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<u>Panel</u>

Negative Partisanship, Affective Polarization, and Political Divisions

Crafting Negative Partisanship in Brazil and the Rise of Bolsonaro

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Abstract

The present study intends to assess the impact of three different events that made negative partisanship significant to understand the rise of far-right populist, Jair Bolsonaro: the religious demographic transition driven by Pentecostal evangelicals; the political activism of the Brazilian justice system and its mutualistic relationship with legacy media outlets; and the rise of social media platforms as a performatic space for political communication, exacerbated by automated disinformation devices. In order to estimate the effects of those transformations on voting, two econometric strategies were deployed: beta regression and quantile regression based on aggregated data by municipalities. Additionally, a set of variables based on CETIC microdata were mobilized to correlate the probability of sharing messages through social media and the stratified impacts of disinformation campaigns. The results, obtained through a logit model, compose a parallel analysis to reinforce the results obtained by the estimates of the models for vote proportion.

Key words: Bolsonaro, 2018 Election, Brazil, Social Media, Vote

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1 Introduction

The global rise of radical right-wing populism and the threats that it presents to democracy have sparked a growing concern both in political and scholarly arenas. A number of analyzes have associated it with feelings of social marginalization and disintegration (Gidron and Hall, 2019) whether they result from a lasting and unprecedented income stagnation of the poorest percentage of the OECD population (undermining the belief in intergenerational equity), or from the erosion of its traditional political parties (Przeworski, 2019). The lack of fairly paid blue-collar jobs in the U.S. over the past two generations, for instance, has had a damning effect on working-class social identity, which besides breeding its resentment towards political elites, has also led to an unprecedented fall in U.S. life expectancy, mostly spurred by soaring blue-collar deaths from suicide, drug overdose, and alcoholism diseases (Case and Deaton, 2020). Other scholars have drawn attention to the phenomenon of dealignment and try to encompass among its causes, not only economic and institutional issues, but also cultural developments associated to the perceptions of immigration and rapid ethnic changes as threats in order to explain the re-emergence of national populism (Eatwell and Goodwin, 2018).

As one of the world's largest democracies, Brazil also underwent a general dealignment in the years immediately preceding the electoral success of radical right-wing populist, Jair Bolsonaro. The traditional party system in the country suffered a huge blow in 2018 with the meager electoral results from its main parties and the astounding increase of party fragmentation. However, unlike the lasting income stagnation faced by the working classes of OECD countries, the economic well-being of the poorest percentage of the Brazil's population had undergone a significant improvement over a fifteen year period up to 2015 (Firpo and Pieri, 2018) with these constituencies continuing to support a consolidated left-wing party – Workers' Party (*Partido dos Trabalhadores* hereafter PT) – at the 2018 elections. But contrary to what could be expected as one of the greater beneficiary of economic well-being fostered by a left-center coalition, the majority of Brazil's ascending working class turned their back on the PT in these elections. Those differences may imply that there are specificities in Brazilian dealignment that have not yet been explored in the existing literature.

In this context, one of the most distinguishing developments among scholars to grasp recent dealignment in Brazil has come from studies on antipartisanship and negative partisanship (Fuks; Ribeiro; and Borba, 2021; Samuels and Zucco, 2018; Paiva; Krause; and Lameirão, 2016; Ribeiro; Carreirão; and Borba, 2016; Borges and Vidigal, 2018). As consolidated studies have already observed, antipartisanship is associated with anti-system attitudes, which can contribute to the rise

of neopopulism and, furthermore, to a decline in support for a democratic regime (Poguntke and Scarrow,1996; Mudde, 1996), while negative partisanship focuses on aversion to a specific party that opposes the party in which the individuals themselves identify - having become the most consistent political attitude according some studies (Abramowitz and Webster, 2016).

On the one hand, Brazil's aggregate party identity rates have declined from 45 to 30% on average between 2014 to 2018, reflecting a partial erosion of identification with the PT, which plummeted from 18 to 10% in the same period (Amaral, 2020). On the other hand, the scale of negative partisanship towards the same PT reached 30% in 2018. However, almost half of the electorate did not share strong attitudes (whether of sympathy or dislike) towards the PT (Nicolau, 2020). These figures resonate with studies that had already underlined the centrality of the PT and estimated at least half of the Brazilian electorate organizes their voting preferences based on sympathies or antipathies towards the party (Samuels and Zucco, 2018) but they go further by showing that antipartisanship which pushed dealignment might be partially explained by negative partisanship towards the PT although was not mainly caused by it (Fuks; Ribeiro; and Borba, 2021).

Research on antipartisanship and those that have underlined the cleavages between PT's and anti-PT's voters have supported its analysis in a set of cleavages, including: sociodemographic variables, position on the ideological spectrum, adherence to democratic values, geospatial distribution, position regarding the role of the state in the economy, political corruption and government performance. From this data, however, what such research has offered is solely a taxonomy of the distribution of voters' positions in terms of sympathy, rejection or party indifference, without presenting more comprehensive hypotheses about the causes of these swings in Brazilian voting behavior. Studies have sought to analyze this, as occurred with a number of important works highlighting the role of conditional cash transfer programs to low-income families - Bolsa Família Program (PBF) (Bohn, 2011; Licio; Rennó; Castro, 2009; Soares and Terron, 2008; Zucco, 2008 and 2013; Nicolau and Peixoto, 2007; Hunter and Power, 2007), political corruption scandals (Pereira and Melo, 2015; Winters and Weitz-Shapiro, 2013), economic performance (Shikida et al., 2009), and the general retrospective assessment of the government (Rennó, 2007; Peixoto and Rennó, 2011). However, the debates here still suffer from methodological controversies that, for instance, do not recognize cash transfer programs or economic performance as capable of satisfactorily explaining the full extent of the change in voting behavior observed in the 2006 presidential election (Canêdo-Pinheiro, 2015). On another front, the hypothesis of "conservative redistributivism" as an explanatory variable for a Downsian realignment pointed out the detachment between former president Lula da Silva's electoral base and those identified with the PT (Singer,

2009), although such hypothesis has been challenged by other scholars (Cardoso, 2020; Baker et al, 2016; Rennó and Cabello, 2010).

To circumvent the taxonomical approach, and provide a more encompassing exploratory hypothesis for Brazilian dealignment, this article intends to evaluate the role played by a set of technological, institutional and behavioral transformations that made antipartisanship and negative partisanship significant for Bolsonaro' election, with 55% of the valid votes cast in the 2018 run-off. Here, we have identified what we call the *perverse triad*, that is, a set of transformations whose moral pretensions to improve aspects of the economic, social and political order have resulted in the deterioration of that same order, putting at risk fundamental bedrocks of democracy such as sovereignty and the rule of law: 1) the praetorian political activism of the Brazilian justice system driven by political corruption investigations and its mutualistic relationship with legacy media outlets; 2) the religious demographic transition driven by Pentecostal evangelicals and the conservative electoral mobilization of their leaders; 3) the emergence of social media platforms on the internet as the overwhelming performatic space for political communication, exacerbated by machine learning devices and disinformation campaigns.

In order to ensure an empirical support for such hypotheses, the article mobilized a set of 29 variables based on aggregated data by municipalities (A2 and A3 in Appendix). Those variables are supported by an unprecedented database that was gathered by the authors based on statistical data from nine different sources produced by reputable Brazilian State institutions (see Tables A1 in Appendix). Moreover, as the micro-units for analysis are municipalities, this piece is able avoid the shortcomings of previous scholarship in this area, by avoiding the sample selection bias often present in the survey datasets. By using the beta and quantile regression method, it was possible to distribute the degree of significance of these variables on the vote for Fernando Haddad (PT) or Jair Bolsonaro (Liberal Party - PL), establishing the issues of preferences for the cleavages of the vote and the profiles of ideological identity.

Finally, a logit model was also adopted for individual data, informed by a microdata base of the Center for Studies on the Development of the Information Society (CETIC). As statistical data on the use of social media platforms by municipality is not available, this additional model is required. It aims to explain patterns in the use of social media in relation to individual characteristics and the possible differences in the impact of disinformation campaigns over multiple profiles of income, geospatial location, religious and education preferences, complementarily reinforcing aspects of aggregated data models.

2. Voluntarism of the Justice System and Political Corruption Scandals

In 2013, when judicial investigations into political corruption scandals had not yet been initiated by the Lava Jato Task Force, surveys by Latinobarómetro showed that only 10% of the Brazilian population considered corruption to be the most important problem in Brazil. Four years later, at the height of Lava Jato Scandal, corruption had become the most significant national problem for 31% of the population (Latinobarómetro, 2013; 2017; and 2018). In this sense, on the eve of the 2018 electoral cycle, the perception of political corruption had become a central issue for electoral behavior in Brazil, and the judicial task force headquartered at Curitiba was its warhorse. However, as scholarly works on Lava Jato begin to consolidate their initial findings, they reveal that the strategic action for investigations management by its legal officers had been based on political voluntarism and undermining of due process (Mészáros, 2020; Rodrigues, 2020; Arantes and Moreira, 2019), and the analysis on the role of political corruption scandals regarding electoral behavior has been challenged.

