)$	$\pi(s=1\|\omega, L)$
$\omega = 0$	$1 - q_0^L$	q_0^L
$\omega = 1$	$1 - q_1^L$	q_1^L

	$\pi(s=0\|\omega, H)$	$\pi(s=1\|\omega, H)$
$\omega = 0$	$1 - q_0^H$	q_0^H
$\omega = 1$	$1 - q_1^H$	q_1^H

Table 2: Signal structure for low and high types of government.

The choice of the fourthuple $(q_0^L, q_1^L, q_0^H, q_1^H)$ is such that the expected payoff of protesters is maximized. Recall that the protesters only receive payoff of 1 when $a = 1$ and the government delivers $a = 1$ whenever $\Pr(\omega = 1|s') > 0.5$. Therefore, the protesters will solve this system of four inequalities $\Pr(\omega = 1|s' = 0, \tau = H) \geq \frac{1}{2}, \Pr(\omega = 1|s' = 1, \tau = H) \geq \frac{1}{2}, \Pr(\omega = 1|s' = 0, \tau = L) \geq \frac{1}{2}, \Pr(\omega = 1|s' = 1, \tau = L) \geq \frac{1}{2}$. We will use Baye's rule for the updates. Let's start with the high type of government, recalling that the type of government and the true state of the world are independent. Let's start with $s' = 1$ recalling that for the high type of government, $s' = 1$ can only happen when $s = 0$, since there is no noise in the communication channel:

$$\begin{aligned}
\Pr(\omega = 1|s' = 1, \tau = H) &= \frac{\Pr(s' = 1|\omega = 1, \tau = H)\Pr(\omega = 1)}{\Pr(s' = 1)} \geq \frac{1}{2} \\
&= \frac{q_1^H \mu_0}{q_1^H \mu_0 + q_0^H (1 - \mu_0)} \geq \frac{1}{2} \\
\frac{\mu_0}{1 - \mu_0} &\geq \frac{q_0^H}{q_1^H} \qquad (9)
\end{aligned}$$

Now let's assume $s' = 0$:

$$\begin{aligned}
\Pr(\omega = 1|s' = 0, \tau = H) &= \frac{\Pr(s' = 0|\omega = 1, \tau = H)\Pr(\omega = 1)}{\Pr(s' = 0)} \geq \frac{1}{2} \\
&= \frac{(1 - q_1^H)\mu_0}{(1 - q_1^H)\mu_0 + (1 - q_0^H)(1 - \mu_0)} \geq \frac{1}{2} \\
\frac{\mu_0}{1 - \mu_0} &\geq \frac{1 - q_0^H}{1 - q_1^H} \qquad (10)
\end{aligned}$$

First, note that the likelihood ratio delivered by the inequality 9 is inconsistent with the inequality delivered by 10. However, since the payoff of the protesters is increasing in q_0^H and q_1^H, we find that the solution of this problem is given by $q_1^H = 1$ and with 9 holding with equality, which delivers $q_0^H = \frac{\mu_0}{1-\mu_0}$.

Now we have to find the optimal solutions for the case in which the government is low type. We start with $s' = 1$. Now, since $\tau = L$, $s' = 1$ because there was no noise and so $s = 1$ or because there was noise and $s = 0$. Recall that the noise process is independent of the type of the government and of the state of the world and note that and $\Pr(s' = 1|\omega = 1, \tau = L)\Pr(\omega = 1) =$

$(\Pr(s'=1|\omega=1,\tau=L,s=1)+\Pr(s'=1|\omega=1,\tau=L,s=0))\Pr(\omega=1)\Pr(s'=1)=(\Pr(s'=1|\omega=1,\tau=L,s=1)+\Pr(s'=1|\omega=1,\tau=L,s=0))\Pr(\omega=1)+(\Pr(s'=1|\omega=0,\tau=L,s=1)+\Pr(s'=1|\omega=0,\tau=L,s=0))\Pr(\omega=0)$.

$$\Pr(\omega=1|s'=1,\tau=L)=\frac{\Pr(s'=1|\omega=1,\tau=L)\Pr(\omega=1)}{\Pr(s'=1)}\geq\frac{1}{2}$$

Using the definitions for $\Pr(s'=1|\omega=1,\tau=L)$ and for $\Pr(s'=1)$ from above and the fact that the payoff of the protesters is increasing in q_0^L and q_1^L, with simple algebra we find that the optimal probabilities are $q_1^L=1$ and $q_0^L=\frac{\mu_0-\epsilon}{(1-\mu_0)(1-2\epsilon)}$. For q_0^L to be a probability we require that (i) $\mu_0>\epsilon$ and $\epsilon<0.5$ or (ii) $\mu_0<\epsilon$ and $\epsilon>0.5$. Since $\epsilon<0.5$ is not only the most intuitive assumption – a small error – but also the only one that matches the equilibrium we are describing here, we follow with (i).

Since we have the fourthuple $(q_0^L,q_1^L,q_0^H,q_1^H)$, we can go back and compute the posteriors for all types of government. With simple algebra we find the posteriors mentioned in Proposition 1. □

