



# Essays on inequality and political polarization: Evidence from Spain

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# Declaration

I certify that the thesis I have presented for examination for the MPhil/PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it). The copyright of this thesis rests with the author. Quotation from it is permitted, provided that full acknowledgement is made. This thesis may not be reproduced without my prior written consent. I warrant that this authorisation does not, to the best of my belief, infringe the rights of any third party.

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## Statement of prior publication

I certify that Chapter 2 in this thesis was published in *Political Geography* as an article titled 'The stories we tell ourselves: Local newspaper reporting and support for the radical right' (see Jambrina-Canseco, 2023).

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Beatriz Jambrina Canseco

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# Abstract

The political economy literature suggests that economic interests shape political preferences, implying that periods of economic turmoil are likely to translate into political polarization. In this sense, a rise in economic inequalities, both inter-personal and inter-territorial, has led to widespread discontent and resentment, susceptible to be channeled through the use of narratives into support for radical parties. The essays in this thesis contribute to the burgeoning literature on the links between both of these types of polarization. Read as a whole, they help to explain the turn towards the extremes in the Spanish political landscape. Nonetheless, the problems, lessons, and methodologies easily apply to other contexts.

The first essay highlights the importance of narratives in shaping voting choices. Using machine learning, I track the main narratives present in local newspapers ahead of the last national election. While these narratives often did not align with the reality captured by socioeconomic statistics, they remain good predictors of radical voting patterns. Using spatial econometrics, I show that perceptions related to separatism, economic anxiety, and regional gaps played a key role in the rise of the radical right party VOX in Spain.

I then focus on two of the economic drivers of the radical vote: unemployment and wage inequality. In the second essay, I revisit the classical question of whether unemployment leads to radical voting, providing empirical evidence that recent unemployment shocks have contributed to current political polarization in Spain. Using an instrumental variable strategy, I show that industrial unemployment favored the radical right, while unemployment upon first-time entry in the labor market boosted support for the radical left. These patterns perfectly match party narratives but remain hidden if one looks at the unemployed as a homogeneous group.

The third essay describes the evolution of the real (adjusting for local costs of living) returns to university education in Spain since the years before the Great Recession. Despite relative stability in returns to university education (39-46%), I uncover large cohort gaps that predate the crisis, with younger workers receiving much lower returns on their university

degrees than older workers. Workers over 35 with a tertiary degree earned 45% more than their lesser-educated counterparts, whereas those under 35 received a premium of only 30%. These gaps cannot be accounted for by differences in prior work experience. I also find evidence of increasing within-group wage inequality among the educated, a particularly prominent pattern among the young. Based on these findings, the paper studies the possibility that the evolution in returns to university is linked to an increase in the relative supply of tertiary-educated workers that has been unmatched by relative demand for high-skilled workers.

# Table of Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Economic turmoil and political upheaval . . . . .	1
1.2	What is causing the rise in radical voting? A conceptual framework . . . . .	5
1.3	Why Spain? How generational and territorial gaps can lead to political polarization . . . . .	8
1.4	Overview of the PhD . . . . .	13
1.5	Conclusion . . . . .	15
<b>2</b>	<b>The stories we tell ourselves: Local newspaper reporting and support for the radical right</b>	<b>18</b>
2.1	Introduction . . . . .	18
2.2	Theoretical background . . . . .	20
2.2.1	The reasons behind the success of the radical right . . . . .	20
2.2.2	(Social) media, local narratives and the radical right . . . . .	25
2.3	The radical right in Spain: A brief background . . . . .	27
2.4	Measuring narratives . . . . .	28
2.4.1	Data . . . . .	28
2.4.2	Natural language processing . . . . .	29
2.4.3	Classifying and aggregating topics by location . . . . .	32
2.5	Perceptions vs. reality . . . . .	33
2.5.1	The economic argument . . . . .	33
2.5.2	The cultural backlash argument . . . . .	34
2.5.3	The geography of discontent . . . . .	36
2.6	What narratives suggest about the rise of the radical right . . . . .	37
2.6.1	Baseline estimations . . . . .	37
2.6.2	A spatial approach . . . . .	43
2.7	Conclusion . . . . .	46
2.A	Topics used to train the Naive Bayes algorithm . . . . .	48
2.B	Placebo tests . . . . .	49
2.C	Newspapers included in the study . . . . .	50
2.D	Aggregating tweets by municipality . . . . .	54

2.E	Additional plots . . . . .	55
2.F	Robustness check: Prior radical right vote does not influence topic densities in 2018 . . . . .	57
2.G	SLX and SDEM results: Marginal effects . . . . .	58
<b>3</b>	<b>Unemployment shocks, party narratives, and radical voting</b>	<b>60</b>
3.1	Introduction . . . . .	60
3.2	Why do people vote for radical parties? What we know about the role of economic shocks . . . . .	63
3.3	Radical voting in Spain . . . . .	67
3.4	Results . . . . .	74
3.4.1	Some kinds of unemployment fuel political polarization . . . . .	74
3.4.2	The causal effect of unemployment on political polarization . . . . .	79
3.5	Conclusion . . . . .	86
3.A	Summary statistics . . . . .	88
3.B	Radical party breakdown . . . . .	89
3.C	Placebo tests . . . . .	90
<b>4</b>	<b>Does university education still pay off? A cohort analysis of Spanish wage premiums</b>	<b>91</b>
4.1	Introduction . . . . .	91
4.2	Understanding the evolution of the education-related wage gap . . . . .	96
4.3	The Spanish university system . . . . .	98
4.4	The data . . . . .	101
4.4.1	The Continuous Sample of Employment Histories . . . . .	101
4.4.2	Adjusting wages to local costs of living . . . . .	102
4.5	Hidden variation in the university premium . . . . .	105
4.5.1	The evolution of the university premium . . . . .	105
4.5.2	Inequality within the college group: Generational divides . . . . .	108
4.6	Rising dispersion among the educated . . . . .	111
4.7	The role of relative supply . . . . .	115
4.7.1	Modelling relative supply shifts . . . . .	115
4.7.2	Model implementation . . . . .	117
4.8	Discussion . . . . .	121
4.A	Adjusting wages with local CPIs . . . . .	125
4.A.1	Local Consumer Price Indices . . . . .	125
4.B	Relationship between age and years of experience . . . . .	128
4.C	IV estimation of $\sigma_C$ . . . . .	129
4.D	Estimations using nationally-adjusted CPIs . . . . .	130