Thus far, survey experiments have pointed out there are cleavages in how Brazilian voters perceive the importance of corruption: on the one hand, the lack of information about wrongdoings as the main driver behind voter tolerance for corrupt politicians (Winters and Weitz-Shapiro, 2013) and, on the other, the tradeoff hypothesis argues that the negative marginal effect of corruption on reelection disappears as public expenditure increases (Pereira and Melo, 2015). Since the overall benefits should outweigh the costs in order for voters to cast ballots for corrupt politicians, according to the trade-off approach, one corollary would be that those most in need of public goods, i.e. the lowest classes, are more tolerant of corruption. However, that conclusion was not found by the survey based on information hypothesis whose main findings were both a strong negative reaction by the lowest classes to information about corruption, regardless of the level supposed competence of a candidate to provide public goods, and a greater tolerance for corruption among the upper classes.

In a context of a widely known political corruption scandal and macroeconomic crisis, negatively impacting the government's expenditure capacity from 2016, the aforementioned assumptions about the effects of corruption on voting seemed to offer a coherent explanation about what happened in 2018. Moreover, these approaches have taken for granted that the justice system is ruled by legal due process, and information systems are mainly based on plural organizations committed to producing fact-checked news and analysis, and that both systems work independently, inspecting

each other. However, as we shall see, those accountability institutions have failed to address the rules of the game and have transformed political corruption investigations instead into a corrupted mechanism that nurtured antipartisanship and negative partisanship.

One of the most exhaustive surveys on the media's coverage of Lava Jato investigations gathered 7,820 negative pieces on party politics, a quarter of all political stories between 2014 and 2016, revealing not only a long-term public relations campaign but also a mutualistic pact between the largest media outlets and Lava Jato legal officers (Feres Jr; Barbabela; and Bachini, 2018) - whose biased coverage played a role in deepening the political regime's perception of crisis, laying the ground for authoritarian political willingness (Melo and Mundim, 2018). Such mutualistic pacts did not only reinforce antipartisanship but also particularly enhanced negative partisanship towards the PT. This has been observed by multiple surveys on major media outlets' coverage of corruption-related stories in which the PT and its leaders were targeted by a biased negative coverage (Campello et al., 2020; Davis and Straubhaar, 2020; Damgaard, 2018; Van Dijk, 2017). At the same time, those surveys were able to reject assumptions that such bias could be the result of the function of media watchdogs over the incumbent party in the public interest (Feres Jr. and Sassara, 2018).

Despite the evidence of bias in the visibility distribution of political corruption scandals by media outlets, the aforementioned studies do not focus how these two dimensions (judicial investigation and its visibility bias) are interwoven and mutually determine its results. In the same way that Lava Jato legal officers have exploited media outlets for their purposes, as part of the literature sustains (Almeida, 2016), media outlets have also taken advantage of Lava Jato as they legitimize judicial arbitrariness against victims of its visibility bias (Santos, 2016). This insidious relationship has been also referred to as the "dialectics of spectacle", when scholars realized that a convergence between largely conservative media interests and those of the investigation occurred, spurring an increasingly arbitrary, tendentious, and factious climate, triggering distrust and antipathy towards political institutions (Mészáros, 2020).

This mutualistic pact has also served to boost the corporatist ambitions of cadres and careers from the justice system, already shielded by the lack of external accountability (Kerche; Oliveira; and Couto, 2020). In other words, their political voluntarism enhanced by the mutualistic pact strategically appropriates the law to promote a demiurgic morality that perversely feeds self-interested movements instead of strengthening institutions (Arantes and Moreira, 2019; Carvalho and Palma, 2020; Almeida, 2018). This has unfolded into what some call a judicial praetorianism (Avritzer and Marona, 2017), the main feature of which is the undermining of vertical (democratic)

accountability through both a 'political grammar' that is closer to illiberalism (Sá e Silva, 2020), and a selective political attack against democratic sovereignty (Viegas; Loureiro; and Toledo, 2020; Avritzer and Marona, 2017).

Among the examples of how Lava Jato political voluntarism resulted in judicial praetorianism it is possible to highlight the most insidious of these. The legislative proposal sponsored by Public Prosecutor's Office (Ministério Público Federal), known as the "10 measures against corruption", sought among other things: to restrict the scope of *habeas corpus* petitions, tolerance of illicit evidence, and expand permissible grounds for pre-trial detention, considered by legal scholars as a breach of individual rights and due process (Sá e Silva, 2020; Castellar, 2017). Police raids at Universities, coordinated by the Electoral Justice, censored the electoral debate simultaneously in seven states (Saldaña; Faria; and Pauluze, 2018). According to Facebook's Transparency Report, roughly 4,000 pieces of content were in just restrained the second half of 2018 in Brazil, in compliance with the orders of local courts (more than double what had been censored in the previous electoral cycle), indicating a growing trend of judicial harassment against freedom of expression on social media. As judicial harassment spilled over from social media to reach legacy media and independent journalists alike, advocacy organizations like Freedom House started to rate Brazil as a partially free country (Freedom House, 2019). A pro-Bolsonaro conservative political association was established by members of the Public Prosecutor's Office right after the 2018 election. Composed of 128 tenured prosecutors it is known as "MP Pró-Sociedade" (Pro-Society Public Prosecutor's Office), and while opposing the criminal accountability for the mass dissemination of fake news, the association went on to defend mass incarceration, breaches of human rights guarantees, and lately it has harassed local health services to prescribe ineffective drugs for Covid-19 treatment, following Bolsonaro's negationist policies with regard to the health crisis (Anjos and Oliveira, 2020; Magnoli, 2019; Streck, 2019). Finally, the leak of private chats from those in charge of the Lava Jato Task Force brought to light evidences of collusion, among which many defiled the due process. In addition, recent evidence has substantiated the claims that those legal officers rigged the 2018 presidential election when they prevented its main competitor to run based on procedures widely recognized as unlawful by the international legal scholarly community (Rose-Ackerman et al., 2019).

2   Hybrid Media Systems, New Financing Networks and Fake News

The current environment of political communication in Brazil is driven by social media platforms in which legacy media outlets and political actors are now forced to embed themselves, forging what

has been named as hybrid media systems. Those systems are now mirroring the downfall of the public sphere's gatekeepers whose fact-checking norms are no longer acknowledged, resulting in a rearrangement of visibility between political actors and ideologies with disruptive effects on voting (Chadwick, 2013). It is possible to observe such rearrangement into the instrumental role of social media in boosting agendas and candidates (Allcott and Gentzkow, 2017; Shao et al, 2017), particularly from far-right political parties and their leadership (Schradie, 2019; Ernst et al. 2017). In addition, the phenomenon of political disinformation has been highlighted (Tucker et al, 2018) and how machine learning that drives social media interaction has served to optimally resonate with individual predispositions, reinforcing echo chambers and the so-called filter bubbles (Pariser, 2012) and affording a fractal topology that bypasses representative democracy's separation between person and office as a mainstay for populist politics (Cesarino, 2020b). In this context, the promises of pluralism, disintermediation and sovereignty that underpin the moral rhetoric behind digital platforms have been contrasted with the perverse effects of social media fractionation, polarization and inequality, which has created a reward structure for political engagement in strategic extremism, and with that has undermined one of democratic bedrocks that supposedly should be driven by the vote-maximizing behavior of the median voter (Barberá et al., 2019; Lewandowsky et al., 2017; Downs, 1957).

Surveys on the restructuring of political visibility driven by Brazil's hybrid media system observed that media outlets were not able to keep up as the main vector for the dissemination of information and political opinion on social media. Based on the comparison between the sharing of content produced by legacy media outlets, and those generated by left and right-wing fan pages on Facebook, scholarly works have found that right-wing fan pages largely dominated the content sharing in 2018. Indeed, right-wing fan pages reached a peak of 36.5 million sharing during the second-round of electoral campaign, against 20.4 million from left-wing fan pages, and 17.6 million from legacy media (Santos Jr. and Albuquerque, 2019). This data reinforces other surveys that pointed out Brazil has emulated international experiences on the role of social media to afford radical right-wing populist politics and conservative movements (Cesarino, 2020a; Arnaudo, 2017; Avritzer, 2017).

