Credit Shocks and Populism*

Very Preliminary Draft, Please Do Not Circulate

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This Version: July 2021

Abstract

We investigate whether credit shocks increase the electoral support for populist parties. To this end, we exploit the impact of an exogenous lending cut by a large German bank in 2007–08 on the voting behaviour of individuals settled in counties exposed to the cut. We measure voting intentions using individual-level survey data. We identify the degree of populism over time using a semi-supervised machine learning approach applied to the parliamentary speeches of each party. We find that exposure to the credit shock increases voters' support for parties that are populist, that adopt a populist rhetoric and that discuss more frequently bank-related topics. Overall, our evidence show that credit shocks favour the growth of populism.

Keywords: Populism; Credit; Banking Crisis; Electoral Behavior.

JEL codes: P16; G21; D72; E51.

*We are particularly grateful to Katrine Løken and Jósef Sigurðsson for their precious guidance. We are grateful to Eirik Berger, Andreas Kern, Krisztina Molnar and Gian Marco Pinna for their insightful comments. This paper also benefited from the feedback of seminar participants at the Lunch Seminar and the Emerging Research Seminar at the Norwegian School of Economics (NHH), YSI Political Economy and Financial Stability Plenaries 2020, Scandinavian PhD Seminar 2021 and EPSA Annual Virtual Conference 2021. This draft is a work in progress and comments are welcome. All errors are our own. Replication code is available by request to the authors, as most of the data sources are subject to privileged access.

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1 Introduction

Following the Great Financial Crisis, populist parties scored major electoral successes in a number of countries. As a result, many observers considered the financial crisis responsible for the emergence of populism.[4] However, while the recession originated as a banking crisis characterised by a steep decline in lending (Ivashina and Scharfstein, 2010), empirical studies on the economic causes of populism focused on other aspects of the crisis including unemployment (Dehdari, 2019; Lechler, 2019; Algan et al., 2017; Hobolt and de Vries, 2016), trade (Autor et al., 2020; Colantone and Stanig, 2018*b*; Dippel et al., 2015), exchange rate (Ahlquist et al., 2020; Gyöngyösi and Verner, 2020), austerity (Fetzer, 2019), public finance (Sartre et al., 2020), economic insecurity (Guiso et al., 2020), or migration (Steinmayr, 2021; Dinas et al., 2019; Colantone and Stanig, 2018*a*; Alabrese et al., 2019). Although a number of works highlighted how changes in credit affect political preferences (Herrera et al., 2020; Braggion et al., 2020; Antoniades and Calomiris, 2020; Doerr et al., 2020), evidence on the direct effect of the recent crisis in bank lending on the intention to vote for populists is hence mostly unexplored.

This paper aims to address this gap empirically. We investigate whether sharp reductions in bank credit increase the electoral support for populist parties. To identify a causal link, we exploit an exogenously-driven lending cut by Commerzbank, the second largest German bank, in the outburst of the global financial crisis of 2007-08. The bank suffered from losses on its international trading books, which were unrelated to domestic economic conditions. This shock propagated heterogeneously across Germany, hitting harder those counties that were more exposed to the bank, while leaving others less affected or unaffected. Using data on the bank accounts of each firm in the country, we are able to estimate the exposure of each German county to the bank, and therefore to the credit shock. We combine this data with individual-level survey data to study the effect of this shock on the political preferences of German voters. This approach allows us to compare changes in the preferences of voters that were hit by the shock with different intensity.

We find that an increase by one standard deviation in exposure to the credit shock increased the intention to vote for a populist party by 0.8 percentage points. This result therefore supports the view for which the credit crisis contributed to the electoral growth of populist parties in the recent German Federal elections. In addition, we show that exposure to the lending cut is a good predictor of the general political support for any party. In

[4]Examples of contrasting views in newspaper articles include the following ones: 'Populism is the true legacy of the global financial crisis', *Financial Times*, 30 August 2018. 'From Trump to trade, the financial crisis still resonates 10 years later' *New York Times*, 10 September 2018. 'Populism was not sparked by the financial crisis', *Financial Times*, 29 August 2018; 'No, the Financial Crisis Didn't Spawn Populism', *Wall Street Journal*, 18 September 2018.

particular, we find that voters in counties exposed to the shock are more likely to declare themselves in favour of a particular party than those less or not affected.

After offering evidence for an increase in 'demand' for populism, we further explore the reasons underlying this shift in political preferences by exploring changes in the 'supply' of politics, jointly studying the two sides of the same story, in a similar fashion of Enke (2020) for morality. In particular, it could be that populist parties focused more on the issue of the banking crisis than other parties. If this was the case, our result would just describe that voters are more attracted to parties' commitment to a salient issue rather than their populist rhetoric. We test this hypothesis by analysing separately the focus on banking issues and the supply of populism. To this end, we apply text analysis to the parliamentary speeches of representatives in the Bundestag. Using a semi-supervised machine learning technique, we estimate for each party in each year its focus on the topic of banking as well as its populist rhetoric.

Our results indicate that voters hit by the shock were more likely to support both parties that talked more often about banking and that in particular adopted a populist rhetoric. The most interesting result is that this probability increases substantially when we combine these two measures. This final result indicate that the voters most hit by the credit shock became more likely to favour those parties that talked more often about the banking crisis *and* adopted a populist rhetoric, compared to their peers that either talked about the crisis but with a moderate rhetoric or that adopted a populist rhetoric but did not focus as much on banking issues.

The findings of this paper provide a nuanced interpretation of the recent rise of populism in advanced economies. While we identify that credit shock rewards parties that adopt a populist rhetoric, our evidence indicate that this link does not necessarily stem from an irrational attraction of voters to an anti-establishment rhetoric. On the contrary, we show that parties that simply adopt a populist rhetoric are less rewarded than their peers who adopt this rhetoric and focus on the issue of the banking crisis.

The main contribution of this paper is to provide evidence on the effect of banking crises on the rise of populism. The most similar work to ours are Antoniades and Calomiris (2020) and Doerr et al. (2020). Antoniades and Calomiris (2020) examine the impact of a mortgage credit contraction in the US on voters' preferences for the Presidential election of 2008. They find that voters responded to the drop in credit by shifting their support away from the incumbent party. However, their analysis focuses on the dynamic between incumbent and opponent, and does not examine the impact on populism. Doerr et al. (2020) analyse the political effects of the banking crisis of 1931 in Germany. They show that votes for the Nazi Party surged in areas more closely exposed to *Danatbank*, the bank at the heart of the collapse and led by a Jewish manager. Evidence in their paper and in our work complement each other in unravelling the political effects of lending cuts which, at least for the case of Germany, favour emerging anti-establishment parties such as populist or fascist ones.

Our paper is linked to the emerging literature on the political effect of bank lending and, more broadly, of financial crises. Based on an exogenous credit contraction experienced by China in 1933, Braggion et al. (2020) show that firms with a larger exposure to the lending shock experienced higher social unrest and Communist Party penetration among their workers. On the other hand, Herrera et al. (2020) show that (excessive) credit expansions favour the incumbent in emerging markets. Mian et al. (2014) show for a large sample of countries that, following a financial crisis, voters become more polarised and ideologically extreme. Gyöngyösi and Verner (2020) study the impact of debtor distress during a financial crisis on support for a populist far-right party exploiting variation in exposure to foreign currency household loans during a currency crisis in Hungary in 2008. They postulate that foreign currency debt exposure leads to a large and persistent increase in the populist far-right vote share. Ahlquist et al. (2020) documents the effect of the 2015 surprise revaluation of the Swiss franc on the political preferences of Polish citizens holding Swiss franc mortgages. Households exposed to the financial shock are more likely to demand government support and desert the government in favour of populist parties, which proposed a more generous bailout scheme at the expense of largely foreign-owned banks. This quasi-experimental evidence is supported by comparative studies on financial crises and elections. Funke et al. (2016) find that political uncertainty rises strongly after a financial crisis, leading to an increase in political fractionalisation and preferences for far-right parties.

Finally, our findings add to the broader literature on the economic causes of populism (see Guriev and Papaioannou, 2020 for a comprehensive review). As mentioned at the beginning of this section, most works focus on a number of economic factors to explain the rise of populism other than the decline in bank lending. However, our contribution to this literature is not limited to the study of an unexplored economic cause of populism, but is also methodological. In particular, our text-based index of populism go in the direction suggested by Guriev and Papaioannou (2020), who suggest to move from binary classifiers of populism to finer measures that enhance our understanding of the differences among populist parties. By doing so, not only we distinguish between different intensities of populist rhetoric, but also between populist parties that focus with different intensity to bank-related issues. Moreover, our method approaches another gap identified by Guriev and Papaioannou (2020), that is the need to blend the demand and supply of populism with the aid of textual analysis on political speeches. We do so by combining changes in individual-level responses, which capture the demand for populism, with variations in the populist rhetoric used in parliamentary speeches, which capture the supply.

The remainder of this paper is organised as follows. The next section discusses our identification strategy. In Section 3 we outline the data we use to estimate our model. Section 4 describes the methods we adopt to measure populism. Section 5 presents the results and a number of robustness checks. The final section concludes.

2 Background and Identification

A The Origin of the Credit Shock

Our aim is to investigate the effect of negative credit shocks on the support for populism. The main challenge is to overcome the potential omitted variable bias that could affect this relationship. Omitted variables may simultaneously affect changes in credit and populism, leading to a spurious correlation between lending and populism, even if the true causal effect of the credit shock was null.

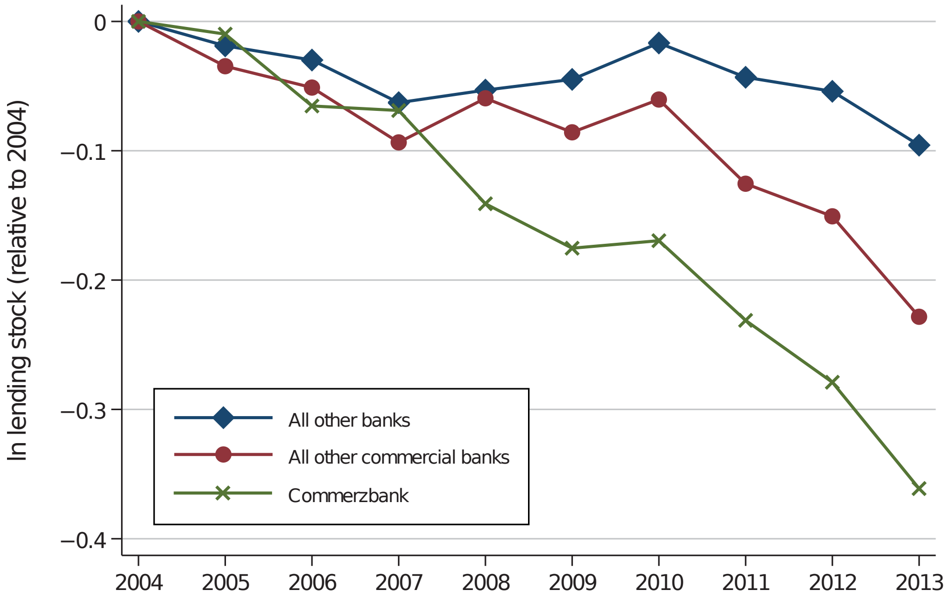
To this end, we need to identify a shock that generated exogenously and had potential repercussions on the preferences of German voters. We focus on the imported lending cut suffered by Commerzbank, the second largest German bank, in 2008-2009. The lending cut is particularly fit for our research purpose, as it stemmed from the losses on the bank's international trading books, and was therefore driven by exogenous causes. This peculiarity allows us to compare German households that were more exposed to the Commerzbank lending cut with those that were less exposed.

Commerzbank is the second largest bank in Germany by the total value of its balance sheet, and it operates as a universal bank, which means that it earns both interest income from lending and non-interest income from trading and investing in international financial markets. At the time of the shock, Commerzbank was in charge of around nine percent of the total bank lending to German non-financial customers, including households.

In Figure 1 we represent the natural logarithm of the lending stock of German Banks to non-financial customers. The figure shows that in 2008 and 2009 lending by Commerzbank fell sharply with respect to all other banks, whereas it presents a parallel trend in the period preceding (*i.e.* until 2007) and following (from 2010 onward) the shock. This difference from the rest of the German banking sector is related to the significant exposure of Commerzbank's trading portfolio to international finance, especially related to investments in asset-backed securities linked to the United States subprime mortgage market as well as the bank's exposure to the insolvencies of Lehman Brothers and Icelandic banks.[2] Given this exposure to foreign securities markets, Commerzbank incurred in significant losses on the trading portfolio – decreasing the equity capital by 68 percent during this period – and reacted by cutting its loan supply to the internal economy, to fulfil Basel II regulations and

[2] Huber (2018) provides a comprehensive overview of the exogenous lending cut operated by Commerzbank in the selected years.