# List of Figures

1.1	European radical parties' average vote share (1981-2022). Parties are categorized as far-left, far-right or other based on the PopuList classification (Rooduijn et al., 2019). The calculations include all EU countries, Iceland, Norway, Switzerland, and the UK. Mean vote shares are weighted by each country's population in 2020. . . . .	2
1.2	Acyclic graph showing the link between unemployment and radical voting. . . . .	7
1.3	Indexed real yearly wages for the 10 <sup>th</sup> , 50 <sup>th</sup> , and 90 <sup>th</sup> percentiles of the male and female wage distributions (2009-2019; base 2009). . . . .	10
1.4	Comparison of labor market conditions for younger workers relative to the rest of the workforce. Source: Eurostat . . . . .	11
1.5	Responses to two questions in the 2021 survey titled 'Childhood and youth facing the COVID-19 pandemic'. Source: Centro de Investigaciones Sociológicas (CIS). . . . .	12
2.1	Share of the vote in favor of VOX during the November 2019 Spanish parliamentary election. Plotted from the data published by the Spanish Interior Ministry. . . . .	27
2.2	Geographical distribution of the main topics relevant to the rise of the radical right in Spain (as shares of local news tweets that correspond to each topic). . . . .	31
2.3	Correlation between the unemployment rate across different Spanish urban areas and the corresponding share of unemployment coverage by local newspapers. Point scale indicates population size. . . . .	33
2.4	Correlation between the actual share of foreigners by urban area and the corresponding share of coverage on immigration issues by local newspapers. Point scale indicates population size. . . . .	35
2.6	Scatter plot showing the correlation between newspaper coverage at the urban area level on religious issues and on issues of feminism and gay rights (no significant relationship). . . . .	55
2.7	Scatter plot showing the correlation between newspaper coverage at the urban area level on immigration and on issues of feminism and gay rights. . . . .	55

2.8	Scatter plot showing the correlation between newspaper coverage at the regional level on regional gaps and actual long-term population change across regions. . . . .	56
3.1	Unemployment rate (%), 1996-2021). The vertical lines mark the introduction of the Euro, the start of the financial crisis in Spain, and the appearance of VOX and Podemos in the Spanish political landscape. . . . .	68
3.2	Main word associations for the term ‘unemployment’. The graph summarizes the relationships present in tweets published from each of the party’s official Twitter accounts 3 months prior to any of the last 4 national elections (2011 -2019). . . . .	72
3.3	Main word associations for the term ‘industry’ . . . . .	73
3.4	Share of manufacturing employment (Spain and European Union average, 1991-2019) . . . . .	84
4.1	Unconditional median hourly wage gaps between older (above 50 years old) and younger (under 30) full-time workers (as a percent change over young workers’ salaries) in selected European countries and the United States. European data comes from the Structure of Earnings Survey (SES), an EU-wide harmonised survey focused on collecting structural data on gross earnings and hours paid, easily accessed through Eurostat. Data for the US is from the Current Population Survey (CPS). It also includes information on full-time workers, but gaps are computed on weekly wages, and young workers are defined as those under 35 and older workers as people aged 55 years old and over. . . . .	93
4.2	Share of the 25-64 year-old population by level of educational attainment, EU27 and Spain. Source: Eurostat . . . . .	99
4.3	Spanish university expansion . . . . .	100
4.4	Number of university graduates, by academic year and branch of degree studied (1985-2021). Source: INE . . . . .	100
4.5	Relationship between the change (in p.p.) in the share of university-educated workers across Spanish cities, and their respective shares of tertiary-educated workers and average monthly housing costs at the beginning of the period (in 2011). Data corresponds to Functional Urban Areas (FUA) as defined by the Spanish Statistical Institute (INE). Bubble size indicates total population in the FUA. Monthly rent refers to the average monthly rent paid for a median-sized apartment (89m <sup>2</sup> across the sample) in the year 2011. . . . .	104

