Inflation Surprises and Election Outcomes

Jonathan Federle, Cathrin Mohr, and Moritz Schularick*

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Abstract

We study the political consequences of inflation surprises, focusing on votes for extremist and populist parties in 365 elections across 18 advanced economies since 1948. Inflation surprises are regularly followed by substantial increases in vote shares of extremist, anti-system, and populist parties. An inflation surprise of 10 percentage points leads to a 15% increase in their vote share, comparable to the increase typically seen after financial crises. We show that the change in voting behavior is particularly pronounced when real wage growth is below its national average, and less evident otherwise. The effects of inflation surprises exceed those of inflation threefold.

JEL Classification: D72, E31, N40, N10.

Keywords: Inflation, economic voting, extremism, populism, radicalization.

*Federle: Kiel Institute (email: jonathan.federle@ifw-kiel.de); Mohr: University of Bonn (email: cmohr@uni-bonn.de); Schularick: Kiel Institute, Sciences Po, and CEPR (email: moritz.schularick@sciencespo.fr). We are very grateful to Alan Taylor, Christoph Trebesch, Jonas Dovern, Manuel Funke, Jacob Edenhofer, Thiemo Fetzer, Robert Gold, Jonathon Hazell, and Elisabeth Kempf as well as the audience at ECB. Benjamin Gottlieb provided excellent research assistance. Schularick acknowledges funding from the Deutsche Forschungsgemeinschaft as part of the Leibniz-Prize.

1 Introduction

The political consequences of inflation feature prominently in the public debate. In the 2024 U.S. presidential campaign, 41 percent of Americans considered inflation a key problem (Gillespie, 2024). Surveys show that voters for whom inflation was a central concern were much more likely to support Donald Trump (Wamsley, 2024). In the European elections in the summer of 2024, a majority of voters reported similar dissatisfaction with high inflation (Abnett, 2024). But voter discontent about inflation is hardly a new phenomenon. Already in the 1970s, inflation was high on the agenda in election campaigns in many countries (Hibbs, 1979).

How do people react to inflation? In recent work, Binetti, Nuzzi and Stantcheva (2024) ask which factors drive people's dislike of inflation. Using survey data, they show that individuals associate inflation with a range of tangible negative impacts on both their personal finances and the broader economy. In line with Shiller (1997), the dominant perception is that inflation erodes purchasing power, and individuals feel their wages do not increase sufficiently to keep pace with inflation. A sense of unfairness also contributes to the dislike of inflation, as the effects are perceived to disproportionately fall on lower income households.

Building on these important insights from surveys, this paper raises a related but more specific question using macroeconomic and electoral data: Given that people dislike inflation and perceive it as unfair, does higher than expected inflation trigger a political backlash in the form of measurable shifts in voting behavior? More precisely, we ask whether inflation surprises prompt individuals to turn away from mainstream political parties and vote for parties from the extremist and populist spectrum. The post-Covid inflation surge across OECD countries provides some *prima facie* evidence supporting this hypothesis. In many countries, the rise of inflation went hand in hand with substantial increases in vote shares of populist and extremist parties. For example, in 2024, France's Rassemblement National led national elections, the UK's Reform Party gained 14%, and Germany's Alternative for Germany secured around 30% of votes in state elections. These parties capitalized on cost-of-living concerns.

Our goal of quantifying the electoral consequences of shifts in economic performance connects our work to the well-known Fair (1978) model that focuses on the importance of economic factors for the popularity of the incumbent government. While our work is related, our main interest is to study the role of

inflation in the rise of anti-system populist and extremist parties. To what extent economic forces are responsible for the rising success of radical parties remains debated (Guriev and Papaioannou, 2022).[1] For instance, Funke, Schularick and Trebesch (2016) show that financial crises typically lead to an outburst of voting for far-right parties, and Algan et al. (2017) underscore the loss of trust in political institutions as a key driver in European data. Yet to our knowledge, the link between inflation surprises and voting behavior for populist and extremist parties has not been studied so far.

We address the question empirically using a novel long-run cross-country data set spanning 76 years, 18 economies, and 365 elections. Importantly, we leverage new long-run data on inflation surprises, i.e., unexpected changes in inflation, that have recently been compiled by Kim, Ranaldi and Schularick (2024). Inflation surprises are defined as the difference between the one-year-ahead inflation forecast and the realized inflation rate. We combine the inflation surprise data with macroeconomic data from the Jordà-Schularick-Taylor Macrohistory Database (Jordà, Schularick and Taylor, 2017) and party vote shares, supplemented by an extended classification of extremist and populist parties from Funke, Schularick and Trebesch (2016, 2023). We also ensure the robustness of our findings using a variety of externally sourced samples of extremist and populist voting outcomes.

Our core finding is that, consistent with the individual-level evidence of Binetti, Nuzzi and Stantcheva (2024), inflation surprises are systematically associated with increased vote shares for anti-system parties. We estimate that in the post-WWII period, a 10 percentage point positive *surprise* in inflation leads to a significant 15 percent or 1.7 percentage point increase in extremist vote shares in the next general election – even after controlling for the effects of *overall* inflation. In contrast, positive growth surprises reduce extremist party vote shares. To put these numbers into perspective, the effect of a 10 percentage point inflation surprise outweighs the effect of systemic financial crises, which is included as a control in our estimations and which we estimate to be around 1.6 percentage points (also refer to Funke, Schularick and Trebesch, 2016). We find the effects of *surprises* to exceed those of *overall* growth and inflation threefold speaking to the important role of economic expectations and voters' disappointment in the electoral process.

Regarding the underlying mechanism, we find evidence that aligns with

[1]While not our object of study, we find some evidence for a negative effect of inflation surprises on the election performance of the incumbent government, but standard errors can be large when it comes to inflation *surprises*.

individual survey responses, linking the dislike of inflation to a decrease in real household income. On average, real wages tend to decline following a positive inflation surprise but increase after a positive growth surprise. Importantly, the increase in vote shares for extremists and populists is about twice as large when inflation surprises coincide with real wage growth which lags behind the national average. Inflation surprises that do not lead to real wage losses have much less pronounced, insignificant effects on radical vote shares. We also provide evidence for an increase in the dissatisfaction of voters by showing that the number of demonstrations and strikes increases after an inflation surprise with below-average real wage growth. Our results are robust to controlling for extremist incumbents; the observed increase in vote shares of populists and extremists is not driven by the performance of extremist incumbents – in about 95% of our elections, the incumbents are centrist parties.

Related literature: The rise of extremism and populism in recent years has prompted an extensive inquiry into its causes, particularly in the context of economic performance. A substantial body of literature has examined the economic determinants of populist or extremist voting patterns (the literature on populist voting has recently been summarized in Guriev and Papaioannou, 2022). Funke, Schularick and Trebesch (2016) demonstrated that financial crises often precipitate a significant increase in far-right vote shares. Guiso et al. (2019) argued that economic insecurity and declining trust in traditional institutions provide fertile ground for populist movements. Rodrik (2018) link rising globalization to populism. This paper extends the existing literature by focusing on the role of economic surprises – deviations between actual outcomes and prior expectations – in influencing extremist vote shares.

In political economy, researchers have long studied the link between macroeconomic performance and voting patterns mostly focusing on incumbents. According to economic voting theory, voters reward or punish incumbents based on economic outcomes (Lewis-Beck and Stegmaier, 2000; Nannestad and Paldam, 1994; Stegmaier, Lewis-Beck and Brown, 2019). Numerous studies have shown that high inflation erodes electoral support for incumbents by reducing real incomes and savings, although there remains disagreement on how much inflation matters compared to other macroeconomic variables (e.g., Anderson, 2000; Baccini and Weymouth, 2024; Chappell Jr and Veiga, 2000; Hibbs, Rivers and Vasilatos, 1982; MacKuen, 1983; Paldam, 1991; Veiga, 2002).

Our analysis adds to this literature twofold. First, we highlight the role that inflation and growth *surprises* play in economic voting decisions. Our coefficients

suggest that macroeconomic surprises play a larger role than their levels. Second, we show that extremist and populist parties, which often advocate for drastic changes in economic policies and political structures, are able to profit when incumbents' votes decrease in light of higher inflation.

Unlike most studies in this field, we work with long-run data spanning multiple electoral cycles across countries, combined with novel inflation surprise series. A partial exception is a study by Palmer and Whitten (1999) who conducted an empirical analysis of how unexpected inflation and growth affected voting for incumbent based on panel of 19 industrialized countries 1970 to 1994. Our focus is different from theirs as we look at voting shares of populist parties. In addition, we improve on their empirical design by including country and year fixed effects and by considering a much longer time horizon.

In studying the response of public unrest, we further add to the literature examining the links between economic conditions and political protests (see Cantoni et al. (2024) for a recent overview). Our examination of strikes is closely related to Guerreiro et al. (2024) who show that realized inflation and the resulting labor conflicts induce discontent among workers. At the same time, our paper connects to the literature on attitudes toward inflation and the economic impacts of unexpected inflation changes (Adam and Zhu, 2016; Pallotti et al., 2024) as well as the rapidly growing body of work on inflation expectations formation (for an overview refer to Coibion, Gorodnichenko and Kamdar, 2018).

2 Data and definitions

Our dataset consists of general election outcomes, economic surprises, and macroeconomic variables for 18 countries since World War II. For the construction of our main dependent variable, the change in vote shares of extremist and populist parties, we turn to four different datasets.

In our baseline, we rely on the dataset of Funke, Schularick and Trebesch (2016) who code the combined vote shares of extremists and populists in general elections of OECD countries. They classify these parties as those opposing the existing system of government and seeking to change it, as conceptualized by Sartori (1976). This also extends to contemporary extremist and populist movements, which include entities within the "New Right" – a movement positioned within the ambiguous boundaries of extremism and right-wing populism. For far-left parties, their definition covers organizations with traditional communist or Marxist-Leninist orientations, as well as those advocating anti-capitalist

ideologies and rejecting the contemporary international economic order.

Funke, Schularick and Trebesch (2016) code parties and national parliamentary election outcomes until 2014. They exclude presidential elections and, for bicameral legislatures, only include the lower chamber (e.g., the House of Representatives in the U.S.). For the period 2015–2023 we extend this data using several sources. First, we draw on election data from Parlgov (Döring and Manow, 2012) which we merge with information on parties' political orientation. We classify parties as extremist or populist based on their classification as far-left or far-right by The PopuList (Rooduijn et al., 2023, 2024). We complement this with information from Parlgov, which also contains a score ranging from 0–10 classifying parties on a left-right scale. We determine the thresholds separating extremist from non-extremist parties on this scale such that the correlation in the overlapping period across the datasets of Funke, Schularick and Trebesch (2016) and Parlgov is maximized.[2] Upon examining the period around the sample change in 2015, we do not find any differences or disconnects in the coding (see Figure A.1 in the Appendix). As the U.S. are not included in Parlgov, we use the corresponding election outcomes for the period not covered by Funke, Schularick and Trebesch (2016) from the U.S. House of Representatives.

In addition, we conduct an external validation exercise by replicating our findings across three entirely different samples from other sources. First, we focus solely on extremist vote shares and election outcomes by Parlgov (Döring and Manow, 2012) showing that our results also hold once we only focus on extremist parties. Second, we use the coding of populist parties and vote shares of V-Dem (Lindberg et al., 2022). Our findings hold if we solely focus on populist vote shares, and the coefficients remain very similar even though these estimations operate on a restricted sample starting in 1970. As expected, the reduction in sample size inflates standard errors and thereby deteriorates statistical power somewhat. Lastly, we replicate our main findings regarding the joint vote shares of populists and extremists using the combined sample of V-Dem and Parlgov. Here, we again arrive at the same conclusions regarding our key hypotheses on macroeconomic surprises in times of below-average real wage growth. In summary, our core results do not depend on the source or coding differences between classification schemes. Our evidence strongly suggests that macroeconomic surprises proliferate both extremist and populist anti-system votes.[3]

[2]The thresholds are 1.6 for left-wing and 8.7 for right-wing extremists.

