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Roots of dissent

Trade liberalization and the rise of populism in Brazil

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Abstract: This paper investigates the long-term impact of economic shocks on populism, by exploiting a natural experiment created by the trade liberalization process implemented in Brazil between 1990 and 1995. This high impact and low duration event generated a profound shock to the economy with, we argue, long term implications for political outcomes. We focus on the 2002 and 2018 presidential elections in Brazil, which resulted in the election of a left-wing and a right-wing populist president, respectively. The results show that trade reforms explain the rise of populism in Brazil during the last two decades. Microregions with larger tariff cuts in the early 1990s had significantly higher preferences for Lula in 2002 and were also more likely to support Bolsonaro in 2018. The link between trade liberalization and populism is mediated by austerity in both cases. The shift between left-wing and right-wing preferences is driven by the supply side of populism, whereby each leader took advantage of existing cleavages in the country at the time of their election—driven by inequality in the case of Lula and by insecurity and corruption in the case of Bolsonaro—to develop narratives against austerity that would appeal to their target audiences.

Key words: trade liberalization, populism, austerity, inequality, insecurity, Brazil

JEL classification: D72, F14, I38

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1 Introduction

On 15 February 2017, the National Transportation Confederation (CNT) and the MDA Research Institute announced unexpected voting intentions in the 2018 presidential elections in Brazil. Luiz Inácio Lula da Silva (at the time still a candidate) was leading the polls, with more than 30 per cent of voters supporting him. Lula was still very popular in Brazil and once again was emerging as the 'representative of interests "from below" while advancing a political project that protected and nurtured interests "from above"—a populist ambiguity' (Andrade 2019: 1). The big news, however, was the performance of Jair Bolsonaro, whose poll numbers placed him third in the presidential race, with 11 per cent of voters expressing their support for him. This was a surprise because until then, Bolsonaro was known for his racist, misogynistic, and anti-LGBT views, as well as for his nostalgia for the military dictatorship—views deemed unlikely to muster much support among the majority of Brazilian voters. But his populist political agenda, centered around the promise of fighting criminality and stopping political corruption, resonated among many discontented voters who had become disillusioned with the corruption scandals that characterized the incumbent government and the rise in crime and insecurity in Brazilian urban areas. In an unpredictable twist of fate, Bolsonaro was sworn in as President of the Republic of Brazil on 1 January 2019.

Much has been written about the rise of Lula and the *Partido dos Trabalhadores* (PT), supported by workers and low-income groups, and the drastic shift of Brazilian middle class voters to far-right Bolsonaro.[1] Most analysts emphasize the role of social dissatisfaction with economic recession, rising inequality, insecurity, and political corruption. Either individually or collectively, all these factors influenced electoral outcomes in Brazil in the immediate term. But the rise of populism in Brazil since the early 2000s has mirrored a global trend with deep roots in processes of globalization (Rodrik 2018). In line with this historical perspective, this paper traces the rise of populism in Brazil—represented both by the victory of Lula earlier in 2002 and later of Bolsonaro in 2018—to subnational economic shocks caused by the process of trade liberalization initiated in Brazil in the early 1990s.[2] We address two specific questions: How have economic shocks affected the long-term rise of (left- and right-wing) populism in Brazil? And, what demand and supply mechanisms explain this rise, as well as shifts between left- and right-wing populism?

To answer these questions, we exploit a set of trade reforms that took place in Brazil between 1990 and 1995, which resulted in a reduction of trade tariffs from 30.5 to 12.8 per cent over that period. This was a high impact, unexpected, and low duration event. Tariffs were suddenly cut in an attempt to modernize Brazil's economy and remained relatively constant thereafter, with large variation across different sectors. These reforms represented an important historical juncture characterized by dramatic changes in the organization of Brazil's economy. Taking advantage of the natural experiment afforded

[1] For instance: https://www.theguardian.com/world/2019/may/01/how-brazil-and-south-africa-became-the-worlds-most-populist-countries; https://www.newyorker.com/magazine/2019/04/01/jair-bolsonaros-southern-strategy.

[2] This analysis complements a number of emerging studies showing how the 1990–95 trade reforms shaped labour market outcomes in Brazil in the long term, in terms of employment (Dix-Carneiro and Kovak 2017), earnings (Dix-Carneiro and Kovak 2017; Kovak 2013), gender effects (Gaddis and Pieters 2017), and formal and informal employment transitions (Dix-Carneiro and Kovak 2019). This trade liberalization process has also been shown to have affected crime rates in Brazil (Dix-Carneiro et al. 2018).

by the 1990—95 trade reforms, we show that variation in sectorial tariff cuts at the microregion level induced by trade liberalization explain the rise of populism in Brazil over the next two decades.

These findings add to a growing literature on the political consequences of economic shocks. Traditionally, political preferences have been considered to be the expression of beliefs deeply rooted in voters' minds (Campbell et al. 1960). However, several studies since the 1990s have shown how adverse economic shocks can lead to both short- and long-term changes in voting preferences and voting behaviour (Ahlquist et al. 2020; Funke et al. 2016; Healy and Malhotra 2013; Jackman and Volpert 1996; Kinder and Kiewiet 1981; Lewis-Black and Stegmaier 2000). In particular, an emerging body of literature has linked the recent rise of populism in the USA and Europe to economic changes driven by processes of globalization and trade liberalization (Autor et al. 2020; Di Tella and Rodrik 2019; Margalit 2013; Rodrik 2018).[3]

Globalization affects voting outcomes because the social and economic reforms associated with globalization processes can magnify social conflicts between those that benefit from them and those that lose out, which will in turn shape how political beliefs are formed and evolve. The existing literature has studied three types of economic change associated with globalization that have affected profoundly political outcomes, including the recent rise of populism and nationalism in the USA and Europe.[4] The first has to do with technological progress and increased automation, and its effects on low-skilled labour sectors (Acemoglu and Autor 2011; Autor 2014; Frey et al. 2018). The second is represented by the 2007–08 global financial crisis, which led to adverse effects on unemployment and economic security across many parts of the world (Algan et al. 2017; Dal Bó et al. 2019; Dehdari 2019; Dustman et al. 2017; Funke et al. 2016; Gidron and Mijs 2019; Guiso et al. 2017; Mian et al. 2014), compounded by austerity programmes characterized by severe cuts in social spending and rises in taxes (Dal Bó et al. 2019; Fetzer 2019). The third is the rising competition in advanced economies from low-wage imports, particularly from China (Autor et al. 2020; Barone and Kreuter 2019; Caselli et al. 2020; Che et al. 2016; Colantone and Stanig 2018a, 2018b, 2018c; Dippel at al. 2015; Margalit 2013; Malgouyres 2017).

Building on these studies, we focus in this paper on the effect of trade reforms driven by the far-reaching process of economic liberalization that took place in Brazil in 1990–95. The focus on Brazil is an important contribution of the paper since existing research has largely concentrated on the determinants of populism in advanced economies. Populist policies everywhere tend to be associated with the undermining of political institutions and worsening economic performance (Guriev and Papaioannou 2020; Rodrik 2018). These effects are likely to be particularly problematic in countries with more unstable democracies and weak institutions.

The study of Brazil allows us to advance the existing literature in two additional innovative directions. The first is the analysis of the long-term effects of trade reforms on two different forms of populism—Lula's left-wing populism in the early 2000s and Bolsonaro's right-wing populism in the late 2000s. This is an important advance to the literature because quantitative studies of populism have seldom observed or explained shifts between different forms of populism. The second is the identification of

[3] A complementary body of research has emphasized the role of cultural factors in fuelling populism (Fukuyama 2018; Mutz 2018; Norris and Inglehart 2019), including how increases in migration may have increased support for right-wing parties (Dustmann et al. 2019; Halla et al. 2017; Mayda et al. 2018).

[4] This literature is reviewed in detail in Rodrik (2018) and Guriev and Papaioannou (2020).

important demand and supply mechanisms that explain the long-term political effects of the trade reforms, as well as of electoral shifts to left-wing populism in 2002 and to right-wing populism in 2018. Despite calls for research on these mechanisms (Guriev and Papaioannou 2020), not much is known empirically about how demand and supply mechanisms (and their interaction) affect the rise of (different varieties of) populism and populist leaders.[5]

In line with the literature on trade liberalization and populism in the USA and Europe (Autor et al. 2020; Che et al. 2016; Colantone and Stanig 2018a, 2018b), we find that trade reforms explain a large proportion of the rise in populism in Brazil. One interesting new result is the fact that microregions with larger tariff cuts in the early 1990s showed a significantly higher preference for Lula in 2002 *and* higher levels of support for Jair Bolsonaro in 2018. This seemingly paradoxical finding speaks to an ongoing debate about what type of populism may emerge from economic shocks. While some studies show that economic shocks can increase support for the left (Alt et al. 2017; Wright 2012), the majority argue that such shocks motivate people to embrace anti-establishment narratives and support right-wing populist parties (Margalit 2019). Using historical data, De Bromhead et al. (2013) show that far-right parties managed a stronger hold in the 1920s and 1930s in European countries that experienced longer economic downturns following the Great Depression, whereas Funke et al. (2016) show a strong association between economic downturns and far-right voting in 20 advanced economies over the period between 1870 and 2014. More recently, several studies have shown similar results in post-austerity Europe (Guiso et al. 2017), during the Brexit vote in the UK (Fetzer 2019), and in Sweden (Dal Bó et al. 2019; Dehdari 2019).

Using a long-term lens and taking advantage of two distinct periods of populist vote for left and right, respectively, we observe that exposure to the trade shocks in Brazil led to increased preferences for both radical left and extreme right, albeit in different time periods. We show further that the results do not reflect only the individual popularity of each candidate but represent rather an actual shift in voting preferences to the left before 2002 and to the right before 2018. Although few quantitative studies of populism have been able to distinguish between the economic drivers of different varieties of populism, this finding is consistent with the view proposed by sociologists and political scientists that all forms of populism promote a process of political identification (Müller 2016), resulting in a narrative built from an 'outside' (Futak-Campbell and Schwieter 2020).[6] Both Lula and Bolsonaro advocated for policies able to meet a series of social and economic demands that had remained ignored by traditional political actors. Both also built political agendas that reflected the will of the 'pure people' (Mudde 2004) and appealed to a larger share of voters, thanks to a language that was more direct and easier for ordinary citizens to understand (Canovan 1999; Moffitt and Tormey 2014).

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[5] One exception is Guiso et al. (2017) who analyse the drivers of populism in Europe by combining both demand and supply side factors. Their results show that economic insecurity benefitted populist parties overall, with far-right parties more likely to perform better in elections in countries with a history of right-wing voting preferences and an influx of migrants. Left-wing parties performed better in countries with a traditional left-wing inclination and with high levels of inequality. In contrast to this paper, we focus on the electoral victory of two populist leaders (rather than marginal improvements in election results of different parties) and show that shifts in varieties of populism can happen in the same country without necessarily a prior historical inclination to either type of populism (as was the case of Bolsonaro's victory in particular).

[6] It is important to note that there is no single definition of populism (see Mudde 2004 and Gidron and Bonikowski 2013 for detailed discussions) but, in general, forms of populism are characterized by 'an anti-establishment orientation, a claim to speak for the people against the elites, opposition to liberal economics and globalization, and often (but not always) a penchant for authoritarian governance' (Rodrik 2018: 1).

We go one step further and show that this result—that trade liberalization shaped both left and right populism—is explained by the fact that both elections were preceded by periods of severe austerity. Although it is well-established in the literature that the economic consequences of globalization drive political attitudes, the mechanisms underlying these changes are generally not well understood. Based on an emerging literature on the political consequences of austerity (Fetzer 2019; Galofré-Vilà et al. 2017; Guriev and Papaioannou 2020), we propose that the severe economic crises and periods of austerity that preceded the elections of both Lula and Bolsonaro magnified the costs associated to prior processes of trade liberalization. Economic crises and their aftermath of austerity can stir citizens' dissatisfaction and radicalization, leading to a drop in trust in traditional parties and the ruling class creating a fertile ground for populist parties to gain strength in the political arena (Guiso et al. 2019). Lula was first elected in 2002 as the first presidential candidate from the *Partido dos Trabalhadores* (Workers' Party)—a political party created outside Brazilian elites—against a backdrop of the severe economic downturn that followed the trade reforms of 1990–95 and the 1999 austerity package implemented by the incumbent administration. In 2018, Bolsonaro won the presidential election also against the backdrop of a dramatic economic crisis and the aftermath of another austerity programme implemented by his predecessors. We show explicitly that cuts in social spending in periods before the two political elections promoted the surge of populism in Brazil in microregions previously affected disproportionately by the tariff cuts of 1990–95. We test the austerity mechanism against alternative 'cultural backlash' mechanisms proposed in the literature and find no evidence that our results are explained by changes in cultural values. At least in Brazil, economic factors seem to play a stronger role in explaining the effect of trade liberalization on the rise of (both right-wing and left-wing) populism.

But even though austerity explains the demand for both forms of populism, we also find that the shift from Lula's left-wing populism to Bolsonaro's right-wing populism was shaped by how each leader supplied their own version of populism. Both took advantage of existing cleavages in the country at the time of their election—driven by inequality in the case of Lula and by insecurity and corruption in the case of Bolsonaro—to develop narratives against economic austerity that would appeal to their target audiences. Taken together, these findings open important paths for future research on the economic determinants of populism by highlighting the importance of both demand and supply factors as mechanisms shaping the relationship between economic shocks and populism in the long-term, as well as the factors that may determine the type of populism that may emerge from economic shocks in different contexts.

The paper proceeds as follows. Section 2 discusses the trade liberalization reforms that took place in Brazil in the 1990s and how the country's political landscape evolved during the 1990s and 2000s. Section 3 presents the data, and Section 4 introduces the paper's empirical strategy. Section 5 discusses the main results. Section 6 analyses the demand and supply mechanisms that explain Lula and Bolsonaro's forms of populism, respectively. Section 7 concludes the paper.

2 Trade liberalization and political changes in Brazil

Like most of Latin America, the political history of Brazil after World War II has been volatile. After an initial democratic period, a military *junta* took power in 1964 limiting political expression and rights. During this period, the political system was bipartisan with a pro-government party, the *Aliança Renovadora Nacional* (ARENA), and an opposition party, the *Movimento Democrático Brasileiro* (MDB).

MDB won its first election in 1985, discrediting the *junta* and providing the chance for a transition towards democracy. The winner of the 1985 elections, Tancredo Neves, died before he could be appointed president and his vice president José Sarney was nominated in his place. Sarney's government faced an ongoing economic recession and ravaging inflation and, although his policy of price controls and debt default won him the popular vote in April 1985, the economy ultimately collapsed, and hyperinflation devastated the country. Sarney managed to stay in power until 1990, when liberal Fernando Collor de Mello was appointed president.

In 1990, the Collor de Mello's government started an aggressive liberalization process by abolishing the list of suspended import licenses and eliminating existing customs regimes. Trade liberalization was especially pronounced in 1994 when tariff cuts were further encouraged by the introduction of Mercosur, a South America trade bloc (Kume et al. 2003). Gradual reduction of import tariffs continued until the end of 1995. As a result, import tariffs decreased from 30.5 per cent to 12.8 per cent over the period between 1990 and 1995 and remained relatively stable thereafter. This reduction was uneven, with large variation across different sectors. For instance, tariff changes in the agriculture and mining sector were relatively small, whereas sectors such as apparel and rubber were subject to tariff reductions of almost 30 percentage points (Dix-Carneiro and Kovak 2017). Importantly, as shown in detail in Dix-Carneiro and Kovak (2017), these tariff reductions were almost perfectly correlated with pre-reform levels, with sectors with initial larger important tariffs experiencing the greatest reductions. We make use of this tariff variation in our empirical identification strategy below.

President Collor de Mello resigned in 1992 just before being impeached for corruption charges. His government also failed to control the high levels of inflation that had been devastating the country for the past 40 years. His successor, former Minister of Economy Fernando Henrique Cardoso, took over and remained president until 2002. In order to contain the economic downturn, the Cardoso administration launched the *Plano Real*, which ultimately succeeded in reducing inflation. Positive results were achieved by developing a new (and currently in use) currency, pegged to the US dollar, and by restricting government expenses and raising interest rates on sovereign debt. Cardoso privatized public services and state-owned companies and welcomed foreign investment. Despite improvements, the Brazilian economy faced mounting pressure in the second half of 1990s from the Asian and Russian financial crises. In the third quarter of 1998, Brazil suffered a speculative attack on the Brazilian real, while international reserves dramatically decreased (Afonso et al. 2016). After an intervention by the IMF and the adoption of a floating exchange rate regime, at the beginning of 1999, the government adopted an inflation-targeting regime and introduced a number of fiscal policy measures to promote fiscal consolidation (Ayres et al. 2019). But, in 2001, the Brazilian economy faced another deterioration due to the US recession and the crisis of the Argentinian peso. As a result, Cardoso's popularity started decreasing as unemployment increased and social indicators worsened. While Cardoso attributed these adverse conditions to international factors, the *Partido dos Trabalhadores* (PT) (a social democratic political party founded in 1980 and the main opposition party at the time) blamed the incumbent government and its neoliberal agenda (Campello 2013). Popular discontent paved the way for Lula's electoral victory in 2002.