4.6	Evolution of the university premium in Spain (2007-2017). Results are based on the specification in Equation 4.1 using locally- and nationally-adjusted real wages. . . . .	106
4.7	Evolution of the university premium in Spain, by age (2007-2017). . . . .	108
4.8	Evolution of the university premium in Spain, by cohort (2007-2017). Results are based on the specification in Equation 4.1 run separately for each of the three samples. . . . .	110
4.9	Quantile regression coefficients for university education at the 0.1, 0.25, 0.5, 0.75, and 0.9 percentiles over time. Results are based on the specification in Equation 4.1 run separately for each year. . . . .	113
4.10	Quantile regression coefficients for university education at the 0.1, 0.25, 0.5, 0.75, and 0.9 percentiles, by cohort (years 2007, 2009, 2014, and 2017). Results are based on the specification in Equation 4.2 run separately for each of the three birth groups. . . . .	114
4.11	Change in employment by sector, 1995-2017 . . . . .	123
4.12	Differences in living costs, year 2016 . . . . .	125
4.13	Evolution of the university premium in Spain, by age (2007-2017). Wages are adjusted using the national CPI. . . . .	130
4.14	Evolution of the university premium in Spain, by cohort (2007-2017). Wages are adjusted using the national CPI. . . . .	131
4.15	Quantile regression coefficients for university education at the 0.1, 0.25, 0.5, 0.75, and 0.9 percentiles, by cohort (years 2007, 2009, 2014, and 2017). Results are based on the specification in Equation 4.2 with an interaction between cohort and the university dummy. Wages are adjusted using the national CPI. . . . .	132

# List of Tables

2.1	Top and bottom 5 urban areas by density of the ‘ <i>religion</i> ’ topic. Each of the columns refers to the topic prevalence across the urban area. . . . .	36
2.2	Baseline OLS regressions . . . . .	40
2.3	Results from the Spatial Error Durbin Model . . . . .	45
2.4	List of topics used to program the Naive Bayes algorithm . . . . .	48
2.6	Placebo tests . . . . .	49
2.7	List of Spanish newspapers included in the analysis . . . . .	50
2.8	Tweet aggregation for the religion topic (La Línea de la Concepción) . .	54
2.9	The vote for the radical right in the 2016 election does not predict the topics communities talk about in 2018. . . . .	57
2.10	SLX marginal effects . . . . .	58
2.11	SDEM marginal effects . . . . .	59
3.1	Vote shares by election and party . . . . .	68
3.2	Most pressing societal problems (% of all respondents). The results correspond to a multi-response, unprompted question in the CIS (Center for Sociological Research) Barometer, a monthly, nationally representative survey aimed at assessing public opinion on current topics of interest. The question is phrased as: ‘Which is, in your view, the most important problem that currently exists in Spain? And the second most important? And the third?’ The data shown in this table corresponds to the months in which national elections took place. . . . .	71
3.3	Baseline TWFE regression for the effect of overall unemployment on radical-party vote . . . . .	76
3.4	Baseline TWFE regression of radical vote on the different types of unemployment . . . . .	78
3.5	Mean relative cohort sizes and radical left vote by year . . . . .	80
3.6	IV estimation of the effect of first-time unemployment on the radical (left) vote . . . . .	82
3.7	IV estimation of the effect of industrial unemployment on the radical (right) vote . . . . .	85

3.8	Summary statistics for the main variables of interest . . . . .	88
3.9	Radical left parties, 2008-2019 Spanish national elections . . . . .	89
3.10	Radical right parties, 2008-2019 Spanish national elections . . . . .	89
3.11	Placebo tests . . . . .	90
4.1	Baseline panel (corresponding to the specification in equation 4.1) . . .	107
4.2	Model estimation Step 1: determining the elasticity of substitution between cohorts ( $\sigma_C$ ) . . . . .	118
4.3	Model estimation Step 2: determining the elasticity of substitution between education groups ( $\sigma_E$ ) . . . . .	121
4.4	Average share of income spent on each of the CPI consumption categories (INE, 2020) . . . . .	126
4.5	Experience summary statistics, by age group . . . . .	128
4.6	IV estimation of Step 1's $\sigma_C$ . . . . .	129
4.7	Model estimation Step 1: determining $\sigma_C$ . . . . .	133
4.8	Model estimation Step 2: determining $\sigma_E$ . . . . .	134

# Chapter 1

## Introduction

### 1.1 Economic turmoil and political upheaval

One key insight emanating from the political economy literature is that economic interests, at least to a certain extent, shape political preferences (Margalit, 2019). The implication is that periods of economic turmoil, such as the ones we live in – following the Great Recession, the Euro-zone crisis, and the COVID-19 pandemic –, are likely to translate into political upheaval.

Across a wide variety of countries, although taking place largely within national borders, the last few decades have seen a rise in two types of economic polarization: inter-personal and inter-territorial inequalities. The first of these terms describes the growing divide, both in income and employment opportunities, between individuals of different social and economic backgrounds (Milanovic, 2016; Chancel and Piketty, 2021). In some developed countries, this divide has also taken on an inter-generational dimension, stemming from limited labor market opportunities for the young and entrenched privileges benefitting the old (Chrisp and Pearce, 2019; Kurer and Staalduin, 2022). On the other hand, inter-territorial inequality refers to the stagnation and decline of many former industrial areas, small towns, and rural communities, which have come to be labeled as the '*places that don't matter*', while jobs and other economic opportunities agglomerate in larger cities and more dynamic areas (Rodríguez-Pose, 2018; McCann, 2019).

The combination of these trends has led to widespread discontent and resentment, susceptible to be channeled through the use of narratives into a wave of support for radical or anti-system political movements. For, over the past couple of decades, the increasing popularity of radical movements has also emerged as a salient feature of the political landscape in many countries around the world. While much of the attention has been focused on the United States and radical right parties (RRPs) in Western Europe, the phenomenon

is widespread and not limited to Western democracies <sup>1</sup>. Moreover, as is evident in the European context, radical politics extends beyond the populist radical right that has drawn so much media attention in recent years (Hopkin, 2020) <sup>2</sup>.