Figure 1: The Lending Stock of German Banks



Notes: The picture describes the ln lending stock to German non-financial customers, relative to the year 2004 in 2010 billions of euros. Source: Huber (2018).

to lower risk exposure to be able to access funding markets again. Therefore, the lending cut was completely unexpected and unrelated to changes in the local economy.

B Baseline Specification

We build a model in order to measure the impact of the exposure to the lending cut on political preferences. We employ an identification strategy similar to the one used in Acemoglu and Johnson (2007) or Cutler et al. (2010) with time instead of cohorts, in a difference-in-differences setting where the treated group is given by a running variable. In particular, we compare long-term outcomes across counties with different exposure to the credit shock by estimating the following reduced-form relationship:

$$y_{ikt} = \alpha + \beta\,(Exposure_k \ \times \ Post) + \boldsymbol{X}_{ik}\boldsymbol{\Gamma} + \boldsymbol{K}_k\boldsymbol{\Pi} + \delta_k + \lambda_t + \varepsilon_{ikt} \tag{1}$$

where y_{ikt} denotes the outcomes of interest for individual i resident in county (*kreise*) k in 2006 at time t. Depending on the model, y_{ikt} captures the degree of political support of individual i or her preference for a specific party. $\boldsymbol{X}_{ik}$ is a vector of pre-shock individual- and household-level characteristics; $\boldsymbol{K}_k$ is a vector of pre-shock county-level macroeconomic characteristics; δ and λ are respectively county and time fixed effects, with δ also including the pre-trend of the shock. The central variable of interest, $Exposure_k \ \times \ Post$ is the interaction term of the pre-shock county-level Commerzbank exposure (described in more detail in the next section, see equation (2)), which captures the treatment intensity and serves as a proxy for the exposure to the credit shock, and an indicator variable equal to one for each period after the end of the credit shock – from 2009 onward. To account for the fact that our variable of interest is measured at county level, whereas the outcomes are at individual level, standard errors are clustered at county level (Bertrand et al., 2004). The coefficient of interest, β, indicates the effect of having a higher exposure to Commerzbank at the time of the lending cut on individual outcomes compared to having a lower exposure beforehand. Throughout the analysis, we implement individual-specific weights to correct for non-response rate in our individual data and to take into account the survey stratification.

The identification of the effect of the lending cut relies on the exogeneity of the credit shock and the regional variation in Commerzbank exposure. Furthermore, it must be that there no unobservable shocks within counties correlated with the measure of Commerzbank dependence. Evidence presented in Huber (2018) supports this assumption.

3 Data

We combine multiple databases in order to estimate the effect of the credit shock on populism. This section outlines the features of the data we use and provides some descriptive statistics before introducing the empirical results. We use firm level data to compute the exposure of each German county (*landkreis*) to Commerzbank's business cycle as a proxy for the exposure to the credit shock. More precisely, based on information on the bank account of each firm, we detect the degree of exposure of each firm to Commerzbank. This allows us to capture variation in exposure to the shock across regions and time. We then use individual level survey data to capture political preferences. We match this information with the our indicator of exposure to the shock based on the county where firms and survey respondents are located. This allows us to identify changes in political preferences depending on the degree of exposure to the credit shock. As our measure of exposure is at county level, we include a number of economic indicators at county level as controls. Finally, we use expert surveys and textual data to identify a party as populist. Given the complexity of the indicators we construct, we analyse these two last data sources separately in the following section.

A Exposure to the Credit Shock using Firm and Bank Data

Having assessed the exogeneity of the shock in Section 2, we now need to find a measure to distinguish between those subjects that were hit by the shock (treatment group) and those that were not (control group). we follow the approach proposed in Huber (2018) who measure the exposure to the Commerzbank lending cut at county level. The indicator we construct is based on the weighted average at county level of the share of relationship banks (*Hausbanken*) that were Commerzbank branches at the time of the shock divided by the number of relationship banks of each firm in the county.

We collect data on firms and banks from the database Amadeus by Bureau van Dijk. These include information on the bank account held by each firm, which goes from a minimum of zero to a maximum of seven bank accounts. We verify whether each firm has at least a bank account with Commerzbank. Our database has a total of around $950,000$ bank accounts, $99,000$ of which are Commerzbank's. We are able to match each firm with its relationship banks through an unique identifier. Since data on relationship banks are cross-sectional at the latest observation available, we rely on the assumption that the local banking market is somewhat stable, and there are negligible differences between the relationship banks in 2006 and the latest recorded ones. Hence, we isolate firms pre-existing in 2006 and we match each firm with the administrative district using ZIP codes[3]. Where the firm ZIP Code is not available, we use the *landkreis* information and the firm's address to match the firm to its county. After this procedure, we retrieve a total number of firms of all sizes of $624,258$. To harmonise county-level data with the waves of the individual data, we consider the administrative district keys at 2017, since some counties were amalgamating into existing districts during the considered time window as a result of state reforms.

In order to compute the degree of exposure of each county to Commerzbank, we apply the following equation on the set of firms F_k in a county k in 2006 (the year preceding the starting point of the credit shock):

$$Exposure_k = \frac{1}{F_k}\left[\sum_{f \in F_k}\left(\frac{\#\text{ Commerzbank Branches}_f}{\#\text{ Total Relationship Banks}_f}\right)\right] \in [0,1] \tag{2}$$

where $\#$ Commerzbank Branches$_f$ is the number of relationship banks of firm $f \in F_k$ located in county k that are Commerzbank Branches. We weight this indicator by the total number of relationship banks, $\#$ Total Relationship Banks$_f$. In this manner, we obtain a measure of exposure for each firm in county k and we average across firms within the county to construct an index of exposure at regional level. Figure 2 plots the geographical distribution of the exposure to the shock estimated with (2).

B County-Level Macro Data

We record several macroeconomic variables at regional level from DeStatis. We retrieve population, size, percentage of foreign citizens, unemployment rate, regional GDP, an indicator variable of whether the country is a rural or an urban area, whether it is a county of the

[3]We implement the ZIP Code – Official Municipality Key (AGS) using the list provided by suche-postleitzahl.org.

former German Democratic Republic (GDR) or whether it is exposed to a similar simultaneous crisis of the lending cut performed by Commerzbank (see Puri et al., 2011). The indicator variables are absorbed by the county-level fixed effects in (1).

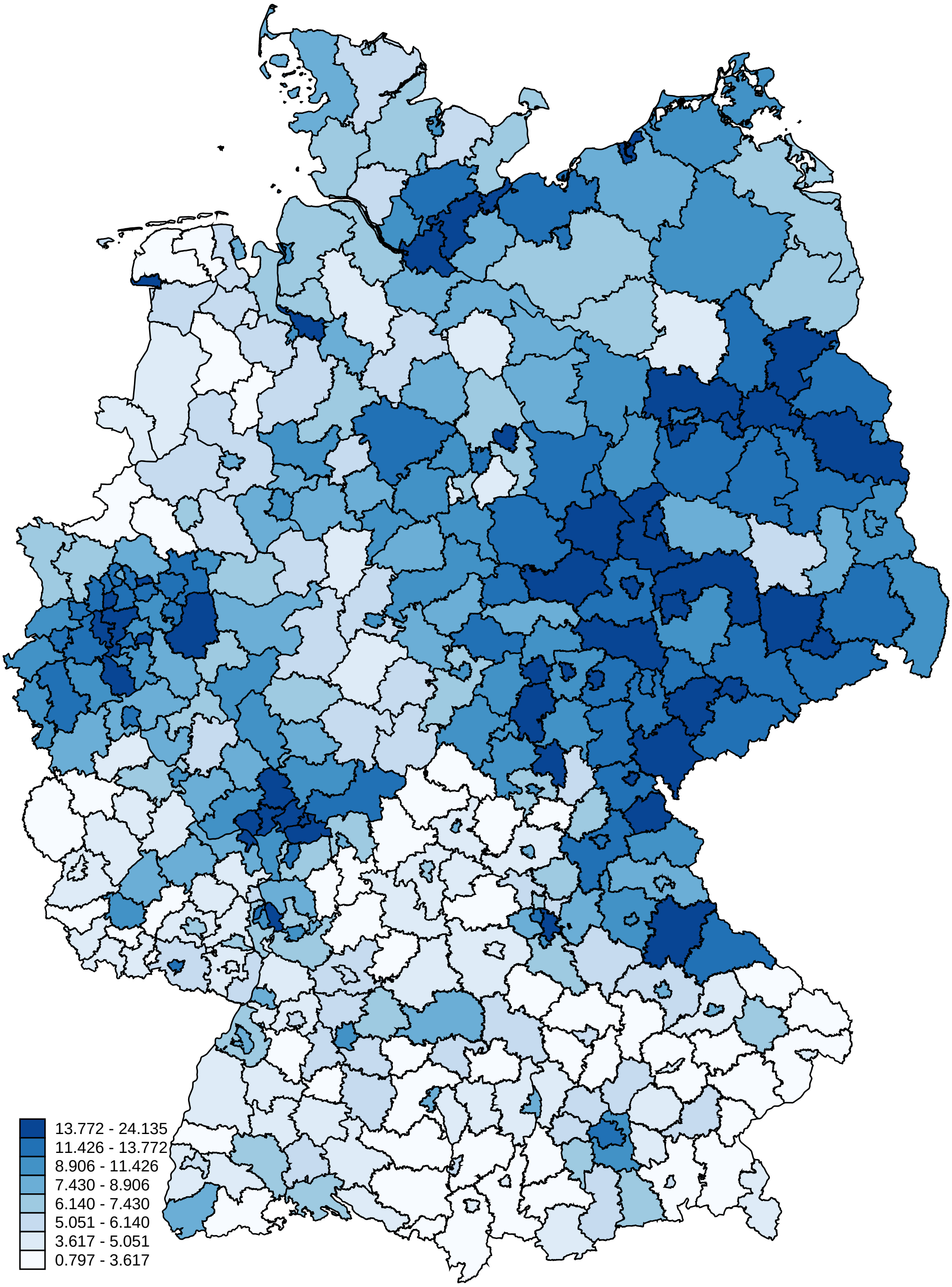
C Political Preferences using Individual Data

We exploit individual data from the *German Socio-Economic Panel* (SOEP) (Goebel et al., 2019, ver. 35) – a nationally representative longitudinal household survey that interviews every year around $30,000$ individuals of different samples. We consider waves from 2000 to 2016. The main advantage of this survey is that it provides detailed information about individual and household characteristics and, for our purpose, it annually records political support and intention to vote, which are our main individual-level outcomes. Political support is registered as an indicator variable which is equal to one for affirmative answer to the question (translated from German) "*Many people in Germany lean towards one party in the long term, even if they occasionally vote for another party. Do you lean towards a particular party?*". The question is repeated in a similar fashion for each considered wave, and its framing allows us to examine a long-term perspective of the political preferences. Our second outcome measures the intention to vote for a populist party conditional on political support. The data provide individual preferences for political parties. Figure 3 shows the geographical distribution of the variation of these outcomes before and after the credit shock.

We consider individuals at least sixteen years old (which corresponds to the eligibility to vote for administrative elections in several counties) in 2006 who did not move between counties or dropped out from the survey. In this fashion, we are able to control for attrition at the time of the shock, which leaves potential attrition at the top and at the tail of our time window. However, most of the drop-outs are related to death or migration abroad (in a meagre size), which makes us confident to postulate that attrition at the margin is as good as random. In the worst case scenario, individuals are willingly dropping out from the sample because of a lack of trust in institutions or a general disinterest towards civic capital: to this extent, our estimates might present a downward bias. Administrative district keys of residence are available at individual level in the data: this allows us to match each individual with the pre-shock county-level exposure to the credit shock, leaving us with information for individual in 396 out of 401 different counties in 2006. We safely measure individual-, household- and county-level characteristics at 2006 to allow that the only variation triggered by the indicated specification in (1) is given by the happening of the lending cut.