Once elected, Lula largely kept the main macroeconomic policies that the previous government had implemented. After 2005, however, fiscal targets were gradually relaxed and state intervention and spending increased as Lula's administration moved towards a more traditional left-wing social programme (Ayres et al 2019). Lula's government (2003–11) succeeded in reducing poverty and inequality largely through social policy measures, including *Fome Zero* and *Bolsa Familia* plans to fight

hunger and provide social assistance to Brazilian most vulnerable families, which resulted in considerable welfare improvements across Brazil.

After Lula's two presidential terms, Dilma Rousseff (also from PT) won the presidential elections in 2010 on the back of these social and economic achievements. From 2012 onwards, the Brazilian economy started to show signs of exhaustion. In 2015 and 2016, the country went through a profound economic recession recording negative GDP growth rates of -3.5 and -3.3 per cent, respectively (Spilimbergo and Srinivasan 2018). The economic crisis occurred alongside a major political crisis linked to a large corruption scandal uncovered by the Operation Car Wash, which resulted in the impeachment of President Rousseff in August 2016 (Hunter and Power 2019; Mello and Spektor 2018). Michel Temer—who had been the vice president since 2011—took office and carried out an austerity programme called 'A Bridge Towards the Future' initiated by his predecessor. These measures did not help promoting economic recovery and contributed to worsening social indicators and increasing people's dissatisfaction with traditional parties, which created fertile ground for Bolsonaro's radical programme.

In mid-August 2018, election polls indicated an almost certain victory of Lula in his renewed candidacy to president. However, at the end of that month, the Federal Electoral Court declared Lula's candidacy invalid due to his corruption conviction, and Fernando Haddad replaced him as PT's presidential candidate. This opened an opportunity for other candidates, in particular Jair Bolsonaro, the candidate from the *Partido Social Liberal* (PSL, or Social Liberal Party), a right-wing conservative party. Bolsonaro's popularity started to increase thanks to his ability to mobilize the educated middle class, as well as ultra-conservative groups, on a platform advocating the return to conservative values and the end of crime and corruption (Hunter and Power 2019). As a result, Bolsonaro won the second round of the 2018 presidential elections against Fernando Haddad with just over 55 per cent of the votes.

Both Lula's 2002 and Bolsonaro's 2018 elections represented major political turning points for Brazil after prolonged periods of dominance by rival parties. Both leaders were able to mobilize large shares of voters channeling grievances caused by the economic downturn and austerity that preceded their election. However, all these shorter-term changes can be traced to the period of economic liberalization in 1990–95, which unleashed a series of socio-economic changes that shaped political processes in the next two decades. In the next sections, we investigate the role of the 1990–95 liberalization policies in fostering Lula and Bolsonaro's populist agendas.

3 Data

The empirical analysis in this paper seeks to estimate the effect of changes in trade tariffs in the period between 1990 and 1995 on presidential election outcomes in 2002 (Lula) and 2018 (Bolsonaro). The unit of analysis is the 'microregion', where we follow the definition adopted by the Brazilian Statistical Agency (IBGE). Each microregion is based on economically integrated contiguous municipalities (counties) with similar geographic and productive characteristics (IBGE 2002). Our final sample includes 480 microregions representing the most intuitive spatial aggregation of neighbouring areas that form a local market (Dix-Carneiro and Kovak 2017). To account for potential changes in the shape and size of microregions between 1990 and 2018, we use the 1991 fixed boundaries throughout

the study,[7] in line with the approach proposed in Dix-Carneiro et al. (2018) and Dix-Carneiro and Kovak (2019).

3.1 Tariff changes

Our study uses data on tariff changes from Kovak (2013). In his original contribution, Kovak (2013) developed an index of local economic shocks, which exploits the fact that regions tend to specialize in the production of different goods and that industries are affected by trade shocks in varying degrees. The exposure of each microregion to the 1990–95 trade liberalization reforms is measured using the interaction between sector-specific trade shocks and its sectoral composition. The main hypothesis being tested is that economic conditions have worsen in microregions that specialized in the sectors for which tariffs were reduced the most. Reductions in the level of tariffs within each region are measured as the industry-weighted average of liberalization-induced price changes between 1990 and 1995.[8] Regional tariff changes (RTC_r) are defined as:

$$RTC_r = \sum_{i \in N} \beta_{ri}\, d\ln(1+\tau_i), \qquad \text{with} \tag{1}$$

$$\beta_{ri} = \frac{\gamma_{ri}\frac{1}{\theta_i}}{\sum_{i^I \in N} \gamma_{ri^I}\frac{1}{\theta_{i^I}}} \tag{2}$$

where r and i refer respectively to individual regions and industries. $\tau_i$is the tariff, while d is the log difference between 1990 and 1995 (the trade liberalization period). β_{ri} refers to the weights given by γ_{ri}, the initial share of region r workers employed in industry i. θ_i equals one minus the wage bill share of industry i, and N is the set of all tradable industries (manufacturing, agriculture, and mining). Kovak (2013) shows that prices of outputs from non-tradable industries are dependent on prices of locally produced tradable goods, and therefore the economic shocks of regional tariff change can be quantified by measuring tradable industries only.

Figure 1 shows the magnitude of the trade-induced shock experienced by each region over the period between 1990 and 1995. Even though the change in tariffs was implemented across all regions, Figure 1 shows large variation in exposure to the trade reforms due to the different weights each industry takes in each region (based on their regional concentration).

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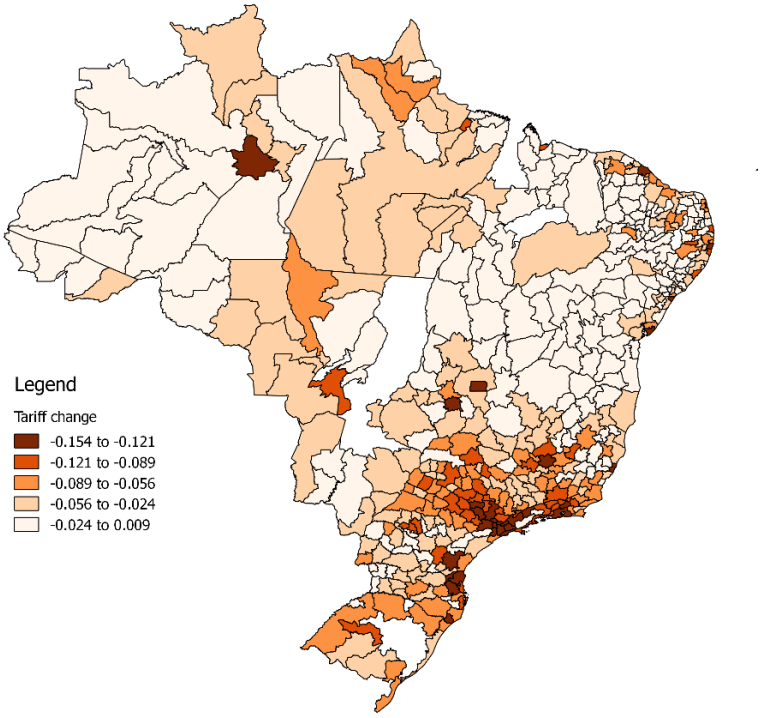
[7] These data were compiled from the *Instituto Brasileiro de Geografia e Estatística* (IBGE), *Divisão Regional do Brasil*, 2017, accessed via https://www.ibge.gov.br/apps/regioes_geograficas. Microregions were abolished in 2017 and replaced by 'immediate geographic regions'. However, we follow the older classification of microregions, which was in place through the period of our empirical analysis.

[8] Original data on trade policy on which the tariff changes calculation is based was acquired through the Brazilian Applied Economics Research Institute (IPEA) by Kume et al. (2003), who report nominal tariffs and effective rates of protection using the Brazilian input-output tables.

Figure 1: Tariff reductions by microregion



Note: regions with darker units faced the largest reductions in the level of tariffs.

Source: authors' illustration based on Kovak (2013) and Dix-Carneiro and Kovak (2017).

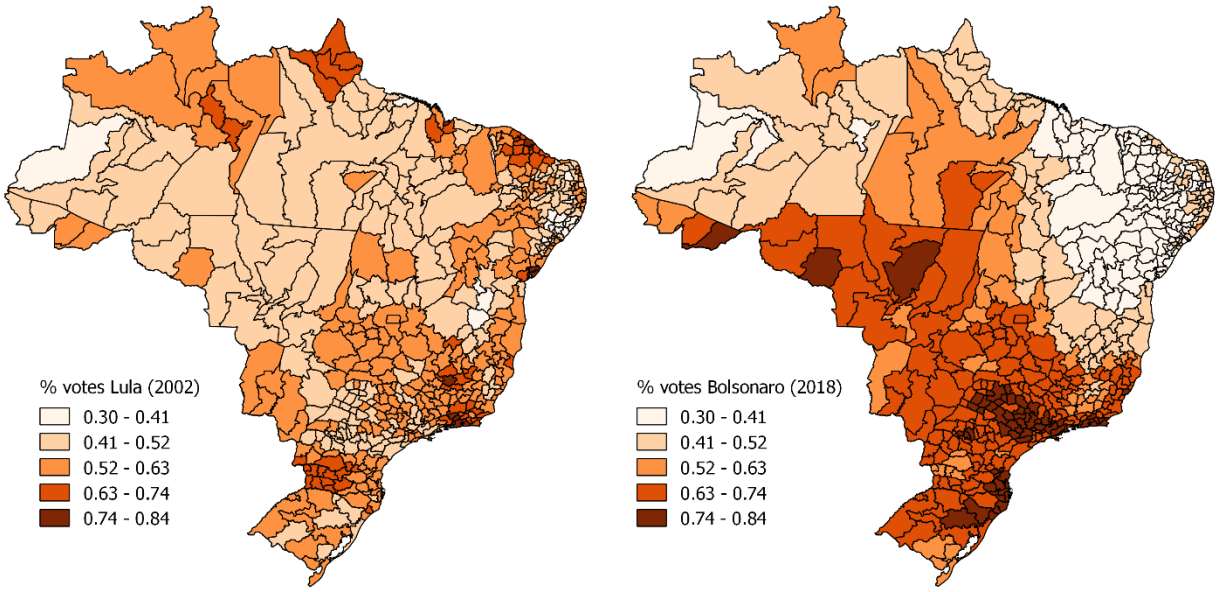
3.2 Presidential elections

Brazilian presidential elections are held every four years. Under the 1988 Constitution, vote is mandatory for literate citizens aged 18–70, and decision about the winning candidate is done over two rounds. The winning candidate is the one with the absolute majority of valid votes in the second round. We include in our dataset results for the second round of the 2002 presidential elections, when Lula first won the presidency, and the second round of the 2018 elections, when Bolsonaro won the popular vote. Data on electoral results were obtained from the Brazilian *Tribunal Superior Eleitoral*, which has been collecting detailed information on the country's elections since 1945. In order to match voting outcomes to exposure to the trade reforms, we added the number of valid votes per *municipio* (third level administrative area) for each microregion previously identified. The merging was done based on geo-localization, whereby we divided the number of valid votes obtained by the winning candidate by the total valid votes in each *municipio* to estimate the share of votes for the winners.[9] This variable is used as our main outcome in all regressions. Although different win-shares are calculated for different elections, they always refer to the share of votes obtained by the winner regardless of their political affiliation.

9 In Appendix D, we calculate candidate win share as the rate of valid votes over total (rather than just valid) votes (i.e. including null and blank votes) as a robustness check, since null and blank votes are commonly used as a form of protest, particularly in countries where voting is compulsory. Results remain unchanged when using this alternative measure. We discuss this point in more detail in the next sections.

As mentioned above, we use the 1991 fixed microregion boundaries to define our unit of analysis. Given that we obtained vote share information at *municipio* level for different points in time, we need to consider the fact that *municipios* and microregions boundaries might not match perfectly. We adopted alternative matching methods to aggregate the information for each *municipio* at the microregion level. These methods are explained in detail in Appendix A. We present in the main text of the paper results based on the most robust and comprehensive outcome obtained by aggregating the vote share results of *municipios* that intersect the polygons of micro-regions (as discussed in Appendix A). Alternative regression estimates (which remain unchanged across different matching methods) are presented in Appendix A too. We also tested the robustness of our main results to the use of *municipios* as the main unit of analysis (in Appendix D) and show that the main results remain largely unchanged.

Figure 2: Presidential votes by microregion



Note: regions with darker units showed the largest shares of votes for Lula (2002) and for Bolsonaro (2018).

Source: authors' calculations based on data from the *Tribunal Superior Eleitoral*.

4 Empirical strategy

The Brazilian case provides a unique context to investigate the impact of economic shocks on political outcomes due to the natural experiment afforded by the 1990–95 trade reforms. The natural experiment derives from the fact that these trade reforms were a one-off policy (all tariff reductions took place between 1990 and 1995) with permanent effects, as tariffs remained stable afterwards (see Appendix E, especially Figure E2, which shows the stability of the tariffs after 1995). This feature of the Brazilian trade liberalization reforms allows us to investigate the causal impact of exposure to tariff reductions across micro-regions within states on citizens' electoral preferences. Equation 3 formalizes our main econometric strategy:

$$V_r = \beta_1 RTC_r + \beta_2 X_{1991} + \sigma_{ri} + \varepsilon_r, \quad (3)$$

where V_r is the share of votes of the winning presidential candidate for microregion *r*. RTC_r represents tariff changes between 1990 and 1995. In order to simplify the interpretation of the results, RTC_r is more positive in microregions experiencing larger tariff cuts. *X* is a vector that includes a series of control variables: the share of people aged 17 years old and over, the share of white people in the total population,[10] the share of people with secondary or higher education, employment status, income per capita, and inequality.[11] Data were compiled from the Brazilian Census, which have been collected systematically every ten years since 1890.[12] Unfortunately, there are no Census data available just before the time of the liberalization process. Hence, we make use of Census data for 1991 harmonized by the Minnesota Population Center's Integrated Public Use Microdata Series (IPUMS International) (Minnesota Population Center 2019). Following Kovak (2013), our assumption is that local economic conditions are likely to have responded slowly to the tariff changes, and therefore it is unlikely that microregional characteristics in 1991 are affected by the trade reforms that started in 1990. To address potential concerns about possible reverse causality, we replace our controls and make use of Census data for the years 1980, when trade liberalization policies had not yet been designed. These results are presented in Appendix D and show that our estimates remain unchanged when using controls based on the 1980 Census.

Equation 3 includes also state-fixed effects σ_{ri} to account for the fact that many institutions (and policies) in Brazil are decentralized at the state government level and might have a key role in shaping voters' preferences. We clustered standard errors by mesoregion—i.e. groups of microregions as defined by the national *Instituto Brasileiro de Geografia e Estatística* (IBGE)—to allow for spatial correlation in error terms across border regions facing the same political choices. To make the results representative at the national level, regressions are weighted by population in 1991. We checked the robustness of our baseline results to alternative clustering and weights in Appendix D and show that results remain unchanged across all different specifications.

The main identification assumption of our model is that tariff changes are uncorrelated with the error term, so that β_1 is consistently estimated. Following the argument in Goldberg and Pavcnik (2005), Kovak (2013) shows that changes in tariffs over the period between 1990 and 1995 were highly correlated with the pre-liberalization tariff levels. In particular, industries with more protection before the 1990s experienced the greatest tariff cuts. Concerns about confounding effects to do with the political economy of tariff reductions are lessen by the fact that changes were clearly associated with an overall protective structure which was set up in the 1950s, well before the time of liberalization process occurred in the early 1990s (Dix-Carneiro et al. 2018; Kume et al. 2003). We show this to be the case and test in detail the validity of this exogeneity assumption in Appendix E. We run also an additional placebo test (results shown in Appendix E) to test whether presidential elections that took place before the liberalization period (in 1955, 1960, and 1989) are in any way correlated with tariff changes. Table E1 shows that the effect of tariff changes on these earlier elections is never statistically significant.

[10] The main ethnic groups in Brazil are, in order of prevalence, White, Mulatto, Black, Asian, and Native.

11 More information about these data and how these variables were constructed is included in Appendix B.

[12] The first Brazilian Census was conducted in 1808. 1890 is the year of the first Census of the Brazilian Republic.