As well as a hybrid media system, legislation reforms on the financing of electoral campaigns have also played a role in the rearrangement of political visibility. With a ban on electoral donations by corporations ruled by the Federal Supreme Court (STF) in 2015, studies identified a change in the electoral financing networks that came to be dominated by public funds and individual donations, whether legally declared or not (Krause et al., 2020). These new financing networks driven by

businessmen, found a way to circumvent the ban on corporate donations by syphoning money into slush funds for political mudslinging on social media, through the mass-forwarding of fake news (Mello, 2020). Even those facts being brought to light during the electoral campaigning by the mainstream media the electoral justice turned a blind eye to this. Considering Bolsonaro's official campaign spending accountability was fifteen times less than that of his runoff competitor, and twenty times cheaper than the richest presidential campaign, this outlier pattern of expenses makes the so-far established evidence on the role played by the undeclared multimillion expenses of social media even more disturbing.

As we have seen so far, a large-scale disinformation campaign on social media has the power to wreak havoc on electoral democracies – especially if those campaigns were backed by the way in which financing networks take advantage of legal loopholes on the internet in a context of astounding increase in web access. According to data from PNAD Continuous ICT 2018 from IBGE[3], 79.1% of Brazilian households have access to the internet, with 95.5% of these households mainly using this to exchange messages via apps (such as WhatsApp, Facebook, Instagram etc.). In this context, scholarly surveys have already presented robust evidence of automation, interconnection and coordinated action to massively boost fabricated defamatory contents through social media platforms against the PT candidate spurred by the already mentioned mutualistic pact and to the moral panic of religious constituencies driven by conservative cultural warfare (Rocha, 2021; Cesarino, 2020b; Resende et al., 2019; Avelar, 2019; Machado and Konopacki, 2018).

4. Religious Transition, the Evangelical vote, and Fundamentalism

According to data from the IBGE census, the number of Brazilians who declared themselves evangelical Protestants grew from 9 to 22.2% between 1991 and 2010. One of Brazil's most reputable polling institute, Datafolha, adds that this number would have reached 31% in 2020, and further estimates point out that in 2032 the evangelical population should surpass that of Catholics nationally, reflecting what studies have referred to as a religious transition (Alves et al., 2017; Zilla, 2020; Balloussier, 2020). Evangelical Pentecostal denominations, in particular, have been gaining significant political representation, either through the election for executive or legislative branches. Until the 2018 election, the number of lawmakers identified with the Pentecostal agenda was 83 congressmen spread over 18 parties or 16% of National Congress (Machado, 2018).

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3 Continuous National Household Sample Survey on Information and Communication Technology (PNAD Continuous ICT) is produced by Brazilian Institute of Geography and Statistics (IBGE) - the main provider of official statistics data about the Country.

As the distribution of the Catholic population voting between Haddad and Bolsonaro resulted in a negligible difference, the much greater number of evangelical votes received by Bolsonaro (11 million more than for Haddad) helps to understand the election results (Almeida, 2019). According to another major Brazilian polling institute, Vox Populi, there was a sudden and massive increase in the voting intentions of evangelicals for Bolsonaro on the eve of the first round of the elections. Within less than two weeks the numbers soared from 31 to 45%; a figure that cannot be ignored when explaining his electoral performance (Figure 1).

FIGURE 1. Evolution of Voting Intentions for Bolsonaro and Haddad among Evangelical Voters (September and October 2018)
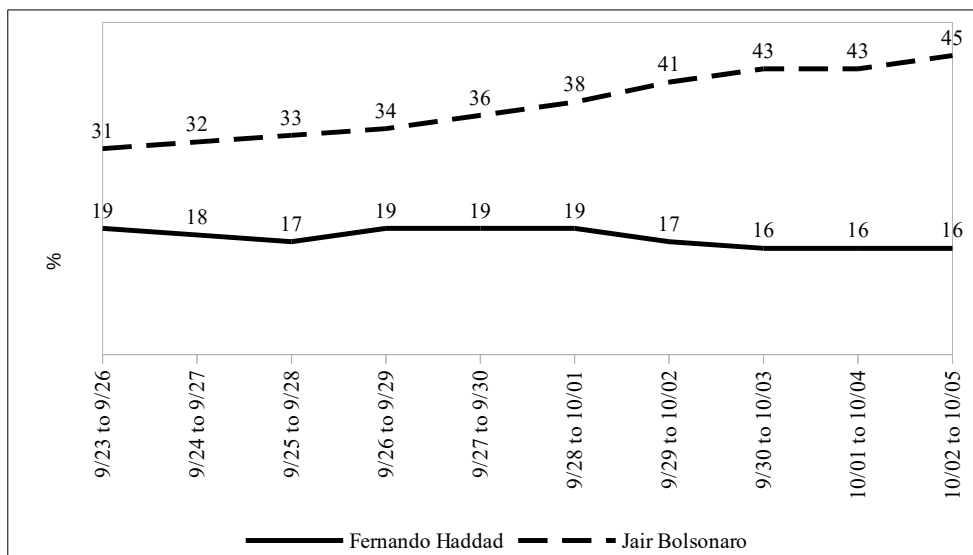
Source: Vox Populi, daily tracking poll, Sep / Oct 2018

As was pointed out previously, the 2018 elections were notable for the unprecedented disinformation campaign spread on social media platforms. That they were mostly based on appeals to the moral panic of religious constituencies, the change in the pattern of evangelical voting on the eve of the election takes on added meaning. Although most of evangelicals are made up of Pentecostal voters and the absolute majority of them part of the poorest percentages of the population, studies have pointed out that their grievances of morality and recognition can hierarchically overlap with redistributive demands, potentially leading these voters to lean towards conservative candidates who will not meet their material protection needs (Silva, 2019). Among the main drivers of the evangelical vote, the role of church attendance and socio-emotional leadership via charismatic experiences have been highlighted by scholars (Rodrigues and Fuks, 2015). The overlapping of moral grievances and the role of charismatic leaders coincide with studies that have focused on the performance of Pentecostal leaders as electoral brokers (Smith, 2019).

In order to understand the effects of a campaign aimed at evangelical voters, it is necessary to emphasize that this constituency is susceptible to interpreting a particular set of public policies as an existential threat, which make it easier to mobilize their political actions based on moral panics or what has been also called *cultural war* (Smith, 2019). The script of this war has been documented, noting the recurrence of synergies between social actors, cultural values and political forces that have interwoven evangelicals with conservatism around certain cleavages (Almeida, 2019). Among these, we can highlight evangelical political support for the agenda of the neoliberal night-watchman state, repressive and punitive actions by the state, sectarian social affections driven by the foe's threat, defense of morality and customs as mainstays of conservative family arrangement. Such a political agenda has driven evangelical lawmakers to stand shrilly against: sex and gender education in schools; the criminalization of homophobia; the regulation of same-sex civil unions; and the decriminalization of abortion and drug use – issues that clash strongly with fundamental civil rights guarantees (Quadros and Madeira, 2018; Lacerda, 2019). Despite all this, it is important to note that the interweaving of the evangelical voter and moral conservatism did not always result in a homogeneous set of conservative political positions throughout electoral cycles, as mistakenly highlighted by some authors (Silva, 2019). Until not too long ago it was not easy to locate this voter in the ideological spectrum between left and right, or as a social basis for radical right wing parties (Bohn, 2004). All of this makes the evangelical voting in the 2018 presidential election in Brazil a phenomenon which needs to be articulated with recent technological, institutional and behavioral dynamics, as pointed out by the use of the perverse triad approach.

5. Method

Based on the result of the second round of the 2018 presidential election, this article employs aggregated data by municipalities to identify patterns of regularity in the proportion of votes received by the PT's presidential candidate, whose results invertedly mirror Bolsonaro's patterns of voting. Indeed, scholars who work on electoral behavior in Brazil have kept their distance from such an approach, always choosing individual data to understand individual behavior. This has resulted in the fact that many of their works present erroneous aspects, both in the specification of models and in the use of qualitative variables, resulting in problems of bias (Bohn, 2011; Ribeiro; Carreirão; and Borba, 2016; Paiva; Krause; and Lameirão, 2016; Borges and Vidigal, 2018).

When reacting to criticism regarding the use of aggregate variables, scholars started to admit the possibility of using regressions with aggregated data to explain individual behaviors (Goodman,

1953) and, even more, that regression coefficients would be preferable to the simple correlation coefficients, since the regression model was well specified to ensure that the model explains a large part of the variations in Y (Hanushek; Jackson; and Kain, 1974). Additionally, non-linear and weighted models, known as 'normal truncated bivariate' and 'beta-binomial hierarchical', can correct the problem of ecological fallacy, ensuring aggregate variables as good predictors for individual behaviors (King, 1997; King; Rosen; and Tanner, 2004).

The variables chosen for this work highlight the influence of economic, public policies, sociodemographic and institutional aspects, as described in Table A.1. As Brazil is a country with deep regional inequalities, as can be seen from the descriptive statistics in Appendix Table A.2, beta regression and quantile regressions were chosen. For example, Brazil has municipalities with Gini indexes that vary between 0.28 and 0.81, or still, municipalities with variations in the GDP rate between 0.81% and 2.38%. While the candidate of the PT, Fernando Haddad, obtained more than 79% of the valid votes in 1,024 municipalities, he did not exceed 40% of the votes in another 1,926 municipalities. What reasons explain this high variability of votes between municipalities? What is the best way to express the effects of explanatory variables on the proportion of votes received by candidates in municipalities with more or less voters?