[3]In the main body of this paper we discuss results based on the Funke, Schularick and Trebesch (2016) data. The results for populist- and extremist-specific results as well as on the

Our unit of observation is a general election held in a given country and year, and the main outcome variable is the percentage point change in radical vote shares relative to the prior election. For each country, our sample starts with the second democratic post-World War II election. This way, we exclude the large swings in votes following the regime changes after World War II.[4] Moreover, we exclude the first elections following prolonged undemocratic episodes such as the 1976 election in Portugal which was the first free democratic election following the establishment of the authoritarian Estado Novo in the 1930s. The first year in our sample is marked by elections in the United States, the Netherlands, and Italy in 1948. The last event covered in our sample is the 2023 election in Finland (see Appendix Table A.1 for an extensive overview of all elections covered).

In constructing our key explanatory variable, inflation surprises, we follow Kim, Ranaldi and Schularick (2024) who define inflation surprises as the difference between realized inflation and prior inflation expectations, i.e., the extent of inflation not anticipated by economic agents based on available economic fundamentals. For the historical period, they rely on regular bi-annual inflation forecasts done by the OECD as part of the work on business cycle monitoring. Inflation surprises represent the difference between realized inflation and prior-year inflation forecasts, for each country i:

$$\varepsilon_{it}^{\pi} = \pi_{it} - \mathbb{E}_{t-1}[\pi_{it}] \tag{2.1}$$

where positive values correspond to positive inflation shocks, i.e., the realized inflation rate is higher than the expected inflation rate, and negative values correspond to negative inflation shocks, i.e., the realized inflation rate is lower than the expected inflation rate. Growth shocks are calculated analogously by comparing realized and forecasted GDP growth rates.

Expected inflation rates and GDP growth rates are from Kim, Ranaldi and Schularick (2024). For 1965 to 2023, they are based on the 1-year-ahead inflation and growth forecasts from the OECD *Economic Outlook*. These forecasts are based on a unified methodology which ensures comparability across countries. Additionally, the OECD's engagement with local experts ensures that forecasts incorporate country-specific policy expectations and conditions. Vogel (2007) found OECD forecasts to be comparable to those from the private sector and to exhibit desirable properties.

joint external validation exercise are presented in Appendices C, D, and E respectively.

[4]For example, Germany experienced a drop in radical voting by 84.3 percent in its first post-war election in 1949 due to the fall of the Nazi regime.

The OECD provides forecasts for a limited number of countries in 1965 and only gradually increased its coverage in the following years. For countries where we lack data on OECD inflation and growth forecasts, we rely on forecasts of Kim, Ranaldi and Schularick (2024) who estimate expectations combining different time-series models and a wealth of macroeconomic and financial variables. To ensure consistency across both measurements throughout our sample, we compare the model-implied and OECD forecasts within the period for which we have joint coverage. We find they are highly correlated: For example, they roughly move one to one as one would expect as they both forecast the same underlying variable (see Figure A.4).

We also construct an index of misery in the spirit of Arthur Okun (see also Barro, 1999) which we define as the difference between inflation and growth. The surprise of the misery index is the difference between the actual misery index and the predicted misery index such that

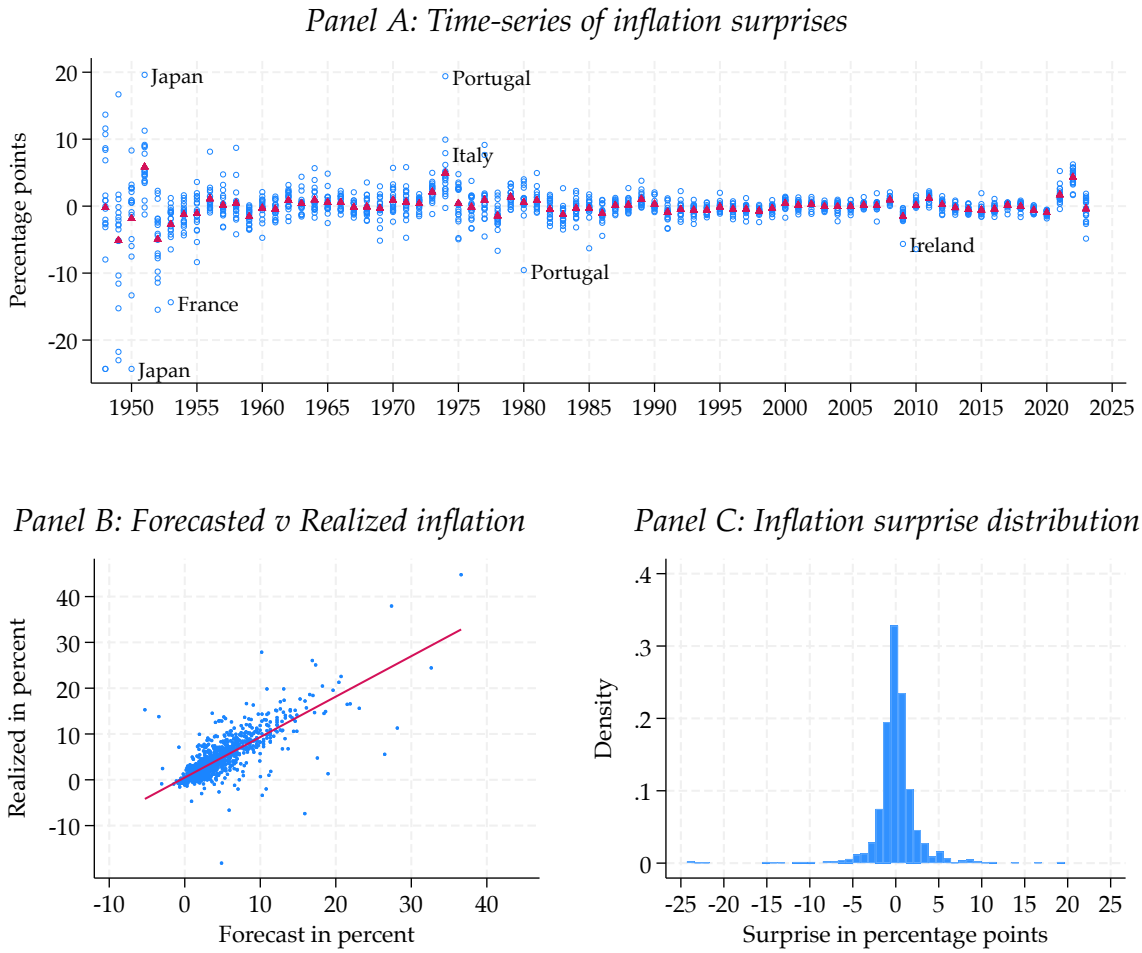
$$\varepsilon_{it}^{misery} = \underbrace{(\pi_{it} - g_{it})}_{\text{Actual misery}} - \underbrace{(\mathbb{E}_{t-1}[\pi_{it}] - \mathbb{E}_{t-1}[g_{it}])}_{\text{Predicted misery}}, \tag{2.2}$$

where π_{it} and g_{it} refer to inflation and growth, respectively. In exploring misery surprises, we seek to further narrow down how the combined effect of negative growth and surging inflation affects radical voting behavior.

Figure 1 visualizes the key properties of inflation surprises in our sample for the period 1948–2024. Panel A shows inflation surprises in percentage points on the y-axis and years on the x-axis. Blue circles denote individual surprises incurred in country years, and red triangles indicate the average surprises across all countries in a given year. Overall, we capture several historical properties such as the large variation in inflation surprises in the first post-war years or the unanticipated inflationary period across several countries in the early to mid 1970s. Also, we see pronounced positive inflation surprises following Covid-19 and the Russian invasion of Ukraine. Panel A also shows inflation surprises do not occur equally across countries over time, but that they differ in sign and magnitude for different countries within the same year.

Inflation forecasts have considerable predictive power regarding future inflation such that deviations between realized and forecast inflation can be regarded as surprises. We provide evidence for this in Panel B of Figure 1, where we plot realized inflation in percent (y-axis) against 1-year forecast of inflation made in the year before in percent (x-axis). Each blue dot represents an individual country-year observation and the red line depicts a fitted linear model. We

Figure 1: Inflation surprises 1948-2023



Note: Panel A shows inflation surprises of individual countries in percentage points over time (blue circles) and the annual mean (red triangles). Panel B shows how 1-year inflation forecasts (x-axis) compare against realized inflation (y-axis), Panel C shows distribution of inflation surprises. Surprises sourced from Kim, Ranaldi and Schularick (2024) and computed as difference between realized inflation and and prior-year expectations on inflation. Inflation, both realized and forecasted, measured in percent, surprises in percentage points.

observe, that a one percentage point increase in inflation forecasts is on average associated with an increase in realized inflation of close to one. This relationship is highly significant as shown in Appendix Table A.2. In Panel C of Figure 1, we present more detailed evidence on how inflation surprises are spread throughout our sample. We find that they are centered around 0, do not have a particular skew, and roughly follow a fat-tailed Gaussian distribution. Both growth and misery surprises have similar statistical characteristics as inflation surprises (see Figures A.2 and A.3 in the Appendix).[5] In sum, inflation, growth, and misery

[5]We also provide country-specific time-series of inflation, growth, and misery surprises in

forecasts have predictive power for future inflation while surprises have the desirable properties of deviations from these expectations.

Our analysis is the first to systematically show how unmet economic expectations translate into radical voting behavior. While the economic surprises in our sample provide plausibly exogenous shocks to the economy, these shocks may have causes that in turn directly affect electoral outcomes. We acknowledge this as a limitation of our study but note that while our approach remains silent on the exact determinant of each shock, we provide systematical evidence on associated patterns in a long-run country panel.

To better understand the political effects of inflation surprises, we also study social unrest. We draw on Banks and Wilson (2014) who quantify for each country-year the number of general strikes, defined as "any strike of 1,000 or more industrial or service workers that involves more than one employer and that is aimed at national government policies". Furthermore, we use the number of anti-government demonstrations, defined as "any peaceful public gathering of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies", in each country-year from Banks and Wilson (2014).[6]

We also include a set of macroeconomic controls, notably inflation, GDP growth, a financial crisis dummy, and nominal wage changes, from the Jordà-Schularick-Taylor Macrohistory Database. We deflate nominal to real wages using consumer price inflation indices which we also source from the Macrohistory database. From 2021 onward, we rely on data from the IMF and OECD databases which were collected from Kim, Ranaldi and Schularick (2024) as well as on data on real wage growth from the International Labor Organization.

3 Empirical strategy

To examine the impact of inflation and growth surprises on vote shares for extremist and populist parties, we employ the following panel data regression

Figures A.5, A.6, and A.7 in the Appendix. Note that we exclude the German 1991 observation on inflation and growth surprises from our sample as it includes massive surprises following the German reunification.

[6]We observe large fluctuations in the number of demonstrations in the two years following the onset of the Covid pandemic in 2020 and the murder of George Floyd. In this period, the global number of demonstrations increased by up to 1,000%. We therefore exclude data points from 2020 and 2021 from our sample to not distort our results.

model:

$$\Delta \text{VoteShare}_{ct} = \alpha_c + \eta_t + \gamma \text{Surprise}_{ct} + \delta \text{Controls}_{ct} + \epsilon_{ct}\,, \tag{3.1}$$

where $\Delta \text{VoteShare}_{ct}$ is the percentage-point difference in the vote share for extremist and populist parties in an election that takes place in country c in year t relative to the prior election. α_c and η_t denote country and time fixed effects. Country fixed effects control for changes in voting patterns, e.g. forparties that are unique to individual countries. Time fixed effects control for general changes in votes for radical parties that affect all countries at the same time in our dataset.

Our variable of interest, $Surprise_{ct}$, denotes either cumulative inflation, growth, or misery surprises in logs during the legislative period preceding the election in country c in year t, excluding the election years. Controls comprise a financial crisis dummy, taking on the value of 1 if at least one crisis took place in the prior legislative period in a country, as well as the cumulative realized inflation and growth in logs in the prior legislative period. In this way, γ is set to capture only the *incremental* effect of inflation, growth, and misery *surprises* on voters' sentiment after controlling for the direct effects of *realized* inflation and growth. Thus, γ does not measure how inflation, growth, and misery shape electoral outcomes, but rather how deviations from expectations do. In this way, one may interpret our coefficient of interest as a measure of unanticipated economic disappointment.