Proof of Corollary 1

Proof. TBF. □

Proof of Corollary 2

Proof. TBF. □

A Figures and Tables

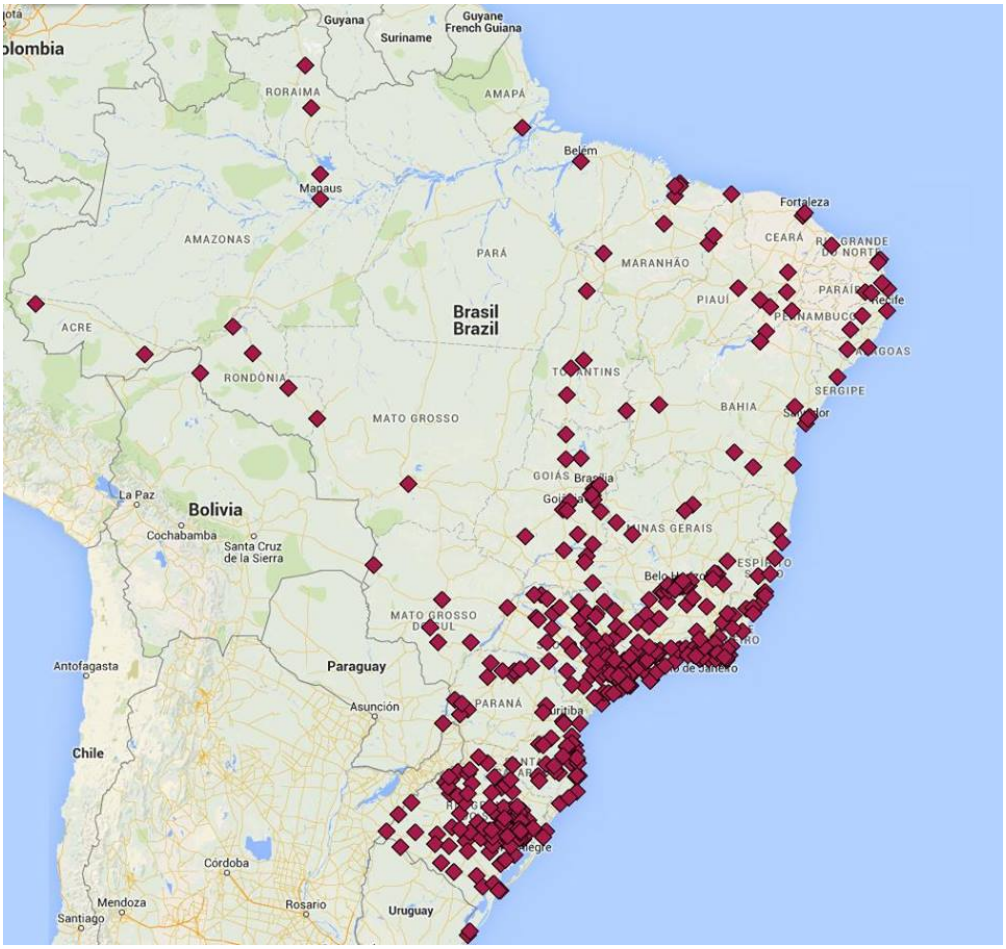


Figure 7: Municipalities that experienced at least one protest in 2013.

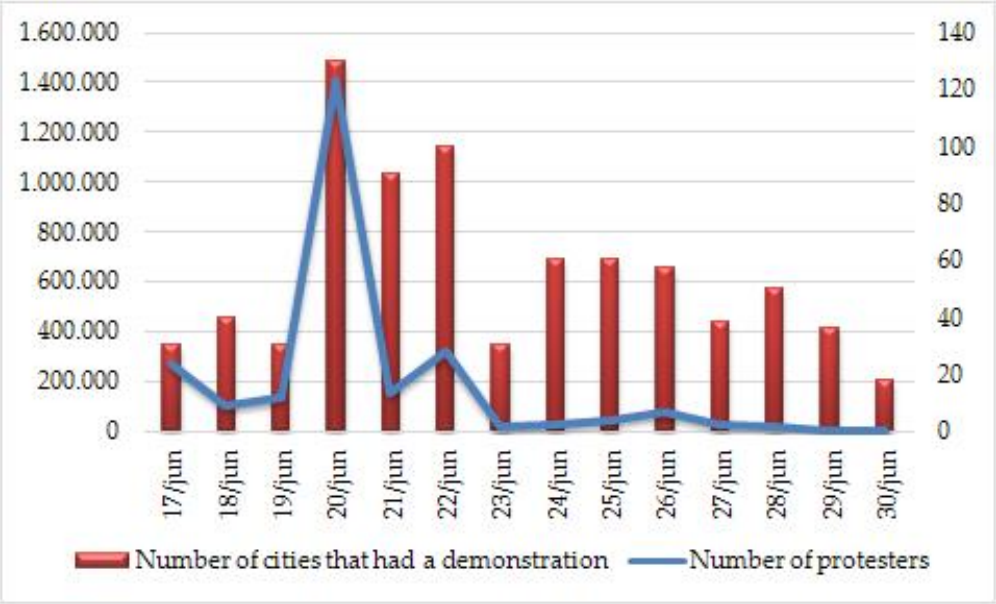


Figure 8: Number of protesters and municipalities that had a protests from June 17th till June 30th.