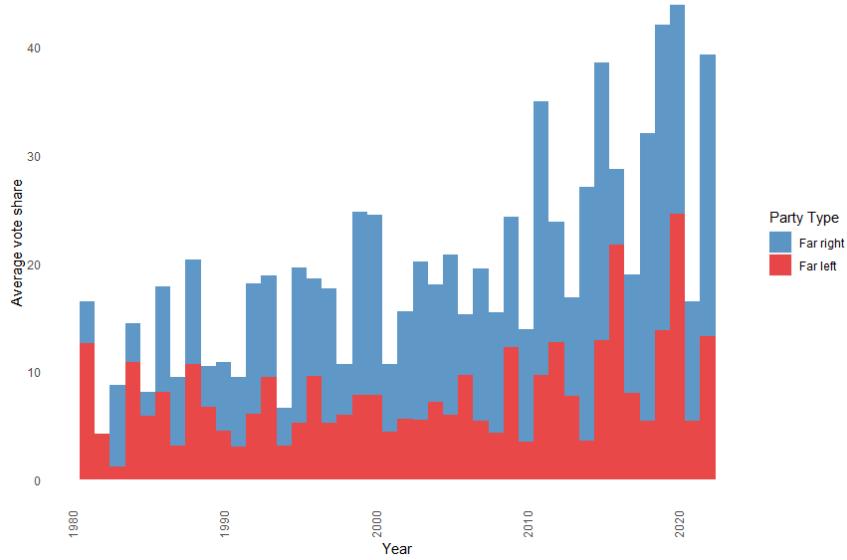


Figure 1.1: European radical parties' average vote share (1981-2022). Parties are categorized as far-left, far-right or other based on the PopuList classification (Rooduijn et al., 2019). The calculations include all EU countries, Iceland, Norway, Switzerland, and the UK. Mean vote shares are weighted by each country's population in 2020.

The growth in radical politics has in fact taken two distinct forms. This can be seen in Figure 1.1, which portrays European radical voting patterns over the last four decades. In line with media reporting, the data reveals a clear and persistent trend, indicating a secular increase in radical right voting that gained momentum at the turn of the millennium. In contrast, the far-left voting bloc demonstrated a relatively stable performance, consistently hovering around the 10% mark. This changed around 2015, a time when far-left parties

<sup>1</sup>Countries like Brazil, India, Japan, Bolivia, or Colombia, to name a few examples, all feature important radical outfits. In Brazil, for instance, the Social Liberal Party (PSL) rose to prominence in the 2018 presidential election, with Jair Bolsonaro winning the presidency on a platform that rejected the traditional political establishment. In India, the Aam Aadmi Party (AAP or the Common Man's Party), currently governing in Delhi and Punjab, was founded in 2012 as an anti-corruption movement. Japan's Party of Hope was established in 2017 by defectors from the ruling party and other opposition groups. In Bolivia, Ecuador and Colombia, among other Latin American countries, the parties Movimiento al Socialismo (Movement for Socialism), Movimiento Revolución Ciudadana (Citizen Revolution Movement), and Colombia Humana (Humane Colombia) present a front against neoliberalism, deregulation, free trade, and the casualization of labor relations.

<sup>2</sup>In Greece and France, for instance, Syriza and La France Insoumise (Disobedient France) emerged as influential forces to the left of the spectrum, challenging the dominance of centrist and conservative parties.

also experienced a significant upswing in popularity, sometimes reaching over 20% of the vote.

The resulting picture is one of rising political polarization, a phenomenon that should worry citizens and policymakers alike. Sharp political divisions can result in severe consequences, including the erosion of democratic values, the breakdown of institutions, and a lack of effective governance. Often, political polarization can undermine national unity, leading to a fractured society with divergent views and interests. Historically, Germany serves as a stark example of its effects in the European context. The country's dire economic conditions and the resulting political divisions in the 1920s and 1930s contributed to the rise of the Nazi Party, which led to the devastating events of World War II (Frey and Weck, 1981). Almost one century later, political polarization continues to be a challenge. We should therefore be curious about the drivers of radical voting, seeking to understand its root causes and its effects on society, and undertaking research that may pave the way for potential solutions.

This thesis seeks to contribute to the literature on the economic causes leading up to this renewed turn towards the extremes. Social scientists studying political polarization have been very prolific, with most works concentrating on the reasons behind the rise of RRP<sup>s</sup> (Golder 2016; Inglehart and Norris 2016; Rodríguez-Pose 2018; Sipma and Lubbers 2018; Essletzbichler et al. 2021; Broz et al. 2021, among many others) and fewer papers focusing on radical left parties (RLPs; Visser et al., 2014; Ramiro and Gomez, 2016) or on polarization per se (Rodrik, 2018; Burgoon et al., 2019; Gidron and Hall, 2019; Autor et al., 2020a; Gethin et al., 2021)<sup>3</sup>. But, despite the breadth of literature, there are still significant gaps in our understanding. We have limited knowledge, for instance, of why different economic shocks lead to diverging voting patterns: sometimes favoring the left, others the radical right, and yet others increasing abstention rates (Margalit, 2019). In addition, the series of economic shocks studied in the literature is relatively limited in scope, mostly focusing on trade and automation (Autor et al., 2020a; Milner, 2021). On both of these scores, this thesis endeavors to advance current knowledge. To do so, I explore and address three salient issues that play a role in the proliferation of radical voting and,

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<sup>3</sup>I include here some works that deal with populism – both of the left-wing and right-wing varieties. The concept of populism as defined by Mudde and Kaltwasser (2018) is indeed a useful one to understand recent political developments. They deem populist a narrative that: 1) splits society between the ‘good people’ and a ‘corrupt elite’, and 2) defends the idea that politics must always respect popular sovereignty, an argument populist parties use to justify challenging the rights of minorities or the separation of powers in liberal democracies. Without aiming to enter into a conceptual debate, throughout this thesis I mainly use the term ‘radical’ to refer to parties at both ends of the Spanish political spectrum. This term better reflects the political distance between both parties rather than the use of populist rhetoric, although the radical and populist groups often overlap.

by extension, political polarization, namely local narratives, unemployment dynamics, and inter-generational patterns of wage inequality.