Tables 1 and 2 describe the data in our full sample and for the pre-shock year, with the variables relevant to our analysis. Monetary values are adjusted for inflation at 2016 current prices. We derive the annual household disposable income as household market income (defined as post-government income in Becker and Hauser, 2000) plus public pensions and

Figure 2: Measure of Pre-Shock County-Level Commerzbank Exposure

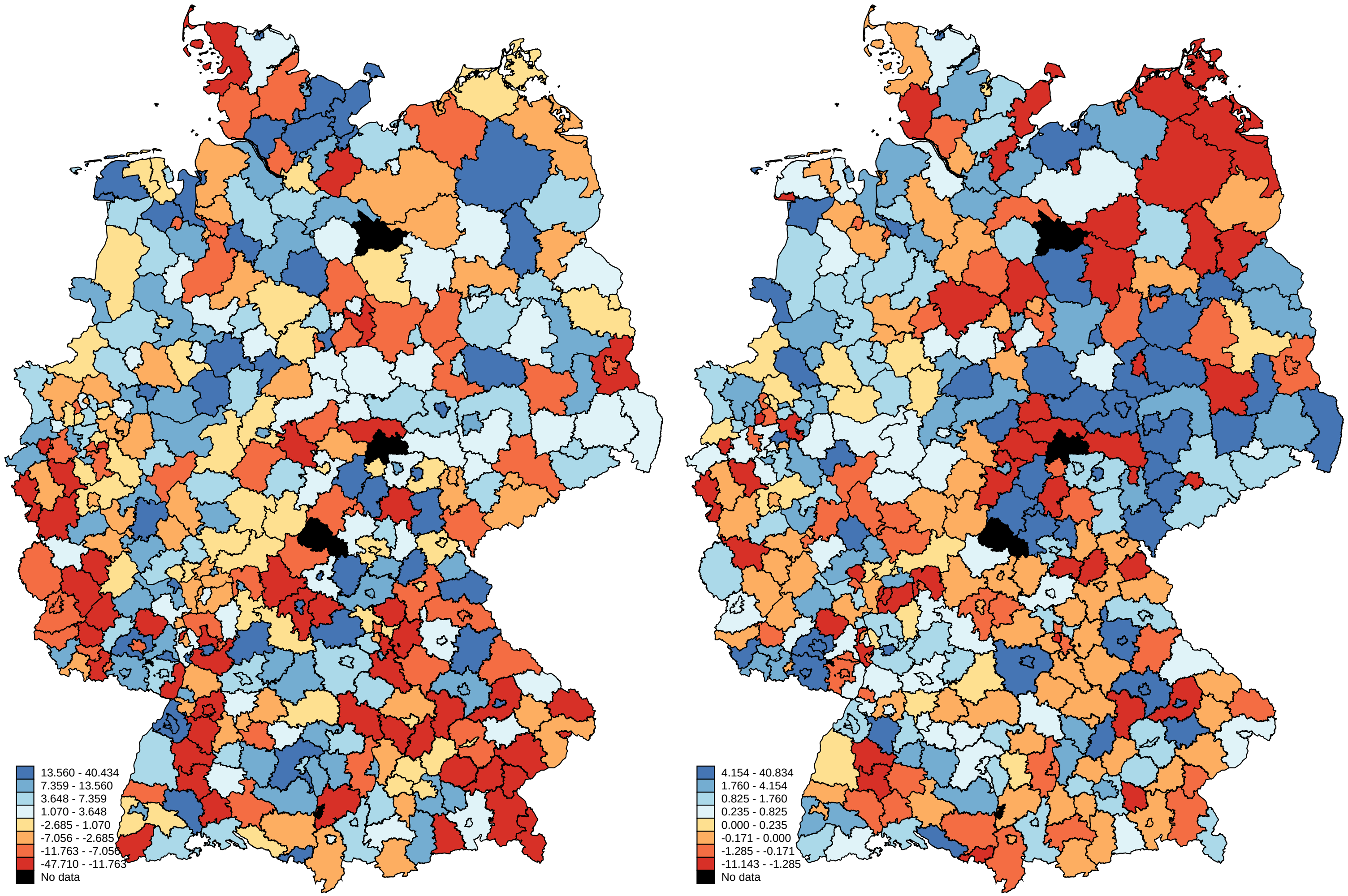


Notes: This map describes the geographical distribution of the calculated county-level Commerzbank dependence in 2006 given the firm-level data as in (2). We categorise the running variable using eight quantiles for better visualisation. Source: German Socio-Economic Panel (SOEP) (Goebel et al., 2019, ver. 35) and Amadeus firm-level data.

Figure 3: Variation of Outcome Variables before and after the Credit Shock

(a) Political Support

(b) Populist Party Voting Intentions



Notes: This map illustrates the descriptive variation of the two main dependent variables from the individual survey data before and after the credit shock at county level. We categorise the outcomes using eight quantiles and a divergent setting. Source: German Socio-Economic Panel (SOEP) (Goebel et al., 2019, ver. 35).

state monetary transfers minus direct taxes and social security contributions, but including the rental value of owner-occupied homes (Grabka and Goebel, 2018). We include an indicator variable for the former residence of the individual in the GDR before the reunification to control for political preferences towards extremism (*e.g.* see Avdeenko, 2018; Lichter et al., 2020).

4 Measuring Populism: Expert Surveys and Text Analysis

Our aim is to identify an indicator that captures the support for populist parties, *i.e.* the dependent variable in (1). Defining a party as populist is not easy since populism may rely on different aspects such as a certain set of policy preferences, ideology, or rhetoric (Norris, 2020; Guriev and Papaioannou, 2020). To account for these nuances, we employ three different, but complementary, approaches to obtain comparable indicators of populism at party level. The first method is based on a binary classification of parties as populist based on expert surveys. The second and third are based on semi-supervised and supervised text analysis techniques respectively.

A Binary Classification with Expert Surveys

We create an indicator variable that is equal to one when the individual leans towards a populist party. To identify populist parties in Germany, we rely on the *PopuList* proposed by Rooduijn et al. (2019) as in Guiso et al. (2020). The PopuList is a list of populist European parties that obtained not less than two percent of the vote in at least one national parliamentary election since 1998 and peer-reviewed by more than thirty academics. On the basis of this data, we identify as populist *Die Linke* and *Alternative Für Deutschland* (AfD) parties. Since our individual survey data are not constrained by any threshold on the share of votes, we are able to include in the list of populist parties also the *Nationaldemokratische Partei Deutschlands* (National Democratic Party of Germany, NPD), a party that never won a seat in Federal elections, but that features in the classification of Norris and Inglehart (2019) based on the 2014's Chapel Hill Expert Survey (CHES).

This measure has two main limitations. First, its binary structure allows to compare only populist and non-populist parties, but not different degrees of populism. Therefore, this measure is not able to describe whether some parties have more populist stances than others. Second, this indicator is time invariant. As a result, we cannot identify whether the degree of a party's populism changes over time and whether voters' preferences adapt accordingly.

Table 1: Summary Statistics: Full Sample

	Mean	SD	Median	Min	Max	N
Panel A: Demographic Variables						
Male	0.475	0.499	0.000	0.000	1.000	251,858
Birth Year	1,956.816	17.460	1,957.000	1,909.000	1,998.000	251,858
Age	50.335	17.681	51.000	16.000	105.000	251,858
Residence in GDR in 1989	0.273	0.446	0.000	0.000	1.000	250,820
Married	0.618	0.486	1.000	0.000	1.000	250,892
Direct/Indirect Migrant	0.131	0.338	0.000	0.000	1.000	251,858
Panel B: Education						
Vocational Degree or Higher	0.886	0.317	1.000	0.000	1.000	247,509
University Degree	0.224	0.417	0.000	0.000	1.000	247,509
Years of Education	12.270	2.659	11.500	7.000	18.000	242,092
Panel C: Occupational Status						
Currently Unemployed	0.057	0.233	0.000	0.000	1.000	251,851
In Working Age	0.755	0.430	1.000	0.000	1.000	251,858
In Labour Force	0.795	0.403	1.000	0.000	1.000	190,063
Self-Employed	0.033	0.179	0.000	0.000	1.000	251,858
In Education	0.045	0.207	0.000	0.000	1.000	251,858
Retired	0.051	0.220	0.000	0.000	1.000	251,858
EGP Score (Job Prestige Scale)	4.513	3.009	3.000	1.000	11.000	193,025
Contractual Working Hours per Week	34.166	9.452	38.500	0.300	80.000	110,676
Officially Unemployed Prev. Yr. No. Months	0.806	2.705	0.000	0.000	12.000	190,061
Monthly Gross Earnings (in 2016 EUR)	2,071.621	2,525.721	1,655.251	0.000	1.63e+05	190,063
Panel D: Household Variables						
Household Size	2.089	0.879	2.000	1.000	9.000	251,858
Number of Children in HH	0.451	0.847	0.000	0.000	9.000	251,858
Home-Ownership	0.561	0.496	1.000	0.000	1.000	251,854
Presence of Outstanding Loans	0.398	0.490	0.000	0.000	1.000	251,772
Annual Household Disposable Income (in 2016 EUR)	25123.126	22215.925	23361.701	-8.65e+04	6.91e+05	251,858
Panel E: County-Level Variables						
County GDP (in 2016 mln EUR)	7,163.390	10925.742	4,405.542	998.818	1.31e+05	6,673
Population Density	526.043	680.460	199.617	36.263	4,712.758	6,673
Unemployment Rate	8.149	4.303	7.100	1.200	25.400	6,673
Share of Foreigners	7.471	4.673	6.600	0.800	33.900	6,673
County of Former GDR	0.190	0.393	0.000	0.000	1.000	6,673
Landkreis in Crisis	0.403	0.491	0.000	0.000	1.000	6,673
Average Household Income (in 2016 EUR)	1.911	15.244	1.713	1.254	1,246.867	6,673
Panel F: Outcome Variables						
Political Supporter	0.467	0.499	0.000	0.000	1.000	250,809
Intention to Vote for Populist Party	0.035	0.184	0.000	0.000	1.000	250,809
Banking and Financial Crisis Index (sLDA)	3.167	0.271	3.202	2.357	3.745	112,696
Populism Index (sLDA)	0.089	0.024	0.089	0.043	0.167	112,696

Notes: This table presents descriptive statistics for all variables in the full sample. Monetary values are adjusted for inflation at 2016 current prices. The EGP score indicates a scale of job prestige based on Erikson et al. (1979) and more recent. Annual Household Disposable Income is partially imputed in five different steps. Identification of counties exposed to a similar simultaneous crisis to the lending cut performed by Commerzbank comes from Puri et al. (2011). Outcome variables are calculated both from the individual-level survey data or as the output of the text analysis. Waves: 2000–2016. Source: German Socio-Economic Panel (SOEP) (Goebel et al., 2019, ver. 35), Destatis, Amadeus and ParlSpeech (Rooduijn et al., 2019, v2) from authors' calculations.

Table 2: Summary Statistics: Pre-Shock Year (2006)

	Mean	SD	Median	Min	Max	N
Panel A: Demographic Variables						
Male	0.477	0.499	0.000	0.000	1.000	20,836
Birth Year	1,956.719	17.565	1,957.000	1,909.000	1,989.000	20,836
Age	49.281	17.565	49.000	17.000	97.000	20,836
Residence in GDR in 1989	0.267	0.442	0.000	0.000	1.000	20,205
Married	0.610	0.488	1.000	0.000	1.000	20,751
Direct/Indirect Migrant	0.143	0.350	0.000	0.000	1.000	20,836
Panel B: Education						
Vocational Degree or Higher	0.880	0.325	1.000	0.000	1.000	20,431
University Degree	0.213	0.410	0.000	0.000	1.000	20,431
Years of Education	12.192	2.646	11.500	7.000	18.000	20,031
Panel C: Occupational Status						
Currently Unemployed	0.073	0.260	0.000	0.000	1.000	20,836
In Working Age	0.766	0.423	1.000	0.000	1.000	20,836
In Labour Force	0.791	0.406	1.000	0.000	1.000	15,957
Self-Employed	0.036	0.187	0.000	0.000	1.000	20,836
In Education	0.046	0.209	0.000	0.000	1.000	20,836
Retired	0.048	0.215	0.000	0.000	1.000	20,836
EGP Score (Job Prestige Scale)	4.560	3.007	4.000	1.000	11.000	15,078
Contractual Working Hours per Week	34.151	9.326	38.500	1.000	72.000	8,774
Officially Unemployed Prev. Yr. No. Months	1.001	3.007	0.000	0.000	12.000	15,957
Monthly Gross Earnings (in 2016 EUR)	2,031.957	2,673.643	1,508.121	0.000	1.35e+05	15,957
Panel D: Household Variables						
Household Size	2.128	0.867	2.000	1.000	8.000	20,836
Number of Children in HH	0.471	0.863	0.000	0.000	7.000	20,836
Home-Ownership	0.554	0.497	1.000	0.000	1.000	20,835
Presence of Outstanding Loans	0.391	0.488	0.000	0.000	1.000	20,828
Annual Household Disposable Income (in 2016 EUR)	26606.992	23533.190	24453.598	-4.99e+04	6.28e+05	20,836
Panel E: County-Level Variables						
County GDP (in 2016 mln EUR)	7,000.992	10651.569	4,275.341	1,154.023	1.05e+05	395
Population Density	525.876	676.956	201.102	39.465	4,166.612	395
Unemployment Rate	10.353	4.493	9.200	3.400	23.700	395
Share of Foreigners	7.324	4.553	6.500	1.100	25.100	395
County of Former GDR	0.190	0.393	0.000	0.000	1.000	395
Landkreis in Crisis	0.403	0.491	0.000	0.000	1.000	395
Average Household Income (in 2016 EUR)	1.720	0.234	1.698	1.319	3.037	395
Panel F: Outcome Variables						
Political Supporter	0.489	0.500	0.000	0.000	1.000	20,732
Intention to Vote for Populist Party	0.035	0.184	0.000	0.000	1.000	20,732
Banking and Financial Crisis Index (sLDA)	3.150	0.146	3.220	2.989	3.402	9,788
Populism Index (sLDA)	0.058	0.012	0.056	0.049	0.089	9,788
Panel G: Variable of Interest						
County-Level Commerzbank Exposure	0.083	0.043	0.075	0.008	0.241	395

Notes: This table presents descriptive statistics for all variables in the 2006 wave. Further details are included in the note at Table 1. Source: German Socio-Economic Panel (SOEP) (Goebel et al., 2019, ver. 35), DeStatis, Amadeus and ParlSpeech (Rooduijn et al., 2019, v2) from authors' calculations.