Lastly, ϵ_{ct} denotes the error term. Standard errors are clustered at the country level.[7]

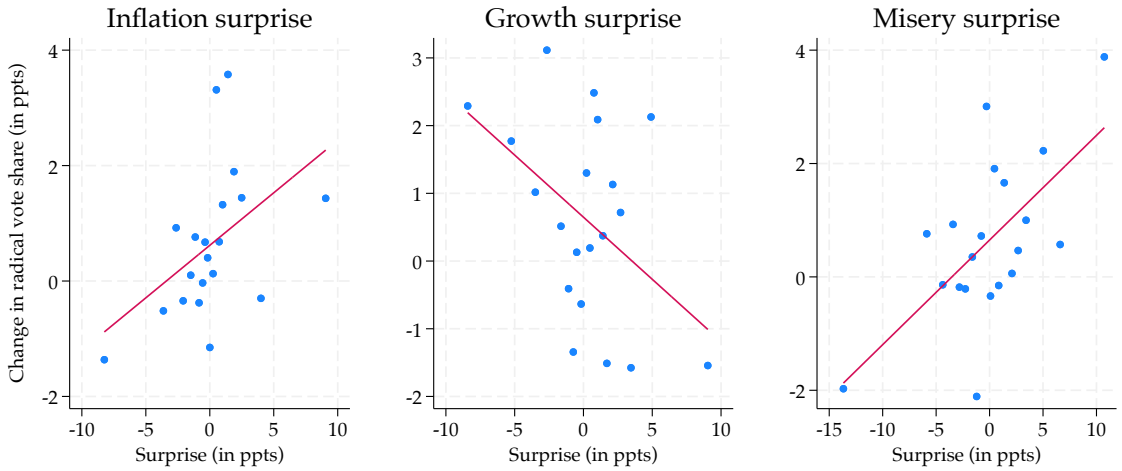
4 Inflation Surprises and Election Outcomes

This section presents our main findings on how macroeconomic surprises affect vote shares of extremist and populist parties. Figure 2 shows binned scatter plots illustrating the relationship between cumulative inflation, growth, and misery surprises during a legislative period (x-axis) and changes in vote shares of radical parties in percentage points in the following election (y-axis).

The left panel shows a strong positive association between inflation surprises and the change in the vote share in the subsequent election. The middle panel depicts a negative relationship of growth surprises and subsequent vote shares of

[7] In Appendix Tables A.3 and A.4, we show that our results are robust to clustering at the time level and to implementing a two-way clustering at the time and country level.

Figure 2: Surprises and vote shares



Note: Figure shows binned scatter plot of how election-on-election vote share changes of extremist and populist parties in percentage points (y-axis) relate to inflation surprises, growth surprises, and misery surprises in percentage points (x-axes).

radical parties. The misery index, calculated as inflation surprise minus growth surprise, is positively associated with radical voting outcomes. In summary, Figure 2 suggests that radical parties profit at the ballot box from unexpected declines in living standards, characterized by high inflation and negative growth.

Table 1 puts this hypothesis to the test in an empirically more rigorous way. It presents the coefficients yielded by estimating Regression (3.1). Column 1 presents a highly significant, positive relationship between inflation surprises and radical vote shares – even after controlling for realized inflation. More precisely, a one-percentage-point inflation surprise increases the vote share for radical parties by approximately 0.174 percentage points (significant at 5 percent level).

Conversely, we find a statistically significant negative relationship between growth surprises and radical vote shares (column 2). A one-percentage-point positive growth surprise is associated with a 0.244 percentage-point reduction in radical vote shares (significant at 10 percent level). In column 3, we present coefficients for the misery surprises. Here, we again find a positive relationship between misery surprises and radical vote shares (significant at 1 percent level). Our results are robust to including an additional control capturing whether an extremist party was the incumbent or part of the ruling coalition in the prior electoral period (see Table B.14).[8]

[8]Note, that we arrive at the same conclusions if we include inflation surprises and growth

Table 1: Surprises and vote shares

	Change in vote share of radical parties		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.174**		
	(0.0655)		
Growth surprise		-0.244*	
		(0.127)	
Misery surprise			0.204***
			(0.0640)
Control variables			
Inflation	0.0677*	0.0852**	0.0511
	(0.0365)	(0.0373)	(0.0365)
Growth	-0.166***	-0.0660	-0.0641
	(0.0569)	(0.0827)	(0.0646)
Financial crisis	1.638	1.480	1.414
	(1.660)	(1.645)	(1.642)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.202	0.205	0.212
N	365	365	365

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote percentage point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

When turning to the coefficients of control variables in Table 1, it appears particularly striking that the coefficients of economic surprises — across all specifications — exceed the coefficients of actual growth and inflation by a factor of about 3. This suggests that frustration over unmet expectations has larger electoral repercussions than economic hardship itself.

Summing up, our results align with the notion that worse-than-expected economic performance tends to harm centrist parties and increases support for radical alternatives, which often base their platforms on (economic) dissatisfaction and the promise of drastic reforms. The positive relationship between inflation surprises and vote shares for extreme and populist parties underscores the political consequences of economic shocks. The economic voting literature posits that voters hold governments accountable for economic performance

surprises simultaneously in a regression.

and the existing literature has emphasized the long-term effects of economic performance on voting behavior. Appendix Table B.13 also provides evidence that macroeconomic surprises affect the vote shares of incumbent parties.[9] Our findings suggest that deviations from prior expectations play a crucial role in shaping electoral outcomes.

5 Real Wages, Elections, and Protests

A hypothesis with substantial support from theory in political economy is that voters react to macroeconomic surprises because they directly affect their personal economic situation. A prominent channel through which inflation could affect individuals' standard of living is the real wage channel, i.e., through changes in their purchasing power. If prices increase more than wages, households have lower real incomes and consumption possibilities. If wages compensate for the price increase, households might react differently. The difference in election outcomes between the two scenarios will thus yield some insights into the underlying causes of the protest vote.

To understand the importance of the real wage channel, we first study the general relationship between inflation or growth surprises and real wages. For this purpose, we estimate a set of local projections, tracing out the dynamic effects of economic surprises on real wages (see Appendix F). We find that inflation and growth shocks trigger substantial changes in real wages. On average, a 1 percentage point inflation or misery surprise shock leads to a decrease in real wages of about 0.5 to 1 percentage points relative to the trend. By contrast, a growth surprise of 1 percentage point increases real wages by a similar amount (see Appendix Figure F.8). The effects on real wages are persistent: Eight years after a surprise shock, real wages typically have not caught up.

We next ask whether these real wage responses affect voting patterns. For this, we include real wage growth as an additional variable in our regression setup and compare the relationship between macroeconomic surprises in elections when real wage growth was lower or higher than a country's average long-run wage growth. The assumption here is that the average real wage growth of a country is a plausible benchmark by which individuals judge their current economic situation. We estimate the following linear model, where we allow the

[9]Note that the incumbency effect is a different but important question from the anti-system mobilization that we study here. Our results are robust to controlling for extremist incumbents (see Appendix Table B.15).

voters' reaction to macroeconomic surprises to differ based on real wage growth during the pre-election period:

$$\begin{aligned}\Delta\text{VoteShare}_{ct} = \alpha_c + \eta_t + \\ \gamma\text{Surprise}_{ct} \times \text{Real wage growth below country mean}_{ct} + \\ \psi\text{Surprise}_{ct} \times \text{Real wage growth above country mean}_{ct} + \\ \delta\text{Controls}_{ct} + \epsilon_{ct}\,.\end{aligned} \tag{5.1}$$

where $\Delta\text{VoteShare}_{ct}$ is the percentage-point difference in the vote share of radical parties in an election taking place in country c in year t relative to the preceding election. α_c and η_t are country and time fixed effects. In the same way as above, $Surprise_{ct}$ is the cumulative inflation, growth, or misery surprise over the legislative period preceding the election in logs. The standard errors are clustered at the country level.[10]

Newly introduced in this regression are dummies indicating whether the annualized real wage growth in the preceding legislative period is below or equal and above the in-sample average real wage growth of the country in which the election takes place. In addition to our previous controls, we include a dummy indicating below-average real wage growth to ensure that our surprise responses are not confounded by the direct effects of real wage growth on election outcomes.

We present the results of this specification in Table 2. The panels in the table depict the heterogeneous effects of inflation (Panel A), growth (Panel B), and misery (Panel C) surprises on the change in radical vote shares depending on whether the economy experienced below or above-average real wage growth in the legislative period preceding the election. The table shows that only inflation surprises that are accompanied by real wage declines (relative to country trend) lead to a statistically significant rise in radical vote shares. When real wages do not hold up, we find that a 1 percentage point inflation surprise triggers a considerably larger increase in radical vote shares of 0.281 percentage points (significant at 5 percent level, Panel A). If real wages hold up, the effect of inflation surprises on vote shares of radical parties remains positive but is attenuated and the coefficient turns insignificant. Overall, we show that the development of real wages plays an important role in the electoral propagation of inflation shocks.

At first glance, these results can be difficult to reconcile with Binetti, Nuzzi

[10]Tables A.5 and A.6 show the estimates with clustering at the year level and two-way clustering at the country-year level.

Table 2: Conditional changes in vote shares

	Change in vote share of radical parties		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.281**		
	(0.109)		
Real wage growth at least country mean	0.127		
	(0.0969)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.348*	
		(0.171)	
Real wage growth at least country mean		-0.102	
		(0.137)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.318***
			(0.101)
Real wage growth at least country mean			0.109
			(0.0877)
Control variables			
Inflation	0.0703*	0.0885**	0.0606
	(0.0385)	(0.0362)	(0.0420)
Growth	-0.169***	-0.0668	-0.0530
	(0.0548)	(0.0823)	(0.0610)
Real wage growth below country mean	-0.710	-0.403	-0.645
	(0.545)	(0.598)	(0.591)
Financial crisis	1.538	1.243	1.062
	(1.655)	(1.651)	(1.650)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.206	0.212	0.221
N	365	365	365

Note: Table shows coefficients obtained by estimating Regression 5.1. They denote percentage-point responses in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise a dummy indicating whether real wage growth was below the country mean, inflation, growth, and a financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

and Stantcheva (2024)'s survey evidence, which suggests that people attribute wage increases that keep up with inflation to personal job performance or career progress, rather than macroeconomic factors, and maintain their dislike of inflation even when real incomes do not change. However, it may be that without

a tangible deterioration in standards of living, this aversion does not translate into the kind of protest voting that we see when real incomes are eroded.

In Panel B we consider the effects of growth surprises conditional on wage growth. Since growth surprises are a positive outcome to the economy, we unsurprisingly find reversed signs: On average, growth surprises are negatively associated with vote shares of extremist and populist parties. Again, the coefficients suggest that voting behavior is much more sensitive to economic conditions if real wage growth is below the country average than if the real wage growth is above the country average (significant at 10 percent level versus not significant at conventional levels, Panel B). Lastly, in Panel C, we turn to the misery surprise. We find a statistically significant relationship between misery surprises and election outcomes only if real wage growth is below the country mean (significant at 1 percent level, Panel C). In terms of magnitude, the coefficient of misery surprises in times of below-average real wage growth exceeds its above-average wage growth counterpart almost by a factor of 3. In sum, these results from Table 2 point to an important role of real wages in modulating the electoral response to macroeconomic surprises.

Lastly, the table also comprises information on control variables. Importantly, the real wage growth dummy does not exhibit any statistically significant relationship with radical voting behavior across all three specifications. This suggests that real wage growth itself does not directly alter radical voting behavior but only matters when voters are exposed to a broader negative development of the economy.