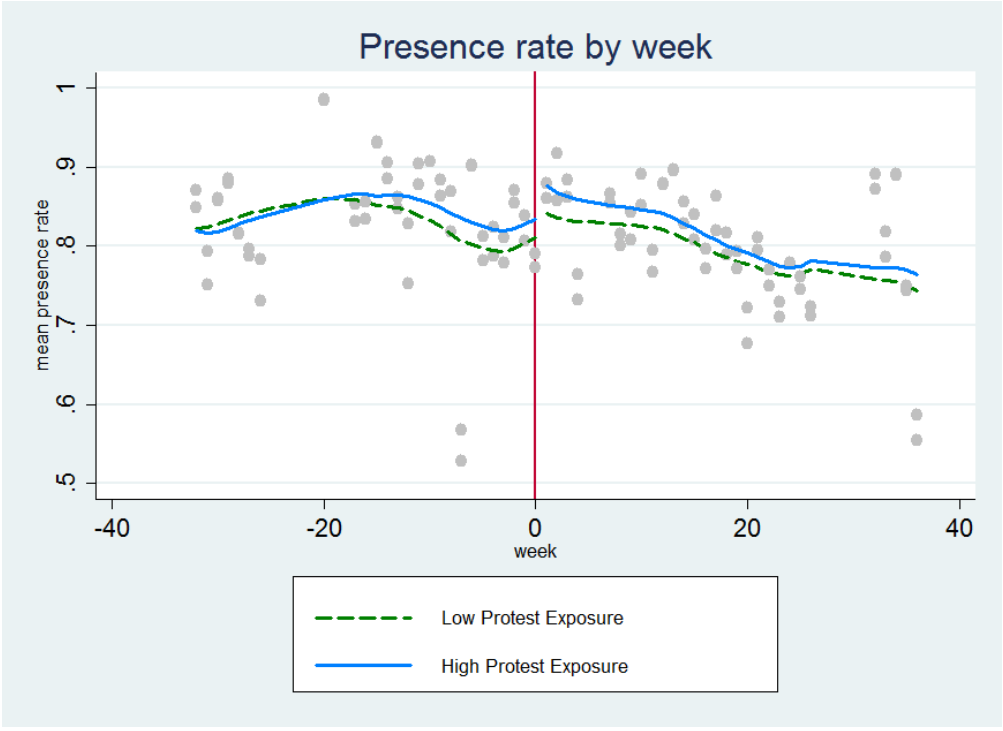


Figure 9: Presence rate - Lowess estimation

Table 3: **Protest incidence by state**

State	% municipalities that had a protest	% population that lives in a municipality that had a protest
DF	100,0%	100,0%
RJ	41,3%	84,4%
RS	19,8%	70,7%
SP	16,3%	69,5%
RR	13,3%	68,5%
AP	6,3%	59,5%
SC	10,9%	52,6%
AM	3,2%	52,5%
MS	7,7%	51,9%
ES	12,8%	50,9%
AC	9,1%	47,8%
GO	6,9%	47,7%
RO	9,6%	45,8%
MG	5,5%	44,4%
PR	4,3%	43,5%
RN	1,8%	40,0%
AL	2,0%	36,7%
CE	2,2%	35,6%
PI	1,8%	34,3%
TO	3,6%	34,3%
BA	2,6%	33,2%
PB	1,8%	31,0%
PE	4,3%	28,4%
SE	1,3%	27,6%
MA	2,8%	23,8%
PA	0,7%	18,4%
MT	0,7%	18,2%

Notes: Data from protests collected from G1, a news website. Population data extracted from 2010 census.

Table 4: **Summary Statistics**

Variables	N	mean	sd
Legislators' characteristics			
Protest Exposure Index	513	0.469	0.280
Candidate in 2014 elections	513	0.817	0.387
Reelected in 2014 elections	419	0.597	0.491
Vote share in the coalition	513	0.106	0.103
Ranking in the coalition	513	0.585	0.284
Government coalition (dummy)	513	0.593	0.492
Worker's Party (dummy)	513	0.173	0.379
Electorate's characteristics			
Urban (%)	513	0.817	0.127
Internet penetration (%)	513	0.267	0.128
Literate (%)	513	0.885	0.067
Legislators' performance			
Presence rate by week	21,767	0.823	0.280
% budgetary amend. related to protests by year	1,402	0.574	0.205
Total number of proposed bills by quarter	6,699	0.970	2.015
Pr(bill related to protests' demands by quarter)	6,699	0.105	0.307
Municipalities' characteristics			
Legislator's vote share	296,374	1.64	5.06
Turnout rate	16,695	0.882	0.139
Null votes (share)	16,695	0.093	0.044
Internet penetration	5,565	0.148	0.112
Literacy	5,565	0.840	0.093
Youngsters' registration 2014 elections	5,565	0.137	0.072
Gini Index	5,565	0.494	0.066
IDSUS	5,525	5.650	0.837
IDEB	5,563	3.538	0.702

Notes: Data on legislators were taken from TSE, Chamber of Deputies and Federal Senate websites. *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. Municipal and Electorate's characteristics use data from the 2010 census and from TSE.

Table 5: **Difference between municipalities that had protests and municipalities that did not have**

	Mun. did not have a protest			Mun. had a protest			Difference in means	
	N	mean	sd	N	mean	sd	Difference	p-value
Population (total)	5,132	18,129	31,206	433	225,670	692,796	-207,540	0.00
Urban population (%)	5,132	0.618	0.213	433	0.882	0.145	-0.264	0.00
Internet penetration (%)	5,132	0.134	0.100	433	0.311	0.116	-0.177	0.00
Radio penetration (%)	5,132	0.764	0.135	433	0.839	0.081	-0.075	0.00
Television penetration (%)	5,132	0.893	0.087	433	0.952	0.033	-0.059	0.00
Gini Index	5,132	0.494	0.067	433	0.501	0.055	-0.007	0.02
Yougnster (%)	5,132	0.179	0.019	433	0.174	0.014	0.005	0.00
Male (%)	5,132	0.506	0.015	433	0.491	0.011	0.015	0.00
Black (%)	5,129	0.064	0.050	433	0.065	0.041	-0.001	0.64
Illiterate (%)	5,132	0.167	0.093	433	0.073	0.042	0.094	0.00
Electricity (%)	5,132	0.958	0.068	433	0.981	0.023	-0.023	0.00
Income per capita	5,132	473.1	220.6	433	803.7	263.1	330.6	0.00
Unemployment	5,132	0.067	0.039	433	0.073	0.028	-0.006	0.00
Life Expectancy	5,132	72.89	2.66	433	75.41	1.60	-2.52	0.00
Infant Mortality	5,132	19.71	7.18	433	13.79	3.32	5.92	0.00

Notes: The unit of analysis is a municipality. Data on protests were taken from G1, a news website. Municipal characteristics uses data of the 2010 census.