5 Results

5.1 Main results

We first analyse the effect of the 1990–95 trade reforms on the share of votes gained by Lula in the 2002 elections. Results reported in Column 1 of Table 1 show that there is a significant positive relationship between Lula's vote share and regional tariff changes: in particular, regions that faced a larger exposure to foreign competition (higher positive *RTC*) in 1990–95 are also the ones in which Lula collected the most votes in the second round of the presidential elections in 2002. In Columns 2 and 3, we add population weights and state fixed effects. The coefficient of tariff reductions increases slightly, suggesting that our main result holds (and improves) when we control for the different size and characteristics of the units of analysis. After adding all controls, the impact of tariff cuts on Lula's vote share remains positive and highly significant (Columns 4–6). The coefficient estimate in Column 6 shows that a region that recorded a 10 percentage points larger tariff reduction in 1990–95 experienced an increase of 8.88 percentage points in voters' support for Lula almost a decade later.

Table 1 also shows that regions more affected by the tariff cuts in 1990–95 supported Jair Bolsonaro's presidential election in 2018. Interestingly, when adding controls, the magnitude of the coefficient of tariff changes is almost identical in 2018 and in 2002 (Columns 10–12): a region that experienced tariff reductions of 10 percentage points in 1990–95 reported a 9.21 percentage points increase in voters' support for Bolsonaro in 2018.

Table 1: Tariff changes and Lula and Bolsonaro vote share

	Lula's vote share 2002						*Bolsonaro's vote share 2018*					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Tariff reductions	0.733***	1.049***	1.125***	0.670***	0.814***	0.888***	2.728***	2.014***	0.658***	0.568***	0.954***	0.921***
	(0.145)	(0.489)	(0.180)	(0.145)	(0.220)	(0.211)	(0.269)	(0.298)	(0.162)	(0.130)	(0.213)	(0.218)
Adult (%)				1.430***	0.964**	0.626				0.130	-0.104	0.046
				(0.360)	(0.386)	(0.448)				(0.429)	(0.456)	(0.513)
White pop (%)				-0.394***	-0.444***	-0.430***				0.492***	0.426***	0.420***
				(0.096)	(0.110)	(0.110)				(0.111)	(0.102)	(0.099)
High education (%)					-0.235	-0.621					-0.795	-0.623
					(0.671)	(0.697)					(0.684)	(0.703)
Employment (%)					0.567*	0.608**					-0.056	-0.074
					(0.295)	(0.2982)					(0.317)	(0.322)
Income per capita					0.020	0.020					0.077***	0.078***
					(0.021)	(0.021)					(0.024)	(0.024)
Gini						0.399*						-0.178
						(0.229)						(0.226)
Constant	0.507***	0.489***	0.483***	0.023	0.092	0.098	0.338***	0.337***	0.448***	0.197	0.404*	0. 401*
	(0.00805)	(0.0131)	(0.0131)	(0.142)	(0.202)	(0.200)	(0.022)	(0.027)	(0.013)	(0.170)	(0.209)	(0.210)
Population weights	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
State fixed effects	N	N	Y	Y	Y	Y	N	N	Y	Y	Y	Y
Observations	480	480	479	479	479	479	480	480	479	479	479	479
R-squared	0.119	0.309	0.692	0.730	0.737	0.741	0.273	0.306	0.901	0.922	0.928	0.928

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Controls are referred to 1991. Regressions from Column 2 to Column 6 are weighted by microregion population. Regressions from Column 2 to Column 6 include state fixed effects. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

5.2 Shifts along the right-left axis

The results above show a clear causal effect of the 1990–95 trade reforms on preferences for left-wing populism (Lula) in 2002 and for right-wing populism (Bolsonaro) in 2018, with similar magnitudes for both. In this section, we ask whether this result was due to the popularity and charisma of both candidates or whether this effect reflects an actual shift in voting preferences to the left in 2002 and to the right in 2018. Latin America has had its fair share of popular and populist political leaders. If the results above reflect the popularity of Lula and Bolsonaro as individuals, then it is unclear whether the trade reforms generated real changes in political preferences. To probe this further, we analyse in this section the impact of tariff cuts on changes in preferences from right to left in the time preceding the 2002 election of Lula and changes from left to right in the time preceding the 2018 election of Bolsonaro. We consider not only the results in the national elections but also those that took place at state level.[13] This allows us to test whether the elections of Lula and Bolsonaro are in line with actual changes in voting preferences before they took place, both at national and at subnational level.

As before, data on presidential and state elections are obtained from the *Tribunal Superior Eleitoral*. At national level, vote shares for the second round of the presidential elections were compiled at *municipio* level and averaged for microregions using the matching method discussed in Appendix A. Shifts along the right-left axis were then calculated by comparing vote shares across microregions for left-wing candidates between 1989 and 2002 (Lula was the left-wing candidate in both cases), and for right-wing candidates between 2002 (José Serra) and 2018 (Bolsonaro).

With respect to gubernatorial (state) elections, we calculated the vote share in the first electoral rounds for left-wing parties between 1986 and 2002,[14] and right-wing parties between 2002 and 2018. The parties considered as left-wing were those with an ideological score similar or further to the left of the PT (Lula's party) for the period 1986—2002. Symmetrically, the parties considered as right-wing are those with an ideological score similar or further to the right than the PSL in 2018 (Bolsonaro's party) in the period 2002–18.[15] Ideological scores were compiled from Faustino et al. (2019), who consider the evolution of parties ideologies through time to measure their position in the left-right continuum.

Figure 3 shows changes in voters' preferences from right to left in the time preceding the 2002 election of Lula and changes from left to right over the time period before the 2018 election of Bolsonaro. In the former case, the average shift to the left at national level was about 12 per cent (with the highest value at 37 per cent) and 22 per cent at state level (with the highest value being 79 per cent). For the period preceding the 2018 election of Bolsonaro, the average vote share for the right-wing presidential candidate at national level and for the right-wing parties at state level remained similar on average, although we observe important differences between microregions, as shown in Figure 3. It is also readily identifiable in Figure 3 that certain microregions share similar shifts for both national and state elections.

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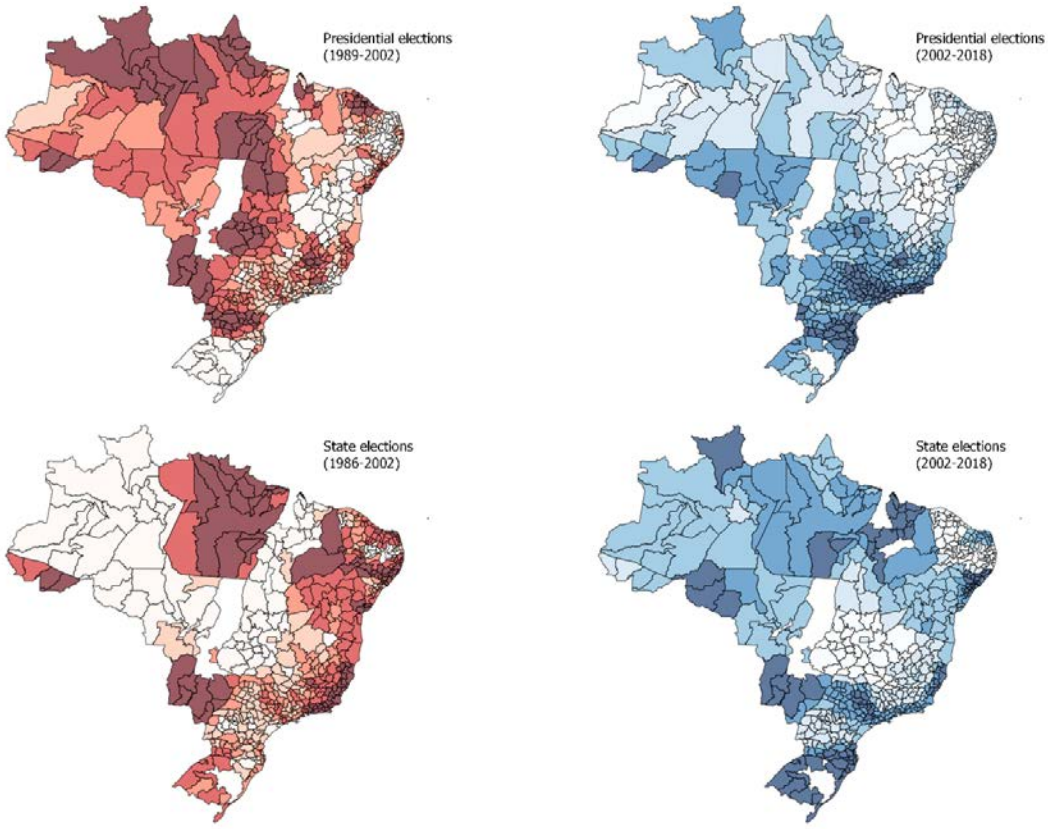
[13] We decided not to include elections of municipal-level representatives because they happen two years out of phase with state and national elections, and because it is not possible to correctly assess the political ideology of the multitude of parties, of which many are independent, that participate in these elections.

[14] We consider 1986 instead of 1989 (the comparison year used for presidential elections) because no gubernatorial elections were held in 1989.

[15] Left-wing parties vote shares included in the 1986—2002 period are the PT, PSOL, PSTU, and PSB. Right-wing parties vote shares included in the 2002–18 period are the PSL, PMDB / MDB, and PSDB.

Figure 3: Changes in voting preferences along right-left axis



Note: shades of red from lighter to darker represent larger shifts in vote share for the left between the late 1980s and 2002, while darker shades of blue represent larger shifts in vote share for the right between 2002 and 2018.

Source: authors' calculations using data extracted from the *Tribunal Superior Eleitoral.*

In order to test the effect of trade reforms on actual voting preferences, we replicated our baseline estimations and replaced the main dependent variables with the changes in voting preferences described above. Results are reported in Table 2. The results confirm that exposure to trade liberalization contributed to shifts in voting outcomes from right to left between the late 1980s and 2002 (Column 1) and to shifts in preferences towards right-wing parties over the period 2002–18 (Column 2). We observe similar results at the subnational level: tariff changes contributed to an actual shift in voting preferences from right-wing to left-wing parties in gubernatorial elections between the late 1980s and 2002 (Column 3), as well as to an actual shift in political preferences from left-wing to right-wing parties in gubernatorial elections between 2002 and 2018 (Column 4).

Table 2: Exposure to tariff changes and changes in voting preferences

	(1)	(2)	(3)	(4)
	Left win share 1989–2002 (Presidential)	Right win share 2002–18 (Presidential)	Left win share 1986–2002 (Gubernatorial)	Right win share 2002–18 (Gubernatorial)
Tariff reductions	0.863***	1.809***	0.468**	0.579**
	(0.211)	(0.261)	(0.181)	(0.274)
Constant	-0.400**	-0.501*	0.059	0.144
	(0.196)	(0.279)	(0.195)	(0.309)
Population weights	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y
Observations	479	479	476	479
R-squared	0.809	0.913	0.938	0.951

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

5.3 Additional political outcomes

We consider in this section whether the results above refer only to political preferences for left or right populism or are also reflected in other political outcomes. We consider three relevant political outcomes: electoral competition, political polarization, and political participation. Detailed information about the construction of these variables and descriptive statistics are provided in Appendix C.

Electoral competition and political polarization are two important measures of the quality of democracy since competitive and less polarized settings are expected to improve government efficiency and, in turn, produce better policies and politics (Holbrook and Van Dunk 1993; Sørensen 2014). Data on these two variables were obtained from the Municipal Ideological Score dataset built by Power and Rodrigues-Silveira (2019). This dataset processes large quantities of information extracted from original sources, such as the *Tribunal Superior Eleitoral* and the *Instituto Brasileiro de Geografia e Estatística* (IBGE). The electoral competition index is computed as the difference between the share of the vote of the two parties with most votes (Power and Rodrigues-Silveira 2019). This index ranges between 0 (highly competitive) and 1 (minimally competitive). The political polarization index measures the ideological distances between parties in policy stances. This index ranges between 0 (no polarization) and 10 (high polarization). Data on both indicators were originally acquired at municipal level and later aggregated at microregion level as described in Appendix C.

With respect to political participation, we consider both a measure of participation through conventional channels (voter turnout) and a measure of political participation through unconventional channels (protests). Voter turnout is an important indicator of how citizens engage with the political system and has been shown to be affected by economic shocks in other studies (Autor et al. 2020). At the same time, strikes, riots, and protests tend to emerge or intensify during economic downturns (Funke et al. 2016). Both variables measure different aspects of how citizens express support or discontent with incumbent governments.

Data on voter turnout in Brazil at municipal level were obtained from the *Tribunal Superior Eleitoral*. The variable includes the total number of votes (valid plus blank and null) divided by the total number of eligible voters during each presidential election. Data were originally compiled at the municipal level and later aggregated at the microregion level. It is well-established that blank and null votes can be used as a form of protest against the political establishment (Kapferer and Theodossopoulos 2019). Thus, as a robustness check, we considered also voter turnout in 2002 and 2018 without including null and blank votes, and the impact of tariff cuts on the share of blank and null votes over total votes. Results remain unchanged and are shown in Appendix C.

Data on protests were compiled from the Google's Global Database for Events, Language and Tone (GDELT) (Leetaru and Schrodt 2013), which, to the best of our knowledge, is the most powerful tool to analyse global occurrence of protests given its automated selection of events based on keywords defined in over 100 languages.[16] Detailed definitions of protests and discussion of how the data was coded is provided in Appendix C.

Results for this analysis are reported in Table 3. Interestingly, the results show that electoral competition in regions that were harder-hit by the tariff reductions in 1990–95 increased during the 2002 and the 2018 presidential elections (Column 1).[17] This contrasts with existing literature showing that political opponents have weak incentives to invest in electoral competition when populists dominate the political scene (Dyck 2019). In contrast to the findings for the USA (Autor et al. 2020), the exposure to trade reforms does not seem to be a factor contributing to party polarization in Brazil in 2002 and seems to reduce polarization in 2018 (Column 2). This is probably due to the fact that, in the case of Brazil, Lula's fall from grace allowed several other parties to attract more voters.

Regarding political participation, results show that voter turnout rates, including blank and null votes, increased in microregions that were harder-hit by the trade reforms in 1990–95: a region experiencing a tariff reductions of 10 percentage points recorded a 3.4 percentage points increase in voter turnout in 2002 and a 3.7 percentage points increase in voter turnout in 2018. This is in line with the previous evidence showing that negative economic shocks can increase political participation, while positive ones tend to reduce voter turnout (Charles and Stephens 2013; Dippel et al. 2017). Autor et al. (2020), for example, show that areas subject to larger increases in trade reform exposure in the USA recorded an increase in voter turnout of 2.6 percentage points in 2002 and of 3.3 percentage points over the period between 2002 and 2010. When blank and null votes are excluded for the calculation of the voter turnout rate, results remain positive and more than double in magnitude (Column 4). The impact of tariff cuts on the share of null and blank votes is negative but only weakly significant in 2002 (Panel A, Column 5). By contrast, trade reforms resulted in a positive and much larger impact on null and blank vote share in 2018 (Panel B, Column 5). This is not surprising considering that, in 2018 presidential elections, approximately 30 per cent of the electorate either abstained or voted blank or null votes, the higher rate since 1989.[18] Lastly, Table 3 shows that protests are not shaped by the trade

[16] The GDELT dataset has been used in various guises by different studies on the determinants of protests (e.g. Brancati and Lucardi 2018; Claassen et al. 2019; Manacorda and Tesei 2020; Ponticelli and Voth 2020).

[17] Lower values of the political competition score mean higher competition. Therefore, the negative coefficient shown in Column (1) indicates a decrease in the competition score and therefore an increase in competition for areas affected by tariffs cuts.

[18] Statistics on 2018 elections available at: https://bit.ly/3lusOQl.

reforms that took place in 1990–95 (Column 6), suggesting that the process of trade liberalization in Brazil has affected political participation through conventional channels only.