As a result of this evident non-linearity of the data and the presence of outliers, the present study opted for models that mitigate these differences and demonstrate the average voting behavior based on the inequalities observed between the municipalities in a non-linear way. With that in mind, we believe the use of traditional multivariate methods as outlined here responds better to the research problem proposed, although it does not intend to answer or identify individual behaviors *per se* but rather electoral patterns by municipality. The data of the candidates' proportion of votes has a bimodal distribution, as shown in the histograms below (Figures 2A and 2B) and does not follow a normal distribution, according to tests of normality developed by Shapiro & Francia (1972) and Royston (1983).

FIGURE 2. Histogram of the proportion of votes

A) Votes of the Fernando Haddad, by municipality.
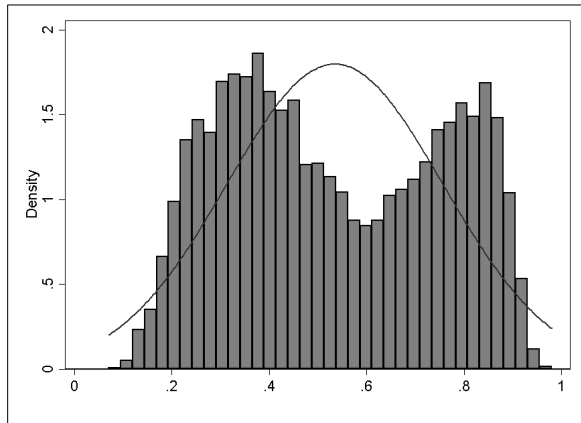
B) Votes of the Jair Bolsonaro candidate, by municipality.
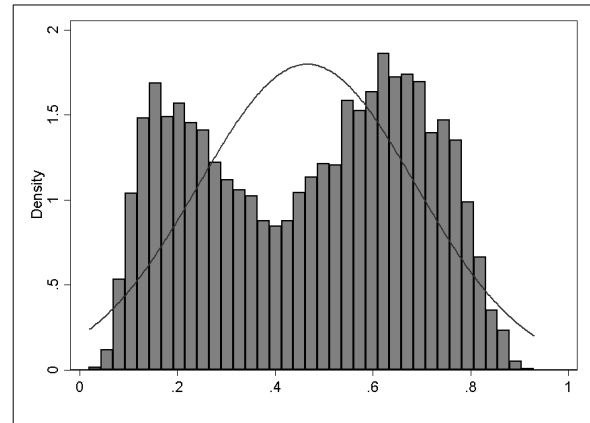
Note: Elaborated by the authors based on TSE data, 2018.

The dependent variable - proportion of votes - is limited between the interval 0 and 1, without including the values 0 and 1, which fits well with the beta regression model with logistic transformation. Besides, the quantile regression model fits better to analyze the behavior of votes along the separatrices, considering the high heterogeneity in the distribution of votes throughout the national territory. In this sense, the present research distinguishes itself in the use of these methods, as it allows the incorporation of variables that express the economic, institutional, urban and sociodemographic structure from the smallest Brazilian administrative units to the largest ones, estimating the effects of direct and indirect public policies on the proportion of votes.

Beta Regression and Quantile Regressions

According to a number of studies, the beta regression method is the most adequate when the dependent variable y_i is a limited proportion between zero and one, $0 < y_i < 1$ (Paolino, 2001; Ferrari and Cribari-Neto, 2004; Cribari-Neto and Zeileis, 2010; Cribari-Neto and Souza, 2013). The beta regression model measures the average effects of covariates over the proportion of votes and follows a beta[4] distribution, with estimates calculated using the maximum likelihood. Equations 1

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4 See more details Ferrari and Cribari-Neto, "Beta Regression for Modelling Rates and Proportions."

and 2 present the beta regression model with variable dispersion, as proposed by Ferrari and Cribari-Neto (2004) and Simas, Barreto-Souza and Rocha (2010):

$$g_1(\mu_i) = \sum_{i=1}^{k} x_i \beta_i \qquad (1)$$

$$g_2(\phi_i) = \sum_{i=1}^{q} \gamma_i z_i \qquad (2)$$

μ_i being the mean and ϕ_i the dispersion, $0 < \mu_i < 1$ and $\phi_i > 0$, for a given average value, the higher the value of ϕ_i, the smaller the dispersion and, therefore, the more accurate the estimate of the average effect. β_i e z_i are the vectors of the parameters of unknown regression, x_i e γ_i are the known covariates. The link functions for $g_1 : (0,1) \to R$ and $g_2 : (0, \infty) \to R$ are: logit and logarithmic.

In addition to the effect in average terms estimated by the beta regression, the quantile regression method introduced by Koenker and Bassett (1978), will be used. These models allow the effects of the explanatory variables at the different points of the conditional distribution of the dependent variable to be analyzed, from the definition of quantiles of a sample, in an ordered set of observations. Thus, we have:

$$Q_\tau(Y|x) = x' \beta(\tau) \qquad (3)$$

The quantile, Q_τ, conditional on the proportion of PT votes (Y) as a function of the $\mathbf{x}'$ matrix of regressors, $\beta(\tau)$ is the vector of the parameters to be estimated in the quantile τ. According to Santos (2012), Koenker and Hallock (2001), and Buchinsky (1998), among the advantages of the quantile regression model are: 1) the minimization of weighted absolute errors, which makes the model more robust in the presence of outliers; 2) allows the researcher a more complete notion of the relationship between the explanatory variables, since the model has a curve for each quantile (0.25, 0.50, 0.75 and 0.95) which can be analyzed together or at a specific point in the distribution of the response variable. Note that quantiles <0.5 refer to municipalities where Haddad obtained less than half of the votes.

Logit

In order to analyze the probability of using social networks according to individual observable characteristics such as: income, sex, skin color, religion, education and region of residence, we will use the logit model. The dependent variable is a binary, according to the Equation 4

$$P\left(Y=1\middle|X_i\right)=F\left(\sum_{i=1}^{k} X_i \beta_k\right) \qquad (4)$$

Since Y is the dichotomous dependent variable, X_i is the vector of known covariates, β_k is the vector of unknown parameters and F represents the cumulative density function of logistic distribution.

6. Discussion of the Estimates: Social Divides and Electoral Behavior

The map below shows the distribution of vote proportions. The warm colors represent the municipalities where the PT candidate obtained a higher number of votes, the cold colors those in which they received lower.

FIGURE 3. Distribution of Votes by Municipality
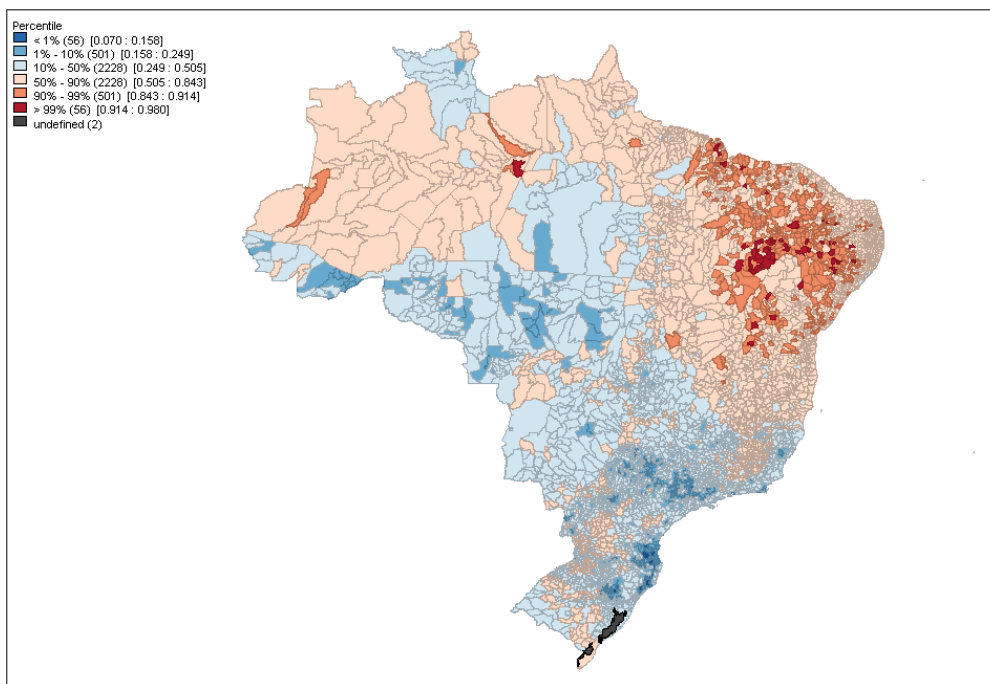
 Note: Elaborated by the authors based on TSE data, 2018.