In addition to their electoral consequences, we also examine whether inflation surprises lead to other realizations of popular discontent in the form of demonstrations and strikes. We estimate the effects of inflation surprises on the number of demonstrations and strikes taking place in a given country using the following Poisson Pseudo Maximum Likelihood (PPML) regression that allows us to account for years in which no events took place:[11]

$$\mathbb{E}\left[y_{i,t}|\cdot\right] = exp\left[\alpha_i + \eta_t + \gamma Surprise_{i,t} + \zeta_{i,t} Controls\right] . \tag{5.2}$$

where, $y_{i,t}$ denotes either the number of demonstrations or strikes taking place in country i in year t and α_i and η_t are country and time fixed effects. The

[11] Alternatively, we can estimate a log-linear OLS regression where we adjust the dependent variable as log(*number of events + 1*). Results remain qualitatively similar (see Tables A.9, A.10, A.11 in the Appendix). Note that such models are widely criticized for yielding biased results (Silva and Tenreyro, 2006) and may lack meaningful interpretation (e.g., Cohn, Liu and Wardlaw, 2022).

Table 3: Inflation surprises and political protest

	Number of...	
	Demonstrations (1)	Strikes (2)
Panel A: Unconditional effects of inflation surprises		
Inflation surprise	-1.233	-0.491
	(3.781)	(1.668)
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Pseudo-R^2	0.690	0.434
N	1,320	1,157
Panel B: Effects of inflation surprises conditional on real wage growth		
Inflation surprise × Real wage growth below country mean	7.920*	4.337
	(4.129)	(3.622)
Inflation surprise × Real wage growth at least country mean	-4.826	-2.280
	(3.485)	(2.867)
Difference	12.746**	6.617*
Chi-squared	4.758	2.823
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Pseudo-R^2	0.694	0.424
N	1,300	1,137

Note: Table shows the coefficients obtained by estimating Regression (5.2) in exponentiated form. They denote percent change in number of demonstrations and strikes in response to 1 percentage point shock in inflation surprises. Controls comprise dummy indicating whether real wage growth was below country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

variable $Surprise_{i,t}$ denotes the year-on-year surprise in either inflation, growth, or misery. The controls comprise realized inflation, GDP growth, and the financial crisis dummy in t. In a similar way as in the previous section, we also estimate a modified version of this regression to elicit the conditional effects of macroeconomic surprises depending on whether they fall together with real wage growth which is below the country's average. In the conditional specification we include a standalone dummy indicating below-country-average real wage growth as a control.

Table 3 presents the results of this regression. Throughout the table, coefficients are reported in exponentiated form, such that they denote the percentage

increase of the outcome variable in response to a one-percentage-point increase in the surprise variable. Panel A depicts the unconditional effects of inflation surprises on demonstrations and strikes and shows that these surprises are not associated with social unrest.

However, Panel B indicates that the unconditional effects outlined above mask substantial heterogeneity in the public's reaction to inflation surprises. Focussing on times where real wage growth lags behind the country mean, we find that a 1 percentage point inflation surprise leads to an almost 8 percent increase in demonstrations(significant at 10 percent level). This picture changes when we turn to times of above-average real wage growth: Here, the number of demonstrations appears to even fall in response to inflation surprises, albeit to a lower extent and insignificantly so. The difference in the inflation surprise impact across times of below- and above-average real wage growth is significant at the 5 percent level. For strikes, we find a similar relationship, although the finding is only significant once we study the differential impact of inflation surprises across the two real wage growth regimes. Growth surprises reduce the incidence of public unrest across the board. For misery surprises, we find a similar relationship as for inflation surprises, but statistical significance is lower. The results are reported in Tables A.7 and A.8 in the Appendix.

6 Conclusion

Leveraging novel data from 18 countries over a period exceeding 70 years, this paper examines the effects of unexpected inflation and growth on voting behavior. Models of economic voting imply that voters hold governments accountable for macroeconomic conditions (Lewis-Beck and Stegmaier, 2019). We add an additional insight, namely that in response to inflation surprises voters regularly turn to anti-system and extremist parties, i.e. that trust in the system of governance is eroded. This finding echoes recent research on the causes of rising populism that highlights the decline of trust as a central correlate of populist success (Algan et al., 2017).

Our findings demonstrate that inflation and growth deviations from expectations significantly influence voting for populist and extremist parties, particularly in periods of below-average real wage growth. We show that surprises matter more than inflation and growth levels. Additionally, inflation and growth surprises are associated with heightened levels of public protest when paired with low real wage growth.

The observed heterogeneity with respect to wage growth represents an important, previously overlooked dimension of economic voting. This insight may help explain the mixed empirical evidence on the relationship between macroeconomic factors, particularly inflation, and voting behavior in the literature.

Our results contribute to the growing literature on the political effects of economic shocks and provide important insights for policymakers seeking to understand the drivers of populism. On an optimistic note, inflation shocks do not deterministically increase votes for populist and extremist parties: In times of higher wage growth, the effects are much smaller and insignificant.

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Online Appendix to Inflation Surprises and Election Outcomes

(Not for Publication)

Jonathan Federle, Cathrin Mohr, and Moritz Schularick

March 2025

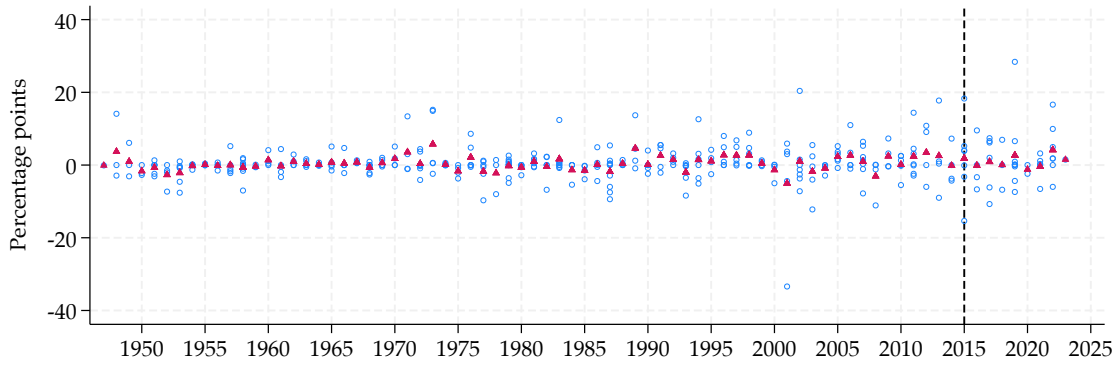
A Additional descriptive statistics

Table A.1: Parliamentary elections in sample

AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	IRL	ITA	JPN	NLD	NOR	PRT	SWE	USA
1949	1949	1953	1951	1953	1950	1979	1951	1951	(1951)	1951	1948	(1947)	1948	1953	(1976)	1952	1948
1951	(1950)	1957	1955	1957	1953	1982	1954	1956	1955	1954	1953	1949	1952	1957	1979	1956	1950
1954	1954	(1958)	1959	1961	1957	1986	1958	1958	1959	1957	1958	1952	1956	1961	(1980)	1958	1952
(1955)	1958	1962	1963	1965	1960	1989	1962	1962	1964	1961	1963	(1953)	1959	1965	1983	1960	1954
1958	1961	(1963)	1967	1969	1964	1993	1966	1967	1966	1965	1968	1955	1963	1969	1985	1964	1956
1961	1965	1965	1971	1972	1966	1996	1970	(1968)	1970	1969	1972	1958	1967	1973	1987	1968	1958
1963	1968	1968	1975	1976	1968	2000	1972	1973	1974	1973	1976	1960	1971	1977	1991	1970	1960
1966	1971	1972	1979	1980	1971	2004	1975	1978	1979	1977	1979	1963	(1972)	1981	1995	1973	1962
1969	1974	1974	1983	1983	1973	2008	1979	1981	1983	1981	1983	1967	1977	1985	1999	1976	1964
1972	1977	1979	1987	1987	1975	2011	1983	1986	1987	(1982)	1987	1969	1981	1989	2002	1979	1966
1974	(1978)	(1980)	1991	1990	1977	2015	1987	1988	1992	1987	1992	1972	(1982)	1993	2005	1982	1968
(1975)	1981	1984	1995	1994	1979	(2016)	1991	1993	1997	1989	1994	1976	1986	1997	2009	1985	1970
1977	1985	1988	1999	1998	1981	2019	1995	1997	2001	1992	1996	1979	1989	2001	2011	1988	1972
1980	1987	1993	2003	2002	1984		1999	2002	2005	1997	2001	(1980)	1994	2005	2015	1991	1974
1983	1991	1997	2007	2005	1987		2003	2007	2010	2002	2006	1983	1998	2009	2019	1994	1976
(1984)	1995	2000	2011	2009	(1988)		2007	2012	2015	2007	2008	1986	2002	2013	2022	1998	1978
1987	1999	2004	2015	2013	1990		2011	2017	2017	2011	2013	1990	(2003)	2017		2002	1980
1990	2003	2006	2019	2017	1994		2015	2022	2019	2016	2018	1993	2006	2021		2006	1982
1993	2007	2008		2021	1998		2019			2020	2022	1996	2010			2010	1984
1996	2010	2011			2001		2023*					2000	2012			2014	1986
1998	2014	2015			2005							2003	2017			2018	1988
2001	2019	2019			2007							2005	2021			2022	1990
2004		2021			2011							2009					1992
2007					2015							2012					1994
2010					2019							2014					1996
2013					2022							2017					1998
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																	2022

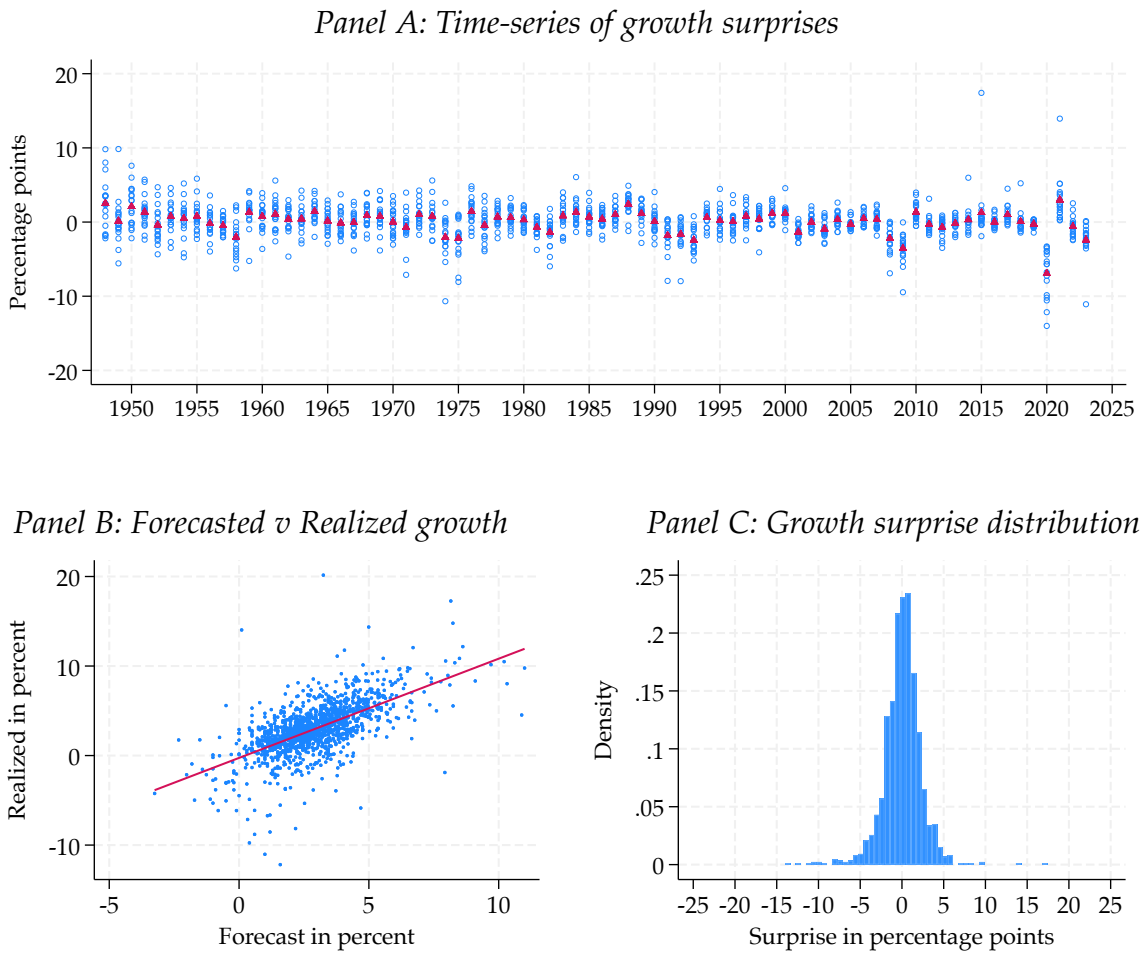
Note: Table shows elections covered in our sample. Elections in parentheses excluded from estimation since legislative periods preceding those elections was shorter than one year. Entries with a star do not enter the regression as they are the only election in a given year and drop out as singletons in the presence of year fixed effects.