Table 3. Exposure to tariff changes and political outcomes

	(1) Electoral competition	(2) Political polarization	(3) Turnout	(4) Turnout (excluding blank and null votes)	(5) Null and blank vote share	(6) Δ Protests
Panel A—2002 results						
Tariff reductions	-0.602**	0.482	0.239***	0.350***	-0.029*	-4.077
	(0.178)	(1.013)	(0.081)	(0.096)	(0.017)	(4.644)
Constant	0.282*	5.351***	0.521***	0.417***	0.053**	-9.343*
	(0.157)	(0.917)	(0.095)	(0.113)	(0.021)	(5.221)
Observations	479	479	479	479	471	479
R-squared	0.718	0.742	0.830	0.882	0.910	0.629
Panel B—2018 results						
Tariff reductions	-0.180***	-4.086***	0.276***	0.173***	0.111***	-5.346
	(0.082)	(0.747)	(0.065)	(0.062)	(0.036)	(7.379)
Constant	0.394***	5.238***	0.549***	0.434***	0.061	-16.66**
	(0.080)	(0.859)	(0.068)	(0.064)	(0.042)	(8.211)
Observations	479	479	479	479	471	479
R-squared	0.579	0.742	0.882	0.863	0.899	0.671
Population weights	Y	Y	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y	Y	Y

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

6 Mechanisms explaining the rise of populism in Brazil

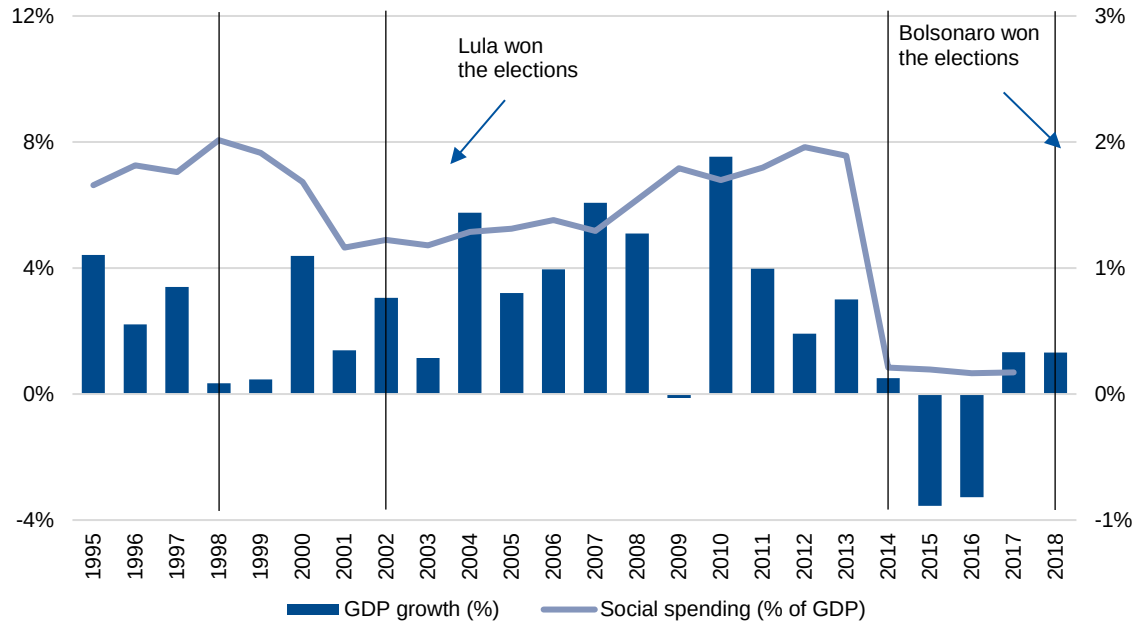
An important question we are interested in addressing in this paper is why populism has taken different forms in these two elections. To answer this question, we have to consider both the demand and supply sides of populism, i.e. what voters demand and what political actors propose to supply to ensure political mobilization (Rodrik 2018).

6.1 The demand for populism in Brazil: the role of austerity

There is evidence that the welfare state plays a key role in mitigating the costs of economic and trade liberalization (Guriev and Papaioannou 2020; Rodrik 2000; Stiglitz 2002; Stolper and Samuelson 1941) and the rise of populism (Albanese et al. 2019; Caprettini et al. 2019). But, while a well-functioning system of social protection can reduce the costs of globalization, cuts in social spending may work in

the opposite direction and worsen the living conditions of those that lose out from processes of globalization (Antràs et al. 2017; Colantone and Stanig 2018c). In fact, historically, times of austerity have been linked to major political shifts (Guriev and Papaioannou 2020), including the rise of the Nazi party in Germany in the 1930s (Galofré-Vilà et al. 2017). In the case of Brazil, as discussed in Section 2, the political successes of Lula and Bolsonaro had a clear similarity: in both cases, political change was preceded by a period of economic downturn and austerity, which resulted in severe cuts in social spending and fiscal tightening (Figure 3).

Figure 3. GDP growth rate (left axis) and social spending (right axis) between 1995 and 2018



Source: authors' calculations based on data on GDP growth rate from the World Bank Group and social spending data from the Brazilian Institute for Applied Economic Research (IPEA).

Austerity can magnify the costs associated to processes of trade liberalization in several ways. First, austerity and associated cuts in social spending may worsen people's living conditions, thereby increasing inequality and social discontent (Justino and Martorano 2018, 2019; Ponticelli and Voth 2020. Secondly, austerity may reduce trust in government institutions and incumbent administrations (Algan et al. 2017), thereby decreasing their legitimacy and support (Manacorda et al. 2011). Recently, Fetzer (2019) showed that the austerity and cuts to the welfare state since 2010 in United Kingdom played a key role in increasing the support for the UK Independence Party, as well as the support for the Leave vote in the 2016 Brexit referendum.

This section investigates how austerity may have contributed to the political outcomes discussed above by amplifying the economic consequences of the 1990–95 trade reforms. In order to capture the hypothesis that austerity may have reinforced the long-term effects of the trade reforms, we interact

our main independent variable (tariff cuts) with a variable measuring cuts on social spending.[19] Formally, we have:

$$V_r = \beta_1 RTC_r + \beta_2 WS\_cuts_r + \beta_3\, RTC_r * WS\_cuts_r + \beta_4\, X_{1991} + \sigma_{ri} + \varepsilon_r \qquad (4)$$

where V_r is the share of votes of the winning presidential candidate for microregion *r*. RTC_r represents tariff changes in the 1990–95 period. As before, RTC_r is more positive in microregions experiencing larger tariff cuts in order to simplify the interpretation of the results. WS_cuts_r is the change in welfare spending between the year of election (2002 or 2018) and the level of spending in the year of the previous election (1998 and 2014, respectively). The variable we use measures annual spending at the municipality level from the Ministry of Finance (*Ministério da Fazenda – Secretaria do Tesouro Nacional*). WS_cuts_r is more positive in microregions experiencing larger spending cuts.

Table 4 reports the results of these regressions. As expected, the interaction term is positive and statistically significant, indicating that austerity facilitated the rise of populism in the microregions that were more exposed to trade liberalization in 1990–95. In other words, the larger the cuts to welfare spending, the greater the effect of trade liberalization in favoring the electoral success of Lula in 2002 and of Bolsonaro in 2018. Interestingly, this interaction between trade reforms and fiscal policy did not play any role on Lula's election success in the 2006 political elections, which took place in a context of economic growth and large welfare improvements (see Appendix D).

Table 4: Austerity and the demand for populism

	(1)	(2)	(3)	(4)
	Lula (2002)	Bolsonaro (2018)	Lula (2002)	Bolsonaro (2018)
Tariff cuts	0.888***	0.921***	1.098***	1.122***
	(0.211)	(0.218)	(0.232)	(0.196)
Cuts on welfare spending			-0.015	-0.119**
			(0.0104)	(0.049)
Tariff cuts * welfare spending cuts			0.307***	2.969***
			(0.103)	(0.539)
Constant	0.098	0.401*	0.081	0.348
	(0.200)	(0.210)	(0.208)	(0.220)
Population weights	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y
Observations	479	479	479	479
R-squared	0.741	0.928	0.748	0.943

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

[19] Data were originally acquired from IPEA at municipal level and aggregated at the microregion level. The matching method was the same used for the main dependent variable, and discussed in Appendix A.

6.2 The demand side of populism: cultural backlash?

The results above are in line with other studies showing that the rise of populism in the USA and Europe is linked to the 2007–08 Great Recession and subsequent policies of austerity (Algan et al. 2017). But several studies have also put forward the hypothesis that rises in demand for populism reflect also a cultural backlash, whereby populism is seen by those left behind as a 'reaction against progressive cultural change' (Inglehart and Norris 2016: 2–3). This processes of 'cultural backlash' is framed theoretically by Grossman and Helpman (2020) in a model which integrates the idea of social identity into a standard trade model. The model identifies how a negative economic shock may strengthen the process of self-identification with certain social groups, which will reshape political preferences. Gennaioli and Tabellini (2019) apply a behavioural general-equilibrium framework to explain the interplay between economics and politics where trade shocks may heighten nationalist versus cosmopolitan (cultural) conflict rather than low versus high income class conflict (as in the previous section). Empirically, Enke (2020) discusses how Donald Trump's election reflected a rise of communal moral values over universal moral values, which tends to support parochialism behaviours and distrust between insider and outsider groups (Bowles and Gintis 2011). Ballard-Rosa et al. (2020) attribute the polarization of politics in the USA and the election of Donald Trump to a cultural backlash against a 'corrupt elite' borne out of processes of liberalization and globalization that have hurt the common people. In particular, they identify a strong association between preferences for authoritarianism and areas more adversely affected by trade with China. Gidron and Hall (2017) link this cultural backlash to the loss of social status among working-class men.

We test in this section the role of cultural variables as potential demand side mechanisms to explain the relationship between the 1990–95 trade reforms and the elections of Lula in 2002 and Bolsonaro in 2018. Specifically, the following equation is tested:

$$V_r = \beta_1 RTC_r + \beta_2 Cultural\_values_r + \beta_3 RTC_r * Cultural\_values_r + \beta_4 X_{1991} + \sigma_{ri} + \varepsilon_r \quad (5)$$

$Cultural\_values_r$ are measured using variables representing religiosity, support for democratic values, and levels of trust in political institutions. Religiosity is measured as the percentage of individuals per microregion who report practicing their religion frequently. We make use of this variable to assess the extent of conservative values across Brazilian regions. We measure support for democratic values using two variables. The first illustrates levels of support for democracy and is measured as the percentage of individuals who believe democracy is preferable to any other regime. Low levels of this variable may suggest preferences for authoritarianism. The second variable represents satisfaction with existing democratic institutions and is measured as the percentage of individuals reporting to be at least somewhat satisfied with the current democratic regime. Trust in political institutions is measured as the percentage of individuals who exhibit some confidence in the capacity of political parties and congress. These data are compiled from the Latinobarometro. Because Bolsonaro was also known for his racist, misogynistic, and anti-LGBT views, we also make use of data collected by the Latin America Public Opinion Project (LAPOP)[20] and Brazilian Electoral Study (BES) in order to have a better understanding of how these cultural components may have affected the 2018

[20] LAPOP is the premier academic institution carrying out surveys of public opinion in the Americas, and their AmericasBarometer is conducted in 34 countries of North, Central, South America, and the Caribbean. BES is the first Brazilian post-electoral national survey for academic purposes and is part of the Comparative Study of Electoral Systems (CSES), a worldwide study of norms, representation, and accountability according to voters' perceptions.

voting elections. We discuss these variables and report all regression estimates in Appendix F.1. In contrast with the cultural backlash literature discussed above, we find no evidence of cultural variables being a causal mechanism in the relationship between trade reforms and populism in Brazil.

6.3 The supply side of populism in Brazil: the role of inequality and crime

Crisis and austerity drive demand for political change among citizens but may not per se necessarily ensure shifts in political systems towards populism. For populism to rise, particular political actors need to emerge and be able to construct a populist narrative that will mobilize voters and capture votes. In the words of Dani Rodrik (2018: 13): 'that is where the supply side of politics comes in. Populist movements supply the narratives required for political mobilization around common concerns. They present a story that is meant to resonate with their base, the demand side'. Left-wing populism tends to emphasize income and class cleavages and targets the wealthy and large corporations. By contrast, right-wing populism seeks to magnify identity cleavages and target minority groups. The everyday experience of voters and the societal and economic contexts in which they vote shape the ability of politicians to appeal to voters through the use of either form of narrative (Guiso et al. 2017; Rodrik 2018). In contexts where class divisions are salient and inequalities are high, narratives around redistribution, economic rights, and economic fairness are likely to be upheld by left-wing populism. Right-wing populism, in contrast, is likely to amplify salient cultural cleavages along regional, ethnic, or religious lines and demonize groups that are seen as a threat to the 'common people'. These contexts can vary across countries: traditionally, Latin American countries have welcomed left-wing populism in its various forms, whereas recent populism in Europe leans towards the right-wing variety (Acemoglu et al. 2013; Guriev and Papaioannou 2020; Rodrik 2018). Although more rarely studied, supply-side narratives can also vary across time within specific countries: for instance, the strong political opposition to railway barons in the USA in the late 19th century stands in stark contrast to the right-wing populism of the current Trump administration (Rodrik 2018). We postulate that this shift in narratives has also defined populism in Brazil and explains the similar effect of trade reforms in the early 1990s (magnified by periods of austerity) on both the elections of Lula and Bolsonaro. We analyse this argument in more detail below.

Lula and the role of inequality in Brazil

In the late 1990s and early 2000s, populism in Latin American was viewed as being associated to negative perceptions about globalization and the costs of rapid trade opening, financial liberalization, and multiple economic crises (Rodrik 2018). De la Torre, for instance, argues that '[l]eft-wing populists emerged [in Latin America] as a result of widespread popular resistance to neoliberalism' (2016, 63–4). Brazil followed a similar path to other countries in the region. Austerity and neoliberal policies adopted by President Cardoso in his second term contributed to deteriorating people's living conditions and to make economic disparities more salient as the 2002 elections approached. In such a context, Lula emerged as the symbol of change, leading a political party not under the influence of Brazilian elites. This was also, as discussed above, preceded by large shifts of voters before 2002 from right to left. By the time the 2002 elections took place, ordinary people were able to easily identify themselves with Lula because he was 'one of them'.

Lula was born in a rural area in the state of Pernambuco. His family was poor and moved to São Paulo when Lula was only seven years old. He had little formal education and started to work quite early, first as street vendor and later as employee in the automobile industry. Hence, Lula easily embodied the hope of redemption for the 'forgotten people' and the only possibility to defeat traditional ruling

class in Brazil. Lula was also able to meet the social needs of an 'alliance of losers' (working class and lower middle class) of economic liberalization and globalization who were demanding more jobs, education, health, and security (Saad-Filho and Morais 2018). Lula's political agenda was inspired by a critique of capitalism and of the selfishness of Brazilian elite. During his campaign, Lula clearly expressed concern about high (and rising) levels of inequality. He argued it was time for ordinary people to be involved in the society and their voices heard. Just before the second round of the 2002 presidential elections, Lula explicitly stated that he would like his 'victory to symbolize that nobody is inferior to anybody else'—a clear message against inequality.[21]

Inequality may be therefore a good proxy to illustrate how the supply side of populism may shape the relationship between trade liberalization and political outcomes we reported in the previous section. The idea behind using inequality as a proxy is that Lula's narrative around injustice, fairness, and equality is likely to resonate more strongly in regions where inequality has risen and is visible. As before, we use an interaction term to capture how inequality may have reinforced the effect of economic shocks and contributed to Lula's election in regions more exposed to trade liberalization. Formally, we have:

$$V_r = \beta_1 RTC_r + \beta_2 Inequality_r + \beta_3 RTC_r * Inequality_r + \beta_4 X_{1991} + \sigma_{ri} + \varepsilon_r \quad (5)$$

$Inequality_r$ refers to the level of inequality in the year of election. To measure inequality, we use a Gini coefficient derived from municipal-level GDP information compiled by the IBGE. The variable is in *Reais* deflated at 2010 values. The Gini coefficient is calculated using all *municipios* within the microregions present in our dataset. To match *municipios* and microregions, we use official IBGE microregions codes (mode details in Appendix A).

Regression results are reported in Table 5. In line with our theoretical expectations discussed above, the interaction term between inequality and tariff cuts is positive and statistically significant, confirming that inequality facilitated the electoral success of Lula in 2002 in the areas more exposed to the 1990–95 trade liberalization. Interestingly, the interaction term is not significant in explaining the electoral success of Bolsonaro in 2018, largely because inequality and class divisions were not salient in 2018. What then explains Bolsonaro's election victory?

[21] The idea of Lula becoming president of Brazil generated some uncertainty and worry in the financial markets at the time of elections and credit rating agencies prompted downgraded Brazilian debt. As a result, Lula was forced to sign the '*Carta aos Brasileiros*', a document where he promised (should he win the election) to continue the prudent economic policies enacted by the previous administration (Gethin and Morgan 2018: 1). Once elected, Lula's administration was careful in continuing with policies that avoided generating inflation and the macro disequilibria familiar to previous left-wing populism in Brazil and elsewhere in Latin America (Andrade 2019).

Bolsonaro and the rising level of crime in Brazil

Bolsonaro also emerged as a symbol of change—as an alternative to politicians largely disconnected from the 'pure people' and thus unable to meet their social demands and needs.[22] However, his political agenda, and political discourse more broadly, was quite different from Lula's. The rhetorical attacks of Bolsonaro had a clear misogynous component (Barros and Santos Silva 2019). In 2016, for example, Bolsonaro argued during a TV interview that women and men should not earn equal wages because 'women get pregnant'. Bolsonaro showed sympathy for the military regime and its unorthodox methods. During Rousseff's impeachment trial, he dedicated his vote to the memory of Colonel Carlos Alberto Brilhante Ustra—recognized as a torturer during the dark time of the military dictatorship.[23] The rhetorical attacks of Bolsonaro had also clear homophobic and racist components.[24]

These facts did not seem to prevent the very groups he attacked from voting for him in the election run-off. Opinion polls showed, for example, that women's voting intentions were almost equally divided between Bolsonaro and Haddad.[25] This is because Bolsonaro's 'strongman' rhetoric resonated with widespread concerns about rising crime and instability in Brazil's society (Barros and Santos Silva 2019). Thanks to Lula's welfare programmes, inequality and poverty had been reduced considerably in Brazil by the late 2000s and these were no longer salient social cleavages.