Haddad Voter

The PT candidate, Fernando Haddad, got 45% of valid votes cast in the 2018 run-off. What do the estimates on the variables that explain the vote for the PT candidate tell us about social cleavages and party identity? In general, it is possible to observe that even if he or she does not spontaneously express sympathy for the party of the candidate for which they voted, this voter presented a relatively coherent ideological-programmatic adherence, as illustrated by their preference for Fernando Haddad according to criteria including: (1) supply of quality jobs and income, measured by the balance of formal jobs generated and Gini coefficient; (2) universalization of public policies reflected in the professionalization of municipal bureaucratic officials and the scope of investments in infrastructure and housing made by state-owned public banks; (3) Haddad voter's age stratification and education profile shows that groups that are more fragile in relation to income and the need for encompassed social protection systems, such as the illiterate, the elderly and the young, identified themselves with a PT public policy agenda. Let's now look at how this is expressed in the estimates found.

The Gini index showed a positive and significant correlation on average and in all quantiles (Table A3 and A4, Appendix), indicating that Haddad obtained more votes in municipalities with a higher level of inequality. This trend in voting was repeated in variables like net employment rate and GDP growth rate among municipalities with less than 20 thousand inhabitants. In this context of poverty and low economic dynamism, the variable regarding to proportion of people benefited by the Bolsa Família Program (PBF) confirmed evidence of studies already mentioned in the introduction on the role of that conditional cash transfer program on voting for the PT. In addition, municipalities with a higher proportion of illiterate or high school-educated voters showed greater electoral preference for the PT candidate which partially contradicts the estimates of recent studies (Nicolau, 2020). Considering the robust correlation between the vote for the PT candidate and younger voters (Table A4) - a contingent between 16 and 24 years old that mostly hold a secondary education - those estimates indicate that the PT's social basis at 2018 presidential election couldn't be restricted to the illiterate voters whose overwhelming majority is among voters aged 60 or over.

The estimates of the municipalities with mayors belonging to left-wing parties also had positive and significant effects in relation to the vote for the PT candidate, when compared to municipalities governed by right-wing or central parties, particularly in the median and in the 0.75 quantile (Table A4). Among municipalities with more than 20,000 inhabitants, which were recipients of

investments stimulated by BNDES loans, the estimates were also positive and significant in relation to the proportion of votes for the PT candidate both in average terms and from the lower quantiles to the median. Distinguished among the major development banks in the world as having a sophisticated bureaucratic capacity (Colby, 2013), BNDES has disbursed the equivalent of USD $1.22 trillion in subsidized loans between 2003-2016. Besides the role played by central state bureaucracy, like that operated by BNDES, it was also possible to observe an increase in the proportion of votes for Haddad in municipalities with a higher proportion of tenured bureaucrats, that is, with greater local state capacity, confirming results found by Canêdo-Pinheiro (2015). As there was a decentralization and increased coverage of public policies throughout PT government period (2003-2016), the strengthening of street and mid-level bureaucracies played an important role in their execution (Oliveira and Abrucio, 2018), especially in poor municipalities with low state capacity.

Bolsonaro Voter

Which variables, then, explain the vote for Bolsonaro and what do they express in terms of social cleavages of that voter's party identity? As we will see, the survey put together a set of estimates to explain the proportion of votes for Bolsonaro that defies conventional assumptions about electoral behavior, forcing us to assess the role played by the perverse triad. Empirical tests identified the following cleavages: 1) social strata of higher income and education; 2) those more exposed to social media platforms; 3) the biggest beneficiaries of housing credit, social security and educational expenses all from the central government funds; 4) and Pentecostal evangelical voters. Below is a summary of the main patterns reflected by these estimates.

According to the initial surveys of the 2018 election, Bolsonaro's victory would have been the result of a set of structural reasons, among which the following factors were most prominent: a) the demoralization of political elites and the party system, caused by Lava Jato; b) the public security crisis; c) the importance of social media as a communication platform (Moura and Corbellini, 2019). We agree with (a) and (c), but we do not consider the security crisis to be one of the reasons that led to the election of Bolsonaro. In its place, we point to the religious demographic transition and cultural wars of Pentecostal leaders as the third structural reason for our perverse triad. Although our estimates for the security crisis did not include burglaries and thefts, but only the variable homicide rate (Table A3 and A4), this did not show statistically significant effects in beta regression and in any of the quantiles.

In terms of income, the variables on average formal sector wage income, GDP growth rate and the number of pensioned retirees from INSS system presented negative estimates (Table A3 and A4). Those variables express patterns of electoral behavior associated with appropriated wealth, showing that the average vote for Bolsonaro was higher in the wealthiest municipalities.

As with income cleavages, the central government's per capita expenditure on education also showed negative and significant results on voting for PT candidate both in average terms and in all the quantiles (Table A3 and A4). The rejection of the PT candidate among voters with elementary education was also found but showed a reduction in the quantiles in which Fernando Haddad obtained a majority of votes. However, the same did not happen with the proportion of voters with college education: there was an increase in rejection of these voters towards the PT candidate and, therefore, greater approval towards Bolsonaro in the quantiles.

Considering the unprecedented expansion of the Brazilian public higher education and technical college systems which contributed to the increase in college enrollments from 3.89 to 8.05 million between 2003-2016[5] and had as its main policy maker the PT presidential candidate himself, the estimates on variables of college educated population as well as per capita expenditure on education by central government went against expectations and require additional considerations. Our working hypothesis is that it is an example of a more complex phenomenon, in particular, the product of an informational diet from social and legacy media that blurred the college educated voters' perception regarding public policies that undoubtedly brought economic and status benefits, meeting their class interests. Therefore, it is relevant to understand the role of the *perverse triad* in disrupting the system of information which should provide a common ground where ideological cleavages rationally organize the electoral competition. As an insidious outcome of the mutualistic pact between the justice system and information system to exacerbate moral grievances toward the party system added to the religious moral panic button, further deepened by the mass dissemination of fake news through social media, the perverse triad short-circuited the Brazilian political system, dividing public opinion apart and pushing voters toward negative partisanship and antipartisanship. In order to explore how this triad played a decisive role in Bolsonaro's electoral performance, the article provides below a stratified analysis of the electoral behavior of the religious constituencies, looking for possible voting correlations from those more exposed to news coming from the social media platforms.

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5 Figures from National Institute for Educational Studies and Research "Anísio Teixeira" (INEP)

7. Social Stratification of Social Media Use and Electoral Behavior

As for the estimates of the stratifications of the use of social media, the results seem to ratify the hypotheses about the cleavage of preferences for voting, discussed in Section 3 of this paper: the higher the proportion of evangelicals in a municipality, the greater the average proportion of votes for Bolsonaro. According to CETIC data, the use of smartphones for message sharing increased by 33% from 2015 to 2018, that is, it reached 123.6 million users in the electoral year. If we start from the hypothesis that all voters were exposed, to some degree, to the disinformation campaign, this article argues that it is possible to distribute the impact of disinformation by stratified identification of the segment of the population using social media most often.

FIGURE 4. Average probability of using a cell phone to send messages, by age, religion and region of residence.
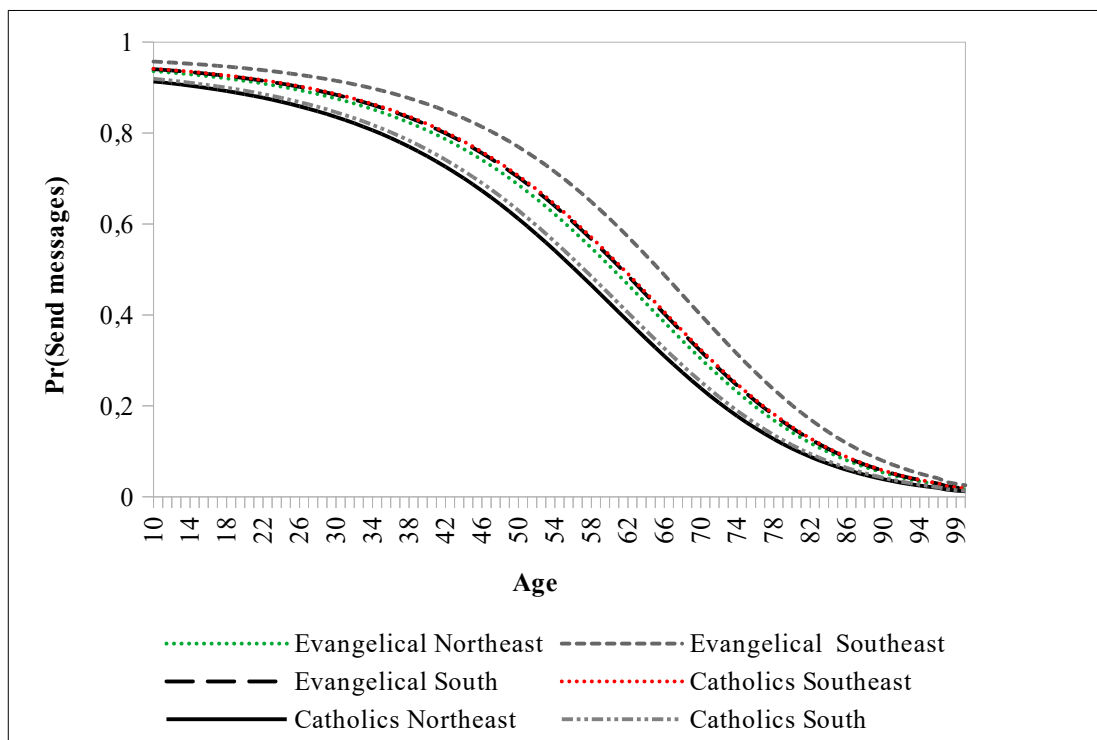
Note: Authors' elaboration