This thesis consists of three separate essays, intended to be read independently. Drawing from academic traditions in political economy, political and economic geography, and labor economics, they can nonetheless also be considered as a whole. Doing so paints a clearer picture of some of the economic and social shifts that have influenced political polarization in Spanish society. Chapter 2 studies how local narratives can be leveraged to understand the economic and cultural issues that drive voters to support the radical right, highlighting that these narratives often do not align well with the reality shown in socioeconomic statistics. Chapter 3 centers the discussion around unemployment, outlining how it can be used by radical politicians to split up the electorate, thus generating an attitudinal turn towards the extremes. Finally, Chapter 4 deals with a specific source of discontent among young Spaniards: the fact that, even if they have invested in a university education, they hold a precarious position in the labor market. Adding to one of the classical discussions in labor economics about the returns to university education, this last paper documents patterns of inequality in those returns, uncovering important gaps that strongly favor older workers over younger generations. The connection to political polarization is explained in Section 1.3 within this introductory chapter.

By providing novel evidence on the links between narratives, labor market outcomes, and radical voting in Spain, this thesis contributes to the understanding of both inequality and political polarization. Both researchers and policymakers may find it interesting insofar as it offers insights that may inform the development of effective policies and interventions to mitigate current political discontent.

The remainder of this introduction is organized as follows. Section 1.2 discusses a conceptual framework that will help the reader to understand which may be the causes behind the rise in radical voting. Section 1.3 provides some context for the following chapters, giving background information on Spain and justifying its selection as an interesting case study. Section 1.4 outlines the structure of the thesis, briefly describing the contents of each of the three essays. Section 1.5 concludes, drawing general implications for the whole thesis and identifying potential areas of future research.

## 1.2 What is causing the rise in radical voting? A conceptual framework

Radical voting is a multifaceted phenomenon that has drawn the attention of a substantial number of researchers. The result is a vast academic literature, which I briefly outline in this section to provide context and a conceptual framework for each of the subsequent chapters in the thesis. I organize the discussion based on one of the key debates in the literature: the *economic-cultural backlash debate* – on which I expand in Chapter 2. Given the complexity of the issue at hand, where the drivers of radical voting are many and often influence one another, this is certainly not the only way to look at the evidence. Nonetheless, it does provide helpful structure and a tractable way to approach a broad and complicated topic.

### The economic drivers of radical voting

There is broad academic agreement that globalization has played a role in the rise of radical parties (Guriev, 2018). Increased trade competition from other countries as well as offshoring have led to the deindustrialization of many areas in developed nations (Autor et al., 2014, 2021; Colantone and Stanig, 2018b; Aksoy et al., 2020; Baccini and Weymouth, 2021)<sup>4</sup>. Deindustrialization has in turn generated localized dynamics of de-agglomeration, resulting in short- and long-term unemployment and declining populations, which can be linked to limited job opportunities in local communities away from major cities, decreased service provision, and social fragmentation (Rodríguez-Pose, 2020; Broz et al., 2021). These circumstances all affect individual political preferences; in the long run, they also help to shift perceptions of local culture and identity (Rodríguez-Pose et al., 2021). Subsequently, radical and populist parties can capitalize on the resulting sense of discontent among voters who feel left behind by traditional political parties by offering policies that aim to create jobs, protect local industries, or support small local businesses.

Automation – or technological advances more broadly – operates in parallel to the dynamics of trade competition and offshoring, which means that its effects are often difficult to disentangle from the other two. Technological improvements increase worker productivity, but they also often make workers expendable in the process, leading to increased unemployment and to shifts in the nature of work. This can lead to a sense of uncertainty and insecurity among workers, which once again shapes individual political preferences. These

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<sup>4</sup>But also in developing countries (see Rodrik, 2016).

conditions, Anelli et al. (2019) and Milner (2021) find, tend to push voters towards voting for nationalist movements and RRPs.

The financial crisis of 2008 is also thought to have influenced radical voting patterns (Foster and Frieden, 2017; Fetzer, 2019). The global economic downturn brought about high rates of unemployment and depressed wages, effects that were aggravated in many countries by the implementation of austerity policies. The long-run decline of unions also contributed to these dynamics. With diminished worker bargaining power, many countries have seen a long-run trend of labor casualization, which can be linked to a lower labor share (Drautzburg et al., 2021; Grossman and Oberfield, 2022). Both of these forces have led to increasing inequality, even as public trust in traditional political parties was being eroded (Algan et al., 2017). These conditions in turn created a fertile ground for the emergence of alternative political movements offering anti-austerity solutions to address economic precarity, unemployment, and inequalities more broadly.

Note that all these explanations share two common threads: unemployment and wage inequality. As a result, many more papers concentrate exclusively on those two driving factors (Han, 2016; Algan et al., 2017; Becker et al., 2017; Essletzbichler et al., 2018; Engler and Weisstanner, 2021, among many others). Around these issues, too, lies the focus of last two chapters in this thesis. Chapter 3 looks to the connection between unemployment and radical voting. Chapter 4 deals with wage inequality, and with one of its elements in particular: gaps in the returns to education between different generations. Section 1.3 better explains how this relates to radical voting.