B Seeded LDA

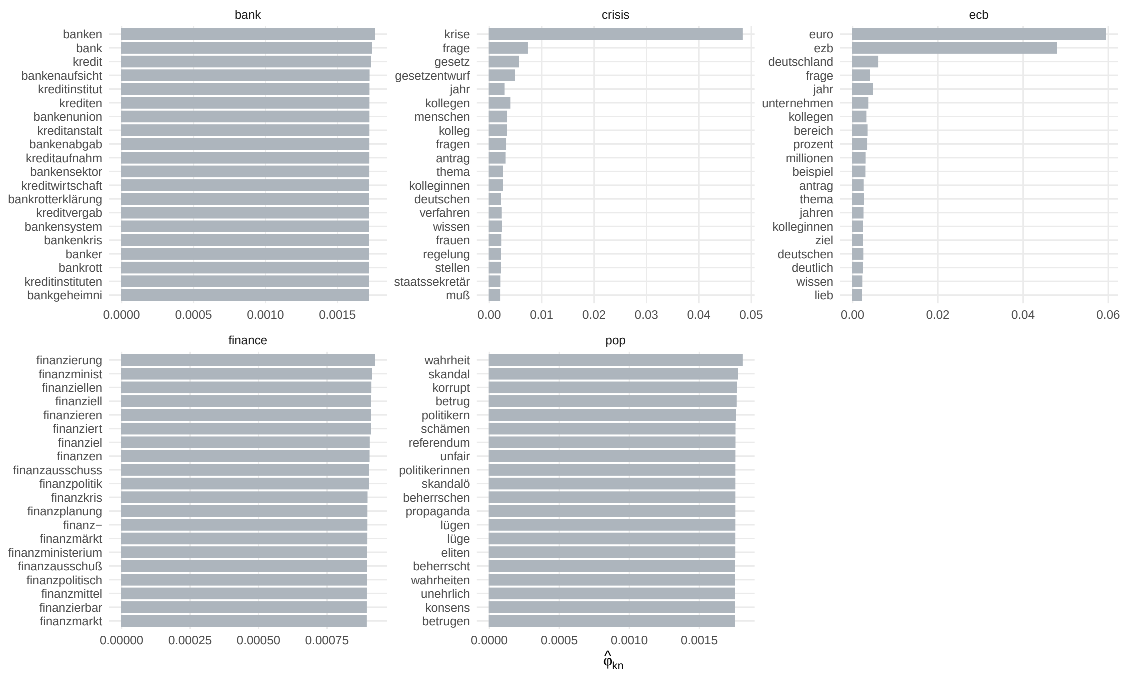
To overcome these limitations, we employ a second measure of populism based on text analysis. We rely on two sources of political textual data. First, we use the text of the parliamentary debates of party representatives in the Bundestag. We use the *ParlSpeech (v2)* database from Rauh and Schwalbach (2020), which contains the full text corpora of 6.3 million parliamentary speeches of nine representative democracies, including Germany. From this source we select the subsample of speeches of the German Bundestag in the years from 1991 to 2018. Our subsample includes 379,545 speeches, with 13,555 average speeches per year from 1990 to 2018. By construction, this measure necessarily rules out the NDP from the sample, as it never had any seat in the Bundestag. This applies also to other populist parties that had no seats in specific years. Second, we use the text of the electoral manifesto of each party from the Comparative Manifesto Database (Burst et al., 2020). Manifesto data serves as a helpful robustness test since they extend to all parties that ran for the elections, covering also those that did not receive sufficient votes to be represented in parliament. However, the limitation of manifesto data is that, by construction, they cover only those years when an election was held, while parliamentary speeches cover all years.

We compute the degree of populism using seeded Latent Dirichlet Allocation (seeded LDA). Seeded LDA is a semi-supervised machine learning method used to extract the intensity of a topic for a given set of textual documents (Watanabe and Zhou, 2020; Lu et al., 2011). Seeded LDA works similarly to a classical LDA, which is an unsupervised method used to uncover the latent topics of a text. LDA is a generative probabilistic model based on the assumption that each document is a mixture of topics and that the words observed in the document of a corpus are generated by latent topics. The main difference between the two approaches is that seeded LDA extracts these topics based on a prior 'seed' of selected terms that capture the object of interest (*i.e.* populist rhetoric in our case). The seeds train the model to extract the latent topics for each document based on the words provided as priors. Watanabe and Zhou (2020) and Ferner et al. (2020) show that this method fixes the inconsistency of topics that is generally produced by LDA. Another advantage of seeded LDA, differently from LDA, is that it does not require to select a pre-determined number of topics K. Overall, LDA can be helpful if we want to identify the topics that compose a text and we have no priors on them. On the other hand, seeded LDA is preferable in our case since we already know which topics we intend to identify, *i.e.* the topic of banking and financial crisis and populist rhetoric. We summarise the seeded LDA generative process in the plate diagram of Figure A.2 together with the full text analysis workflow we adopt for the computation of our measures in Figure A.1.

We first select a seed of words that captures together the topics of banking, finance and the financial crisis (we provide the full lists of words in Section B of the Appendix). This allows us to obtain an indicator of how much each party discusses the topic of the crisis and banking. We intentionally do not focus on keywords related solely to crisis. In this way, we can capture how much each party focused on the topic of banking before the financial crisis and the credit crunch happened. For brevity, we will refer to this first macro topic as ‘banking and financial crisis’ in the rest of the paper. Second, we select a seed of terms that captures populist rhetoric. We take these terms from the populist lexicon composed by Rooduijn and Pauwels (2011) to capture the degree of populist rhetoric of German-speaking parties. This lexicon is particularly interesting as it builds on the the definition of populism provided by Mudde (2004, p. 543) as “*a ‘thin’ ideology (Freeden, 1998) that considers society to be ultimately separated into two homogeneous and antagonistic groups, ‘the pure people’ versus ‘the corrupt elite’, and which argues that politics should be an expression of the* volonté générale *(general will) of the people*”. According to this definition, the ideology of populism is made of two elements: people-centrism and anti-elitism. The lexicon focuses more on the latter, as measuring people-centrism by means of uni-grams does not give the correct flavour of the context and the rhetoric is directed to other political representatives. The list is composed of twenty stemmed terms, such as ‘elit*’ and ‘korrupt*’.

We select the top twenty tokens based on the topic-specific posterior probability distribution of the topic model. Figure 4 displays the top twenty terms for the topic of banking and financial crisis (divided in four subcategories: bank, crisis, ECB and finance) and for populist rhetoric based on the populist dictionary.

Figure 4: Top Twenty Terms by Posterior Probability using Seeded LDA, Populism using the Rooduijn and Pauwels (2011) lexicon.



Based on the top twenty terms associated to each topic through seeded LDA, we compute an indicator that captures for each party (1) its focus on the topic of banking, finance and the crisis, and (2) its populist rhetoric. Formally, we estimate the following equation for each party p in year t:

$$L_{pt} = \sum_{d \in D_{pt}} \left[\frac{\sum_{n \in N_d} \mathbb{1}\left(w_{dn} \in B_L\right)}{N_d} \right] \ \forall\ L = \{BF, POP\} \tag{3}$$

where w_{dn} is the observed word $n \in N_d$ in document d. The sets of terms extracted by seeded LDA is B_L, where $L = \{BF, POP\}$, and where BF and POP are the top twenty terms for the 'banking and financial crisis' topic and for populist rhetoric defined as the set (6) described in Section A of the Appendix. $D_{pt} \in \mathcal{C}$ is the collection of speeches for party p in year t of a corpus $\mathcal{C}$ (*i.e.* parliamentary speeches). $D_{pt} \subset \mathcal{C}$ is the collection of speeches for party p in year t of a corpus $\mathcal{C}$, which is either the corpus of parliamentary speeches, or the corpus of electoral manifesto. The sum of matched terms, $\sum_{n \in N_d} \mathbb{1}(\omega_{dn} \in B_L)$, is weighted by the total number of terms in each document, N_d. This allows us to control for variations in the length of speeches in line with previous works (*e.g.*, Fraccaroli et al., 2020; Cantarella et al., 2020).

Figures 5 and 6 show the evolution of the scores by party from 1991 to 2018. Figure 5 displays the focus of each party on the topic of banking and financial crisis over time. We notice that all parties increase their attention on banking issues at the beginning of the crisis. The attention of most parties on the topic peak in 2010, which marks the beginning of the Eurozone crisis. The low score of the AfD party on banking may appear surprising at first, considering that the party was established by a group of economists with strong stances on the Euro crisis and the Greek bailout. However, the party enters parliament (and hence our sample) only in 2017. By that year, AfD was taken over by its most extremist faction, which focused on topics such as immigration, nationalism and Islamophobia, whereas the economist faction left the party[5].

Figure 6 displays the scores of populist rhetoric. We notice that the supply of populist rhetoric increases substantially for all parties from 2009 to 2010. However, this change has different intensity depending on the party. The centre-right CDU/CSU and the liberals (FDP) present the lowest scores, followed by the centre-left socialists (SPD) and the Green party (GRUENE). Populist rhetoric increases sharply for the left-wing party LINKE, that reaches its peak in 2011 and later on in 2018. From 2006, LINKE has the highest score in the whole sample until 2017, when the far right AfD enters the sample. In the last year of our database, LINKE and AfD are the two parties with the highest degree of populist rhetoric, reflecting the general categorisation of these parties as populist.

Since we are interested in comparing for each party (1) its focus on banking and financial

[5]For a comprehensive description of this transition, as well as of the transition of the AfD's populist rhetoric and issue salience in their speeches see Cantoni et al. (2019).

Figure 5: Focus on Banking & Finance in parliamentary speeches, by political party (1991-2018)