Figure 4 shows the estimated curves of the logit model, considering the probability of using a cell phone to send messages, according to the individual's age, religion and distribution in the Northeast, Southeast and South regions. The possibility of Evangelicals to use a cell phone to send messages was 139% higher than Catholics (Table A5, Appendix). With regard to the regions, with the exception of the Central West, all the others were less likely to be used compared to the Southeast. For example, the chance for an evangelical individual and resident in the Northeast to use a cell

phone to send messages was 81% lower in relation to evangelicals living in the Southeast region. On the other hand, the ability of individuals with a higher education to send messages by cell phone was 224% higher, compared to those with no formal education. The probability and chances of using the internet increase for individuals who live in households with a higher level of income. For instance, the chances of individuals living in households with an income higher than 10 minimum wages was 387% higher than those living in households with no income.

8. Conclusions

Based on the state-of-art of literature and gathering of exhaustive database with socioeconomic, institutional and political variables, this article sought to provide comprehensive hypotheses aimed at explaining the results of the 2018 presidential election in Brazil. We claim such comprehensiveness is underpinned by a *perverse triad* which works as multicausal mechanism on electoral behavior whose parts reinforce each other resulting in an exponential number of effects in the 2018 election.

By expanding the set of explanatory variables for voting in presidential elections it was possible to challenge a sort of heuristic understanding which links lower-income and less educated voters to an inertial and opportunistic electoral behavior in Brazil (Zucco, 2008 and 2013; Pereira and Melo, 2015; Hunter and Power, 2007). The survey managed to point out that the pattern of cleavages that characterizes left and right-wing ideological stances can be also found in the 2018 election. On the one hand, employment and income are still crucial factors to explain the vote for left-wing parties, associated with improvement of state capacity measured by the proportion of tenured officials at the municipal level, conditional cash transfers policies, and infrastructure projects through subsidized long-term financing like those provided by BNDES. On the other hand, the vote on the right is concentrated significantly on variables such as conservatism of customs and tolerance of inequality.

Surprisingly, public policy based on unprecedented amount of resources such as the largest subsidized housing program (Minha Casa, Minha Vida) and massive investments in the expansion of Brazilian public higher education and technical college systems did not convert into votes in favor of their policy-makers. Considering that the municipalities with the highest investments per capita in education are also the wealthiest, and enjoy better provisions through their local public administration, in addition to being the group whose population is therefore supposedly better equipped to rationally associate its class interests with those public policies, what could explain the

largest vote for a candidate who did not disguise his willingness to wipeout all these policies like Bolsonaro promised in 2018?

Considering that the 2018 presidential election in Brazil was unique due to the role played by the perverse triad to disrupt voting preferences of those most exposed to its effects, the heuristic assumptions on inertial and opportunistic voting behavior of the bottom of the social pyramid have turned upside down. Ironically, it is precisely those most exposed to social media and the mutualistic pact between the justice system and news outlets - that is, those with higher level of education and income - that are the most vulnerable to an inertial and misinformed voting trend driven by new fractionalization mechanisms, in particular social media disinformation campaigns on the internet.

Finally, the 2018 electoral cycle is not comparable with those previous or in the future, as the judicial investigation model which drove task forces such as Lava Jato did not exist before 2014, and was dismantled by the Attorney General's Office appointed by Bolsonaro and demoralized by the evidence of corrupted collusion between their legal officers. Despite news outlets support for Lava Jato legal officers still partially remains, even after their corrupted collusion be brought to light, the entire political system has already understood the mutualistic pact between justice and information systems, which should neutralize its disruptive effects in near future. The party system also learned social media platforms as having overwhelming potential for political communication, which should counterweight previous advantages from those actors who first accessed and deployed this to their full, vicious potential.

9. References

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Appendix

Table A1. Description, Year and Source

Description	Year	Source
Total roll call votes, second round of presidential elections and voter characteristics	2018	*Superior Electoral Court* (TSE)
Loans from BNDES	2002 to 2018	Brazilian Development Bank *(BNDES)*
Estimated number of people who receive Bolsa Familia	2017	*Unified Registry* (CadUnico)
Pensioned retirees	2017	*National Social Security Institute* (INSS)
Number of houses built	2014	*Federal government saving bank* - (Caixa Econômica)
Formal sector wage income	2017	*Annual Report of Social Information* (RAIS)
Net generation of formal jobs	2016 to 2017	
Tenured officials at the municipal level	2017	*Brazilian Institute of Geography and Statistics* (IBGE)
Party affiliation of incumbent mayors	2017	
Population	2018	
Gini index	2010	
Religion	2010	
GDP at current prices	2010 to 2016	
Homicide rate*	2014 to2017	*Department of Data Processing of the Unified Health System* (Datasus)
Expenditure on education	2015	*System for the Public Budgets in Education* (SIOPE)

Notes: *Homicide rate for every 100 thousand inhabitants, variable obtained by adding the ICDs 10: X85-Y09 and Y35-Y36.

TABLE A2. Descriptive Statistics of the Variables Used in the Model for Proportion of Votes, by Municipality

Variables	Mean	SD*	Minimum	Maximum
Proportion of nominal votes by municipality				
Haddad	0.535	0.222	0.07	0.98
Bolsonaro	0.465	0.222	0.02	0.93
Total proportion of nominal votes				
Haddad	0.449	0	0.449	0.449
Bolsonaro	0.551	0	0.551	0.551
Logarithm of the average formal sector wage income	7.508	0.202	6.892	8.691
Central West	0.084	0.277	0	1
North East	0.322	0.467	0	1
North	0.081	0.273	0	1
South East	0.299	0.458	0	1
South	0.214	0.41	0	1
Illiterate	0.073	0.051	0.001	0.352
Elementary level education	0.061	0.023	0.012	0.171
High School Education	0.176	0.064	0.027	0.428
College Education	0.055	0.035	0.002	0.327
Loans of BNDES (yes=1; no=0)	0.183	0.387	0	1
Houses built by Caixa Econômica Federal	0.72	0.449	0	1
Proportion of pensioned retirees by INSS	0.165	0.088	0	0.616
Municipalities governed by parties on the left (yes=1; no=0)	0.194	0.396	0	1
Approximate proportion of people who receive PBF	0.043	0.039	0	0.236
GDP growth rate (2015/2016)	0.09	0.141	-0.809	2.379
Proportion of tenured officials	0.035	0.016	0	0.203
BNDES loans in medium and large municipalities	0.128	0.335	0	1
Municipalities with >20 thousand inhabitants	0.317	0.465	0	1
60 years or more	0.198	0.041	0.067	0.405
16 to 24 years	0.16	0.031	0.085	0.298
Houses built in small municipalities	0.44	0.496	0	1
GDP growth rate in small municipalities	0.071	0.133	-0.809	2.379
Gini Index	0.503	0.066	0.284	0.808
Homicide rate	21.21	18.54	0	133.41
Catholics	0.753	0.135	0.078	0.992
All other Evangelicals	0.061	0.063	0	0.83
Evangelical Pentecostals	0.11	0.065	0	0.521
Net rate of professional employment	0.065	0.223	-1.777	1.964
Log of per capita municipal expenditure on education, federal resources	7.711	0.495	-1.751	10.181

Notes: *Standard deviation
1. Left parties that were considered: Workers' Party (PT), Communist Party of Brazil (PC do B), Democratic Labor Party (PDT), Socialism and Freedom Party (PSOL) and Brazilian Socialist Party (PSB).

TABLE A3. Estimates of the parameters of the beta regression models, marginal mean effect and precision sub-model. Dependent variable: proportion of votes in Haddad.