### **Economic shocks vs. culture**

So far, all the drivers of radical voting I have discussed are economic in nature. But, as I mentioned, there exists an important debate in the literature on whether it is economic or cultural factors that push citizens to vote for radical parties (Inglehart and Norris, 2016; Mudde, 2019). Issues like immigration or LGBTQ+ rights, for instance, tend to polarize voters in most countries and are at the core of RRP narratives (see, among many, Rydgren, 2008). While this is indeed the case, there is also substantial evidence that economic shocks are often mediated by beliefs and attitudes related to culture and identity (Cerrato et al., 2018; Alesina et al., 2018; Mayda et al., 2022)<sup>5</sup>. This would suggest that the main drivers

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<sup>5</sup>Several papers also point to the importance of labor market competition – i.e. that migrants constitute an economic threat to local jobs and wages (Dancygier, 2010; Bolet, 2021). Notice the arrow between the immigration and unemployment nodes in the DAG.

of radical voting are in fact economic, even if radical movements are often able to build narratives that capitalize on issues related to culture and identity (Rodrik, 2021).

To understand how culture and identity may influence individual perceptions of the economic relationships I have described, first consider that all the explanations outlined above relate to what we would call demand-side factors; this is, variables that influence the collective desires and expectations of a group of citizens for specific policies or actions from their government or from other political agents. Political supply in turn refers to the policies or actions that political agents in fact perform. I take this focus following most of the literature, which tends to hone in on the former rather than on the latter (Rodrik, 2018).

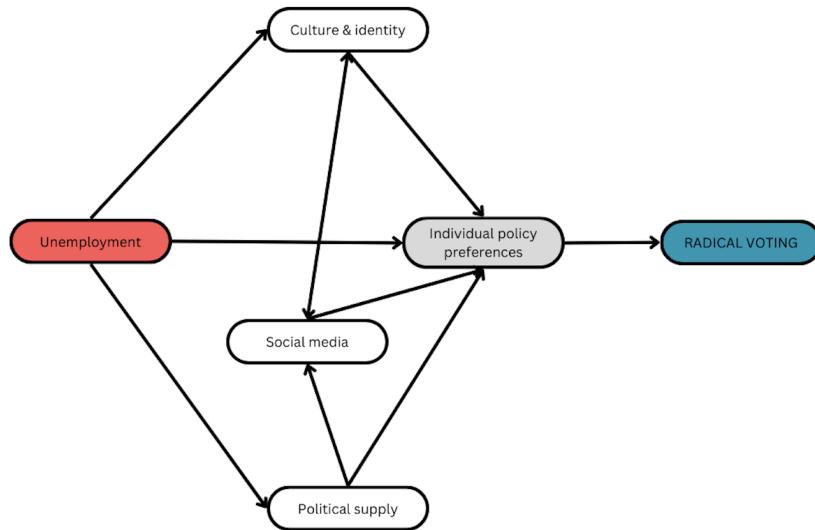


Figure 1.2: Acyclic graph showing the link between unemployment and radical voting.

Then, consider the diagram represented in Figure 1.2, which simplifies the set-up by narrowing the question down to the relationship between unemployment and radical voting. Here, I add nodes representing political supply, culture, and the influence of social media. The implication, in line with the argument in Rodrik (2021), is that economic shocks – illustrated here for simplicity with the unemployment variable – can lead to radical voting through four different causal pathways. Most directly, unemployment will influence individual preferences for (presumably protectionist) policies (pathway 1). But this same experience of unemployment may also impact identity or increase the salience of certain cultural values, something that can feed back into individual policy preferences (pathway 2). In addition, the economic shock is likely to influence the ideology and the narratives

built by different political contenders, which in turn affects both individual perceptions (pathway 3) and, over the long-run by making certain issues more salient to voters, culture and identity (pathway 4). Social media plays a mediating role in this process. In other words, culture and identity do play a role, but they are influenced both by economic shocks and by political supply. Chapter 3 deals with this issue directly, highlighting how Spanish radical parties have been able to reframe unemployment worries to split up the electorate and gain votes.

In sum, the rise of radical parties is a complex phenomenon that can be traced back to a wide range of factors. Globalization, automation, the financial crisis, the decline of unions, and the subsequent patterns of unemployment and inequality, but also immigration, corruption, and political supply all play a role in the dynamics of support for radical parties. While the reasons why people vote for radical parties vary, it is clear that these movements offer an alternative to traditional political parties that have failed to address the issues that matter to many voters.

### 1.3 Why Spain? How generational and territorial gaps can lead to political polarization

The chapters in this thesis draw upon Spain as a compelling case study. For a few years hailed as an *Iberian exception* (Heyne and Manucci, 2021), Spain constitutes an interesting example of how the intersection between inter-personal and inter-territorial inequalities can lead to political polarization. Aiming to clarify these relationships, this section draws some key missing links between the financial crisis, inter-generational inequalities, territorial gaps, and the rise in the vote in favor of radical parties.

For some time, Spain was considered as an exception to the wave of political radicalisms (Norris, 2005). Despite a stable parliamentary presence of the radical left, since its democratic turnabout in 1975, Spain had not witnessed a major presence of radical parties in Congress<sup>6</sup>. This would all change with the financial crisis, a convulsive episode that spurred political innovators. Among them was Podemos (We Can)<sup>7</sup>. The new party, founded in early 2014 by a political science professor on the back of anti-austerity movements that took to the streets after the wave of budget cuts implemented by the Spanish

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<sup>6</sup>At the height of their popularity in 1979 and 1996, the Partido Comunista de España (Spain's Communist Party) and its allies – later operating under the umbrella of Izquierda Unida (United Left) – obtained under 11% of the vote.