Table 6: **Electoral consequences of protests - Turnout**

Dep. Var: Turnout (rate)	Total sample	Access to Internet		Education		Youngter registration		Income inequality	
		High penetration	Low penetration	High literacy rate	Low literacy rate	High registration rate	Low registration rate	High Gini index	Low Gini index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.0793***	0.0777***	0.0795***	0.0796***	0.0763***	0.0848***	0.0753***	0.0792***	0.0804***
	(0.00170)	(0.00239)	(0.00217)	(0.00256)	(0.00206)	(0.00286)	(0.00205)	(0.00242)	(0.00210)
Post x Protest	-0.0107*	-0.00831	0.0153	-0.0105*	0.0202***	0.0395***	-0.00849	-0.0148**	0.00226
	(0.00602)	(0.00622)	(0.0125)	(0.00630)	(0.00742)	(0.0116)	(0.00602)	(0.00722)	(0.00435)
Observations	16,695	8,349	8,346	8,346	8,349	8,346	8,349	8,157	8,538
Number of municipalities	5,565	2,783	2,782	2,782	2,783	2,782	2,783	2,719	2,846
Adjusted R-squared	0.557	0.603	0.451	0.599	0.478	0.496	0.603	0.538	0.601
Mean Dep. Var.	0.88	0.87	0.89	0.88	0.88	0.93	0.84	0.86	0.91
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on turnout. Observation unit is turnout rate of municipality m at election t, where t refers to 3 elections (2006, 2010 and 2014). Each column presents the result of an OLS regression with municipality and time fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster registered to vote* is the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table 7: **Electoral consequences of protests - Protest votes**

Dep. Var: Null votes (share)	Total sample	Access to Internet		Education		Youngter registration		Income inequality	
		High penetration	Low penetration	High literacy rate	Low literacy rate	High registration rate	Low registration rate	High Gini index	Low Gini index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.0416***	0.0488***	0.0326***	0.0462***	0.0378***	0.0324***	0.0479***	0.0370***	0.0469***
	(0.00132)	(0.00190)	(0.00126)	(0.00198)	(0.00144)	(0.00158)	(0.00175)	(0.00163)	(0.00196)
Post x Protest	0.0217***	0.0143***	-0.00615	0.0166***	0.0223**	0.0136	0.0157***	0.0236***	0.0270***
	(0.00330)	(0.00355)	(0.00989)	(0.00364)	(0.0105)	(0.00865)	(0.00349)	(0.00429)	(0.00462)
Observations	16,695	8,349	8,346	8,346	8,349	8,346	8,349	8,157	8,538
Number of municipalities	5,565	2,783	2,782	2,782	2,783	2,782	2,783	2,719	2,846
Adjusted R-squared	0.549	0.610	0.253	0.619	0.308	0.242	0.622	0.549	0.572
Mean Dep. Var.	0.09	0.11	0.08	0.11	0.08	0.08	0.11	0.09	0.10
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on null votes. Observation unit is turnout rate of municipality m at election t, where t refers to 3 elections (2006, 2010 and 2014). Each column presents the result of an OLS regression with municipality and time fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster registered to vote* is the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table 8: **Electoral consequences of protests - Heterogeneity on municipalities' characteristics**

Dep. Var: Vote share	Total sample	Access to Internet		Education	
		High Internet penetration	Low Internet penetration	High literacy rate	Low literacy rate
	(1)	(2)	(3)	(4)	(5)
Post	-0.0748***	-0.0208	-0.177***	-0.0264	-0.139***
	(0.0164)	(0.0180)	(0.0346)	(0.0177)	(0.0355)
Post x Protest	-0.0567**	-0.116***	-0.418	-0.112***	0.0779
	(0.0276)	(0.0281)	(0.320)	(0.0280)	(0.182)
Observations	296,374	184,790	111,584	189,766	106,608
Number of legislators	416	416	416	416	416
Adjusted R-squared	0.126	0.167	0.061	0.160	0.091
Mean Dep. Var.	1.64	1.34	2.15	1.34	2.19
Controls	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' vote share in 2010 and 2014 elections. The sample consists of all legislators elected in 2010 that run for reelection in 2014 elections. Observation unit is vote share of municipality m that refers to legislator d at election t. Each column presents the results of an OLS regression with legislator and municipality fixed-effects. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 5 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. All columns include legislator-municipality characteristics: a dummy whether legislator d was from the same party of the mayor of m; the amount (log) of federal budget amendments from legislator d directed to municipality m; a dummy whether municipality m is the hometown of legislator d; and the number of legislator running at the state, divided by total population of municipality m. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table 9: (cont.) **Electoral consequences of protests - Heterogeneity on municipalities' characteristics**

Dep. Var: Vote share	Youngster		Inequality		Public service - Education		Public service - Health	
	High registration rate	Low registration rate	High index	Low Index	High quality	Low quality	High quality	Low quality
	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Post	-0.115***	-0.0480***	-0.158***	0.0154	-0.0875***	-0.0645***	-0.168***	-0.0276
	(0.0346)	(0.0183)	(0.0275)	(0.0184)	(0.0257)	(0.0202)	(0.0311)	(0.0181)
Post x Protest	-0.277	-0.0859***	-0.00857	-0.0122	-0.0228	-0.0828**	0.00688	-0.0788**
	(0.197)	(0.0282)	(0.0392)	(0.0326)	(0.0376)	(0.0367)	(0.0482)	(0.0335)
Observations	110,230	186,144	132,966	163,408	147,690	148,684	149,844	146,530
Number of legislators	416	416	416	416	416	416	416	416
Adjusted R-squared	0.061	0.163	0.143	0.102	0.125	0.129	0.116	0.136
Mean Dep. Var.	2.26	1.28	1.91	1.43	1.71	1.58	1.68	1.62
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' vote share in 2010 and 2014 elections. The sample consists of all legislators elected in 2010 that run for reelection in 2014 elections. Observation unit is vote share of municipality m that refers to legislator d at election t. Each column presents the results of an OLS regression with legislator and municipality fixed-effects. Columns 6 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster* refers to the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. *Inequality* is based on the Gini Index. *Public service - Health* was constructed based on the municipal average of the IDSUS index, which measures the quality of health. Similarly, *Public service - Education* was constructed based on the average of the public schools of municipality m on the IDEB index, which measures the quality of education. High quality refers to the *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. All columns include legislator-municipality characteristics: a dummy whether legislator d was from the same party of the mayor of m; the amount (log) of federal budget amendments from legislator d directed to municipality m; a dummy whether municipality m is the hometown of legislator d; and the number of legislator running at the state, divided by total population of municipality m. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table 10: **Effect of protests on legislators' behavior**