Figure A.1: Radical vote share changes over time



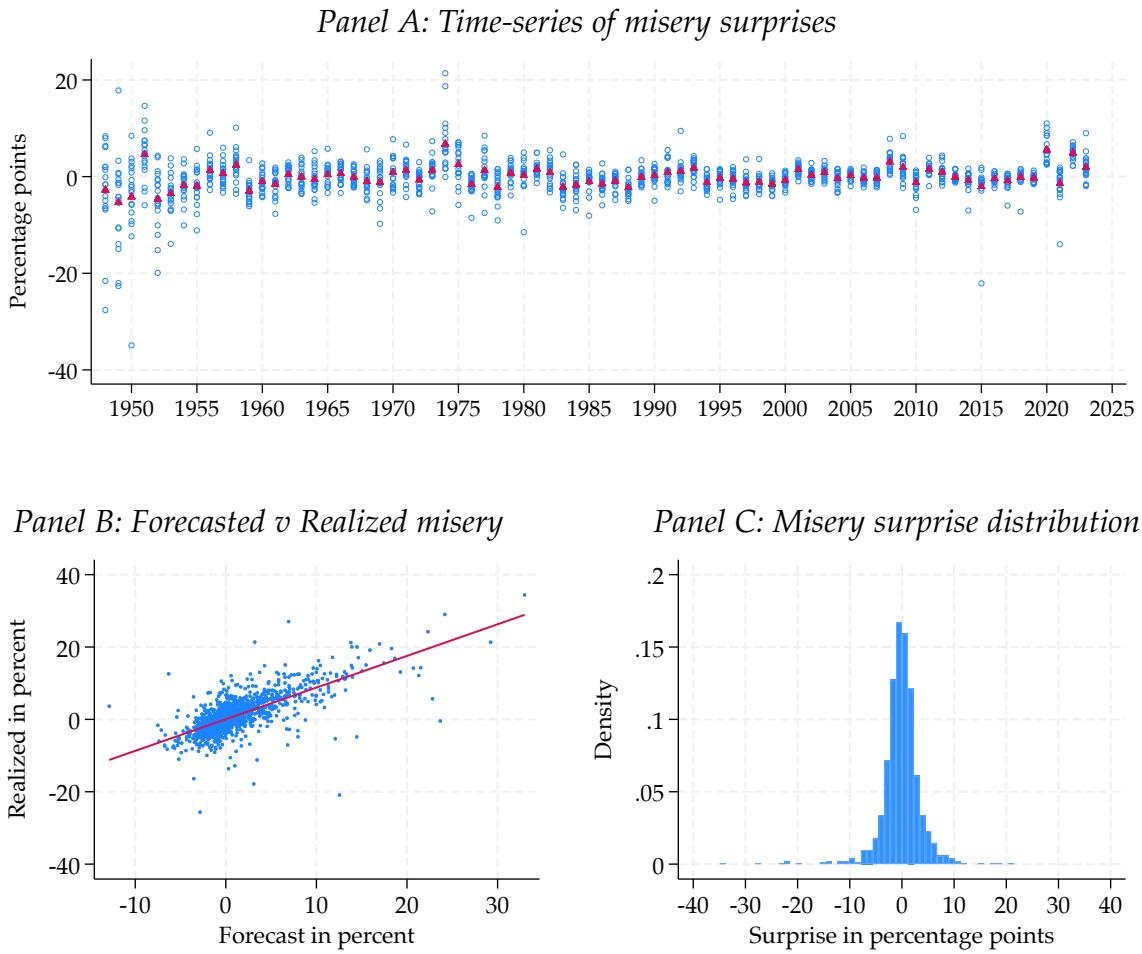
Note: Figure shows election-on-election changes in radical vote shares in percentage points (y-axis) over time (x-axis). Vertical dashed line demarcates the year in which we switch to the new election outcome sample.

Figure A.2: Growth surprises 1948-2023



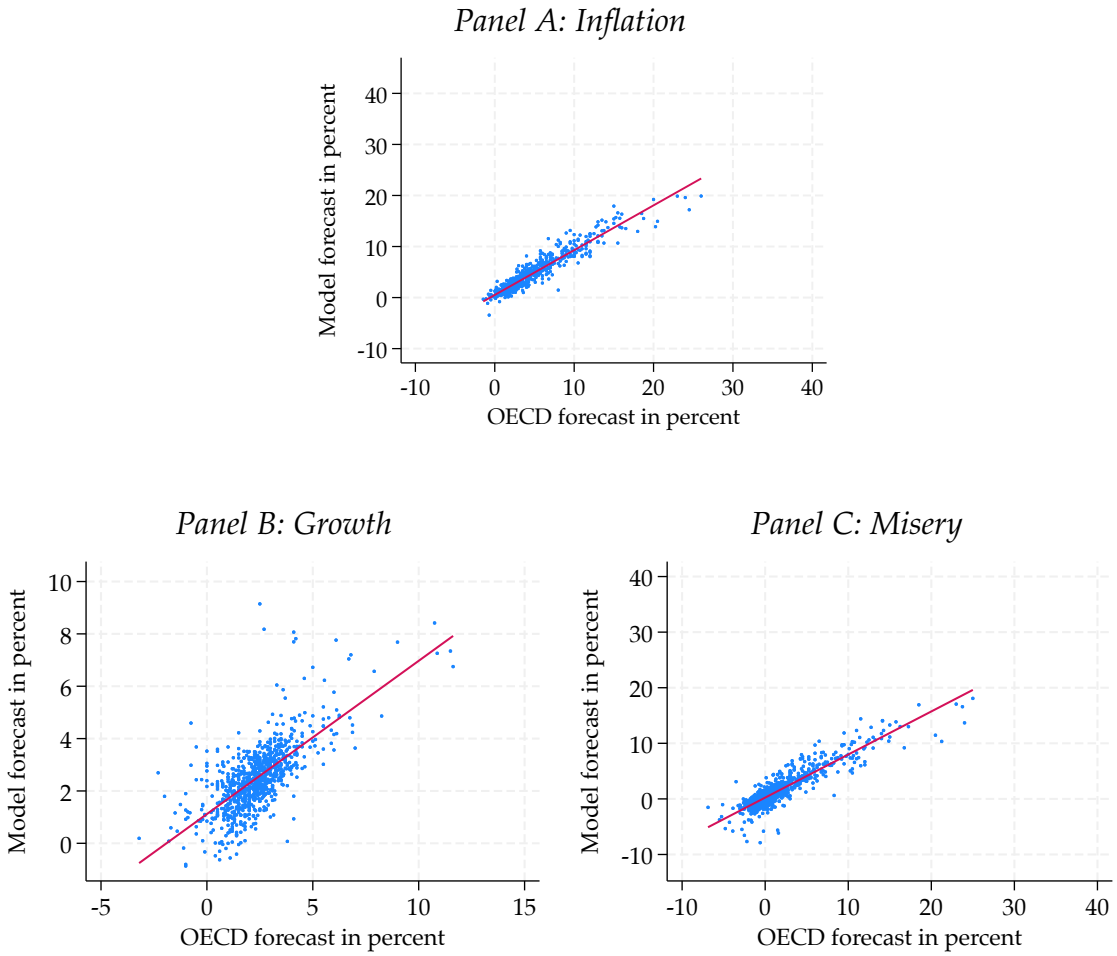
Note: Top panel A shows growth surprises of individual countries in percentage points over time (blue circles) and the annual mean (red triangles). Bottom panel left panel B shows how 1-year growth forecasts (x-axis) compare against realized growth (y-axis), bottom right panel C shows distribution of growth surprises. Surprises sourced from Kim, Ranaldi and Schularick (2024) and computed as difference between realized growth and and prior-year expectations on growth. Growth, both realized and forecasted, measured in %, surprises in percentage points.

Figure A.3: Misery surprises 1948-2023



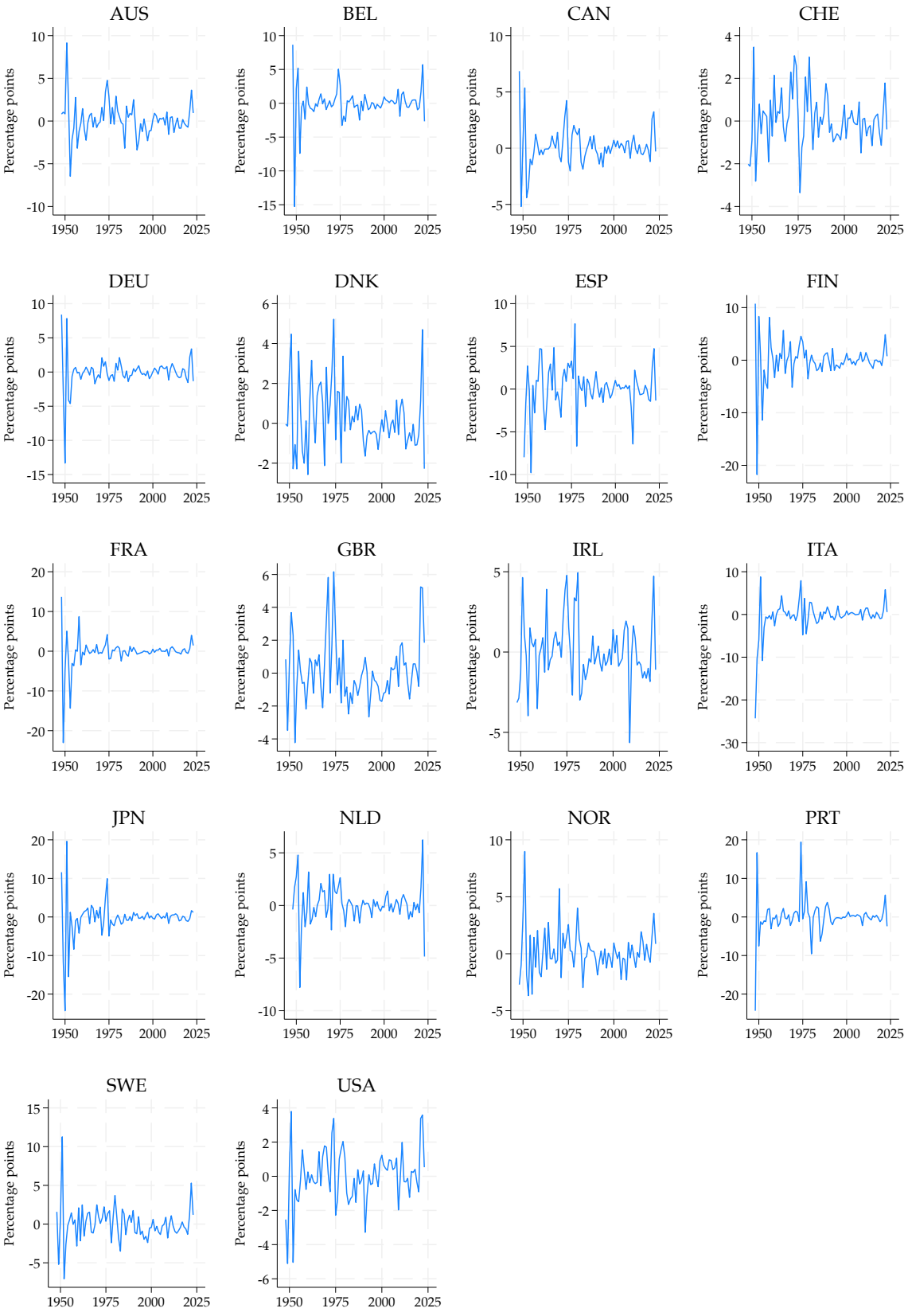
Note: Top panel A shows misery surprises of individual countries in percentage points over time (blue circles) and the annual mean (red triangles). Bottom panel left panel B shows how 1-year misery forecasts (x-axis) compare against realized misery (y-axis), bottom right panel C shows distribution of misery surprises. Surprises sourced from Kim, Ranaldi and Schularick (2024) and computed as difference between realized misery and and prior-year expectations on misery. Misery, both realized and forecasted, measured in %, surprises in percentage points.