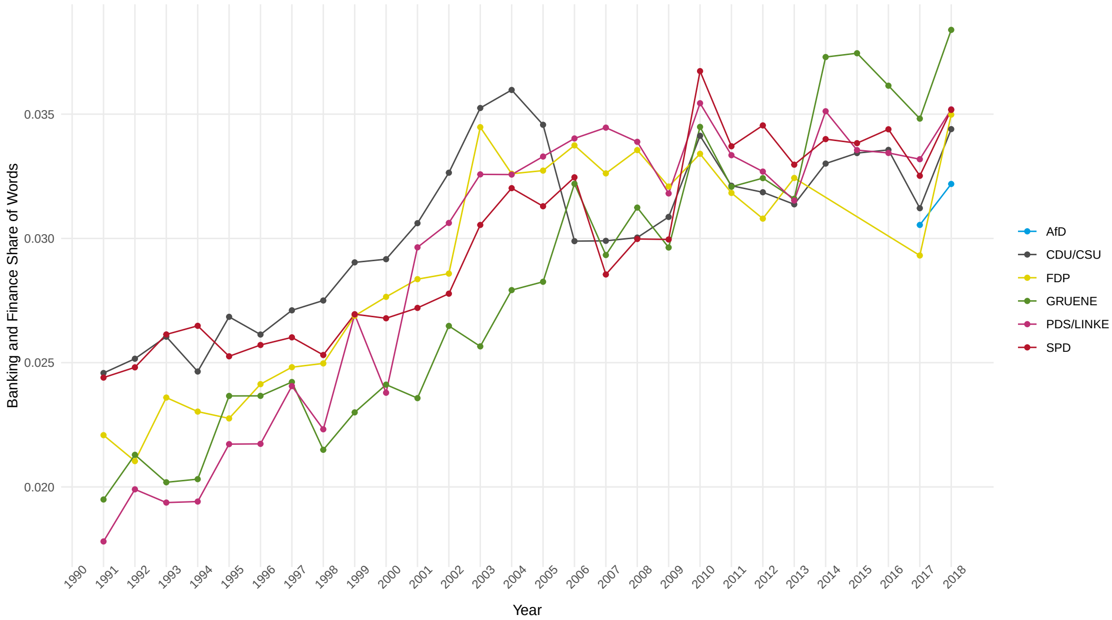
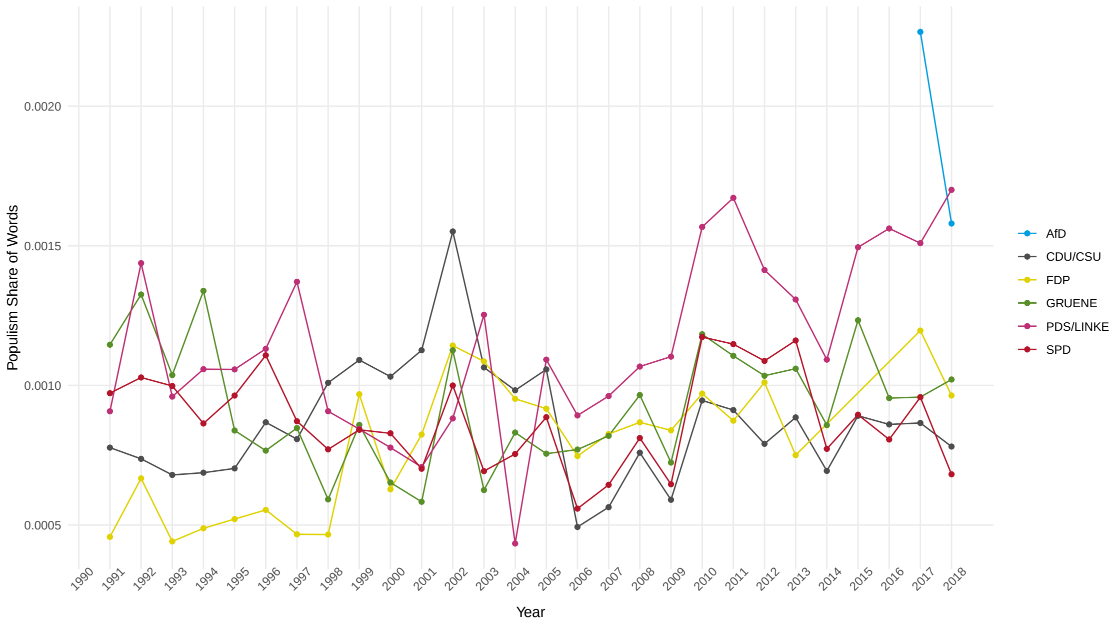


Figure 6: Populist Rhetoric using Rooduijn and Pauwels (2011) in parliamentary speeches, by political party (1991-2018)



crisis, (2) its populist rhetoric and (3) the combination of the two, we need a third indicator that provides us with an estimate of the latter. To this end, we create an indicator that we call *Combined* which equals for each party and year the average between a party's score in the topic of banking and financial crisis and a party's score in populist rhetoric for each year.

C Dictionary Approach

For robustness, we compute the focus on the topic of banking and financial crisis and the degree of populist rhetoric using an alternative text analysis, known as dictionary approach (or *bag-of-words* approach). We apply the same lexicons that we applied as seeds in the previous approach, and which we define S_V, $V = \{BF^s, POP^s\}$. We then compute the dictionary-based scores as follows:

$$V_{pt} = \sum_{d \in D_{pt}} \left[\frac{\sum_{n \in N_d} \mathbb{1}\left(w_{dn} \in S_V\right)}{N_d} \right] \; \forall \; V = \{BF^s, POP^s\} \tag{4}$$

where the numerator computes the frequency of terms in dictionary S_V that occur in document d, and the denominator weight such frequency by the length in terms of words of the document, N_d. In other words, we compute a similar score to the one in Equation 3. The main difference is that in this case we use the raw dictionaries rather than the terms with the highest posterior probability drawn with the seeded LDA. Similarly to the seeded LDA, also in this case we compute a third index based on the average between the dictionary-based score in banking and financial crisis and in populism.

5 Empirical Results

In this section, we analyse the effect of the Commerzbank's lending cut on political support and intention to vote for a populist party. The results from estimating Equation (1) for various specifications are presented in Table 3. In Column 1 we have our baseline specification with county-level and wave fixed effects, and basic demographic controls such as gender, a second-order polynomial of age, residence in former GDR, occupational and education controls. We find a substantial increase in political support and in the intention to vote for a populist party in counties that had higher levels of exposure to the credit shock *ex ante*. That is, the coefficient on $Exposure_k \times Post$ denotes that an increase of county-level Commerzbank exposure by one standard deviation expands political support by 1.1 percentage points and the intention to vote for populist parties by 0.7 percentage points, a sizeable effect and statistically significant at one percent. The results are robust adding household (household size, number of children, home-ownership, outstanding loans, disposable income), and regional controls in Column 2 and 3. When limiting the analysis to rural and urban counties separately, the results remains very similar, and we find no significant difference between the two sub-samples (see Table D.1 in the Section 1 of the Appendix). However, we lose significance due to the restriction of the sample size.

To test the validity of our results, we perform a pre-trends analysis proposing a model

Table 3: The Effect of the Credit Shock on Political Preferences: Baseline Results

	Political Support			**Intention to Vote for Populist Party**		
	(1)	(2)	(3)	(4)	(5)	(6)
$Exposure_k \times Post$	0.011**	0.013***	0.013***	0.007**	0.007***	0.007***
	(0.005)	(0.005)	(0.005)	(0.003)	(0.002)	(0.002)
Number of Observations	229,699	206,604	206,604	229,699	206,604	206,604
Adjusted R-Squared	0.129	0.139	0.139	0.078	0.076	0.076
Number of Counties	396	396	396	396	396	396
County-Level FE	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	No	Yes	Yes
Regional Controls	No	No	Yes	No	No	Yes

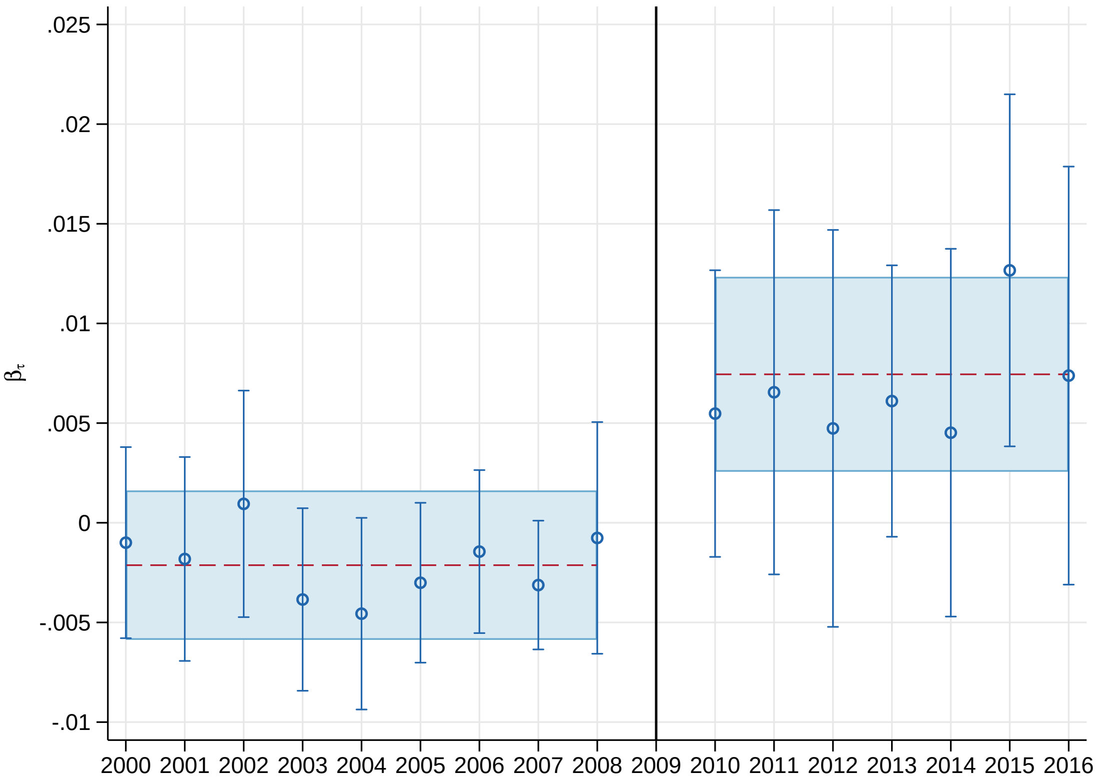
Notes: This table shows the effect of the credit shock on political support and intention to vote for a populist party. Each estimate is from a different regression. The outcome variables are standardised indicator variables equal to one respectively when the individual defines herself as a political supporter answering affirmative to the question indicated in Section C and when expresses preferences towards a populist party listed in the same section. Basic controls are gender, a second-order polynomial of age, residence in former GDR in 1989, employment status in different categories and years of education. Household controls are household size, number of children, home-ownership status, presence of outstanding loans and ln annual disposable income. Regional controls are ln population, ln regional GDP, unemployment rate and share of foreigners. All controls are fixed at 2006. Significance Levels: *** 1% level, ** 5% level, * 10% level. Robust standard errors adjusted for clustering at the county of residence in 2006 level in parentheses.

similar to Autor (2003). Following the model in (5), we produce year-by-year point estimates using the first year of the shock as reference year.

$$\begin{aligned} y_{ikt} = \alpha \; &+ \sum_{\tau \in [2000,2009)} [\beta_\tau \;\times\; Exposure_k \;\times\; \mathbb{1}\,(t=\tau)] \\ &+ \sum_{\tau \in (2009,2016]} [\beta_\tau \;\times\; Exposure_k \;\times\; \mathbb{1}\,(t=\tau)] \\ &+ \boldsymbol{X}_{ik}\boldsymbol{\Gamma} + \boldsymbol{K}_k\boldsymbol{\Pi} + \delta_k + \lambda_t + \varepsilon_{ikt} \end{aligned} \tag{5}$$

In Figure 7 present the result for the model specification in (5) with populist electoral preferences as outcome variable. Even though point estimates are noisy due to sample restriction and attrition to the extremes, the figure shows the presence of no pre-trends, which allow parallel trends to hold in our main specification. It is worth to remember that results provide ITT estimates, so they are a precautionary lower bound of the true effect.

Figure 7: Pre-Trends Analysis of the Baseline Specification



Notes: This figure illustrates the point estimates from the specification in (5). The outcome variable is a standardised indicator variable equal to one when the individual express preferences towards a populist party as a follow-up to the question indicated in Section C. Basic controls are gender, a second-order polynomial of age, residence in former GDR in 1989, employment status in different categories and years of education. Household controls are household size, number of children, home-ownership status, presence of outstanding loans and ln annual disposable income. Regional controls are ln population, ln regional GDP, unemployment rate and share of foreigners. All controls are fixed at 2006. Confidence intervals for the point estimates are obtained from robust standard errors adjusted for clustering at the county of residence in 2006. Regression lines and their confidence intervals before and after the credit shock are obtained from the specification in (5) and a placebo regression to pool together the pre-trend years.

In addition to the pre-trends validation, we also check whether results lead to the same direction varying the time window of the analysis, performing a placebo tests using different starting years of the shock to determine the correct timing. Results are still robust considering 2007 and 2008 as the starting point of the shock outbreak, with a lower magnitude. Moreover, conditioning the support to populist parties on answering affirmatively to the political support question indicated in Section C also leads to robust results with an effect of 1.2 percentage points at the last specification, suggesting that our specification provides a lower bound result.

These estimates are based on populism defined as a binary classification of the political parties supported by each individual as populist or not. While we estimates indicate that being exposed to the credit shock increases the probability of voting for a populist party, it is not clear yet whether individuals do so because of a party's populist rhetoric, because of its focus on banking issues or because of a combination of the two. To this end, we now replace the dependent variable with the continuous text-based indicator of populism we described in Section 4.

The first indicator we study is the score based on the seeded LDA estimates and computed on the parliamentary speeches of the representatives of each party. The estimates of the model for this dependent variable are displayed in Panel A of Table 4. The panel presents the results for the seeded LDA using the populist lexicon of Rooduijn and Pauwels (2011). As in the previous table, also in this case column 1 includes country-level and wave fixed effects as well as basic controls, while in columns 2 and 3 we progressively add controls at household and regional level. Columns 1 to 3 display the the estimates for the topic of 'Banking and Financial Crisis'. The coefficients captures the probability of an individual hit by the credit shock to vote for a party based on the party's focus on the topic of banking and financial crisis. As we saw from the descriptive analyses, much of the terms related to this topic are related to credit and the crisis. The coefficient is positive and significant at the one percent level, indicating that individuals exposed to the credit crunch were more likely to vote for parties that spoke more frequently about banking and credit issues, regardless of their degree of populist rhetoric.