Dep. Var.	Presence in plenary	Budgetary amendments	Proposed bills	
	presence rate	% related to protests	total number	related to protests= 1
	(1)	(2)	(3)	(4)
Post	0.00919	0.260***	-0.707***	-0.114***
	(0.0173)	(0.0149)	(0.143)	(0.0224)
Post x Protest Exposure	-0.0152	-0.121***	-0.104	0.0263
	(0.0144)	(0.0263)	(0.158)	(0.0292)
Observations	21,767	1,402	6,699	6,699
Number of legislators	513	500	513	513
Number of periods	55 weeks	3 years	14 quarters	14 quarters
Adjusted R-squared	0.081	0.471	0.044	0.014
Mean Dep. Var.	0.82	0.57	0.97	0.12
Time FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' performance. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Column 1 is at the week level, column 2 at the year level and columns 3 and 4 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table 11: **Effect of protests on legislators' behavior and reelection incentives**

Dep.Var.	Presence in plenary		Budgetary amendments		Proposed bills			
	presence rate		% related to protests		total number		related to protest = 1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.00919	0.00900	0.260***	0.310***	-0.707***	-0.724***	-0.114***	-0.108***
	(0.0173)	(0.0245)	(0.0149)	(0.0289)	(0.143)	(0.192)	(0.0224)	(0.0366)
Post x Protest Exposure	-0.0152	-0.0531	-0.121***	-0.290***	-0.104	-0.478	0.0263	-0.0351
	(0.0144)	(0.0465)	(0.0263)	(0.0526)	(0.158)	(0.329)	(0.0292)	(0.0581)
Post x Reelection		0.000899		-0.0604*		0.0274		-0.00674
		(0.0220)		(0.0326)		(0.164)		(0.0362)
Post x Protest Exposure x Reelection		0.0438		0.197***		0.421		0.0704
		(0.0487)		(0.0602)		(0.375)		(0.0666)
Observations	21,767	21,767	1,402	1,402	6,699	6,699	6,699	6,699
Number of legislators	513	513	500	500	513	513	513	513
Number of periods	55 weeks	55 weeks	3 years	3 years	14 quarters	14 quarters	14 quarters	14 quarters
Adjusted R-squared	0.081	0.081	0.471	0.476	0.044	0.045	0.014	0.014
Mean Dep. Var.	0.82	0.82	0.57	0.57	0.97	0.97	0.12	0.12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' performance. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Columns 1 and 2 are at the week level, columns 3 and 4 at the year level and columns 5 to 8 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. *Reelection* is a dummy whether the legislator was running for reelection in 2014 elections or for a higher position (senator, state governor or vice-governor). All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table 12: **Effect of protests on legislators' behavior and the open-list proportional electoral system**

Dep.Var.	Presence in plenary		Budgetary amendments		Proposed bills			
	presence rate		% related to protests		total number		related to protest = 1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.00919	0.0301	0.260***	0.284***	-0.707***	-0.382*	-0.114***	-0.0796**
	(0.0173)	(0.0246)	(0.0149)	(0.0388)	(0.143)	(0.228)	(0.0224)	(0.0400)
Post x Protest Exposure	-0.0152	-0.0721**	-0.121***	-0.198***	-0.104	-0.733*	0.0263	-0.0109
	(0.0144)	(0.0336)	(0.0263)	(0.0690)	(0.158)	(0.402)	(0.0292)	(0.0710)
Post x Ranking in coalition		-0.0342		-0.0378		-0.523*		-0.0565
		(0.0287)		(0.0568)		(0.276)		(0.0546)
Post x Protest Exposure x Ranking in coalition		0.0931*		0.117		1.000*		0.0601
		(0.0489)		(0.0993)		(0.564)		(0.105)
Observations	21,767	21,767	1,402	1,402	6,699	6,699	6,699	6,699
Number of legislators	513	513	500	500	513	513	513	513
Number of periods	55 weeks	55 weeks	3 years	3 years	14 quarters	14 quarters	14 quarters	14 quarters
Adjusted R-squared	0.081	0.081	0.471	0.472	0.044	0.044	0.014	0.014
Mean Dep. Var.	0.82	0.82	0.57	0.57	0.97	0.97	0.12	0.12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' performance. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Columns 1 and 2 are at the week level, columns 3 and 4 at the year level and columns 5 to 8 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. *Ranking in coalition* is the legislator's percentile at the coalition vote share distribution. All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table 13: **Effect of protests on legislators' behavior and government alignment**

Dep.Var.	Presence in plenary		Budgetary amendments		Proposed bills			
	presence rate		% related to protests		total number		related to protest = 1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.00919	0.00543	0.260***	0.226***	-0.707***	-0.704***	-0.114***	-0.124***
	(0.0173)	(0.0189)	(0.0149)	(0.0237)	(0.143)	(0.188)	(0.0224)	(0.0318)
Post x Protest Exposure	-0.0152	-0.00352	-0.121***	-0.0852**	-0.104	-0.151	0.0263	0.0731
	(0.0144)	(0.0219)	(0.0263)	(0.0390)	(0.158)	(0.273)	(0.0292)	(0.0530)
Post x Govnt. Coalition		0.00620		0.0481*		-0.00876		0.0179
		(0.0157)		(0.0287)		(0.159)		(0.0321)
Post x Protest Exposure x Govnt. Coalition		-0.0201		-0.0495		0.0869		-0.0827
		(0.0287)		(0.0525)		(0.329)		(0.0619)
Observations	21,767	21,767	1,402	1,402	6,699	6,699	6,699	6,699
Number of legislators	513	513	500	500	513	513	513	513
Number of periods	55 weeks	55 weeks	3 years	3 years	14 quarters	14 quarters	14 quarters	14 quarters
Adjusted R-squared	0.081	0.081	0.471	0.473	0.044	0.044	0.014	0.014
Mean Dep. Var.	0.82	0.82	0.57	0.57	0.97	0.97	0.12	0.12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' performance. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Columns 1 and 2 are at the week level, columns 3 and 4 at the year level and columns 5 to 8 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. *Governmnet coalition* is a dummy whether the legislator belongs to the party of a cabinet minister between 2011-2014. All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table 14: **Electoral consequences of protests - Heterogeneous effects on legislators' actions**