Figure A.4: OECD v Model surprises



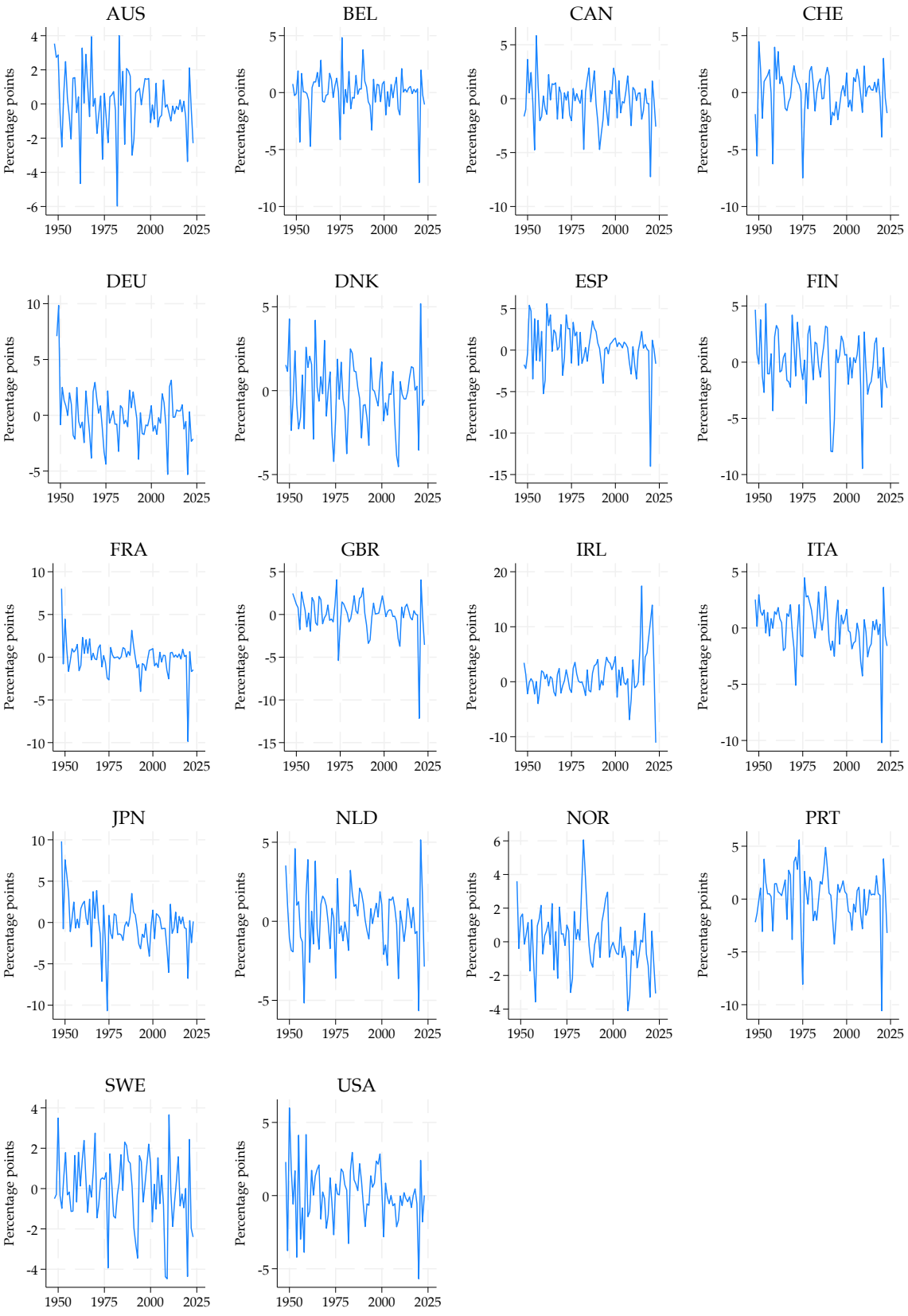
Note: Figure plots forecasts of inflation (top panel A), growth (bottom left panel B), and misery (bottom right panel C) depending on whether they are model-based (y-axis) or provided by the OECD (x-axis). All forecasts sourced from Kim, Ranaldi and Schularick (2024).

Figure A.5: Country-specific inflation surprises



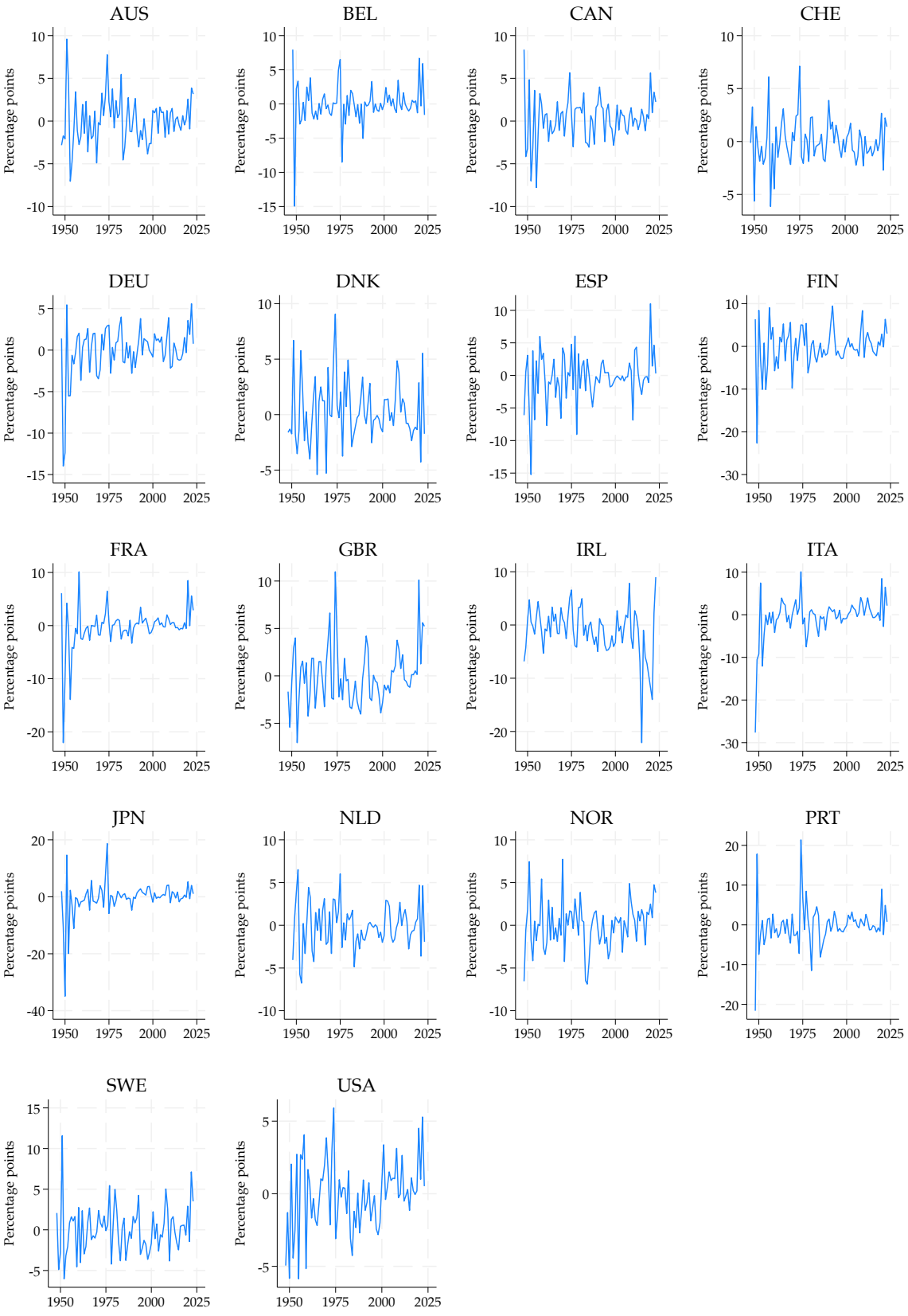
Note: Figure shows time-series of inflation surprises across all countries in sample.

Figure A.6: Country-specific growth surprises



Note: Figure shows time-series of growth surprises across all countries in sample.

Figure A.7: Country-specific misery surprises



Note: Figure shows time-series of misery surprises across all countries in sample.

Table A.2: Regressing realized inflation and growth on forecasts

	Realized inflation	Realized growth	Realized misery
Inflation forecast	0.883***		
	(0.0841)		
Growth forecast		1.108***	
		(0.0922)	
Misery forecast			0.875***
			(0.0853)
R^2	0.63	0.40	0.51
N	1,367	1,365	1,365

Note: Table shows results of regressing realized inflation and growth on their prior year forecasts. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.3: Surprises and vote shares (clustering at time-level)

	Change in radical vote share		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.174*		
	(0.103)		
Growth surprise		-0.244*	
		(0.129)	
Misery surprise			0.204**
			(0.0850)
Control variables			
Inflation	0.0677*	0.0852**	0.0511
	(0.0387)	(0.0368)	(0.0375)
Growth	-0.166**	-0.0660	-0.0641
	(0.0680)	(0.0822)	(0.0794)
Financial crisis	1.638	1.480	1.414
	(1.789)	(1.912)	(1.874)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.202	0.205	0.212
N	365	365	365

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote percentage point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at time level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.4: Surprises and vote shares (twoway clustering)

	Change in radical vote share		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.174*		
	(0.0867)		
Growth surprise		-0.244*	
		(0.134)	
Misery surprise			0.204**
			(0.0751)
Control variables			
Inflation	0.0677*	0.0852**	0.0511
	(0.0358)	(0.0364)	(0.0363)
Growth	-0.166**	-0.0660	-0.0641
	(0.0610)	(0.0789)	(0.0676)
Financial crisis	1.638	1.480	1.414
	(1.797)	(1.905)	(1.862)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.202	0.205	0.212
N	365	365	365

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote percentage point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors twoway clustered at country and time level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.5: Conditional changes in radical vote shares (clustering at time-level)

	Change in radical vote share		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.281**		
	(0.135)		
Real wage growth at least country mean	0.127		
	(0.132)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.348**	
		(0.155)	
Real wage growth at least country mean		-0.102	
		(0.151)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.318***
			(0.106)
Real wage growth at least country mean			0.109
			(0.104)
Control variables			
Inflation	0.0703*	0.0885**	0.0606
	(0.0365)	(0.0343)	(0.0379)
Growth	-0.169**	-0.0668	-0.0530
	(0.0685)	(0.0837)	(0.0773)
Real wage growth below country mean	-0.710	-0.403	-0.645
	(0.756)	(0.752)	(0.764)
Financial crisis	1.538	1.243	1.062
	(1.843)	(1.976)	(1.975)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.206	0.212	0.221
N	365	365	365

Note: Table shows coefficients obtained by estimating Regression (5.1). They denote percentage-point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise dummy indicating whether real wage growth was below the country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at time level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.6: Conditional changes in radical vote shares (twoway clustering)