However, the number of homicides had been continuously increasing in Brazil since the 1990s, from 33,500 in 1995 to around 56,400 in 2017. Corruption and white-collar crime were also rampant among the incumbent administration, leading to angry protests in the years before the 2018 election. In such a setting, Bolsonaro's though-on-crime rhetoric—constantly symbolized by his 'finger-gun' gesture—appealed to many voters, particularly those of middle and upper classes and business circles, who felt left behind by the policies implemented by PT (Gethin and Morgan 2018) and wanted to protect their privileged status in society (Ballard-Rosa et al. 2017). Bolsonaro's narrative reassured these voters by promising more safety and less crime even at the cost of implementing extreme responses such as restoring the death penalty.[26]

In order to assess the role of Bolsonaro's security narrative, we compiled data on levels of crime, as well as data on perceptions of security, and use these variables as proxies for how voters' experiences of insecurity may have contributed to the political outcomes discussed above. Using the same approach as above, we interact tariff cuts with a variable measuring the changes in crime/insecurity in the period before the election, as follows:

$$V_r = \beta_1 RTC_r + \beta_2 \Delta Crime_r + \beta_3 RTC_r * \Delta Crime_r + \beta_4 X_{1991} + \sigma_{ri} + \varepsilon_r \quad (6)$$

We start by measuring crime as the number of homicides recorded in each microregion in 2017. Data are originally compiled by the *Sistema Único de Saúde* (SUS) and standardized by the Institute for Applied

[22] Hunter and Power (2019) report several controversial facts involving Bolsonaro.

[23] See https://www.bbc.com/news/world-latin-america-36093338.

[24] See https://eu.usatoday.com/story/news/world/2018/10/29/jair-bolsonaro-brazils-new-president-has-said-many-offensive-things/1804519002.

[25] See http://media.folha.uol.com.br/datafolha/2018/10/28/b469d4556e176c907bad8986ccc459cd.pdf.

[26] See https://www.bbc.com/news/world-latin-america-45774849.

Economic Research (IPEA). Information is presented at microregion-level, so no matching between *municipios* and microregions is needed. Homicide rate has been considered a reliable proxy for overall criminality in Brazil in previous studies, and it has been shown to be correlated with trade shocks in the short term (Dix-Carneiro et al. 2018). Because Bolsonaro's discourse relied closely on stoking feeling of insecurity and fear (Hunter and Power 2019), we also make use of data collected by the Latin America Public Opinion Project (LAPOP) in order to have a better measure of people's perception about safety.[27] We use information on individual perception of safety in their neighbourhood. The question asked to respondents: 'Speaking of the neighbourhood where you live and thinking of the possibility of being assaulted or robbed, do you feel very safe, somewhat safe, somewhat unsafe, or very unsafe?' We created a dummy variable of value of 1 if people feel in any way unsafe in their neighbourhood (either 'somewhat unsafe' or 'very unsafe'). As in the previous cases, we averaged these values (using individual weights) at municipal level to obtain the percentage of individuals who feel unsafe in each *municipio*. We matched *municipios* with microregions using the method explained in Appendix A.

Results in Table 5 show that the interaction term between tariff cuts and changes in the number of homicides is positive but not statistically significant. However, perceptions of safety explain strongly voting preferences for Bolsonaro in regions more affected by the trade reforms in the early 1990s. These results confirm that globalization facilitated the rise of Bolsonaro's right-wing populism in the areas more exposed to tariff reductions in 1990–95 and where perceptions about unsafety were highest before the 2018 elections.

Table 5: Supply of populism—the role of inequality and crime

	(1)	(2)	(3)	(4)	(5)
	Lula (2002)	Bolsonaro (2018)	Lula (2002)	Bolsonaro (2018)	Bolsonaro (2018)
Tariff cuts	0.359	1.418***	0.685***	0.904***	-0.505
	(0.230)	(0.281)	(0.228)	(0.250)	(0.743)
Inequality	-0.0320	0.216**			
	(0.0733)	(0.0939)			
Tariff cuts * inequality	2.418**	-2.464			
	(1.082)	(1.508)			
Changes in the number of homicides			-3.91e-05	-0.00902	
			(0.0103)	(0.00713)	
Tariff cuts * changes n. of homicides			0.143	0.0604	
			(0.0980)	(0.137)	
Feeling unsafe in the neighbourhood					-0.235**
					(0.102)
Tariff cuts * feeling unsafe in the neigh.					2.603**
					(1.215)

[27] LAPOP is the premier academic institution carrying out surveys of public opinion in the Americas, and their AmericasBarometer is conducted in 34 countries of North, Central, South America, and the Caribbean.

Constant	0.191	0.311	0.316	0.0483	0.719***
	(0.216)	(0.199)	(0.202)	(0.220)	(0.265)
Population weights	Y	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y	Y
Observations	452	452	426	420	151
R-squared	0.754	0.931	0.931	0.747	0.942

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

Taken together, the results above suggest that the shift in preferences for left-wing populism in 2002 and for right-wing populism in 2018 seems to be largely explained by the supply side of these different forms of populism. On the left, Lula took advantage of the austerity period and dramatic rises in inequality to amplify economic cleavages in society. On the right, Bolsonaro also took advantage of another austerity period and associated feelings of insecurity to strengthen social divisions and gain political advantage.

The austerity of the late 1990s was addressed by Lula's government by large programmes of redistribution aimed at reducing imbalances between the poor and the rich. This good work was however undermined by PT's increased involvement in corruption scandals, which opened the opportunity for opposition parties to contest their achievements. By the time Bolsonaro rose in the polls in 2018, cynicism about PT's redistributive agenda was widespread, particularly among the middle classes. These had by then experienced a reduction in living standards during PT's successive governments, which were perceived to have benefitted the poor at the expense of the middle classes. Protests against the government to express this mounting dissatisfaction were common too (Justino and Martorano 2019).[28]

At the same time, Brazil was also experiencing a shift from class-based divisions to divisions along cultural values and education as early processes of trade liberalization and economic globalization created not only economic winners and losers but also social winners and losers. This was also felt in other parts of the world (Inglehart and Norris 2016; Norris and Inglehart 2019), where the liberal views of young, urban, and well-educated elites stood in contrast with those of older, more conservative, and less skilled workers (Gennaioli and Tabellini 2019; Gidron and Hall 2017). This process of social divide that started as globalization increased is likely to have been further exacerbated by traditional and social media (Durante et al. 2019; Zhuravskaya et al. 2020).

Testing the role of value divisions in political elections directly is not straightforward as we do not have individual level data available that can be matched to the microregion data we use in this paper. We have, however, estimated the average profiles of those who voted for Lula in 2002 and for Bolsonaro in 2018. Results are reported in Appendix F.2. These results show that Bolsonaro was supported largely by white, rich, and older voters. In the case of Lula, support appears to have been

[28] Colantone and Stanig (2018b) discuss a similar argument to explain the rise of far-right parties in Europe in the aftermath of the 2007–08 financial crisis and the subsequent euro crisis.

across all demographics. Thus, while trade liberalization and subsequent austerity policies explain the rise of populism in Brazil, narratives built by presidential candidates around existing economic and cultural divides seem to explain why seemingly similar economic changes led to two different varieties of populism in 2002 and later in 2018.

7 Conclusion

Populism is on the rise in many parts of the world and this growing trend may affect profoundly the sustainability of advanced and developing democracies alike. A lot of attention has been paid to these political changes in Europe and the USA. But populism is on the rise in developing countries too, where institutions may struggle to contain its more authoritarian features. In India, the largest democracy in the world, the BJP won a second term in landslide elections by appealing to its Hindu nationalistic constituencies and proceeding to entrench religious division across the country. In Turkey, Erdoğan's success in reducing poverty quickly slipped into populist policies that appeal to its conservative base. The same story repeats itself across many other countries. What drives the rise of populism?

This paper sought to address this question by exploring the effect of a trade liberalization process that took place in Brazil in the early 1990s and profoundly reshaped Brazil's economy, society, and politics. The trade reforms created a natural experiment whereby a high impact, low duration shock in the form of trade tariff reductions were implemented between 1990 and 1995 and remained approximately constant afterwards.

The results uncover a compelling narrative: adverse economic shocks caused by the trade liberalization process that took place in Brazil in the period between 1990 and 1995 have profoundly shaped political preferences in subsequent decades. One important finding is that exposure to trade reforms at the subnational level seems to explain both left-wing populism in the early 2000s and right-wing populism in the late 2000s. Microregions across Brazil which experienced the shock of larger tariff cuts in the early 1990s had a significantly higher preference for Lula in 2002 and were also more likely to support Bolsonaro in 2018. In both cases, the demand side of populism played the same role: austerity and adverse welfare shocks magnified the earlier trade shocks and propped up the election of two populist governments of both left and right inclinations. We find no evidence for a role in cultural factors and in 'cultural backlash' hypotheses proposed in the literature on the rise of populism of Brazil. We find however that the shift between preferences for left-wing populism in 2002 and for right-wing populism in 2018 seems to be explained by the supply side of these different forms of populism and the narratives adopted by their political proponents. On the left, Lula took advantage of the austerity period and dramatic rises in inequality to amplify economic cleavages in society. On the right, Bolsonaro also took advantage of another austerity period and associated feelings of insecurity to strengthen social divisions and gain political advantage.

These results have significant implications. Importantly, they emphasize similarities on how both left-wing and right-wing forms of populism respond to economic shocks. In both cases, shifts in voters' preferences were determined by periods of austerity that disenfranchised key voting constituencies. Economic factors seem however to determine the rise of populism itself, rather than explain its different varieties. These varieties appear to be shaped by supply-side factors whereby different

political leaders make use of relevant cleavages and contexts to drive whatever message that may mobilize votes to their own advantage.

The paper also points towards a number of questions for future research. The first has to do with the shifts in varieties of populism observed in Brazil in a period of two decades. Brazil is not unique in this respect. In Spain, anti-austerity radical-left party *Unidas Podemos* gained popularity and joined a coalition government in 2019, at the same time that a far-right party (VOX) with sympathetic views about the Franco dictatorship rose in the polls, campaigning on an anti-immigration platform. In Greece, both Syriza (left) and Golden Dawn (far-right) gained prominence in the period that followed the 2007–08 financial crisis and subsequent economic austerity programme. In Indian's latest elections, both the (right-wing) BJP and (left-wing) Congress Party run on largely populist platforms. More research is needed to better understand what factors explain shifts in the form populism takes on in different countries or in the same country across space and time. The results we discussed in this paper point towards the interaction between economic shocks (trade liberalization magnified by period of austerity before each election) and supply side contextual factors. In addition to analysing contextual variables as proxies for supply side factors, as we do in this paper, it would also be useful to measure directly how narratives of each candidate mobilize voters using textual analysis of speeches, interviews, or manifestos (see Gennaro et al. 2019). This will be an important avenue for future research on the role of supply side mechanisms on the rise of populism. Another important question for future research is how economic and cultural factors may interact at the subnational level to explain the rise of (different varieties of) populism. We used a number of variables to measure potential cultural factors, but our analysis was restricted by the availability of enough fine-grained data on the measurement of cultural characteristics, an issue that is generating large attention in the economics literature (Alesina and Giuliano 2015) and could advance further our knowledge about the rise and sustainability of populism and populist leaders.

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Appendix A: Matching

We use the share of votes obtained by the winning candidate in the 2002 and 2018 presidential elections as our outcome of interest. Official electoral data from the *Tribunal Superior Eleitoral* are available at municipal level between 1989 and 2018.[29] When matching TSE electoral results information with IBGE *municipios* geographical boundaries, unique codes assigned to each municipality did not coincide between datasets. For this reason, it was necessary to conduct matching between the two sources based on *municipios*' names and the name of the state in which they are located.[30] Following this strategy, we matched 2018 *municipios* boundaries with 2018 electoral results. But we had to match 2001 *municipios* boundaries with 2002 municipal-level electoral results since no geographical boundaries were present for 2002 in IBGE data repository.[31] In 2002, we ended up with a sample of 5,541 matched *municipios*. It was not possible to find a precise match for 21 *municipios*. In 2018, our sample includes 5,541 matched *municipios*. It was not possible to match 40 *municipios*. These are very small numbers and, overall, we were able to match more than 99 per cent of the information from the TSE electoral data with the IBGE *municipios* geographical boundaries.

A.1 Alternative methodologies for spatial matching

As mentioned above, the electoral result data we use is at *municipio* level. Since our unit of analysis is Brazil's microregion, we need to match and aggregate *municipio*-level information to the microregion-level. To ensure that the impact of tariff cuts is correctly estimated, we use microregion boundaries set at the beginning of the liberalization process in 1991, following Kovak (2013) and Dix-Carneiro and Kovak (2017). The use of the 1991 boundaries is necessary because the shape of microregions changed across the years up to the point they were officially abolished in 2017 and replaced by 'immediate geographic regions'. To produce the most robust results possible, we make use of several matching strategies between *municipios* and microregions. The first two of these methods use GIS technology, while the third method relies on identification codes for microregions and municipalities, as defined by the *Instituto Brasileiro de Geografia e Estatística* (IBGE). We discuss these three techniques below.

Method 1: Intersected municipios

The first technique we adopt is to average the municipal vote share for the winning presidential candidate between *municipios* that intersect with each microregion polygons (i.e. boundaries). A spatial matching algorithm from QGIS software identifies intersecting polygons between the two

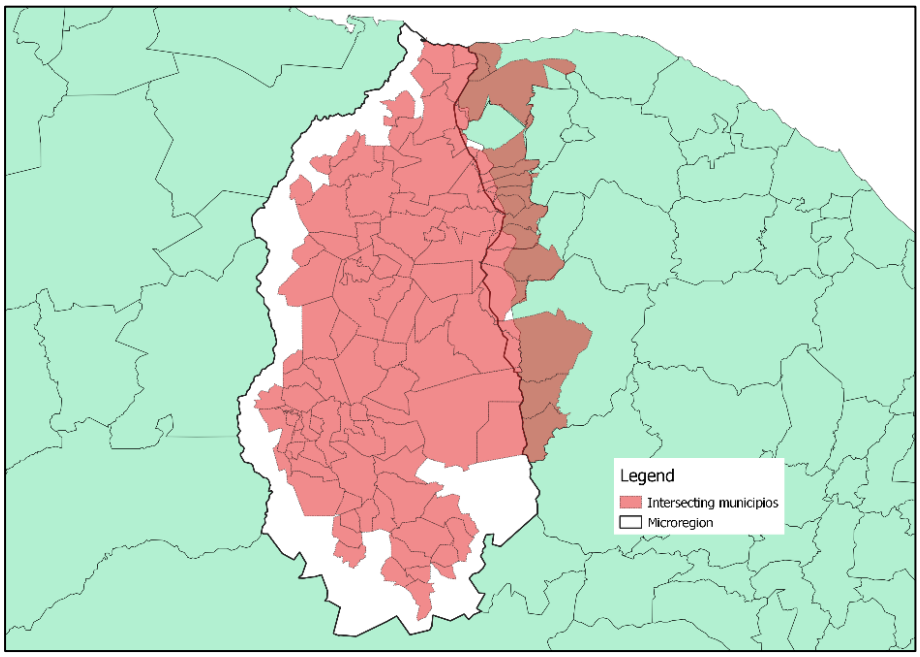
[29] The *Tribunal Superior Eleitoral* data repository reports that a revision of electoral results for the period 1994–2002 is currently being conducted by their office. For this reason, information might be lacking for some *municipios*. Our analysis finds that, although this lack of information is problematic for the 1994 and 1998 electoral results, data from 2002 is mostly complete, as it includes information for 5,565 *municipios* compared to the 5,570 included in datasets from 2006 onwards.

[30] A Microsoft Excel tool, Fuzzy Lookup, was used to perform the matching. The application identifies commonalities in the way two names are spelled and associates each name from a list (i.e. the one of TSE municipalities) to its closest match in another list (i.e. the one of IBGE geographical boundaries). The software also produces a similarity score ranging between 0 and 100 and reporting how similar the paired names are. As a cut-off, we consider a similarity score above 90 to be acceptable. In addition, all names, even those with a score lower than 90, were double checked by the authors to ensure the matching was correct.