Dep. Var.: Vote share	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.0607***	-0.0748***	-0.0875***	-0.0752***	-0.143***	-0.0727***
	(0.0124)	(0.0164)	(0.0200)	(0.0163)	(0.0206)	(0.0179)
Post x Protest	-0.0950***	-0.0567**	-0.0654*	-0.0502*	-0.0306	-0.0618
	(0.0286)	(0.0276)	(0.0383)	(0.0284)	(0.0332)	(0.0393)
Protest x Δ Presence rate			0.422			
			(0.350)			
Post x Δ Presence rate			-0.0435			
			(0.151)			
Post x Protest x Δ Presence rate			0.00393			
			(0.275)			
Δ budg. amend. (% total mun.)				-1.390***		
				(0.460)		
Protest x Δ budg. amend. (% total mun.)				0.831*		
				(0.494)		
Post x Δ budg. amend. (% total mun.)				0.0676		
				(0.272)		
Post x Protest x Δ budg. amend. (% total mun.)				-0.174		
				(0.285)		
Protest x Proposed a bill related to protest					0.0637	
					(0.0681)	
Post x Proposed a bill related to protest					0.123***	
					(0.0236)	
Post x Protest x Proposed a bill related to protest					-0.0514	
					(0.0443)	
Protest x PT						0.258*
						(0.151)
Post x PT						-0.0214
						(0.0296)
Post x Protest x PT						0.0286
						(0.155)
Observations	296,374	296,374	270,006	296,374	296,374	296,374
Number of legislators	416	416	416	416	416	416
Mean Dep. Var.	1.64	1.64	1.64	1.64	1.64	1.64
Adjusted R-squared	0.013	0.126	0.141	0.128	0.126	0.127
Controls	No	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the effects of the protests on legislators' vote share in 2010 and 2014 elections. The sample consists of all legislators elected in 2010 that run for reelection in 2014 elections. Observation unit is vote share of municipality m that refers to legislator d at election t. Each column presents the results of an OLS regression with legislator and municipality fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Except for column 1, all columns include legislator-municipality characteristics: a dummy whether legislator d was from the same party of the mayor of m; the amount (log) of federal budget amendments from legislator d directed to municipality m; a dummy whether municipality m is the hometown of legislator d; and the number of legislator running at the state, divided by total population of municipality m. In column 3, we control for the difference between the mean of presence rate at plenary sessions before and after the protests. In column 4, we control for the difference between the mean of the share of federal budget amendments from legislator d directed to municipality m before and after the protests that are related to health, education, urban development and transportation. Column 5 includes a dummy whether the legislator proposed a bill after the protests that relates to health, education, urban development and transportation; and column 6 includes a dummy whether the legislator is from PT, the same party as the president. All columns Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

B Appendix

Table A.1: **Robustness check: Electoral consequences of protests - Turnout**

Dep. Var: Turnout (rate)	Total sample	Access to Internet		Education		Youngter registration		Income inequality	
		High penetration	Low penetration	High literacy rate	Low literacy rate	High registration rate	Low registration rate	High Gini index	Low Gini index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.0351***	0.0308***	0.0410***	0.0306***	0.0399***	0.0433***	0.0298***	0.0362***	0.0332***
	(0.00109)	(0.00167)	(0.00113)	(0.00179)	(0.00109)	(0.00178)	(0.00132)	(0.00146)	(0.00158)
Post x Protest	-0.0128***	-0.00872*	0.0103	-0.00931*	0.0132**	0.0276***	-0.00943**	-0.0152***	-0.00532
	(0.00477)	(0.00494)	(0.00959)	(0.00500)	(0.00597)	(0.00931)	(0.00475)	(0.00566)	(0.00331)
Observations	11,130	5,566	5,564	5,564	5,566	5,564	5,566	6,100	5,030
Number of municipalities	5,565	2,783	2,782	2,782	2,783	2,782	2,783	3,050	2,515
Adjusted R-squared	0.376	0.351	0.441	0.333	0.472	0.466	0.360	0.361	0.418
Mean Dep. Var.	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks the robustness of previous findings by using a shorter panel of just two periods.Observation unit is turnout rate of municipality m at election t, where t refers to 2 elections (2010 and 2014). Each column presents the result of an OLS regression with municipality and time fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster registered to vote* is the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table A.2: **Robustness check: Electoral consequences of protests - Turnout**

Dep. Var: Turnout (rate)	Total sample	Access to Internet		Education		Youngter registration		Income inequality	
		High penetration	Low penetration	High literacy rate	Low literacy rate	High registration rate	Low registration rate	High Gini index	Low Gini index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	-0.0145***	-0.0177***	0.00245**	-0.0177***	0.00220*	0.00108	-0.0189***	-0.0146***	-0.0212***
	(0.00187)	(0.00242)	(0.00120)	(0.00279)	(0.00133)	(0.00157)	(0.00226)	(0.00286)	(0.00198)
Post x Protest	-0.00482	-0.00676	0.0135	-0.00907*	0.0273***	0.0231***	-0.00528	-0.00232	0.00479
	(0.00435)	(0.00456)	(0.0111)	(0.00490)	(0.00853)	(0.00637)	(0.00447)	(0.00474)	(0.00400)
Observations	16,695	8,349	8,346	8,346	8,349	8,346	8,349	9,150	7,545
Number of municipalities	5,565	2,783	2,782	2,782	2,783	2,782	2,783	3,050	2,515
Adjusted R-squared	0.635	0.672	0.592	0.675	0.600	0.633	0.661	0.649	0.646
Mean Dep. Var.	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Linear trend by state	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks the robustness of previous findings by adding a linear trend by state. Observation unit is turnout rate of municipality m at election t, where t refers to three elections (2006, 2010 and 2014). Each column presents the result of an OLS regression with municipality and time fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster registered to vote* is the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table A.3: **Robustness check: Electoral consequences of protests - Protest votes**