	Change in radical vote share		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.281**		
	(0.115)		
Real wage growth at least country mean	0.127		
	(0.123)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.348*	
		(0.171)	
Real wage growth at least country mean		-0.102	
		(0.154)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.318***
			(0.0999)
Real wage growth at least country mean			0.109
			(0.102)
Control variables			
Inflation	0.0703*	0.0885**	0.0606
	(0.0363)	(0.0342)	(0.0408)
Growth	-0.169**	-0.0668	-0.0530
	(0.0588)	(0.0797)	(0.0630)
Real wage growth below country mean	-0.710	-0.403	-0.645
	(0.657)	(0.698)	(0.701)
Financial crisis	1.538	1.243	1.062
	(1.820)	(1.957)	(1.932)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.206	0.212	0.221
N	365	365	365

Note: Table shows coefficients obtained by estimating Regression (5.1). They denote percentage-point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise dummy indicating whether real wage growth was below the country mean, inflation, growth, and financial crisis dummy. Standard errors twoway clustered at country and time level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.7: Growth surprises and political protest

	Number of...	
	Demonstrations	Strikes
Panel A: Unconditional effects of growth surprises		
Growth surprise	-6.355	-10.47**
	(5.350)	(5.230)
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Pseudo-R^2	0.690	0.436
N	1,320	1,157
Panel B: Effects of growth surprises conditional on real wage growth		
Growth surprise × Real wage growth below country mean	-2.479	-14.07*
	(8.335)	(7.935)
Growth surprise × Real wage growth at least country mean	-7.802	-14.43**
	(4.773)	(7.274)
Difference	5.323	0.364
Chi-squared	0.462	0.005
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Pseudo-R^2	0.693	0.426
N	1,300	1,137

Note: Table shows coefficients obtained by estimating Regression (5.2) in exponentiated form. They denote percent change in number of demonstrations and strikes in response to 1 percentage point shock in growth surprises. Controls comprise dummy indicating whether real wage growth was below country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.8: Misery surprises and political protest

	Number of...	
	Demonstrations	Strikes
Panel A: Unconditional effects of misery surprises		
Misery surprise	0.634	0.633
	(3.509)	(1.307)
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Pseudo-R^2	0.690	0.434
N	1,320	1,157
Panel B: Effects of misery surprises conditional on real wage growth		
Misery surprise × Real wage growth below country mean	2.554	3.797
	(3.614)	(3.650)
Misery surprise × Real wage growth at least country mean	-1.337	-0.246
	(2.990)	(2.388)
Difference	3.892	4.043
Chi-squared	0.666	1.245
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Pseudo-R^2	0.693	0.424
N	1,300	1,137

Note: Table shows coefficients obtained by estimating Regression (5.2) in exponentiated form. They denote percent change in number of demonstrations and strikes in response to 1 percentage point shock in misery surprises. Controls comprise dummy indicating whether real wage growth was below country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.9: Inflation surprises and political protest (log-linear OLS)

	$ln(\#Demonstrations + 1)$	$ln(\#Strikes + 1)$
Panel A: Unconditional effects of inflation surprises		
Inflation surprise	-0.432	-0.211
	(0.875)	(0.663)
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
R^2	0.520	0.247
N	1,320	1,355
Panel B: Effects of inflation surprises conditional on real wage growth		
Inflation surprise × Real wage growth below country mean	2.475**	1.477
	(1.236)	(1.163)
Inflation surprise × Real wage growth at least country mean	-1.351	-0.898*
	(0.863)	(0.480)
Difference	3.826***	2.375**
Chi-squared	10.113	4.732
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
R^2	0.511	0.261
N	1,300	1,335

Note: Table shows exponentiated coefficients obtained by estimating Regression (5.2) as a log-linear ordinary least squares model. They denote percent change in number of demonstrations and strikes in response to 1 percentage point shock in inflation surprises. Controls comprise dummy indicating whether real wage growth was below country mean, inflation, growth, and financial crisis dummy. Standard errors are robust to heteroskedasticity, serial and cross-sectional correlation (Driscoll and Kraay, 1998) and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.10: Growth surprises and political protest (log-linear OLS)

	$ln(\#Demonstrations + 1)$	$ln(\#Strikes + 1)$
Panel A: Unconditional effects of growth surprises		
Growth surprise	-3.700*	-1.839*
	(1.931)	(1.021)
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
R^2	0.522	0.249
N	1,320	1,355
Panel B: Effects of growth surprises conditional on real wage growth		
Growth surprise × Real wage growth below country mean	-3.004	-2.499**
	(2.255)	(1.108)
Growth surprise × Real wage growth at least country mean	-3.623*	-1.364
	(2.029)	(1.190)
Difference	0.620	-1.134*
Chi-squared	0.131	3.549
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
R^2	0.510	0.259
N	1,300	1,335

Note: Table shows exponentiated coefficients obtained by estimating Regression (5.2) as a log-linear ordinary least squares model. They denote percent change in number of demonstrations and strikes in response to 1 percentage point shock in growth surprises. Controls comprise dummy indicating whether real wage growth was below country mean, inflation, growth, and financial crisis dummy. Standard errors are robust to heteroskedasticity, serial and cross-sectional correlation (Driscoll and Kraay, 1998) and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A.11: Misery surprises and political protest (log-linear OLS)

	$ln(\#Demonstrations + 1)$	$ln(\#Strikes + 1)$
Panel A: Unconditional effects of misery surprises		
Misery surprise	0.292	0.150
	(0.728)	(0.679)
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
R^2	0.520	0.247
N	1,320	1,355
Panel B: Effects of misery surprises conditional on real wage growth		
Misery surprise × Real wage growth below country mean	1.583*	1.335*
	(0.907)	(0.807)
Misery surprise × Real wage growth at least country mean	-0.374	-0.541
	(0.694)	(0.568)
Difference	1.957**	1.876***
Chi-squared	6.000	8.761
Controls	✓	✓
Country fixed effects	✓	✓
Year fixed effects	✓	✓
R^2	0.510	0.262
N	1,300	1,335

Note: Table shows exponentiated coefficients obtained by estimating Regression (5.2) as a log-linear ordinary least squares model. They denote percent change in number of demonstrations and strikes in response to 1 percentage point shock in misery surprises. Controls comprise dummy indicating whether real wage growth was below country mean, inflation, growth, and financial crisis dummy. Standard errors are robust to heteroskedasticity, serial and cross-sectional correlation (Driscoll and Kraay, 1998) and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B Macro surprises and incumbency

Throughout this section, we provide two distinct pieces of evidence: First, we show how macroeconomic surprises affect the incumbent parties. Second, we show that our main findings are robust to controlling for the incumbency effect.

For the former, we draw on data from NELDA (Hyde and Marinov, 2009), who code for a wide range of elections, a dummy indicating whether the vote count was a gain for the opposition. We then proceed to estimate our baseline regressions with the outcome variable now being the dummy indicating whether the incumbent lost instead of the election-on-election change in the extremist vote share. The coefficients yielded by the resulting linear probability model then indicate the probability change of an unfavorable electoral outcome for the incumbent in response to a one-percentage-point change in the surprise variables. The results are shown in Tables B.12 and B.13 below. As can be inferred from the table, the coefficients always conform with expectations but only insignificantly so, i.e., inflation and misery surprises appear to hurt the incumbent whereas growth surprises benefit the incumbent. For the conditional results, we see, similar to our baseline, that the effects of macroeconomic surprises are more pronounced in times of below-average real wage growth. In sum, we think of the regression results as providing suggestive evidence of macroeconomic surprises hurting the incumbent government, but only so to a small degree.

In order to examine the second question of whether our measured economic surprises effectively capture an incumbent effect, we set up another dummy variable that controls for whether at least one party in the governments established during the legislative period following the previous election was extremist according to the Parlgov coding. In this way, we seek to control for possible endogeneity arising from a correlation between economic deterioration and extremist incumbency. As can be inferred from the tables below, our findings – if anything – appear to be reinforced by the inclusion of the incumbency control, see Tables B.14 and B.15.

Table B.12: Surprises and their unconditional effects on the incumbent

	Opposition gained indicator		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.00112		
	(0.0102)		
Growth surprise		-0.0152	
		(0.0121)	
Misery surprise			0.00681
			(0.00738)
Control variables			
Inflation	0.00681*	0.00615*	0.00541
	(0.00392)	(0.00351)	(0.00360)
Growth	-0.00125	0.00574	0.00254
	(0.00852)	(0.0106)	(0.0102)
Financial crisis	0.290**	0.274**	0.280**
	(0.107)	(0.108)	(0.105)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.262	0.267	0.265
N	352	352	352

Note: Table shows coefficients yielded by estimating Regression (3.1) as linear probability model with outcome variable being indicator variable: "Was the vote count a gain for the opposition?", as provided by NELDA (Hyde and Marinov, 2009). Coefficients denote change in probability of vote count gain for opposition to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.13: Surprises and their conditional effects on the incumbent

	Opposition gained indicator		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.0114		
	(0.0162)		
Real wage growth at least country mean	-0.00630		
	(0.0109)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.0101	
		(0.0150)	
Real wage growth at least country mean		-0.0216*	
		(0.0121)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.00877
			(0.0102)
Real wage growth at least country mean			0.00414
			(0.00827)
Control variables			
Inflation	0.00731*	0.00596*	0.00568
	(0.00412)	(0.00339)	(0.00361)
Growth	-0.000406	0.00603	0.00314
	(0.00815)	(0.00996)	(0.0103)
Real wage growth below country mean	0.0453	0.0450	0.0478
	(0.0788)	(0.0770)	(0.0804)
Financial crisis	0.279**	0.286**	0.272**
	(0.111)	(0.112)	(0.113)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.267	0.270	0.266
N	352	352	352

Note: Table shows coefficients yielded by estimating Regression (3.1) as linear probability model with outcome variable being indicator variable: "Was the vote count a gain for the opposition?", as provided by NELDA (Hyde and Marinov, 2009). Coefficients denote change in probability of vote count gain for opposition to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.14: Surprises and vote shares (controlling for extremist incumbents)

	Change in radical vote share		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.199**		
	(0.0720)		
Growth surprise		-0.304**	
		(0.136)	
Misery surprise			0.238***
			(0.0647)
Control variables			
Inflation	0.106**	0.128***	0.0889**
	(0.0389)	(0.0373)	(0.0387)
Growth	-0.179**	-0.0613	-0.0635
	(0.0669)	(0.0967)	(0.0738)
Financial crisis	0.696	0.431	0.410
	(1.988)	(1.952)	(1.977)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.254	0.259	0.267
N	324	324	324

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote percentage point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.15: Conditional changes in radical vote shares (controlling for extremist incumbents)

	Change in radical vote share		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.363***		
	(0.0988)		
Real wage growth at least country mean	0.126		
	(0.112)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.431**	
		(0.173)	
Real wage growth at least country mean		-0.132	
		(0.158)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.397***
			(0.0958)
Real wage growth at least country mean			0.110
			(0.0969)
Control variables			
Inflation	0.113**	0.134***	0.106**
	(0.0416)	(0.0366)	(0.0466)
Growth	-0.186**	-0.0644	-0.0536
	(0.0645)	(0.0993)	(0.0718)
Real wage growth below country mean	-0.919	-0.507	-0.886
	(0.532)	(0.631)	(0.586)
Financial crisis	0.485	0.0555	-0.194
	(1.985)	(1.940)	(1.959)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.261	0.268	0.282
N	324	324	324

Note: Table shows coefficients obtained by estimating Regression (5.1). They denote percentage-point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise dummy indicating whether real wage growth was below the country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

C External validation: Focusing on populism

In this section, we present a replication of our key results only for populist vote shares using an entirely different dataset. To this end, we draw on electoral outcome data and populist vote shares of V-Dem (Lindberg et al., 2022). In this dataset each party p is, at each point in time t, assigned populism score, $PPOP_{pt} \in [0, 1]$ indicating "to what extent [do] representatives of the party use populist rhetoric".

We leverage the party-time specific index of populism provided by V-Dem and apply it to election outcomes. To this end, we define the set of parties P_{ct} operating in a given country c in year t. The vote share of each individual party in an election that takes place in year t is given by $VOTE_{p,t}$.