[31] IBGE repository accessible via: https://bit.ly/2EKHxFS.

geographical entities.[32] An intersection is, by definition, the sharing of a point or a line between two different polygons. Figure A1 shows an example from a microregion and its matched municipalities in the state of Ceará in the north-eastern part of the country.[33] The algorithm is able to identify the majority of *municipios* included within the microregion boundaries—red areas in Figure A1. However, some information from *municipios* that are not contained entirely within the boundaries of these microregion are included as well—dark red areas in Figure A1. The portion of the microregion covered by *municipios* that have been matched with a neighboring area is excluded from the calculation of the average vote share—white areas in Figure A1.

Figure A1: Municipality-to-microregion matching (intersect)



Source: authors' illustration based on *Tribunal Superior Eleitoral* data, IBGE data, and Dix-Carneiro and Kovak (2017).

Method 2: Contained municipios

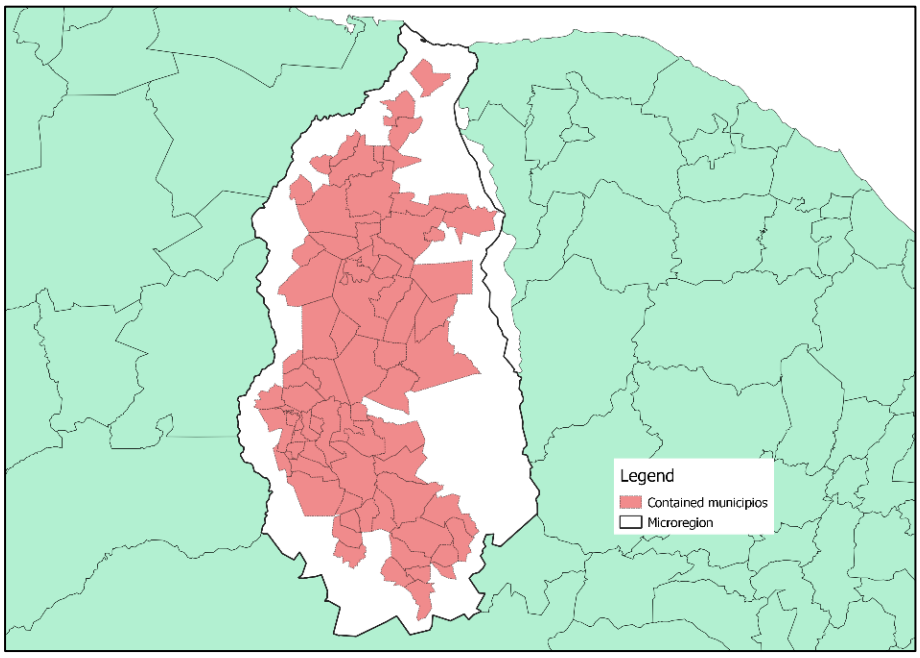
Figure A1 shows that considering intersecting *municipios* to estimate average vote shares at the microregion level might cause our estimation to suffer from the inclusion of areas that are not exactly within a microregion boundaries. To avoid this, an alternative matching method can be adopted, which includes only *municipios* perfectly contained within each microregion and discards all of those outside the boundaries. Below we report the results of this type of matching for the same microregion as in Figure A1. Figure A2 shows that all matched municipalities are now exactly within the microregion. This means too that we miss voting information of municipalities not fully included in a certain microregions. Although more precise, the 'containment' matching might suffer from the loss of

[32] More information on the 'intersect' function in QGIS is available at: https://qgis.org/api/classQgsGeometry.html#adef699cedf47b6a337f82a62c7f04877.

[33] The microregion's boundaries from 1991 correspond approximately to the current Immediate Geographic Regions of Teresina, Amarante – Agua Branca – Regeneracao, Campo Maior, Valenca do Piaui, Barras, Parnaiba, Piripiri, Esperantina, Picos, and Oeiras.

information from municipalities that are shared between two microregions and are therefore excluded from the process.

Figure A2: Municipality-to-microregion matching (contain)



Source: authors' illustration based on *Tribunal Superior Eleitoral* data, IBGE data, and Dix-Carneiro and Kovak (2017).

Method 3: Official identification codes

The two matching methods above rely on calculating the spatial intersection of polygons. However, both *municipios* and microregions are assigned an official code from the IBGE. These codes have been retrieved through IBGE reports of gross domestic product for each *municipio* and can be used to match microregions and *municipios* exactly as they are intended by the Brazilian government.[34] However, identification codes were standardized for the period 2002-2017 and official codes for 1991 microregions do not perfectly match with those included in the IBGE dataset, causing some microregions to be excluded in the calculation of average vote shares. The total sample of microregions is reduced to 454 from the original 480 due to this discrepancy. Processed information on electoral results obtained from the *Instituto de Pesquisa Econômica Aplicada* data portal (IPEADATA) at microregion level have also been considered as an alternative source, although identification codes present the same discrepancies.[35]

[34] Identification codes are retrievable together with municipal GDP information at https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9088-produto-interno-bruto-dos-municipios.html?=&t=resultados.

[35] The total number of microregions included in the final dataset is 454 when using the IBGE matching codes. Note that the IPEADATA portal does not provide information on votes totalized by PSL party (Bolsonaro's party) in 2018 at microregion level. Data accessed via: http://www.ipeadata.gov.br/Default.aspx.

A.2 Robustness checks using three matching methods

All three matching techniques above present both strengths and weaknesses. It is therefore important to test whether results for our main analysis remain robust to different matching strategies. We start by reporting correlation matrices between microregion-level vote shares obtained with all three of our matching methods. Results in Table A1 show that the three variables are highly correlated for both the 2002 and 2018 elections.

Moreover, population-weighted average vote shares for all microregions are comparable to official figures regardless of the matching methods used. In the 2002 election, Lula obtained 61.3 per cent of the votes in the second turn. In our sample, the average vote share for all microregions is 57.6 per cent when using the 'intersect' matching method, 62.7 per cent with the 'contain' method, and 60 per cent using the ID code. In 2018, Bolsonaro won with 53.1 per cent of the votes. The average vote share for all microregions is 51 per cent using the 'intersect' matching, 54.1 per cent with the 'contain' method, and 52 per cent when using the ID code.[36]

Table A1: Correlation matrix of vote share (different matching methods)

	Intersect	Contain	ID code
Panel A—Lula's vote share			
Intersect	1.000		
Contain	0.841***	1.000	
ID code	0.955***	0.887***	1.000
Panel B—Bolsonaro's vote share			
Intersect	1.000		
Contain	0.955***	1.000	
ID code	0.991***	0.969***	1.000

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

We repeat our baseline estimation using information from all three matching techniques to test the robustness of our claims. Results are reported in Table A2. Regardless of the matching method, tariff cuts have a strongly significant and very similar positive impact on share of votes for both Lula and Bolsonaro in their respective presidential elections. The number of observations included in the analysis is the highest when using 'intersect' matching method with 479 microregions, followed by ID code matching (452 microregions) and by 'contain' matching (227 microregions).

Table A2: Tariff changes and Lula and Bolsonaro vote share (different matching methods)

	Lula's vote share			*Bolsonaro's vote share*		
	Intersect	Contain	ID code	Intersect	Contain	ID code

[36] Any discrepancy between national electoral results and vote share in our sample can be explained by the fact that our dataset does not present information on some microregions for which that calculation of tariff cuts was impossible, as explained in Kovak (2013).

Tariff reductions	0.888***	1.171***	1.029***	0.921***	1.014**	1.082***
	(0.626)	(0.334)	(0.242)	(0.217)	(0.410)	(0.225)
Constant	0.098	0.374*	0.136	0.401	-0.281	0.0452
	(0.200)	(0.205)	(0.278)	(0.210)	(0.275)	(0.221)
Population weights	Y	Y	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y	Y	Y
Observations	479	227	452	479	224	452
R-squared	0.741	0.775	0.757	0.928	0.881	0.907

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Controls are referred to 1991. All regressions are weighted by microregion population and include state fixed effects. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

Considering all tests above, the results presented in the main text use the 'intersect' matching option because of its lower number of missing values. This choice has been done to increase the representativeness of the results for the entirety of Brazil. However, the results remain similar when using either of the other two methods.

A.3 Matching of other voting election results

We have calculated vote shares for elections in 1955, 1960, 1989 and 2006, which we use to conduct robustness checks in Appendix D and a placebo test in Appendix E. Data for the 2006 elections are available at the *municipio* level and can be matched using the process outlined in Section A.1. Complete data on electoral results for 1955, 1960 and 1989 are available only at state level. To match state-level information to the 1991 microregions boundaries (i.e. the boundaries used in our analysis), we matched vote shares from 1955, 1960, and 1989 by first pairing state-level information to the 2001 *municipios* boundaries and then using the 'intersect' method discussed in the previous section. This was done to ensure that subsequent changes in state boundaries were accounted for.[37]

A.4 Matching of crime and municipal GDP and inequality data

We matched official information on number of homicides and municipal-level GDP using official IBGE identification codes instead of resorting to spatial matching. This is because microregion-level data on number of homicides was available on the IPEADATA platform,[38] so no matching between *municipios* and microregions was needed. In order to calculate the Gini coefficient of microregions in 2002 and 2017, we associated each *municipio* to its microregion through IBGE official codes (the same used in method 3, Section A.1).

[37] For example, the states of Mato Grosso do Sul and Tocantins were not yet separate state entities in 1960. Mato Grosso do Sul was created from a portion of the state of Mato Grosso in 1977, while Tocantins was founded in 1988.

[38] Accessible via: https://bit.ly/31JS64M.

Appendix B: Variables

This appendix discusses the variables included in our main analysis: main dependent variable, independent variable and controls. Alternative outcomes are introduced in Appendix C. Table B1 shows descriptive statistics for all variables used in the analysis. Detailed description of each variable is reported below.

Table B1: Variables included in main estimations

	Mean	SD	Min.	Max.	Obs.
Vote share—2002	0.539	0.083	0.230	0.847	480
Vote share—2018	0.457	0.205	0.109	0.836	480
Tariff cuts	0.043	0.039	-0.008	0.154	480
Share of adults	0.553	0.060	0.395	0.667	480
Share of white population	0.470	0.251	0.028	0.974	480
Share of pop. with higher education	0.147	0.016	0.104	0.201	480
Share of employed population	0.355	0.057	0.203	0.533	480
Per capita income	1.267	6.107	0.026	132.127	480
Income inequality	0.553	0.038	0.414	0.757	480
Population count (thousand)	301.3	778.1	1.7	11,700	480

Source: authors' calculations based on *Tribunal Superior Eleitoral* data¸ Census data, and Kovak (2013) and Dix-Carneiro and Kovak (2017)

Vote share

Definition: This variable is our main outcome of interest. It represents the percentage of votes obtained by the winning presidential candidate during the second turn of presidential elections in 2002 and 2018 regardless of the political affiliation of the candidate. It is obtained as the average value of vote share of *municipios* intersecting each microregion (see Appendix A). Vote shares for 1955, 1960, and 1989 elections were calculated with the same methodology and used for robustness checks (Appendix A).

Source: The source of data for this variable is the electoral results data repository from the *Tribunal Superior Eleitoral* (TSE), available at https://bit.ly/31akgq3. Information on electoral results is at municipal level for the 2002 and 2018 elections. Complete information on 1955, 1960, and 1989 elections is only available at state level.

Tariff cuts

Definition: This variable is our main explanatory variable. It represents the changes in trade tariffs recorded in each microregion during the trade liberalization process between 1990 and 1995. Tariff changes are measured as the industry-weighted average of liberalization-induced price log-differences between 1990 and 1995. For ease of interpretation, tariff changes are inverted so that higher values represent a higher decrease in trade tariffs. This is discussed also in section 3.

Source: Information on tariff changes was obtained from Kovak (2013).

Share of adults

Definition: This variable is used as a control variable in our models. It represents the share of adult population (above the age of 17) in 1991. The average share of adults over total population is 55 per cent, with 39 per cent and 67 per cent being the minimum and maximum shares, respectively. The original share values are log-transformed to account for outliers and ease interpretation of results.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX.

Share of white population

Definition: This variable represents the share of the white population in Brazil in 1991. The average share of white population in the total population is 47 per cent, with 3 per cent and 97 per cent being the minimum and maximum shares, respectively. The original shares values are log-transformed to account for outliers and ease interpretation of results.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX.

Share of population with higher education

Definition: This represents the share of people with higher education (completed high school or higher) in 1991. The average share of population with higher education over total population is 15 per cent, with 10 per cent and 20 per cent being the minimum and maximum shares, respectively. The original shares values are log-transformed to account for outliers and ease interpretation of results.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX.

Share of employed population

Definition: This variable represents the share of people who have worked any type of job in the last 12 months in 1991. The average share of employed population over total population is 35 per cent, with 20 per cent and 53 per cent being the minimum and maximum shares, respectively. The original shares values are log-transformed to account for outliers and ease interpretation of results.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX.

Per capita income

Definition: This variable represents the average household income from any source per microregion divided by the population count in 1991. Income information has been standardized at 2010 prices. The average per capita income is BRL1.27, with BRL0.03 and BRL132.13 being the minimum and maximum values, respectively. The original values are log-transformed to account for outliers and ease interpretation of results.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX. For income deflation, we followed the procedure devised by Foguel and Leite Corseuil (2002) using data from the National Consumer Price Index (INPC) calculated by IBGE.

Income inequality

Definition: Income inequality is measured using the Gini coefficient, computed based on the distribution of household income within each microregion in 1991. Income information has been standardized at 2010 prices. As usual, the Gini index ranges between 0 (perfect equality) and 1 (perfect inequality). The average Gini coefficient is 0.55, with 0.41 and 0.76 being the minimum and maximum values, respectively. The original values are log-transformed to account for outliers and ease interpretation of results.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX. For income deflation, we followed the procedure devised by Foguel and Leite Corseuil (2002) using data from the National Consumer Price Index (INPC) calculated by IBGE.

Population count

Definition: This variable represents the population count in each microregion in 1991. Average population count is 301,269 with 1,686 and 11,700,000 representing the minimum and maximum values, respectively.

Source: The source of data for this variable is the 1991 Population Census. Individual information from the Census was averaged at microregion level. Matching at microregion level was conducted using official codes and followed Dix-Carneiro and Kovak (2017). Original data for the 1991 Census are available on IBGE website at https://bit.ly/2YqFMEX.

State

Definition: Our analysis includes state fixed effects. Brazil has 26 states and one federal district. Several microregions are included in each state. The table below reports the number of microregions in each state in our sample.

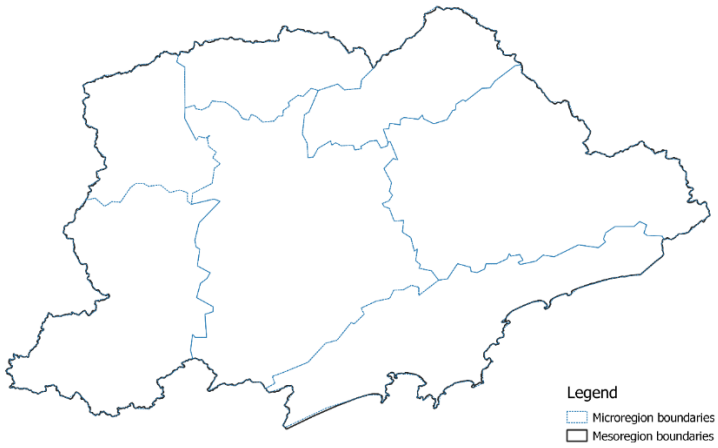
Table B2: Microregions within Brazilian states

State	N. of microregions
Acre	4
Alagoas	13
Amapá	13
Amazonas	4
Bahia	32
Ceará	33
Distrito Federal	1
Espírito Santo	12
Goiás	18
Maranhão	14
Minas Gerais	64
Mato Grosso do Sul	8
Mato Grosso	11
Pará	18
Paraíba	20
Pernambuco	19
Piauí	4
Paraná	39
Rio de Janeiro	17
Rio Grande do Norte	19
Rondônia	3
Roraima	2
Rio Grande do Sul	10
Santa Catarina	20
São Paulo	13
Sergipe	62
Tocantis	7

Mesoregion

Definition: This variable is used to cluster standard errors in our analysis. It reports the mesoregion in which each microregion is located. Location refers to boundaries in 1991, which are used throughout our analysis. Figure B1 shows a mesoregion in the state of Sao Paulo and the microregions contained in it.

Figure B1: Mesoregion and microregion boundaries



Source: authors' illustration based on IBGE data.

Appendix C: Alternative outcomes

Appendix C presents the list of variables included as alternative outcomes in our study. Table C1 shows their descriptive statistics. Detailed description of each variable is reported below.