Dep. Var: Null votes (share)	Total sample	Access to Internet		Education		Youngter registration		Income inequality	
		High penetration	Low penetration	High literacy rate	Low literacy rate	High registration rate	Low registration rate	High Gini index	Low Gini index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.0333***	0.0425***	0.0206***	0.0408***	0.0252***	0.0204***	0.0416***	0.0283***	0.0415***
	(0.00121)	(0.00186)	(0.000958)	(0.00197)	(0.00119)	(0.00176)	(0.00151)	(0.00152)	(0.00182)
Post x Protest	0.0202***	0.0114***	-0.0177	0.0131***	0.0182	0.0162***	0.0126***	0.0219***	0.0274***
	(0.00362)	(0.00388)	(0.0220)	(0.00399)	(0.0119)	(0.00560)	(0.00379)	(0.00466)	(0.00421)
Observations	11,130	5,566	5,564	5,564	5,566	5,564	5,566	6,100	5,030
Number of municipalities	5,565	2,783	2,782	2,782	2,783	2,782	2,783	3,050	2,515
Adjusted R-squared	0.559	0.626	0.203	0.637	0.259	0.203	0.635	0.542	0.631
Mean Dep. Var.	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks the robustness of previous findings by using a shorter panel of just two periods. Observation unit is turnout rate of municipality m at election t, where t refers to 2 elections (2010 and 2014). Each column presents the result of an OLS regression with municipality and time fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster registered to vote* is the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table A.4: **Robustness check: Electoral consequences of protests - Protest votes**

Dep. Var: Null votes (share)	Total sample	Access to Internet		Education		Youngter registration		Income inequality	
		High penetration	Low penetration	High literacy rate	Low literacy rate	High registration rate	Low registration rate	High Gini index	Low Gini index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	0.0248***	0.0341***	0.00831***	0.0334***	0.0123***	0.00792***	0.0329***	0.0186***	0.0358***
	(0.00221)	(0.00282)	(0.00158)	(0.00293)	(0.00173)	(0.00288)	(0.00264)	(0.00308)	(0.00229)
Post x Protest	0.0192***	0.0117***	-0.00452	0.0125***	0.0204**	0.0241***	0.0132***	0.0210***	0.0267***
	(0.00306)	(0.00329)	(0.0114)	(0.00337)	(0.00852)	(0.00361)	(0.00332)	(0.00367)	(0.00409)
Observations	16,695	8,349	8,346	8,346	8,349	8,346	8,349	9,150	7,545
Number of municipalities	5,565	2,783	2,782	2,782	2,783	2,782	2,783	3,050	2,515
Adjusted R-squared	0.604	0.659	0.384	0.670	0.425	0.367	0.667	0.609	0.629
Mean Dep. Var.	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Linear trend by state	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks the robustness of previous findings by adding a linear trend by state. Observation unit is turnout rate of municipality m at election t, where t refers to three elections (2006, 2010 and 2014). Each column presents the result of an OLS regression with municipality and time fixed-effects. *Post* is a dummy if $t = 2014$ and *Protest* is a dummy whether municipality m had a demonstration. Column 1 presents the results for the whole sample of municipalities, and columns 2 to 9 divide the municipalities accordingly to the characteristic mentioned at the column title, by separating municipalities above and below the median. *Youngster registered to vote* is the fraction of youngsters to whom voting is not mandatory (16 and 17 years old) that registered to vote relative to all youngsters. Standard errors are clustered by municipality and displayed in brackets. All regressions are weighted by the number of voters of municipality m who participated in the 2014 elections.

Table A.5: **Robustness check: Effect of protests on legislators' behavior**

Dep. Var.	Presence in plenary	Budgetary amendments	Proposed bills	
	presence rate	% related to protests	total number	related to protests= 1
	(1)	(2)	(3)	(4)
Post	-0.000286	0.243***	-0.682***	-0.120***
	(0.0203)	(0.0232)	(0.172)	(0.0319)
Post x Protest Exposure	-0.00593	-0.0825**	-0.107	0.0317
	(0.0181)	(0.0326)	(0.188)	(0.0386)
Controlling for urban population	Yes	Yes	Yes	Yes
Controlling for education	Yes	Yes	Yes	Yes
Controlling for access to Internet	Yes	Yes	Yes	Yes
Observations	21,767	1,402	6,699	6,699
Number of legislators	513	500	513	513
Number of periods	55 weeks	3 years	14 quarters	14 quarters
Adjusted R-squared	0.081	0.479	0.044	0.013
Mean Dep. Var.	0.82	0.57	0.97	0.12
Time FE	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes

Notes: This table checks previous findings by controlling for three electorate's characteristics: urban population (%), literacy (%) and Internet penetration (%). Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Column 1 is at the week level, column 2 at the year level and columns 3 and 4 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table A.6: **Robustness check - Effect of protests on legislators' behavior and reelection incentives**