<sup>7</sup>Currently operating in coalition with Izquierda Unida under the name Unidas Podemos (Together We Can).

government, was a resounding success. As a result, over a quarter of votes in the 2015 election went to the radical left (Ramiro and Gomez, 2016). The same wave of political entrepreneurs would also lead to a win for the radical right. This was a truly unprecedented development as, in all of its recent democratic history, Spain had only seen a single radical right politician access Congress <sup>8</sup>. The streak broke in the 2019 national election, as VOX – Spain’s main RRP – carried off 15% of the vote. This electoral result sent alarm bells ringing, catching the attention of both scholarship and the media (see, to cite a few, González, 2019; Álvaro Carvajal, 2019; Turnbull-Dugarte, 2019; Mendes and Dennison, 2020; Rama et al., 2021; Heyne and Manucci, 2021 as well as the second chapter in this thesis).

### **Territorial gaps and the radical right**

VOX’s rise in the Spanish political scene cannot be fully understood without acknowledging the long-standing territorial disparities that plague the country (Rama et al., 2021). Tension between Spain’s central government and its autonomous regions has been at the forefront of the political debate for some time. And, in Chapter 2 in this thesis, I show that VOX has specifically capitalized on local narratives about separatism. This aligns with Turnbull-Dugarte (2019)’s proposition that, after the Catalan referendum in 2018, VOX’s hardline stance on the separatist cause has been one of the key drivers of its success, particularly among voters who feel that the country’s unity is under threat (Turnbull-Dugarte, 2019).

But, beyond the Catalan issue, Chapter 2 highlights how VOX has in addition been successful in tapping into the economic discontent that exists in many *places that don’t matter* (Rodríguez-Pose, 2018). To do so, VOX presents itself as a voice for these forgotten areas, promising to tackle issues such as unemployment, poverty, and lack of economic development. This narrative favoring reindustrialization, tinted with the party’s anti-establishment and anti-globalization rhetoric, has resonated with voters who feel that the traditional political parties have ignored their concerns (see Chapter 3 on this issue).

VOX’s rise in Spain reflects the complex and multifaceted nature of the country’s political landscape. While inter-territorial gaps can explain much of its appeal, VOX’s success is the result of a combination of factors, including the historical and cultural tensions that divide Spain, the failures of the traditional political parties, and the changing socioeconomic dynamics of the country. I discuss these issues more closely in Chapters 2 and 3.

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<sup>8</sup>This parliamentarian belonged to the party Fuerza Nueva (New Force), which obtained one seat in Congress in the 1979 national elections.

## Inter-generational gaps and the radical left

Changing socioeconomic dynamics are in turn related to radical left support. Across Europe, the Great Recession and the Eurozone crisis have often been labeled the catalysts of political radicalization (Hobolt and Tilley, 2016). In the Spanish case, there is ample evidence that wage inequality increased sharply during that period (Bonhomme and Hospido, 2017). This is clearly illustrated in the panel in Figure 1.3, which plots the evolution of inflation-adjusted wages between 2009 and 2019 for both men and women at the median as well as at the 10<sup>th</sup> and 90<sup>th</sup> percentiles of the wage distribution. To aid comparison, I index all three wage groups to 100 in the year 2009. The overall pattern tells a well-known story: wages dropped at all levels of the wage distribution – an unsurprising outcome given that the period includes the financial crisis years. The trough for both genders lies between 2012 and 2014, coinciding with the start of the economic recovery <sup>9</sup>. Nonetheless, despite a visible improvement, wages for all three groups still remained below pre-crisis levels in 2019.

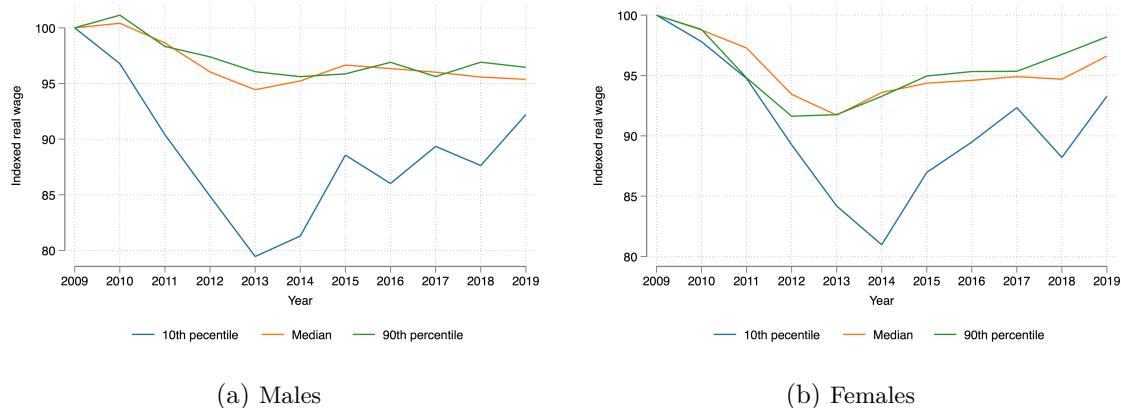
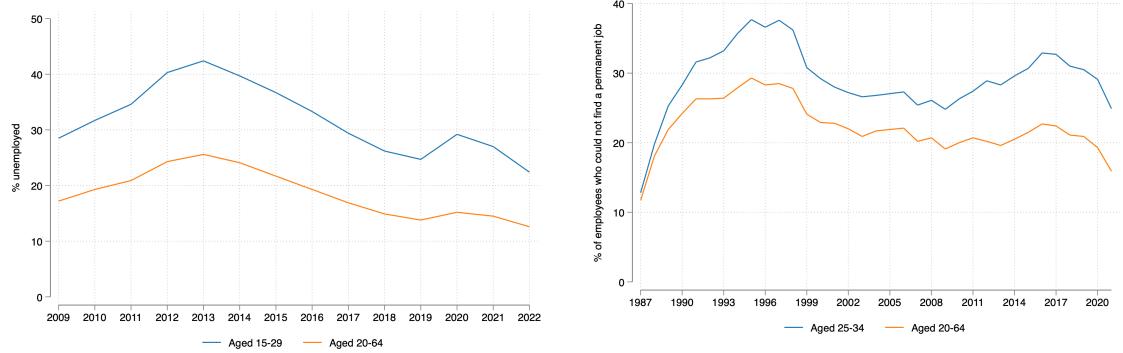