Table C1: Variables included in alternative estimations

	Mean	SD	Min.	Max.	Obs.
Voter turnout 2002	0.798	0.049	0.621	0.895	480
Voter turnout 2018	0.785	0.043	0.641	0.875	480
Voter turnout 2002 (no blank and null)	0.701	0.066	0.437	0.807	480
Voter turnout 2018 (no blank and null)	0.701	0.053	0.536	0.813	480
Presidential vote shift to the left (1989–2002)	0.121	0.103	-0.220	0.363	480
Presidential vote shift to the right (2002–18)	-0.004	0.233	-0.488	0.497	480
Gubernatorial vote shift to the left (1986–2002)	0.221	0.177	-0.449	0.772	477
Gubernatorial vote shift to the right (2002–18)	-0.135	0.329	-0.794	0.899	480
Electoral competition 2002	0.209	0.079	0.025	0.491	480
Electoral competition 2018	0.127	0.041	0.033	0.347	280
Political polarization 2002	6.312	0.483	4.773	7.64	480
Political polarization 2018	5.479	0.381	4.585	6.676	480
Protests (1998-2002)	0.625	4.144	0.000	60	480
Protests (2014-2018)	7.589	61.092	0.000	1011	480

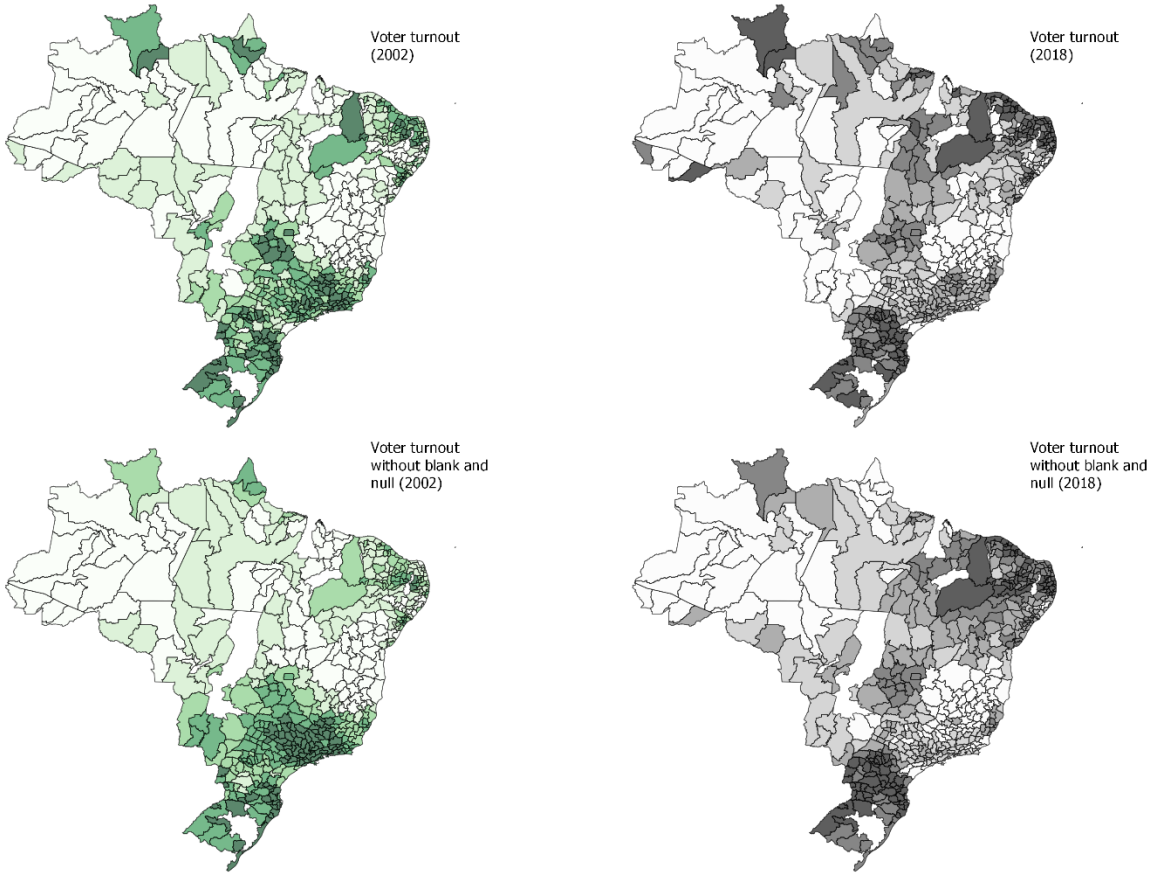
Source: authors' calculations based on *Tribunal Superior Eleitoral* data, GDELT data, and Power and Rodrigues-Silveira (2019).

C.1 Voter turnout

Definition: This variable is used to measure political participation. We calculated two versions of this variable. The first one corresponds to the proportion of total number of votes (valid plus blank and null) over the total number of eligible voters during the second round of each presidential election in 2002 and 2018. The second measure excludes blank and null votes from the vote count and therefore from the final vote share for 2002 and 2018. Data are compiled at municipal level and averaged at microregion level. Figure C1 presents a graphical representation of voter turnout by microregion in 2002 and 2018 (for both specifications). It is worth to observe that areas recording higher participation in 2002 are also those recording higher participation in 2018. It is also to note that the two variables measuring voter turnout are highly correlated.

Source: The source of data for this variable is the electoral results data repository from the *Tribunal Superior Eleitoral* available at https://bit.ly/31akgq3. Data are obtained at municipal level and averaged at microregion level using intersect matching (see Appendix A).

Figure C1: Voter turnout in 2002 and 2018



Note: dark green represents a higher voter turnout in 2002, and dark gray represents a higher turnout in 2018.

Source: authors' illustration based on *Tribunal Superior Eleitoral* data, Kovak (2013), and Dix-Carneiro and Kovak (2017).

C.2 Right-left shifts

Definition: This variable is used as an alternative voting outcome. It measures the difference in vote share for the left-wing parties/candidates during presidential and gubernatorial elections between 1989 (1986 for gubernatorial) and 2002 elections, and the difference in vote share for the right-wing parties/candidates during presidential and gubernatorial elections between 2002 and 2018.

The identification of the left-wing and right-wing candidate in presidential elections was straightforward, given the clear political orientation of presidential candidates in the second round of the 1989, 2002, and 2018 elections. The selection of left-wing and right-wing parties for gubernatorial elections required more complex coding. Gubernatorial elections involve a multitude of parties, some of which are independent and unique to some States. To capture this complexity, we first considered only votes obtained by parties in the first election round to ensure that all states were included in our calculation, and not just the states which had to undergo a second round of elections (in several states decisions were made during the first round). Second, to assign parties to the political left or the political right, we made use of an ideological score calculated by Faustino et al. (2019), which updates and enriches a previous score calculated by Power and Zucco (2009). We considered as left-wing parties

all those parties reporting an ideological score similar or more to the left than the PT (Lula's party) in 2002. Likewise, we considered as right-wing all the parties with an ideological score similar or more to the right than the PSL (Bolsonaro's party) in 2018 and the PSDB party, the historical adversary of PT and third major party in the national congress.

Source: The source of data for this variable is the electoral results data repository from the *Tribunal Superior Eleitoral*, available at https://bit.ly/31akgq3. Data were obtained at municipal level and averaged at microregion level using intersect matching (see Appendix A).

C.3 Electoral competition and political polarization

Definition: The electoral competition index is computed as the difference between the proportions of the vote of the two parties with most political votes (Power and Rodrigues-Silveira 2019). This index ranges between 0 (high competition), when both parties get exactly the same number of votes, to 1 (no competition), when one of the two parties obtains all the votes.

The Dalton's index of political polarization for multiparty systems measures the ideological distances between parties in policy stances (Dalton 2008; Power and Rodrigues-Silveira 2019). It is computed as ten times the squared root of the sum of the products between the proportion of votes of each party and its absolute variation from the mean local ideological position. Formally:

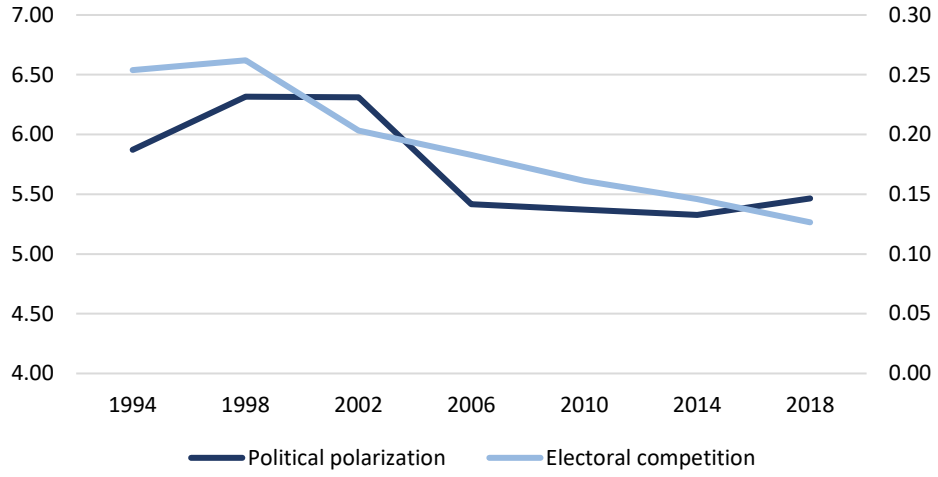
$$10 * \sqrt{\sum_{i=1}^{n} p_i * \left| \frac{I_i + I}{5} \right|}$$

where p_i shows the vote share of each party, while I_i and I represents the ideological position of each party, respectively, and of the local political system. The latter two variables are rescaled to a 1–9 scale. The polarization index ranges from 0 (no polarization) to 10 (extreme polarization).

As shown in Figure C2, political polarization and electoral competition indexes followed opposite paths between 1994 and 2018. While political polarization reached its peak during the 1998 political election, competition reached its lowest level in the same election year. Electoral competition started to increase from 2002 and reached its peak during the 2018 presidential election. Polarization was still high in 2002 but decreased in subsequent years (Figure C2).

Source: Both indicators are extracted from the Municipal Ideological Score dataset built by Power and Rodrigues-Silveira (2019), available at: https://bit.ly/2OLB6Ed.

Figure C2: Electoral competition and political polarization



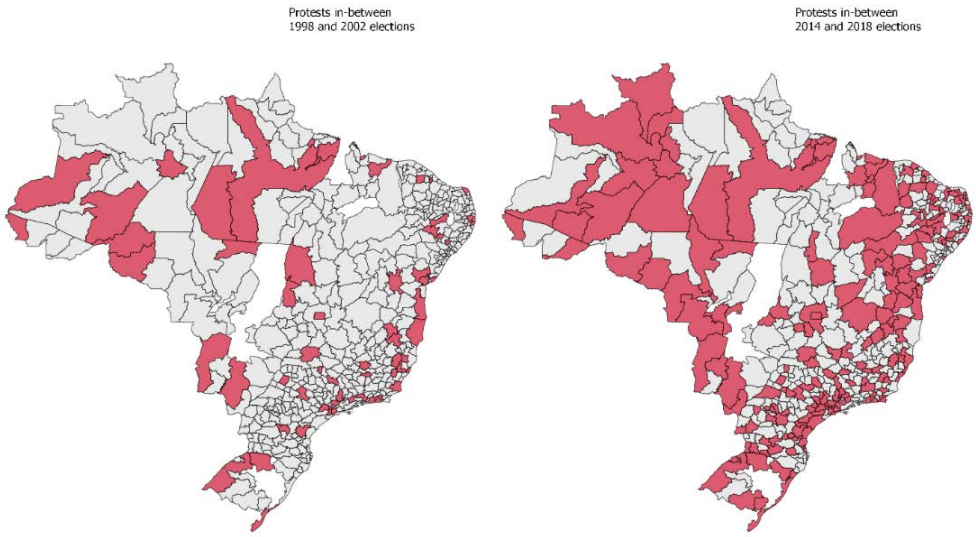
Source: authors' illustration based on Power and Rodrigues-Silveira (2019).

C.4 Protests

Definition: This variable is used as an alternative measure of political participation. The (log) number of protests is geo-located within microregions covering the period preceding the two presidential elections (i.e. from November 1998 to September 2002, and from November 2014 to September 2018). To ensure that protest events are not duplicated in our counting, we allow for only one event to be counted in each location/day. Figure C3 shows the areas affected by protests for both periods. Protests seems to have increased substantially between the two time periods.

Source: The source of data for this variable is the Google's Global Database for Events, Language and Tone (GDELT). The GDELT Project processes and organizes terabytes of information on events worldwide from digitalized newspapers and news agencies, as well as from web-based news aggregators. Events are coded following the Conflict and Mediation Event Observations (CAMEO) coding, which provides a list of approximately 15,000 actions and 60,000 political actors. Protests are defined as 'civilian demonstrations and other collective actions carried out as protests against the target actor not otherwise specified' (Schrodt 2012: 67). Original data are available at https://bit.ly/3fV9ok0.

Figure C3: Areas affected by protests between 1998–2002 and 2014–18



Source: authors' illustration based on GDELT data, Kovak (2013), and Dix-Carneiro and Kovak (2017).

Appendix D: Robustness tests

D.1 Alternative unit of analysis, weights, clustering approach and vote share calculations

In this section, we test the robustness of our results to the use of different specifications of our main model. Results are presented in Table D1. First, we replace information at microregion level with information at municipal level. In line with the existing literature on trade liberalization in Brazil, our identification strategy is based on the premise that microregions offer the best approximation to an economically integrated region. This is because microregions tend to specialize in the production of different goods and are therefore similarly affected by trade shocks (Kovak 2013). However, it can be hypothesized that economic differences may persist between municipalities within the same microregion. To this purpose, we replicated the main analysis considering *municipios* as our unit of analysis. This increases the number of observations from 479 to more than 3,200 (Column 2). Second, we clustered our standard errors at state level (Column 3). This strategy allows us to account for remaining covariance in the error terms across our units of analysis (microregions) located within the same state. Third, we weighted the main regression using the number of municipalities within each microregion instead of using the population size (Column 4). The use of analytic weights arises from the need to account for the fact that microregion-level information is obtained by averaging municipal level information. Counting the number of municipalities within each region is an alternative way of ensuring the results are representative at the national level. Fourth, we tested whether our baseline model results hold when the vote share is calculated as the rate of vote obtained by a candidate over total votes (i.e. including null and blank votes) (Column 5).

The results in Table D1 show that the impact of trade liberalization remains always positive and statistically significant and that all alternative coefficients are close to the baseline estimations in most of the cases. Overall, our results are robust to alternative specifications and not dependent on different ways of estimating key variables.

Table D1: Robustness checks

	(1) Baseline Model	(2) Information at municipal level	(3) Standard errors clustered at state level	(4) Weighted by number of *municipios*	(5) Vote share calculated against total votes
Panel A—2002 results					
Tariff reductions	0.888***	1.062***	0.888***	0.648***	0.867***
	(0.211)	(0.150)	(0.259)	(0.166)	(0.201)
Constant	0.098	-0.252	0.098	0.223	0.073
	(0.200)	(0.166)	(0.188)	(0.180)	(0.190)
Observations	479	3,273	479	479	479
R-squared	0.741	0.581	0.741	0.488	0.743
Panel B—2018 results					

Tariff reductions	0.921***	0.608***	0.921***	0.771***	0.794***
	(0.218)	(0.188)	(0.259)	(0.145)	(0.190)
Constant	0.401*	-0.353*	0.401*	0.147	0.345
	(0.210)	(0.209)	(0.218)	(0.169)	(0.189)
Observations	479	3,206	479	479	479
R-squared	0.928	0.808	0.928	0.929	0.922
Microregion fixed effects	N	Y	N	N	N
State fixed effects	Y	Y	Y	Y	Y

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Controls are referred to 1991. Regressions are weighted by microregion population excluding results in column 4 weighted by municipalities. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

D.2 Replacing main controls with 1980 Census data

As reported in Section 4, in our baseline estimations we use control variables extracted from the Census data. Because there are no Census data available just before the time of the liberalization process, we make use of the 1991 Census data. In using these data, we make the assumption that socioeconomic characteristics of microregions in 1991 are unlikely to have been affected by the trade liberalization process which started in 1990. This is so because local economic conditions respond slowly to the changes in tariffs.

However, concerns might still rise about the potential correlation between 1991 socio-economic characteristics and tariff changes. We address these concerns by replacing our controls with information from 1980 Census, when trade liberalization policies had not yet been designed. Table D2 shows that results remain similar (Columns 3 and 4). These findings reassure us that our results are not being driven by potential endogeneity in the measurement of the control variables.