Variables	β_i	z_i^1	Marginal Effect
Logarithm of the average formal sector wage income	-0.1346***		-0.0334***
	(0.039)		(0.010)
Central West	-0.8547***		-0.2089***
	(0.029)		(0.007)
North	-0.9036***		-0.2200***
	(0.028)		(0.006)
South East	-0.8515***		-0.2097***
	(0.024)		(0.006)
South	-0.8513***		-0.2095***
	(0.030)		(0.007)
Illiterate	1.4528***	1.0369**	0.3603***
	(0.204)	(0.420)	(0.050)
Elementary Education level	-5.5494***		-1.3763***
	(0.426)		(0.106)
High School Education	0.2901*		0.0719*
	(0.161)		(0.040)
College Education	-2.3561***	3.3099***	-0.5843***
	(0.285)	(0.604)	(0.071)
Loans BNDES (yes=1; no=0)	-0.0824***		-0.0205***
	(0.026)		(0.006)
Houses built by Caixa Econômica Federal	-0.1488***		-0.0368***
	(0.038)		(0.009)
Proportion of pensioned retirees	-0.5250***		-0.1302***
	(0.089)		(0.022)
Mayors belonging to parties on the left(yes=1; no =0)	0.0453***		0.0112***
	(0.015)		(0.004)
Proportion of PBF beneficiaries	3.8947***		0.9659***
	(0.256)		(0.063)
GDP (2015/2016)	-0.1905**		-0.0472**
	(0.095)		(0.024)
Proportion of tenured officials	1.0418**		0.2584**
	(0.429)		(0.106)
BNDES loans in municipalities with >20 thousand inhabitants	0.1109***		0.0274***
	(0.034)		(0.008)
Municipalities with> 20 thousand inhabitants	-0.1148***		-0.0285***
	(0.041)		(0.010)
60 years or more	3.0776***		0.7633***
	(0.292)		(0.072)
16 to 24 years	8.1449***		2.0199***
	(0.455)		(0.113)
Houses built in small municipalities	0.0705*		0.0175*
	(0.040)		(0.010)
GDP growth rate in small municipalities	0.2378**		0.0590**
	(0.107)		(0.027)
Gini Index 2010	1.3711***		0.3400***
	(0.116)		(0.029)
Homicide rate (2014-2017)	-0.0002	0.0024**	-0.0000
	(0.000)	(0.001)	(0.000)
Catholics	0.4884***	1.2547***	0.1211***
	(0.139)	(0.345)	(0.035)
All other Evangelicals	-0.3899**	1.9188***	-0.0967**
	(0.188)	(0.487)	(0.047)
Evangelical Pentecostals [§]	-0.7381***	1.4495***	-0.1830***
	(0.222)	(0.556)	(0.055)
Net rate of professional employment	0.0958***		0.0238***
	(0.030)		(0.008)
Log of per capita municipal expenditure on education	-0.0678***		-0.0168***
	(0.015)		(0.004)
Constant	-0.2700	1.6387***	
	(0.361)	(0.353)	
Observations	5,517	5,517	5,517

Notes: Standard error in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

§ According to the IBGE classification, this category is composed of Pentecostal and Neopentecostal churches

1.Table A3 shows the estimates of the precision sub-model, indicated in column $z_{i,}$. The values of column z_i when positive, indicate low dispersion in the distribution of variables, that is, the dispersion of μ, equation 1, tends to decrease as the parameter estimates, equation 2, decrease. According to the estimates presented above, all values in z_i are positively related to the variables presented, indicating a low variability and greater precision of the estimated values presented in column β_i.

Table A4. Estimates of the Parameters of Quantile Regressions on the Proportion of Haddad votes in the 2nd round.

Variables	τ=0,05	τ=0,15	τ=0,25	τ=0,50	τ=0,75	τ=0,90	τ=0,95
Log of the average formal sector wage income	-0.0066	-0.0477***	-0.0315***	-0.0448***	-0.0430***	-0.0515***	-0.0420***
	(0.019)	(0.014)	(0.012)	(0.011)	(0.012)	(0.014)	(0.015)
Central West	-0.2239***	-0.2065***	-0.1966***	-0.1903***	-0.1973***	-0.1976***	-0.1919***
	(0.015)	(0.011)	(0.009)	(0.009)	(0.009)	(0.070)	(0.011)
North	-0.3011***	-0.2286***	-0.2096***	-0.1731***	-0.1632***	-0.1300***	-0.1270***
	(0.014)	(0.010)	(0.009)	(0.008)	(0.009)	(0.010)	(0.011)
South East	-0.2349***	-0.2098***	-0.2039***	-0.1981***	-0.1872***	-0.1781***	-0.1691***
	(0.012)	(0.009)	(0.007)	(0.007)	(0.008)	(0.009)	(0.009)
South	-0.2518***	-0.2062***	-0.2002***	-0.1880***	-0.1756***	-0.1736***	-0.1607***
	(0.015)	(0.010)	(0.009)	(0.008)	(0.009)	(0.011)	(0.011)
Illiterate	0.2653***	0.2652***	0.3185***	0.3171***	0.2432***	0.1368*	0.1579**
	(0.097)	(0.068)	(0.059)	(0.055)	(0.070)	(0.070)	(0.074)
Elementary Education level	-1.3873***	-1.5136***	-1.4636***	-1.3231***	-1.1755***	-1.1014***	-1.0402***
	(0.213)	(0.150)	(0.129)	(0.121)	(0.132)	(0.154)	(0.163)
High School Education	0.1527*	0.1778***	0.1858***	0.1044**	0.0517	0.0409	-0.0166
	(0.080)	(0.056)	(0.049)	(0.046)	(0.050)	(0.058)	(0.061)
College Education	-0.3212**	-0.5440***	-0.5998***	-0.6602***	-0.7383***	-0.7762***	-0.6598***
	(0.145)	(0.102)	(0.088)	(0.083)	(0.090)	(0.105)	(0.111)
Loans BNDES (yes=1; no=0)	-0.0209	-0.0221**	-0.0190**	-0.0238***	-0.0135	-0.0069	-0.0093
	(0.014)	(0.010)	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)
Houses built by Caixa Econômica Federal	-0.0263	-0.0176	-0.0124	-0.0138	-0.0193*	-0.0631***	-0.0651***
	(0.018)	(0.012)	(0.011)	(0.010)	(0.011)	(0.013)	(0.014)
Proportion of pensioned retirees	-0.0800*	-0.1339***	-0.0861***	-0.1138***	-0.0822***	-0.0626*	-0.0636*
	(0.045)	(0.032)	(0.027)	(0.026)	(0.028)	(0.033)	(0.035)
Mayors belonging to parties on the left(yes=1; no=0)	0.0192**	0.0105**	0.0077*	0.0178***	0.0086*	-0.0003	-0.0064
	(0.008)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)
Proportion of PBF beneficiaries	0.6574***	0.7027***	0.7746***	0.7999***	0.9576***	0.8521***	0.8884***
	(0.119)	(0.083)	(0.072)	(0.068)	(0.074)	(0.086)	(0.091)
GDP (2015/2016)	-0.0231	-0.0590*	-0.0617**	-0.0399	-0.0273	-0.0414	-0.0754**
	(0.047)	(0.033)	(0.029)	(0.027)	(0.029)	(0.034)	(0.036)
Proportion of tenured officials	0.1724	0.1970	0.1985	0.1559	0.4308***	0.3165**	0.3567**
	(0.217)	(0.152)	(0.131)	(0.123)	(0.135)	(0.156)	(0.165)
BNDES loans in municipalities with >20 thousand inhabitants	0.0190	0.0389***	0.0301***	0.0366***	0.0168	-0.0013	-0.0039
	(0.018)	(0.012)	(0.011)	(0.010)	(0.011)	(0.013)	(0.013)
Municipalities with > 20 thousand inhabitants	0.0075	-0.0253*	-0.0457***	-0.0528***	-0.0540***	-0.0100	-0.0091
	(0.019)	(0.013)	(0.012)	(0.011)	(0.012)	(0.014)	(0.015)
60 years or more	0.6211***	0.7377***	0.7025***	0.6720***	0.4241***	0.4200***	0.2042*
	(0.148)	(0.104)	(0.090)	(0.084)	(0.092)	(0.107)	(0.113)
16 to 24 years	1.7103***	1.9781***	1.9579***	1.6456***	1.4381***	1.2902***	1.1364***
	(0.222)	(0.156)	(0.134)	(0.126)	(0.138)	(0.160)	(0.169)
Houses built in small municipalities	0.0281	0.0019	-0.0140	-0.0084	0.0074	0.0484***	0.0497***
	(0.019)	(0.013)	(0.011)	(0.011)	(0.012)	(0.014)	(0.014)
GDP growth rate in small municipalities	0.0555	0.0757**	0.0657**	0.0382	0.0400	0.0527	0.0754*
	(0.053)	(0.037)	(0.032)	(0.030)	(0.033)	(0.038)	(0.040)
Gini Index 2010	0.2705***	0.3071***	0.2762***	0.3392***	0.3598***	0.3022***	0.2784***
	(0.059)	(0.041)	(0.036)	(0.033)	(0.036)	(0.042)	(0.045)
Homicide rate (2014-2017)	-0.0003	-0.0000	0.0001	0.0000	0.0001	-0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Catholics	0.1480**	0.1207***	0.1257***	0.1164***	0.0486	-0.0474	-0.0711
	(0.061)	(0.043)	(0.037)	(0.035)	(0.038)	(0.044)	(0.046)
All other Evangelicals	0.0976	-0.0235	-0.0857	-0.1094**	-0.1909***	-0.3415***	-0.3739***
	(0.086)	(0.061)	(0.052)	(0.049)	(0.054)	(0.062)	(0.066)
Evangelical Pentecostals [§]	-0.0766	-0.1224*	-0.1269**	-0.1726***	-0.2736***	-0.3933***	-0.4096***
	(0.100)	(0.070)	(0.061)	(0.057)	(0.062)	(0.072)	(0.077)
Net rate of professional employment	0.0431***	0.0182*	0.0115	0.0152*	0.0142*	0.0109	0.0218**
	(0.014)	(0.010)	(0.008)	(0.008)	(0.009)	(0.010)	(0.011)
Log of per capita municipal expenditure on education, federal resources	-0.0039	-0.0112**	-0.0166***	-0.0181***	-0.0323***	-0.0322***	-0.0309***
	(0.007)	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Constant	0.0201	0.4039***	0.3729***	0.5922***	0.8722***	1.1495***	1.1927***
	(0.175)	(0.123)	(0.106)	(0.100)	(0.109)	(0.126)	(0.133)
Observations	5,517	5,517	5,517	5,517	5,517	5,517	5,517