Dep.Var.	Presence in plenary		Budgetary amendments		Proposed bills			
	presence rate		% related to protests		total number		related to protest = 1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	-0.000286	0.0265	0.243***	0.356***	-0.682***	-0.684**	-0.120***	-0.110
	(0.0203)	(0.0364)	(0.0232)	(0.0519)	(0.172)	(0.300)	(0.0319)	(0.0707)
Post x Protest Exposure	-0.00593	-0.0788	-0.0825**	-0.308***	-0.107	-0.508	0.0317	-0.0278
	(0.0181)	(0.0570)	(0.0326)	(0.0682)	(0.188)	(0.426)	(0.0386)	(0.0878)
Post x Reelection		-0.0316		-0.140**		0.00401		-0.0141
		(0.0364)		(0.0576)		(0.288)		(0.0730)
Post x Protest Exposure x Reelection		0.0853		0.270***		0.454		0.0716
		(0.0600)		(0.0773)		(0.477)		(0.0978)
Controlling for urban population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlling for education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlling for access to Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,767	21,767	1,402	1,402	6,699	6,699	6,699	6,699
Number of legislators	513	513	500	500	513	513	513	513
Number of periods	55 weeks	55 weeks	3 years	3 years	14 quarters	14 quarters	14 quarters	14 quarters
Adjusted R-squared	0.081	0.081	0.479	0.485	0.044	0.044	0.013	0.013
Mean Dep. Var.	0.82	0.82	0.57	0.57	0.97	0.97	0.12	0.12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks previous findings by controlling for three electorate's characteristics: urban population (%), literacy (%) and Internet penetration (%). Each of these characteristics was included in the same way as the index, that is, in an interaction with *Post* and in a triple interaction. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Columns 1 and 2 are at the week level, columns 3 and 4 at the year level and columns 5 to 8 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. *Reelection* is a dummy whether the legislator was running for reelection in 2014 elections or for a higher position (senator, state governor or vice-governor). All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table A.7: **Robustness check: Effect of protests on legislators' behavior and the open-list proportional electoral system**

Dep.Var.	Presence in plenary		Budgetary amendments		Proposed bills			
	presence rate		% related to protests		total number		related to protest = 1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	-0.000286	0.0154	0.243***	0.221***	-0.682***	-0.347	-0.120***	-0.157**
	(0.0203)	(0.0335)	(0.0232)	(0.0620)	(0.172)	(0.305)	(0.0319)	(0.0619)
Post x Protest Exposure	-0.00593	-0.0723*	-0.0825**	-0.126	-0.107	-0.919**	0.0317	0.0273
	(0.0181)	(0.0408)	(0.0326)	(0.0860)	(0.188)	(0.456)	(0.0386)	(0.0883)
Post x Ranking in coaliton		-0.0375		0.0195		-0.653		0.0158
		(0.0443)		(0.0865)		(0.404)		(0.0811)
Post x Protest Exposure x Ranking in coalition		0.120**		0.0831		1.413**		0.0478
		(0.0608)		(0.122)		(0.664)		(0.126)
Controlling for urban population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlling for education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlling for access to Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,767	21,767	1,402	1,402	6,699	6,699	6,699	6,699
Number of legislators	513	513	500	500	513	513	513	513
Number of periods	55 weeks	55 weeks	3 years	3 years	14 quarters	14 quarters	14 quarters	14 quarters
Adjusted R-squared	0.081	0.081	0.479	0.481	0.044	0.045	0.013	0.015
Mean Dep. Var.	0.82	0.82	0.57	0.57	0.97	0.97	0.12	0.12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks previous findings by controlling for three electorate's characteristics: urban population (%), literacy (%) and Internet penetration (%). Each of these characteristics was included in the same way as the index, that is, in an interaction with *Post* and in a triple interaction. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Columns 1 and 2 are at the week level, columns 3 and 4 at the year level and columns 5 to 8 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. *Ranking in coalition ally* is a dummy whether the legislator's party was in control of any Ministry between 2011-2014. All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.

Table A.8: **Robustness check: Effect of protests on legislators' behavior and government alignment**

Dep.Var.	Presence in plenary		Budgetary amendments		Proposed bills			
	presence rate		% related to protests		total number		related to protest = 1	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	-0.000286	-0.00486	0.243***	0.261***	-0.682***	-0.834***	-0.120***	-0.132***
	(0.0203)	(0.0248)	(0.0232)	(0.0365)	(0.172)	(0.243)	(0.0319)	(0.0459)
Post x Protest Exposure	-0.00593	-0.00205	-0.0825**	-0.0952*	-0.107	0.118	0.0317	0.0880
	(0.0181)	(0.0287)	(0.0326)	(0.0497)	(0.188)	(0.322)	(0.0386)	(0.0678)
Post x Govnt. Coalition		0.00751		-0.0229		0.218		0.0193
		(0.0259)		(0.0458)		(0.244)		(0.0537)
Post x Protest Exposure x Govnt. Coalition		-0.00978		0.0158		-0.301		-0.0944
		(0.0369)		(0.0657)		(0.396)		(0.0816)
Controlling for urban population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlling for education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlling for access to Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,767	21,767	1,402	1,402	6,699	6,699	6,699	6,699
Number of legislators	513	513	500	500	513	513	513	513
Number of periods	55 weeks	55 weeks	3 years	3 years	14 quarters	14 quarters	14 quarters	14 quarters
Adjusted R-squared	0.081	0.081	0.479	0.481	0.044	0.044	0.013	0.013
Mean Dep. Var.	0.82	0.82	0.57	0.57	0.97	0.97	0.12	0.12
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Legislator FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table checks previous findings by controlling for three electorate's characteristics: urban population (%), literacy (%) and Internet penetration (%). Each of these characteristics was included in the same way as the index, that is, in an interaction with *Post* and in a triple interaction. Observation unit is performance variable of legislator d at time t. Each column presents the result of an OLS regression where the dependent variable is listed in the column. Columns 1 and 2 are at the week level, columns 3 and 4 at the year level and columns 5 to 8 at the quarter level. *Post* is a dummy indicating periods after the protests and *Protest Exposure* is an index reflecting the percentage of the legislator's electorate that lives in a municipality that had a demonstration: the higher the index, more exposure to the protests the legislator had. *Governmnet coalition* is a dummy whether the legislator belongs to the party of a cabinet minister between 2011-2014. All regressions include time and legislator fixed-effects. Standard errors are clustered by legislator and displayed in brackets.