Table D2: Robustness checks—election results using controls measured in 1991 and 1980

	Using 1991 controls		*Using 1980 controls*	
	(1)	(2)	(3)	(4)
	Lula (2002)	Bolsonaro (2018)	Lula (2002)	Bolsonaro (2018)
Tariff reductions	0.888***	0.921***	1.252***	0.680***
	(0.211)	(0.218)	(0.205)	(0.184)
Constant	0.098	0.401*	0.640***	-0.099
	(0.200)	(0.210)	(0.228)	(0.232)
Population weights	Y	Y	Y	Y
State fixed effects	Y	Y	Y	Y
Observations	479	479	414	414

R-squared	0.741	0.928	0.747	0.925

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Controls are referred to 1991 in Columns 1 and 2 and at 1980 in Columns 3 and 4. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

D.3 Lula's 2006 elections

Section 6.1 shows that austerity facilitated the electoral success of Lula in 2002 and of Jair Bolsonaro in 2018 in microregions that were more exposed to trade liberalization in the 1990–95 period. This section investigates whether spending cuts (together with trade liberalization) played also a role in shaping political preferences during the 2006 elections. If the austerity hypothesis holds, we should not observe any impact of welfare spending cuts in Lula's election in 2006 given that this election took place in a period of prosperity. Table D3 confirms that the interaction between trade reforms and fiscal policy did not play any role on Lula's election success in the 2006 political elections.

Table D3: Austerity and the demand for populism

	(1) Lula (2002)	(2) Lula (2006)	(3) Bolsonaro (2018)
Tariff cuts	1.098***	-0.0121	1.122***
	(0.232)	(0.180)	(0.196)
Cuts on welfare spending	-0.015	0.00127	-0.119**
	(0.0104)	(0.0185)	(0.049)
Tariff cuts * welfare spending cuts	0.307***	-0.248	2.969***
	(0.103)	(0.207)	(0.539)
Constant	0.081	0.762***	0.348
	(0.208)	(0.161)	(0.220)
Population weights	Y	Y	Y
State fixed effects	Y	Y	Y
Observations	479	479	479
R-squared	0.748	0.918	0.943

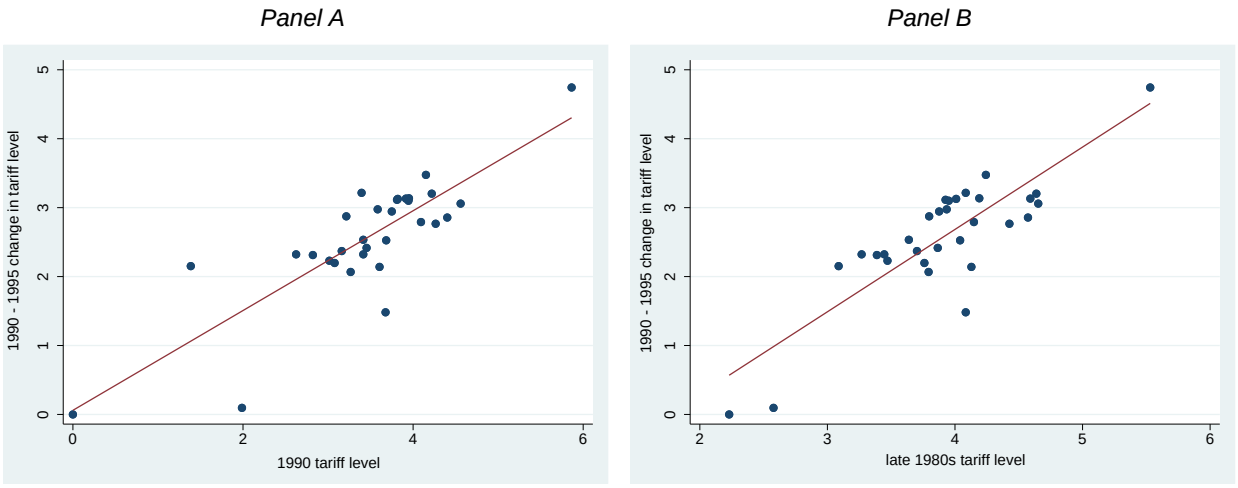
Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix E: Identification strategy

E.1 Relationship between tariff changes in the early 1990s and pre-liberalization tariff levels

Our main identification assumption is that the trade shocks that took place in Brazil between 1990 and 1995 can be considered exogenous. This assumption is based on Kovak (2013), who shows in detail how changes in tariffs in the period between 1990 and 1995 were highly correlated with pre-liberalization tariff levels. In other words, industries with more protection before the 1990s experienced the greatest tariff cuts during the time of trade liberalization. To further test this assumption, we repeat the same analysis as Kovak (2013), using the original data from Kume et al. (2003). Figure E1 confirms that changes in tariffs in the period between 1990 and 1995 are positively correlated with pre-liberalization tariff levels: larger cuts in the tariff levels over the period 1990–95 are associated with higher levels of tariffs in 1990 (Figure E1—panel A) and higher levels of tariffs in the late 1980s (Figure E1—panel B). The coefficient of correlation is respectively 0.83 and 0.84.[39]

Figure E1: Relationship between tariff changes in the early 1990s and pre-liberalization tariff levels in 1990 (Panel A) and in the late 1980s (Panel B)

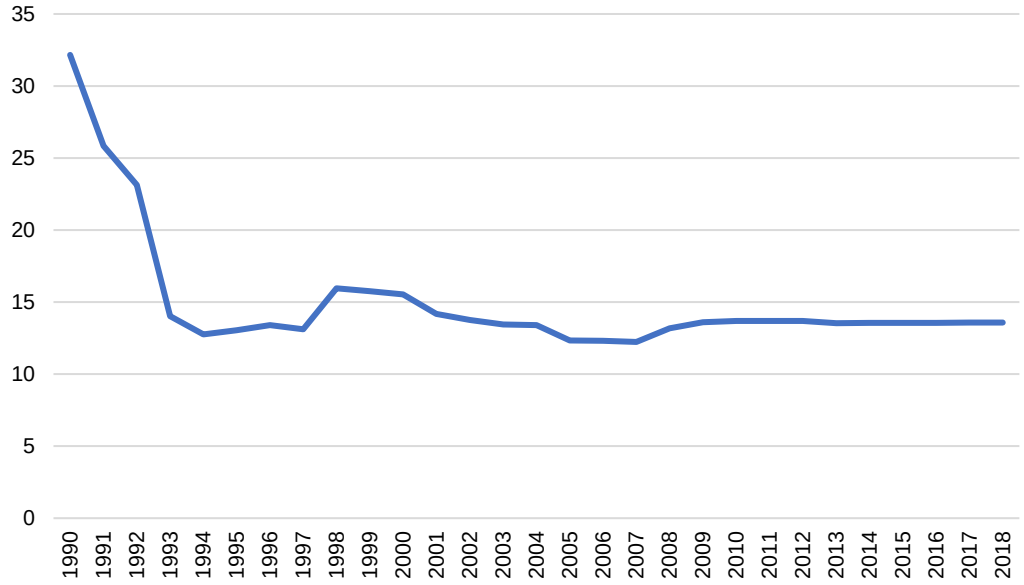


Source: authors' calculations based on data extracted from Kume et al. (2003).

Another important feature of our exogeneity assumption is the fact that these trade reforms were a one-off policy (all tariff reductions took place between 1990 and 1995) with permanent effects, as tariffs remained stable afterwards. This is shown clearly in Figure E2.

[39] The coefficient of correlation increases to 0.97 if we consider the changes over the period 1991 and 1995. We also ran a simple OLS regression. Results shows that the level of pre-liberalization tariffs in 1990 predicts the changes in tariff implemented in the early 1990s. The coefficient of the estimate is 0.72. Results are available upon request.

Figure E2: Tariff changes over the period 1990–2018



Note: data refer to the average value of tariff rates (most favoured nation) computed considering the simple mean for all the products.

Source: authors' illustration based on the World Integrated Trade Solution (WITS) database.

E.2 Placebo test

We ran also a placebo test to analyse whether presidential elections that took place before the liberalization period are in any way correlated with tariff changes. To that purpose, we investigate the impact of tariff changes in 1990–95 on election outcomes in 1955, 1960, and 1989—all well before the trade liberalization policies were designed and implemented (or even announced). Table E1 shows that the coefficient of tariff changes is never statistically significant demonstrating that reverse causality concerns are unlikely to affect our analysis.

Table E1: Robustness checks: election results in 1955, 1960, and 1989

	(1)	(2)	(3)
	1955 election	1960 election	1989 election
Tariff reductions	-0.00236	-0.00192	-0.024
	(0.0662)	(0.0230)	(0.037)
Constant	0.345***	0.489***	0.502***
	(0.0734)	(0.0256)	(0.048)
Population weights	Y	Y	Y
State fixed effects	Y	Y	Y
Observations	475	475	479
R-squared	0.978	0.978	0.986

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Controls are referred to 1991. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix F: Cultural variables

F.1 Testing the cultural backlash hypothesis

We compiled a series of cultural variables from three individual-level datasets: the Latinobarometro, the Latin America Public Opinion Project (LAPOP) and the Brazilian Electoral Study (BES). Latinobarometro is an annual public opinion survey including around 20,000 interviews in 18 Latin American countries. The sample size for Brazil in 2002 and 2018 was 1,000 individuals in each year, residing in 85 different *municipios* in 2002 and in 92 *municipios* in 2018. LAPOP is an academic institution devoted to the collection of data on public opinion across the Americas. Their main survey, the AmericasBarometer, is a rigorous comparative survey on public opinion covering 34 nations in most of North, Central and South America and the Caribbean. Data for Brazil for 2018 is based on information for approximately 1,500 individuals from 100 *municipios*. BES is based on post-electoral survey of voters conducted at the end of each presidential election round since 2002. Data for 2018 includes information on voters' behaviour and opinions obtained from approximately 2,500 individuals from 156 *municipios*. For all datasets, data at *municipio* level were matched and averaged for microregions using the method explained in Appendix A. Table F.1.1. show the effect of religiosity, support for democratic values and political trust on the 2002 and 2018 elections. All coefficients are not statistically significant. It is to note that results are to be taken with caution because we only have enough data for 54 microregions for Lula, and 162 microregions for Bolsonaro (161 when analysing religiosity).

Bolsonaro was known for his racist, misogynistic, and anti-LGBT views, and we use data collected by LAPOP and BES to estimate the effect of these cultural components on the 2018 elections. The LAPOP surveys asked respondents their opinion about homosexuality and gay marriage. Responses are coded on a scale from 1 to 10 with lower values showing higher disapproval for homosexuality and gay marriage. We examined also a set of questions from BES which asked respondents to agree or

disagree with the following statements: (i) 'minorities have to adapt to Brazilian tradition'; (ii) 'migrants help Brazilian economy', (iii) 'migrants endanger Brazilian culture', (iv) 'migrants increase crime rate in Brazil', and (v) 'quotas reserved for blacks and *indios* harm those who have more competence'. Answers to these questions were coded as dummies with value 1 when respondents agreed (even marginally) with these statements. We averaged these values (using individual weights) at municipal level to obtain the percentage of individuals who answered the questions above in each *municipio*. We matched *municipios* with microregions using the method explained in Appendix A. Again, we find no evidence of cultural variables being a causal mechanism in the relationship between trade reforms and populism in Brazil. Results are to be taken again with caution since we have only enough data for 151 microregions from LAPOP, and for 95 microregions from BES.

Table F.1.1 Cultural backlash (2002 and 2018)

	Lula (2002)					Bolsonaro (2018)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tariff cuts	-0.460	-0.108	-0.129	0.348	-0.199	1.133***	0.972**	1.069***	1.086***	1.005**
	(0.571)	(0.735)	(0.749)	(0.592)	(0.426)	(0.291)	(0.448)	(0.290)	(0.399)	(0.387)
Religiosity	-0.0964					-0.226*				
	(0.225)					(0.129)				
Tariff cuts * religiosity	2.674					0.757				
	(2.322)					(1.251)				
Support for democracy		0.0776					-0.0268			
		(0.172)					(0.0635)			
Tariff cuts * support for democracy		0.0459					0.138			
		(2.222)					(0.791)			
Satisfaction with democracy			0.0298					0.101		
			(0.137)					(0.0618)		
Tariff cuts * satisfaction with democracy			0.206					0.444		
			(2.773)					(0.622)		
Trust in political parties				0.0954					0.0733	
				(0.364)					(0.170)	
Tariff cuts * trust in political parties				-1.951					-0.284	
				(3.194)					(2.464)	
Trust in Congress					0.0276					0.0386
					(0.194)					(0.119)
Tariff cuts * trust in Congress					0.564					0.467
					(1.898)					(1.720)
Constant	-0.517	-0.536	-0.443	-0.475	-0.413	0.892***	0.682**	0.553**	0.679**	0.650**
	(0.308)	(0.335)	(0.303)	(0.308)	(0.301)	(0.267)	(0.282)	(0.275)	(0.277)	(0.261)
Observations	54	54	54	54	54	161	162	162	162	162
R-squared	0.978	0.977	0.977	0.978	0.977	0.949	0.946	0.950	0.946	0.947

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

Table F.1.2. Cultural backlash in 2018

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff cuts	-0.0753	2.146	2.859***	1.893**	1.494**	1.295***	1.577***
	(2.522)	(1.359)	(0.906)	(0.828)	(0.628)	(0.421)	(0.560)
Disapproval of homosexuality	-0.0594						
	(0.100)						
Tariff cuts * disapproval of homosexuality	0.527						
	(1.294)						
Disapproval of gay marriage		-0.0568					
		(0.0958)					
Tariff cuts * disapproval of gay marriage		-0.713					
		(0.821)					
Minorities should adapt			0.244*				
			(0.143)				
Tariff cuts * minorities should adapt			-2.859*				
			(1.449)				
Migration is good for the economy				0.0659			
				(0.142)			
Tariff cuts * migration is good for the economy				-1.364			
				(1.270)			
Migration endangers culture					0.216		
					(0.202)		
Tariff cuts * migration endangers culture					-1.231		
					(2.200)		
Migration brings crime						-0.0800	
						(0.0766)	
Tariff cuts * migration brings crime						-0.00914	
						(0.682)	
Minorities penalize those with competence							-0.0632
							(0.109)
Tariff cuts * minorities penalize those with competence							-0.726
							(1.200)
Constant	0.679**	0.622*	0.793***	1.045***	0.822***	1.041***	1.020***
	(0.322)	(0.317)	(0.285)	(0.293)	(0.256)	(0.297)	(0.316)
Observations	151	151	95	95	95	95	95
R-squared	0.938	0.947	0.938	0.935	0.935	0.934	0.937

Note: controls include information on percentage of adults, race, education, employment rate, income per capita, inequality of income (measured with a Gini coefficient), and average yearly rainfall. All the controls are expressed in log. Regressions are weighted by microregion population. Standard errors are clustered at the mesoregion level. *** p<0.01, ** p<0.05, * p<0.1.

F.2 Voters' profiles in Lula and Bolsonaro'e elections

This section reports microregion-level statistics on the characteristics of voters who participated in the 2002 and 2018 elections using data from the Brazil Electoral Study (BES). Area averages are computed from individual data from over 5,000 interviewees using information on the *municipio* of residence of each survey participant. Microregions are considered to support a specific presidential candidate when more than 50 per cent of individuals interviewed voted for that candidate.

Table F2.1: Electorate differences in 2002

	Pro-Lula *N=70*		Pro-Serra *N=19*		*Diff.*
	Mean	*SD*	*Mean*	*SD*	
Age	38.7	4.2	39.3	5.9	-0.6
Female (%)	55.9	13	55.3	18.2	0.6
Completed high school	36.4	17.8	36.6	21.4	-0.2
White (%)	44.8	20.7	46.3	26	-1.5
Middleclass (50-90th perc.,%)	36.8	16.2	36.8	15	0
0.3Poor (<50th perc.,%)	49.5	19.6	49.2	21.4	-0.3
Rich (>90th perc.,%)	13.7	12.4	13.8	13.3	-0.1

Note: *N* is the number of observations, SD is the standard deviation, 'perc' is the percentile. *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' calculations based on BES data, and Kovak (2013) and Dix-Carneiro and Kovak (2017).

Table F2.2: Electorate differences in 2018

	Pro-Bolsonaro *N*=54		Pro-Haddad *N*=53		*Diff.*
	Mean	*SD*	*Mean*	*SD*	
Age	42.2	4.18	40.4	2.9	1.8**
Female (%)	52	53.2	52.5	5	-0.5
Completed high school	69.8	14.3	56.9	14.7	12.9
White (%)	35	19.6	24.2	20.1	10.8***
Middleclass (50-90th perc.,%)	41.7	20.9	36.4	20.3	5.3
Poor (<50th perc.,%)	48.5	22	59.4	22.3	-10.9**
Rich (>90th perc.,%)	9.7	12.4	4.2	6.8	5.5***

Note: *N* is the number of observations, SD is the standard deviation, 'perc' is the percentile. *** p<0.01, ** p<0.05, * p<0.1.

Source: authors' calculations based on BES data, and Kovak (2013) and Dix-Carneiro and Kovak (2017).