Equipped with these variables, we can define the following election-specific populism index,

$$CPOP_{ct} = \sum_{p \in P_c} \left(PPOP_{pt} * VOTE_{pt} \right) . \tag{C.1}$$

As such, $CPOP_{ct}$ denotes the vote-share-weighted populism index in an election taking place in country c in year t. In this way, $CPOP_{ct}$ increases both in degree of populism of existing parties as well as in overall vote shares of populists. For the cases that the aggregate vote shares of parties for which we have a populism score in a given election year does not sum to 100% we scale the index accordingly as to not confound our measure with fluctuations in party coverage. In doing so, we implicitly assume that the populism scores of smaller parties do not systematically deviate from those of larger ones. We then proceed to estimate our main regression equations, now, however, using the election-on-election change in the populism index as outcome variable instead of the percentage point change in extremist vote shares, see Tables C.16 and C.17. The results turn out highly suggestive of our effect of interest: Inflation surprises increase the populism index, and more so in times of below-average wage growth, whereas growth surprises decrease the populism index. We find similar effects for misery surprises. As the sample period is, however, severely restricted as compared to our baseline analysis, we note that statistical significance deteriorates as the standard errors inflate with the reduced sample size.

Table C.16: Surprises and populism index

	Change in populism index		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.164		
	(0.168)		
Growth surprise		-0.0551	
		(0.132)	
Misery surprise			0.0953
			(0.1000)
Control variables			
Inflation	0.0326	0.0544	0.0321
	(0.0615)	(0.0546)	(0.0607)
Growth	-0.154	-0.122	-0.102
	(0.0994)	(0.126)	(0.106)
Financial crisis	2.257	2.278	2.204
	(2.241)	(2.274)	(2.279)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.241	0.238	0.240
N	238	238	238

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote change of populism index to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C.17: Conditional changes in populist vote shares

	Change in populism index		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.233		
	(0.200)		
Real wage growth at least country mean	-0.0536		
	(0.187)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.0916	
		(0.147)	
Real wage growth at least country mean		0.0464	
		(0.139)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.154
			(0.124)
Real wage growth at least country mean			-0.0576
			(0.101)
Control variables			
Inflation	0.0452	0.0584	0.0436
	(0.0650)	(0.0553)	(0.0640)
Growth	-0.132	-0.105	-0.0740
	(0.0990)	(0.127)	(0.102)
Real wage growth below country mean	0.695	0.830	0.850
	(0.840)	(0.822)	(0.853)
Financial crisis	2.162	2.135	1.951
	(2.246)	(2.260)	(2.242)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.247	0.243	0.248
N	238	238	238

Note: Table shows coefficients obtained by estimating Regression (5.1). They denote percentage-point response in populism index to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise dummy indicating whether real wage growth was below the country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

D External validation: Focusing on extremism

Table D.18: Surprises and vote shares

	Change in extremist vote share		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.215*		
	(0.103)		
Growth surprise		-0.126	
		(0.151)	
Misery surprise			0.177*
			(0.0982)
Control variables			
Inflation	0.0836**	0.116**	0.0823**
	(0.0328)	(0.0451)	(0.0372)
Growth	-0.0988*	-0.0645	-0.0195
	(0.0486)	(0.0791)	(0.0729)
Financial crisis	1.320	1.263	1.154
	(2.310)	(2.351)	(2.349)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.284	0.273	0.286
N	328	328	328

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote percentage point response in extremist vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.19: Conditional changes in extremist vote shares

	Change in extremist vote share		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.316		
	(0.199)		
Real wage growth at least country mean	0.141		
	(0.0885)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.205	
		(0.175)	
Real wage growth at least country mean		-0.0115	
		(0.159)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.262*
			(0.128)
Real wage growth at least country mean			0.0843
			(0.102)
Control variables			
Inflation	0.0890**	0.116**	0.0920**
	(0.0349)	(0.0424)	(0.0392)
Growth	-0.0948*	-0.0555	-0.00857
	(0.0486)	(0.0801)	(0.0756)
Real wage growth below country mean	0.243	0.625	0.371
	(0.700)	(0.794)	(0.756)
Financial crisis	1.212	1.063	0.834
	(2.227)	(2.298)	(2.227)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.287	0.279	0.293
N	328	328	328

Note: Table shows coefficients obtained by estimating Regression (5.1). They denote percentage-point response in extremist vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise dummy indicating whether real wage growth was below the country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

E External validation: Extremists and populists

In this section, we reconcile the findings from our baseline regarding the effect of macroeconomic surprises on joint vote shares of extremists and populists using an entirely different sample and observation period. For this purpose, we use the data on election results and left-right scores from Parlgov and merge it with the populist-party classification of V-Dem (Lindberg et al., 2022). Equipped with these datasets, we proceed to replicate our main analysis on a sample that aims to classify both populists and extremists. For the classification of extremists, we use the same thresholds that we used in our baseline to extend the sample beyond the period covered by Funke, Schularick and Trebesch (2016), i.e., from 2015 onwards. For the classification of populist parties, we classify the 10% of party-election observations with the highest populism scores as populists. This corresponds to a populism score of 0.755, on a scale where 1 would signify a party whose representatives make very high use of populist rhetoric and 0 would signify a party whose representatives make only very little use of populist rhetoric.

To merge the datasets, we leverage linking tables from Partyfacts (Döring and Regel, 2019). Wherever multiple parties are summarized into an encompassing entity within Partyfacts, we compute the left-right and populism scores of the "mother party" as the vote-share weighted scores of its constituents. We only keep parties for which we have both scores from Parlgov as well as from V-Dem.

Upon estimating our baseline regression with the alternative measure of extremist and populist vote shares, we observe the exact same patterns. The unconditional effects are outlined in E.20. Here, the effects of macroeconomic surprises appear somewhat elusive with all coefficients pointing in the same direction as in our baseline but only with misery surprises doing so in a statistically significant manner. Turning, however, to the conditional surprises in Table E.21, we observe the exact same results as in our baseline: Across the board, all effects regarding macroeconomic surprises turn significant as we zoom into times of below-average real wage growth.

As can be inferred from the tables, the sample is reduced as compared to our baseline which has two reasons: First, the sample is restricted to the period starting from 1970 due to the availability of populism scores in V-Dem. Second, we require joint availability of data across Parlgov and V-Dem. The latter may introduce selection effects into the results outlined throughout this section, which is why we decided to stick with the sample of (Funke, Schularick and Trebesch,

2016) in our baseline. Yet, the fact that we arrive at the same conclusions even though we rely on an entirely different dataset and observation period speaks to the robustness of our results.

Table E.20: Surprises and vote shares

	Change in radical vote share		
	(1)	(2)	(3)
Surprise variables			
Inflation surprise	0.656		
	(0.406)		
Growth surprise		-0.327	
		(0.213)	
Misery surprise			0.441*
			(0.238)
Control variables			
Inflation	0.122	0.210*	0.115
	(0.0790)	(0.107)	(0.0842)
Growth	-0.180	-0.0122	0.0441
	(0.146)	(0.159)	(0.147)
Financial crisis	3.246	3.058	2.876
	(3.026)	(3.163)	(3.141)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.312	0.293	0.313
N	209	209	209

Note: Table shows coefficients yielded by estimating Regression (3.1). Coefficients denote percentage point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table E.21: Conditional changes in radical vote shares

	Change in radical vote share		
	(1)	(2)	(3)
Panel A: Inflation surprise × ...			
Real wage growth below country mean	0.817*		
	(0.433)		
Real wage growth at least country mean	0.170		
	(0.514)		
Panel B: Growth surprise × ...			
Real wage growth below country mean		-0.329	
		(0.191)	
Real wage growth at least country mean		-0.265	
		(0.340)	
Panel C: Misery surprise × ...			
Real wage growth below country mean			0.528**
			(0.185)
Real wage growth at least country mean			0.178
			(0.380)
Control variables			
Inflation	0.144*	0.207*	0.132
	(0.0814)	(0.102)	(0.0901)
Growth	-0.132	0.0178	0.0766
	(0.139)	(0.161)	(0.137)
Real wage growth below country mean	1.183	1.739	1.419
	(1.295)	(1.599)	(1.412)
Financial crisis	3.089	3.071	2.466
	(3.004)	(3.137)	(3.083)
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
R^2	0.325	0.301	0.323
N	209	209	209

Note: Table shows coefficients obtained by estimating Regression (5.1). They denote percentage-point response in radical vote share to one-percentage-point increase in either inflation, growth, or misery surprises. Controls comprise dummy indicating whether real wage growth was below the country mean, inflation, growth, and financial crisis dummy. Standard errors clustered at country level and reported in round brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

F Real wage responses to surprises

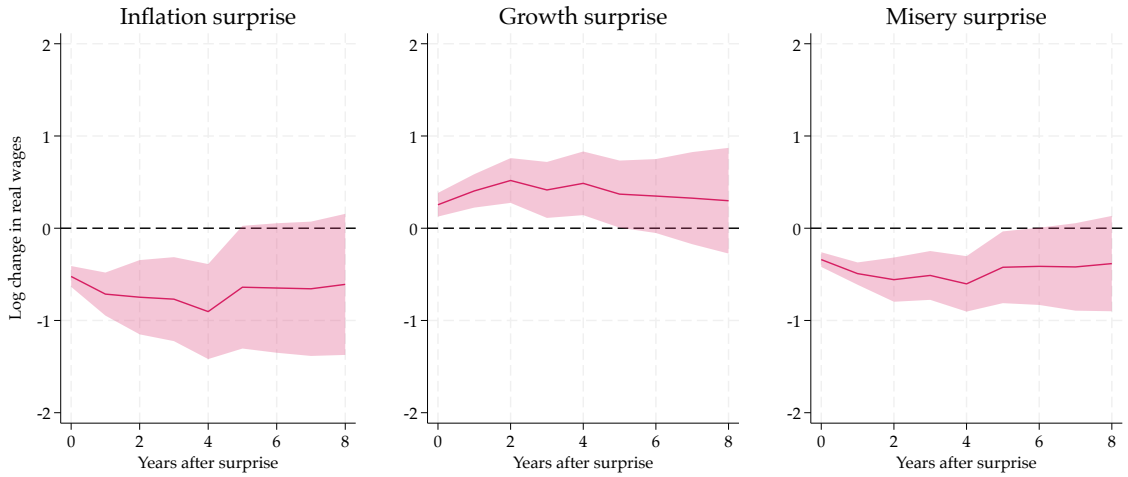
In this section, we describe our empirical framework examining the effects of inflation, growth, and misery surprises on real wage growth. Our point of departure is a simple set of local projections (Jordà, 2005) of the following form:

$$ln(wage_{i,t+h}) - ln(wage_{i,t-1}) = \alpha_{i,h} + \beta_{t,h} + \gamma_h \varepsilon_{i,t} + \mu_{i,t} + u_{i,t+h} \quad \text{(F.1)}$$

Here, we relate the log change in real wages within country i in year t over horizon h to a set of country-fixed effects, $\alpha_{i,t}$, year fixed effects, $\beta_{t,h}$, our surprise shocks, $\varepsilon_{i,t}$, as well as vector of control variables, $\mu_{i,t}$. As in our analysis above, the surprise shocks denote either inflation, growth, or misery surprises. The vector of control variables comprises three lags of inflation, growth, a financial crisis dummy, and real wage growth.

The estimated responses are depicted in Figure F.8 and scaled to denote the percentage point response (y-axis) to a one-percentage-point shock in inflation, growth, and misery surprises. The figure shows that across the board real wages respond significantly to all three types of surprises. On average, a 1 percentage point change in inflation and misery leads to about a 0.5-1 percentage point decrease in real wages. In line with our results, a similar but inversed relationship emerges when turning to growth surprises.

Figure F.8: Real wage response to 1 percentage point shock in...



Note: Figure shows change of real wage changes in percentage points (y-axis) in response to 1 percentage point shock in inflation surprise, growth surprise, or misery surprise. Standard errors are clustered at the year level.