In columns 4 to 6 we replace the dependent variable with the text-based indicator of populist rhetoric. The interpretation of these estimates is the same of the previous columns, but for populist rhetoric. The positive and significant coefficients in columns 4-6 indicate that individuals exposed to the cut in lending are more likely to vote for parties that use a populist rhetoric, regardless of their focus on banking issues. This result supports the overall finding presented in Table 3, for which the credit shock causes an increase in intentions to vote populists. The difference is that here populism is defined as a continuous - and not binary - variable, meaning that we are not just comparing populist and non-populist parties, but parties with different degrees of populism. Moreover, here we are focusing specifically on the use of populist rhetoric in the context of parliamentary debates, whereas binary classifiers are based on a number of factors, such as a party's policy stances.

These results are particularly interesting when compared with the estimates presented in columns 7-9. In this set of columns, the dependent variable captures the intention to vote those parties that use a populist rhetoric *and* talk frequently about the topic of banking and financial crisis. Also in this case, the coefficient of the credit shock is positive and significant at the one percent level. This result indicates that the credit shock had a positive effect on individual intentions to vote for populist parties that focused on banking and financial crisis. However, it should be noted that the coefficient of the shock is the largest when the dependent variable is only populism (Columns 4-6), even when compared to the combined dependent variable (Columns 7-9). This means that parties that the credit shock mostly rewarded parties that adopted a populist rhetoric, holding constant their focus on the topic of banking and financial crisis.

In Panel B of Table 4 we apply the same model but using the seeded LDA scores on the text of party manifestos. A major difference compared to the text of parliamentary speeches is data availability. As party manifestos are published only in view of an election, the sample of text is smaller and less frequent over time than the one for parliamentary speeches. For this reason, the number of observations reported in this panel is significantly smaller than the number of observations of Table 3. We identify a positive and significant effect of the shock on support for parties that focus on the topic of banking and financial crisis in their manifestos (columns 1-3 of Panel B in Table 4). This result is particularly striking as previous research found that voters react only minimally to changes in policy stances, as expressed in election manifestos (Adams et al., 2011; 2014; Fernandez-Vazquez, 2014). The same does not hold for populism, where the coefficient of the credit shock is positive and significant (columns 4-6 of Panel B in Table 4). When we combine the scores of both the focus on banking and financial crisis and populist rhetoric (columns 7-9 of Panel B in Table 4), we notice that the effect of the credit shock is positive and significant, and displays a higher coefficient than the one for banking and financial crisis, similarly to the result for parliamentary speeches. Table D.2 in the Appendix provides the results using the dictionary approach using parliamentary speeches and electoral manifestos. The estimates do not display significant differences from the baseline results.

6 Conclusions

The electoral rise of populist parties after the Great Financial Crisis opened a debate on the influence of banking crises on electoral behaviour. However, so far existing research has identified the economic drivers of populist sentiments outside the banking sector. In this paper we fill this gap and study the causal effect of a drop in credit on electoral preferences in Germany.

Based on an exogenous shock that decreased bank lending in some German counties in 2007-08, we are able to identify the causal effect of the crisis on individual political preferences. We find that voters in counties more exposed to the credit shock were 0.8 percentage points more likely to vote for a populist party than their peers. Moreover, we show that the exposure to the credit crunch increases the support of individuals for a specific party. This finding is particularly interesting as it contrasts with the recent literature that

Table 4: The Effect of the Credit Shock on Political Preferences: Outcomes as Topic Model Scores

	Banking and Financial Crisis			**Populism**			**Combined**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Parliamentary Debates									
$Exposure_k \times Post$	0.058***	0.060***	0.060***	0.128***	0.120***	0.120***	0.066***	0.067***	0.067***
	(0.015)	(0.016)	(0.016)	(0.024)	(0.025)	(0.025)	(0.016)	(0.017)	(0.017)
Number of Observations	105,720	93,533	93,533	105,720	93,533	93,533	105,720	93,533	93,533
Adjusted R-Squared	0.590	0.584	0.584	0.556	0.560	0.560	0.570	0.566	0.566
Number of Counties	393	393	393	393	393	393	393	393	393
Panel B: Electoral Manifestos									
$Exposure_k \times Post$	0.081***	0.084***	0.083***	0.049***	0.049***	0.050***	0.084***	0.087***	0.086***
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.014)
Number of Observations	25,842	22,816	22,816	25,842	22,816	22,816	25,842	22,816	22,816
Adjusted R-Squared	0.601	0.593	0.594	0.341	0.337	0.338	0.593	0.586	0.587
Number of Counties	387	387	387	387	387	387	387	387	387
County-Level FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Regional Controls	No	No	Yes	No	No	Yes	No	No	Yes

Notes: This table shows the effect of the credit shock on political preferences. The outcome variables are standardised indicator variables equal to the score assigned for each year to each political party the individual defines herself a supporter of as a follow-up to the affirmative answer to the question indicated in Section C. The score is based on the estimates of the seeded LDA for each topic computed on the text of party representatives' parliamentary speeches (Panel A) or of party electoral manifestos (Panel B). Basic controls are gender, a second-order polynomial of age, residence in former GDR in 1989, employment status in different categories and years of education. Household controls are household size, number of children, home-ownership status, presence of outstanding loans and ln annual disposable income. Regional controls are ln population, ln regional GDP, unemployment rate and share of foreigners. All controls are fixed at 2006. Significance Levels: *** 1% level, ** 5% level, * 10% level. Robust standard errors adjusted for clustering at the county of residence in 2006 level in parentheses.

associates the growth of populism with the decrease of engagement in politics (Magni, 2017). While more research is needed, our result may not be necessarily in contradiction with previous works. On the contrary, it may suggest that while political engagement decreases following crises (as shown in the existing literature), it increases among those groups that are exposed to the shock (as shown in this paper).

We study more in depth the link between the shock to individual intentions to vote for populists, taking into consideration the supply side of populism. We find that individuals more exposed to the shock were more likely to vote for parties that adopted a populist rhetoric, but also for those parties that focused on the topic of banking and financial crisis more than others. This suggests that, while populist rhetoric matters to gain the support of individuals exposed to the shock, voters also care about parties that speak closely to their topic of interest, *i.e.* the crisis and bank-related issues for voters hit by the shock. Nevertheless, we identify the effect of the shock to be larger on populist rhetoric rather than on banking-related issues. This means that, while voters care about these topics being discussed, the credit shock increases their probability to support a party that adopts a populist rhetoric, regardless of its focus on banking and financial issues.

While we find a robust effect of shock exposure on populist voting, more research is needed to understand the nuances of the mechanism linking the two phenomena. The evidence in Huber (2018) on the economic effect of the Commerzbank shock provides interesting insights to explore this matter. While his study shows that the lending cut had a negative impact on the performance of firms exposed to the shock, it also finds household debt was not directly affected. This rules out the hypothesis of a direct mechanism for which individuals more exposed to the shock tend to vote for populist parties *because* they directly suffer a reduction in their personal loan portfolio. A more plausible interpretation is that voters follow a sociotropic reaction, similar to the one identified in other works (Colantone and Stanig, 2018*a*; Colantone and Stanig, 2018*b*; Duch and Stevenson, 2008). This means that voters orient their political preferences based on changes in local economic conditions triggered by the shock, rather than on changes in their individual or household level conditions. In other words, the effect of the lending cut extended broadly across many segments of the population in the counties exposed, and was not restricted to a specific category of voters.

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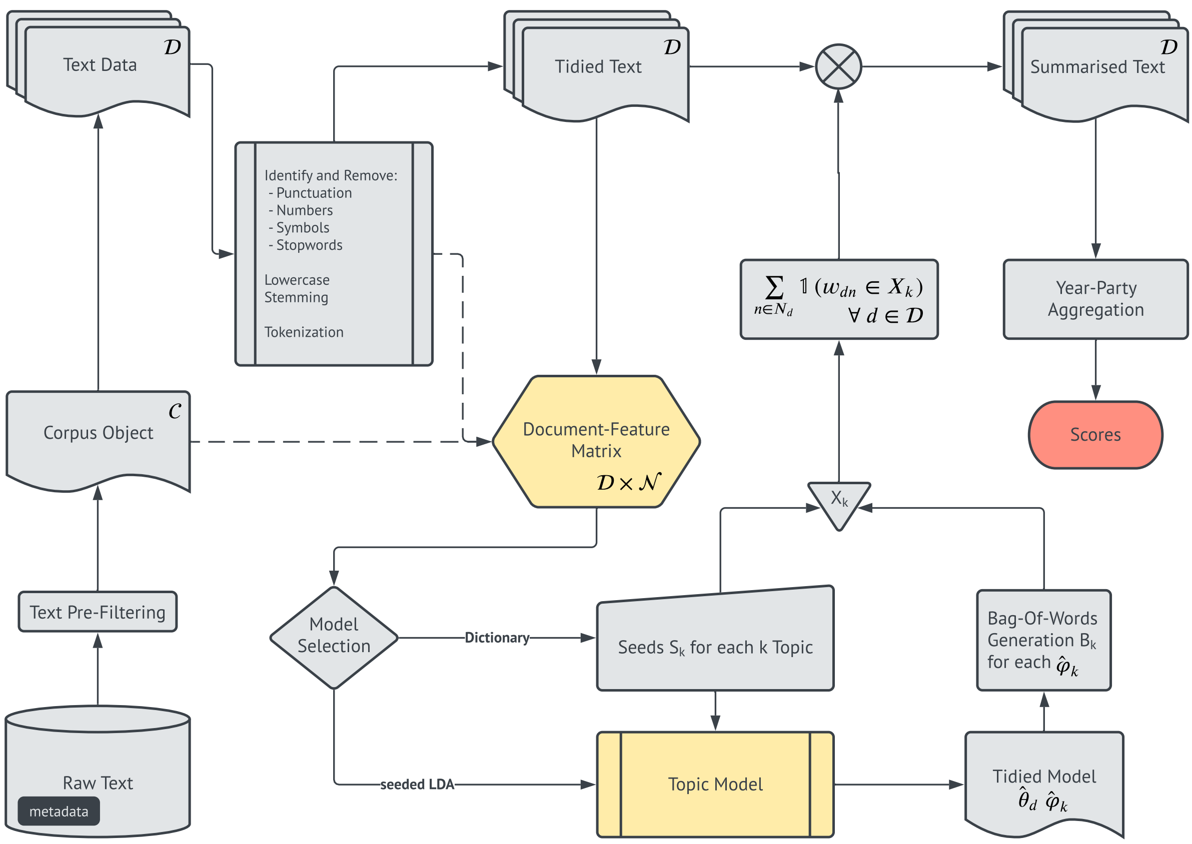
A Text Analysis Workflow with Topic Modelling

Figure A.1: Flowchart of the Text Analysis Workflow including topic modelling

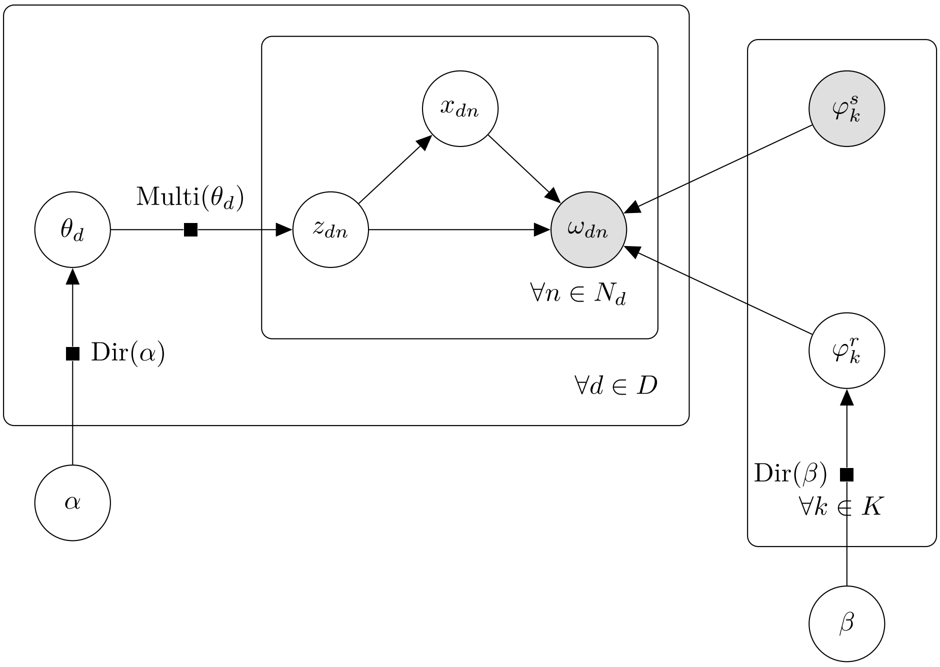


In Figure A.1, we describe in detail the process of our text analysis workflow. The entry point is always the raw textual data, either from ParlSpeech (Rooduijn et al., 2019, v2) or the *Comparative Manifesto Database* (Burst et al., 2020) with some related metadata describing in particular the party, the year and the contributor. The raw text is pre-filtered using simple adjustments on metadata and common mistakes, and shaped as a Corpus object. Once the text is shaped as a dataframe, we pre-process it. In particular, we identify and remove punctuation, numbers, symbols and stopwords[6]. For simplicity, we transform the text data as lowercase to perform the tokenisation in uni-grams. From the token data, we create the document-feature matrix at which we either apply the topic model or not based on the model selection decision, and we calculate the sum of matched terms for each topic using either the bag-of-words obtained as in (6) or the seeds lexicon. After that, we apply

[6]For the identification of stopwords, we both use the standard dictionary of German stopwords in the `quanteda` R package and an extended dictionary from the Github repository of `solariz`.

the aggregation decision at year-party level as described by Equation (3) or (4) in Section 4. Theoretical guidance for the right level of aggregation is often limited, which makes it an important dimension along which to check the sensitivity of results. This is an additional reason to why we also include textual data from political manifestos, where aggregation is irrelevant as we have one single manifesto for each election year and each party.