Note: Standard error in parentheses, level of significance: *** p<0,01, ** p<0,05, * p<0,1.

Table A5. Estimates of the Logit Models: individuals who used their cell phones for send text messages through the Internet or used social media platforms

Variables	Send messages (yes=1; no=0)			Social network (yes=1; no=0)		
	Logit	*Marginal Effects*	*Odds ration*	*Logit*	*Marginal Effects*	*Odds ration*
Urban (yes=1; no=0)	0.6045***	0.1213***	1.830***	0.5457***	0.1350***	1.726***
	(0.077)	(0.017)	(0.141)	(0.073)	(0.018)	(0.126)
Sex (Male=1; Female=0)	-0.3323***	-0.0604***	0.717***	-0.4302***	-0.1046***	0.650***
	(0.050)	(0.009)	(0.0356)	(0.047)	(0.011)	(0.0305)
Age	-0.0145**	-0.0026**	0.986**	-0.0303***	-0.0074***	0.970***
	(0.007)	(0.001)	(0.0068)	(0.007)	(0.002)	(0.007)
Age^2	-0.0006***	-0.0001***	0.999***	-0.0004***	-0.0001***	1.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
College Education (yes=1; no=0)	3.1100***	0.3146***	22.42***	3.1285***	0.4917***	22.84***
	(0.142)	(0.009)	(3.192)	(0.161)	(0.014)	(3.686)
High School (yes=1; no=0)	2.2541***	0.3414***	9.527***	2.5412***	0.5168***	12.69***
	(0.115)	(0.015)	(1.098)	(0.147)	(0.023)	(1.872)
Elementary Education (yes=1; no=0)	1.1364***	0.1964***	3.116***	1.4903***	0.3419***	4.438***
	(0.111)	(0.019)	(0.346)	(0.145)	(0.030)	(0.645)
Can read (yes=1; no=0)	0.2406	0.0408	1.272	0.2381	0.0566	1.269
	(0.258)	(0.041)	(0.329)	(0.283)	(0.065)	(0.359)
Evangelical (yes=1; no=0)	0.3293***	0.0578***	1.390***	0.1415*	0.0343*	1.152*
	(0.076)	(0.013)	(0.105)	(0.074)	(0.018)	(0.0856)
More than 10 wages (yes=1; no=0)	1.3521***	0.1677***	3.866***	0.7611***	0.1681***	2.141***
	(0.224)	(0.017)	(0.865)	(0.175)	(0.034)	(0.374)
5 to 10 wages (yes=1; no=0)	0.8399***	0.1238***	2.316***	0.5128***	0.1185***	1.670***
	(0.149)	(0.017)	(0.346)	(0.126)	(0.027)	(0.210)
3 to 5 wages (yes=1; no=0)	0.6643***	0.1049***	1.943***	0.4238***	0.0997***	1.528***
	(0.110)	(0.015)	(0.214)	(0.105)	(0.024)	(0.160)
2 to 3 wages (yes=1; no=0)	0.3369***	0.0574***	1.401***	0.2019**	0.0485**	1.224**
	(0.099)	(0.016)	(0.139)	(0.094)	(0.022)	(0.115)
1 to 2 wages (yes=1; no=0)	-0.0978	-0.0179	0.907	-0.1362	-0.0333	0.873
	(0.091)	(0.017)	(0.0826)	(0.089)	(0.022)	(0.0779)
Up to 1 wages (yes=1; no=0)	-0.4491***	-0.0864***	0.638***	-0.4278***	-0.1054***	0.652***
	(0.092)	(0.019)	(0.0588)	(0.090)	(0.022)	(0.0588)
Skin color (white=1; not white=0)	0.0247	0.0045	1.025	0.0280	0.0068	1.028
	(0.054)	(0.010)	(0.0549)	(0.051)	(0.012)	(0.0520)
2016 (yes=1; no=0)	0.5544***	0.0927***	1.741***	0.4491***	0.1065***	1.567***
	(0.069)	(0.011)	(0.120)	(0.066)	(0.015)	(0.103)
2017 (yes=1; no=0)	1.0206***	0.1598***	2.775***	0.6195***	0.1451***	1.858***
	(0.067)	(0.009)	(0.186)	(0.066)	(0.015)	(0.122)
2018 (yes=1; no=0)	1.3539***	0.2035***	3.873***	0.7481***	0.1736***	2.113***
	(0.073)	(0.009)	(0.284)	(0.067)	(0.015)	(0.141)
Has a paid job (yes=1; no=0)	0.1833***	0.0331***	1.201***	0.2621***	0.0637***	1.300***
	(0.059)	(0.011)	(0.0712)	(0.056)	(0.014)	(0.0733)
Works without pay (yes=1; no=0)	0.2234**	0.0384***	1.250**	0.2122**	0.0507**	1.236**
	(0.090)	(0.015)	(0.112)	(0.089)	(0.021)	(0.110)
Took steps to find work (yes=1; no=0)	0.4723***	0.0760***	1.604***	0.3775***	0.0885***	1.459***
	(0.117)	(0.017)	(0.188)	(0.124)	(0.028)	(0.180)
North East (yes=1; no=0)	-0.4236***	-0.0804***	0.655***	-0.2853***	-0.0700***	0.752***
	(0.075)	(0.015)	(0.0488)	(0.070)	(0.017)	(0.0528)
South (yes=1; no=0)	-0.3456***	-0.0664***	0.708***	-0.0999	-0.0244	0.905
	(0.082)	(0.017)	(0.0580)	(0.079)	(0.020)	(0.0719)
North (yes=1; no=0)	-0.4517***	-0.0894***	0.637***	-0.2547**	-0.0628**	0.775**
	(0.102)	(0.022)	(0.0651)	(0.104)	(0.026)	(0.0803)
Central West (yes=1; no=0)	-0.1488	-0.0278	0.862	-0.0596	-0.0145	0.942
	(0.124)	(0.024)	(0.107)	(0.121)	(0.030)	(0.114)
Evangelicals x CW	0.0238	0.0043	1.024	-0.0655	-0.0160	0.937
	(0.183)	(0.033)	(0.187)	(0.181)	(0.044)	(0.170)
Evangelicals x S	-0.0587	-0.0108	0.943	-0.0046	-0.0011	0.995
	(0.161)	(0.030)	(0.152)	(0.148)	(0.036)	(0.148)
Evangelicals x NE	-0.2157*	-0.0409*	0.806*	-0.1428	-0.0350	0.867
	(0.125)	(0.025)	(0.101)	(0.115)	(0.028)	(0.0997)
Evangelicals x NO	-0.2247	-0.0428	0.799	-0.2966*	-0.0733*	0.743*
	(0.156)	(0.031)	(0.125)	(0.157)	(0.039)	(0.117)
Constant	-0.3884*		0.678*	-0.6690***		0.512***
	(0.208)		(0.141)	(0.227)		(0.116)
Observations	55,223	55,223	55,223	55,223	55,223	55,223

Notes: Standard error in parentheses, level of significance: *** p<0,01, ** p<0,05, * p<0,1. Authors' elaboration, from CETIC micro data