Figure A.2: Plate Notation Diagram of the seeded Latent Dirichlet Allocation (seededLDA)



We illustrate the Bayesian network of topic model applied to the workflow using the plate notation in Figure A.2. We define $\mathcal{D}$ and $\mathcal{N}$ as respectively the row and column dimensions of the document-feature matrix $\mathcal{D} \times \mathcal{N}$ obtained from the corpus $\mathcal{C}$. $\theta_d \sim \text{Dir}(\alpha)$ and $\varphi_k^r \sim \text{Dir}(\beta)$ are respectively independent draws for each document $d \in \mathcal{D}$ and for each topic $k \in K$ to generate the document-specific topic distribution and the per-topic general words distribution. In our exercise, the hyper-parameters α and β are sparsely selected ($\alpha = 0.5, \beta = 0.1$). Each (observed) word ω_{dn} in document d is generated from a *two-step* process:

1. draw the topic assignment $z_{dn} \sim \text{Multinomial}(\theta_d)$ which gives a Markov blanket with α as parent and $z_{dn}\ \forall\ n \in N_d \subset \mathcal{N}$ as children;

2. draw $\omega_{dn} \sim \text{Multinomial}\left(\varphi_k^f \mid x_{dn}\right)$ with $f = \{r, s\}$, where x_{dn} is a switch variable drawn from a Beta distribution for each topic and on the basis of the value of x_{dn} either the draw from the general per-topic words distribution φ_k^r or the draw from the prioritised named entity words distribution from the (observed) seeds φ_k^s is selected.

In our application, we perform Bayesian inference using Gibbs sampling as Markov Chain Monte Carlo algorithm. In this case, as in the simpler formats of LDA, the Dirichlet distribution is particularly useful because when blended with a Multinomial distribution returns again a Dirichlet posterior. From the Bayesian network we obtain two main important predictions for our purpose:

(a) $\hat{\theta}_d$ the document-specific posterior probability distribution of topics, which we use to identify the most salient documents for each topic k as in the examples of Section C;

(b) $\hat{\varphi}_k$ the per-topic posterior probability distribution of (unique) words, which we use to create the bag-of-words for the creation of the time-party index for each topic.

We can think of $\hat{\varphi}$ simply as a $\mathcal{B} \times \mathcal{K}$ matrix of posterior probability scores, with $\mathcal{B} = \{b_1, b_2, \dots, b_B\} \subset \mathcal{N}$ the set of unique words in the corpus $\mathcal{C}$ and $\hat{\varphi}_k = (\hat{\varphi}_{kb_1}, \hat{\varphi}_{kb_2}, \dots, \hat{\varphi}_{kb_B})$ the set of posterior probabilities for each unique word in the topic k. On the basis of each $\hat{\varphi}_k$, we can retrieve the subset of $\nu < B$ features with the highest posterior probability within a topic $k \in K = \{BF, POP\}$ as the following set:

$$B_k \coloneqq \left\{ b_j : \hat{\varphi}_{kb_j} \geq \hat{\varphi}_{kb_r} \; \forall \; \mathcal{B} \setminus \{b_1, b_2, \dots, b_\nu\} \right\} \tag{6}$$

where $j = \{1, 2, \dots, \nu\}$ is an index to identify any j word in the ν set of words fulfilling the requirements in the set rule. The obtained set from (6) defines the bag-of-word for each topic k used in the year-party aggregation at (3) in Section 4, where $\nu = 20$.

B Text Analysis Seeds and Lexicons

We input two main sets of keywords in order to perform both text analysis approaches, i.e. seeded LDA and dictionary technique. While the terms are the same we use them differently depending on the approach. For seeded LDA, we use them as initial 'seeds' to guide the topic model (see Section A for more details). For the dictionary approach, we use them as lexicons, meaning that we compute the frequency of these terms in each document (weighted by the number of terms in each document).

In order to capture the discussions on banking, finance and the crisis, we create four different subgroups based on a parsimonious selection of terms. The lists of stemmed terms for each subtopic are the following:

- Banking: 'bank*', 'kredit*';
- Finance: 'finanz*';

- Central banking: ‘ezb’, ‘europaeische zentralbank’, ‘euro’;
- Crisis: ‘krise’, ‘finanzkrise’, ‘bankenkrise’.

We use the list of terms provided by Rooduijn and Pauwels (2011) to capture populist rhetoric. This list is made of the following twenty stemmed terms: ‘elit*’, ‘konsens*’, ‘undemokratisch*’, ‘referend*’, ‘korrupt*’, ‘propagand*’, ‘politiker*’, ‘taüsch*’, ‘betrüg*’, ‘betrug*’, ‘*verrat*’, ‘scham*’, ‘schäm*’, ‘skandal*’, ‘wahrheit*’, ‘unfair*’, ‘unehrlich*’, ‘establishm*’, ‘*herrsch*’, ‘lüge*’.

C Examples of Speeches

In this section we provide some examples of speeches that feature a high score as captured by the seeded LDA relative to other speeches. For each example we report the original text and the translation using Google Translate and DeepL[7].

Populist Rhetoric. The following speeches score high in the seeded LDA trained on populist rhetoric:

Frau Präsidentin! Meine Damen und Herren! Wir lehnen diesen Antrag ab, und zwar allein deshalb, weil die peinliche Einbringungsrede des Bundesfinanzministers eine sofortige Antwort erfordert.
Translation: *Madam President! Ladies and Gentlemen! We reject this motion, for the sole reason that the embarrassing contribution speech of the Federal Minister of Finance requires an immediate response.*

Matthäus-Maier [SPD]: Dummes Zeug! Theo Waigel [CDU/CSU]: Das ist kein dummes Zeug, Frau Kollegin Matthäus-Maier.
Translation: *Matthäus-Maier [SPD]: Stupid stuff! Theo Waigel [CDU/CSU]: That’s not stupid stuff, Ms Kollegin Matthäus-Maier.*

Hans-Dietrich Genscher (FDP, 1991): Herr Kollege, so ist es. Wenn Sie Unterlegenheitsgefühle haben, schlage ich Ihnen vor: Wirken Sie mit bei der Entwicklung des europäischen Pfeilers, dann werden Sie auch dieses letzte Gefühl der Unterlegenheit verlieren . Briefs [PDS/Linke Liste]: Sie glauben gar nicht, mit welch dumpfen Gefühlen Men - schen in Westeuropa die Politik dieser Bun - desregierung betrachten!

[7] A deep-learning powered translator freely available at https://www.deepl.com/translator.

Translation: *Hans-Dietrich Genscher (FDP, 1991): Sir, that's how it is. If you feel inferior, I suggest that you help develop the European pillar, then you will lose that last feeling of inferiority. Briefs [PDS/Linke Liste] : You do not believe the dull feelings with which people in Western Europe view the policy of this federal government!*

D Additional Tables and Figures

1 Tables for Robustness Checks

Table D.1: The Effect of the Credit Shock on Political Preferences: Rural and Urban Areas

	Political Support			**Intention to Vote for Populist Party**		
	Full Sample (1)	Urban Areas (2)	Rural Areas (3)	Full Sample (4)	Urban Areas (5)	Rural Areas (6)
$Exposure_k \times Post$	0.014***	0.013	0.011	0.008***	0.009*	0.009**
	(0.005)	(0.009)	(0.008)	(0.003)	(0.005)	(0.004)
Number of Observations	151,524	43,100	108,424	151,524	43,100	108,424
Adjusted R-Squared	0.143	0.139	0.144	0.086	0.087	0.089
Number of Counties	395	104	291	395	104	291
County-Level FE	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
Full Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows the effect of the credit shock on political support and intention to vote for a populist party. For each outcome, each column contains a different sample. Each estimate is from a different regression. The outcome variables are standardised indicator variables equal to one respectively when the individual defines herself as a political supporter answering affirmative to the question indicated in Section C and when expresses preferences towards a populist party listed in the same section. Urban areas are identified from the definition as *Kreisfreie Stadt* or *Stadtkreis*, whereas rural areas from the definition of *Landkreis* or *Kreis.* Full controls are both basic controls, household controls, and regional controls as described in Table 3. Significance Levels: *** 1% level, ** 5% level, * 1% level. Robust standard errors adjusted for clustering at the county of residence in 2006 level in parentheses.

Table D.2: The Effect of the Credit Shock on Political Preferences: Outcome as Dictionary Scores

	Banking and Financial Crisis			**Populism**			**Combined**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Parliamentary Debates									
$Exposure_k \times Post$	0.038***	0.036***	0.036***	0.127***	0.119***	0.120***	0.051***	0.048***	0.048***
	(0.007)	(0.007)	(0.007)	(0.024)	(0.025)	(0.025)	(0.009)	(0.009)	(0.009)
Number of Observations	105,720	93,533	93,533	105,720	93,533	93,533	105,720	93,533	93,533
Adjusted R-Squared	0.909	0.907	0.908	0.510	0.515	0.515	0.883	0.883	0.883
Number of Counties	393	393	393	393	393	393	393	393	393
Panel B: Electoral Manifestos									
$Exposure_k \times Post$	0.169***	0.171***	0.171***	0.027*	0.031**	0.032**	0.173***	0.176***	0.177***
	(0.028)	(0.029)	(0.028)	(0.016)	(0.015)	(0.015)	(0.030)	(0.030)	(0.030)
Number of Observations	25,842	22,816	22,816	25,842	22,816	22,816	25,842	22,816	22,816
Adjusted R-Squared	0.486	0.475	0.476	0.316	0.313	0.314	0.404	0.397	0.398
Number of Counties	387	387	387	387	387	387	387	387	387
County-Level FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Regional Controls	No	No	Yes	No	No	Yes	No	No	Yes

Notes: This table shows the effect of the credit shock on political support and intention to vote for a populist party. Each estimate is from a different regression. The outcome variables are standardised indicator variables equal to the score assigned to each political party the individual defines herself a supporter of. The score is based on the estimates of the dictionary approach for each topic computed on the text of party representatives' parliamentary speeches (Panel A) or of party electoral manifestos (Panel B). Basic controls are gender, a second-order polynomial of age, residence in former GDR in 1989, employment status in different categories and years of education. Household controls are household size, number of children, home-ownership status, presence of outstanding loans and ln annual disposable income. Regional controls are ln population, ln regional GDP, unemployment rate and share of foreigners. All controls are fixed at 2006. Significance Levels: *** 1% level, ** 5% level, * 10% level. Robust standard errors adjusted for clustering at the county of residence in 2006 level in parentheses.

Table D.3: The Effect of the Credit Shock on Political Preferences: Robustness Checks with Alternative Populism Seeds

	$Exposure_k \times Post$								
	Banking and Financial Crisis			**Populism**			**Combined**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Parliamentary Debates									
(1) Topic Model Scores	0.022***	0.021***	0.021***	0.115***	0.108***	0.109***	0.032***	0.030***	0.030***
	(0.006)	(0.008)	(0.008)	(0.026)	(0.025)	(0.025)	(0.008)	(0.010)	(0.010)
(2) Dictionary Scores	0.038***	0.036***	0.036***	0.119***	0.113***	0.114***	0.048***	0.045***	0.046***
	(0.007)	(0.007)	(0.007)	(0.027)	(0.026)	(0.026)	(0.009)	(0.009)	(0.009)
Adjusted R-Squared (1)	0.773	0.783	0.783	0.521	0.527	0.527	0.763	0.773	0.773
Adjusted R-Squared (2)	0.909	0.907	0.908	0.496	0.501	0.502	0.891	0.891	0.891
Number of Observations	105,720	93,533	93,533	105,720	93,533	93,533	105,720	93,533	93,533
Number of Counties	393	393	393	393	393	393	393	393	393
Panel B: Electoral Manifestos									
(1) Topic Model Scores	0.046***	0.048***	0.046***	0.013	0.021	0.023	0.047***	0.052***	0.051***
	(0.012)	(0.015)	(0.015)	(0.013)	(0.015)	(0.015)	(0.012)	(0.015)	(0.015)
(2) Dictionary Scores	0.169***	0.171***	0.171***	-0.051***	-0.051***	-0.048**	0.155***	0.157***	0.158***
	(0.028)	(0.029)	(0.028)	(0.018)	(0.019)	(0.019)	(0.026)	(0.027)	(0.026)
Adjusted R-Squared (1)	0.446	0.449	0.451	0.590	0.588	0.588	0.594	0.601	0.602
Adjusted R-Squared (2)	0.486	0.475	0.476	0.177	0.200	0.203	0.495	0.488	0.489
Number of Observations	25,842	22,816	22,816	25,842	22,816	22,816	25,842	22,816	22,816
Number of Counties	387	387	387	387	387	387	387	387	387
County-Level FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Regional Controls	No	No	Yes	No	No	Yes	No	No	Yes

Notes: This table shows the effect of the credit shock on political preferences. Each combination of rows and columns indicates the value of the coefficient of interest β from (1) for given text analysis method and a given outcome variable – specification. The outcome variables are standardised indicator variables equal to the score assigned for each year to each political party the individual defines herself a supporter of as a follow-up to the affirmative answer to the question indicated in Section C. The score is based on the estimates of the seeded LDA or the dictionary approach for each topic computed on the text of party representatives' parliamentary speeches (Panel A) or of party electoral manifestos (Panel B). We use alternative populism seeds compared to Table 4 we construct from Cantarella et al. (2020). Basic controls are gender, a second-order polynomial of age, residence in former GDR in 1989, employment status in different categories and years of education. Household controls are household size, number of children, home-ownership status, presence of outstanding loans and ln annual disposable income. Regional controls are ln population, ln regional GDP, unemployment rate and share of foreigners. All controls are fixed at 2006. Significance Levels: *** 1% level, ** 5% level, * 10% level. Robust standard errors adjusted for clustering at the county of residence in 2006 level in parentheses.

2 Additional Figures for the Text Analysis Outcomes

Figure D.1: Top Twenty Terms by Posterior Probability using Seeded LDA for the electoral manifestos, Populism using the Rooduijn and Pauwels (2011) lexicon.

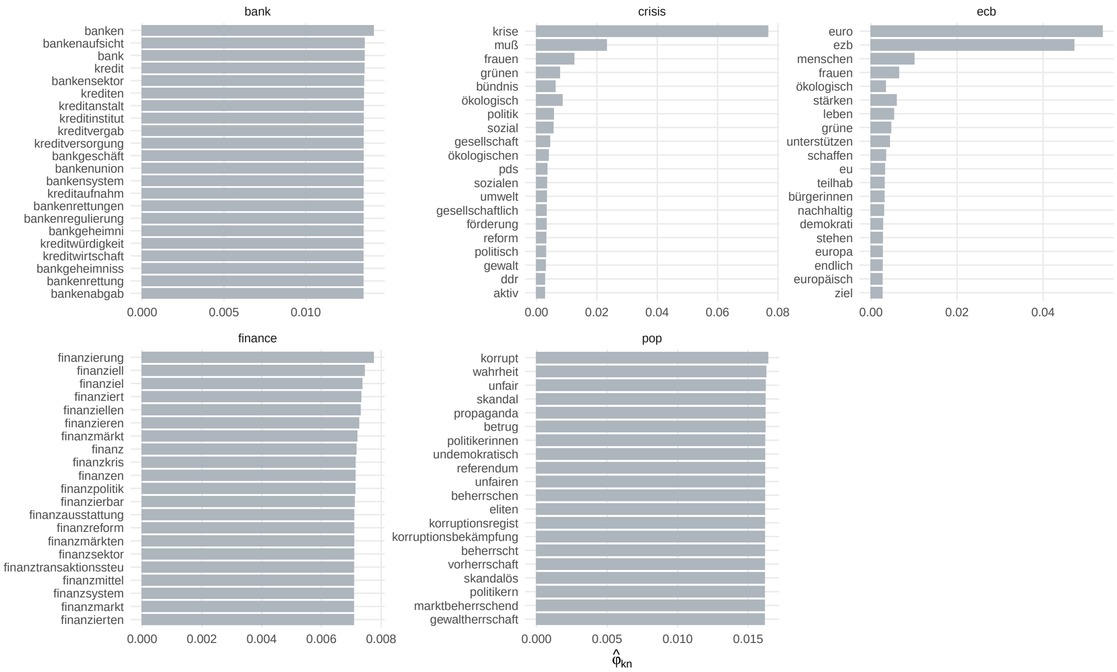


Figure D.2: Focus on Banking & Finance in parliamentary speeches using dictionary approach, by political party (1991-2018)

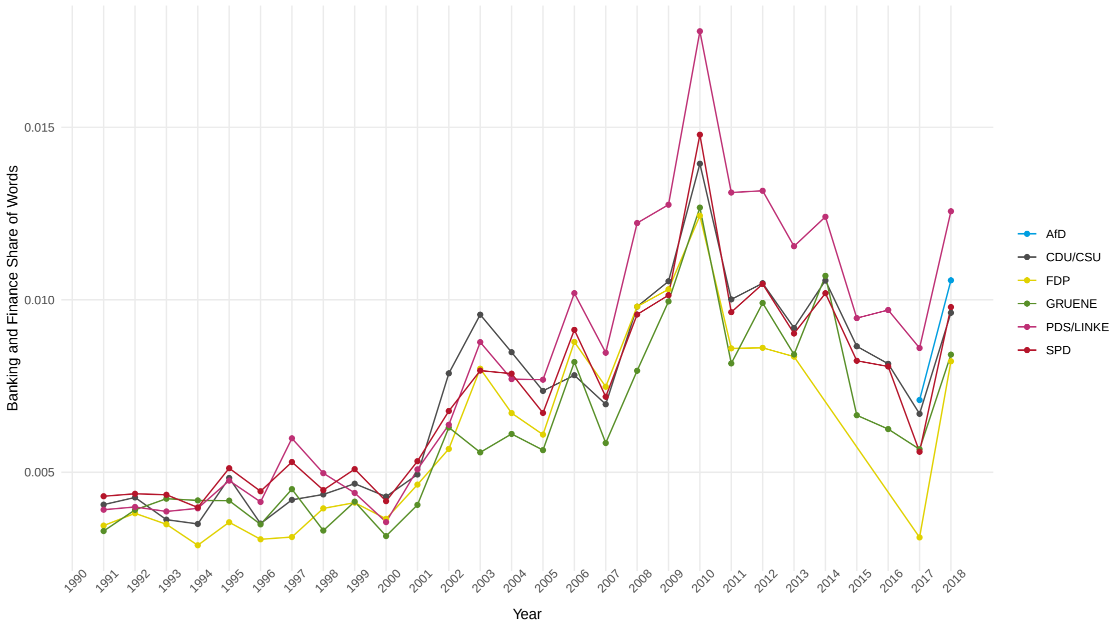


Figure D.3: Populist Rhetoric using Rooduijn and Pauwels (2011) in parliamentary speeches using dictionary approach, by political party (1991-2018)

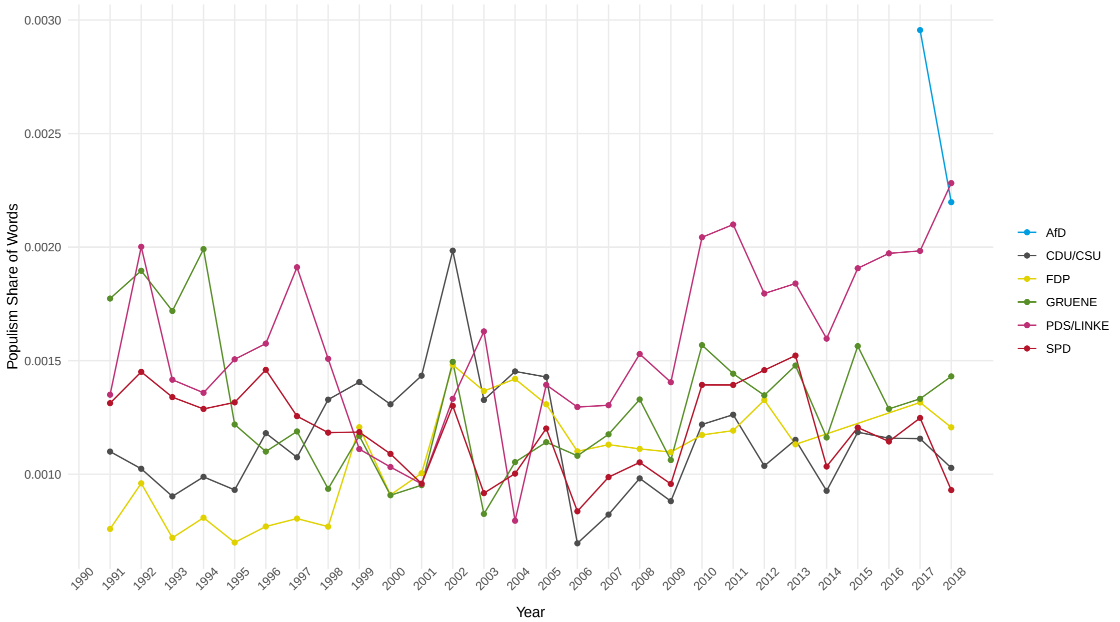


Figure D.4: Focus on Banking & Finance in electoral manifestos, by political party (1991-2018)

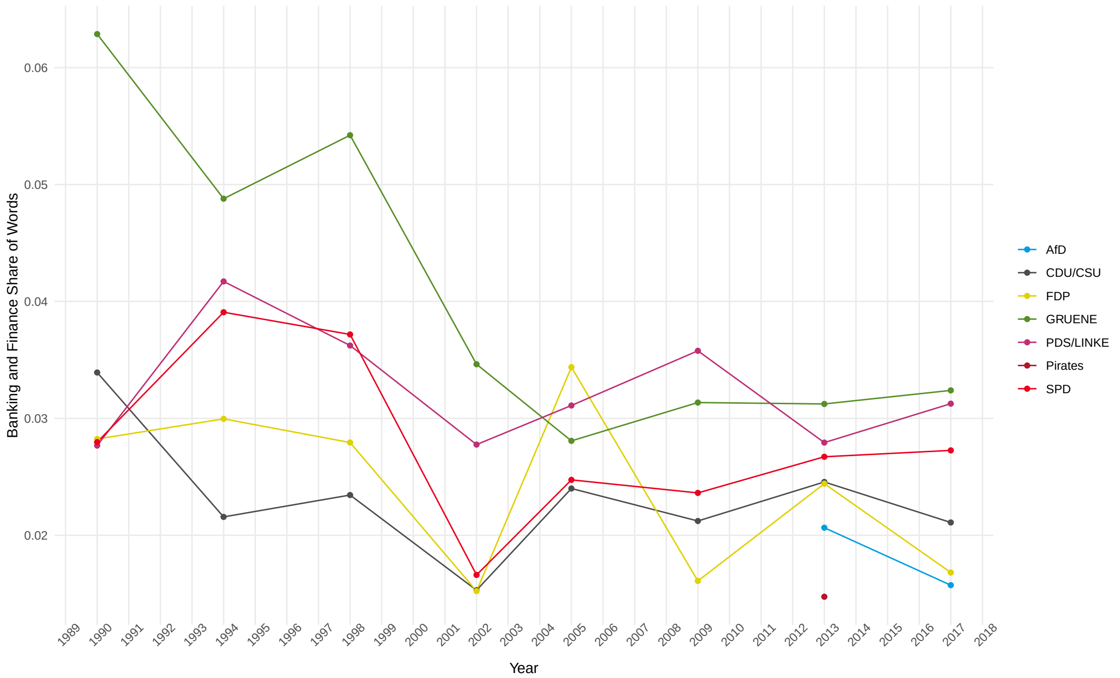


Figure D.5: Populist Rhetoric using Rooduijn and Pauwels (2011) in electoral manifestos, by political party (1991-2018)