Figure 1.3: Indexed real yearly wages for the 10<sup>th</sup>, 50<sup>th</sup>, and 90<sup>th</sup> percentiles of the male and female wage distributions (2009-2019; base 2009).

Another striking insight that emerges from the graphs is how disproportionately the crisis hit the bottom end of the wage distribution: wages for the bottom decile plunged by roughly 20% between 2009 and 2013, and – despite some recovery – were still far below pre-crisis levels in 2019. Wages at the median and at the 90<sup>th</sup> percentile fell by 5-7% and have remained roughly at the -5% mark since. These patterns translate into rapidly rising inequality between the beginning of the period in 2009 and 2014, and a posterior reduction

<sup>9</sup>Overall, the evolution of wages is very similar for males and females, notwithstanding an important gender gap that is not plotted but persists throughout the period – see Leythienne and Pérez-Julián (2021) for an account of the gender pay gap across EU countries.



(a) Share of the workforce who is unemployed by age group (2009-2022).

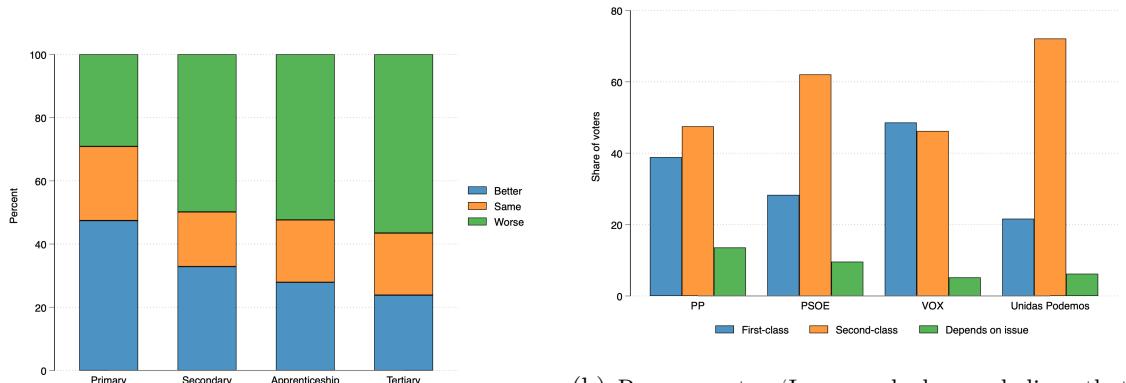
(b) Share of all workers who hold a temporary contract because they could not find a permanent position (1987-2021).

Figure 1.4: Comparison of labor market conditions for younger workers relative to the rest of the workforce. Source: Eurostat

from 2015 onwards. But, despite this recovery, wage inequality had not yet returned to pre-crisis levels in 2019.

The crisis was particularly difficult for younger cohorts. Figure 1.4a shows how, much as the overall unemployment rate reached a striking 26% among workers aged 20-64 at the height of the crisis, unemployment among workers under 30 peaked at a much higher level: 42% in 2013. This economic shock in fact built onto preexisting disappointment with the opportunities available to young people in the labor market. In particular, grievances over job insecurity and the rise of a ‘new precariat’ (Standing, 2011) have been prominently featured in the press (see for instance Biestro 2022 as well as the introduction to Chapter 4 in this thesis). Figure 1.4b plots one dimension of job precarity, illustrating how young workers are significantly more likely to be on a fixed-term contract because they are unable to find permanent employment. Interestingly, these employment dynamics appear to have begun at the end of the 1980s and aggravated over time. In any case, they long predate the crisis and have influenced young people’s perceptions and attitudes towards politics (Standing, 2011; Rama et al., 2021).

The labor market situation, along with austerity measures, an increase in the retirement age from 65 to 67, and a labor reform passed by the Spanish government in September 2010, exacerbated the discontent felt by young voters. This discontent was eventually voiced through street protests organized by the anti-austerity ‘15M’ and ‘*Indignados*’ (outraged) movements. The connection between these movements and the youth was evident. The 15M wave of protests, which swept through all of Spain, was organized by two grass-roots platforms: *Democracia Real y YA!* (Real Democracy NOW!) and *Juventud Sin Futuro*



(a) Responses to: ‘Before the pandemic, did you believe that the new generations would have a standard of living that is better, the same, or worse than that of their parents?’, by educational attainment.

(b) Responses to: ‘In general, do you believe that young people are first-class citizens – with the same rights, and economic and labor opportunities as their parents and older generations – or that they are second-class citizens – in a worse position and with less opportunities?’, according to the party the respondent voted for in the 2019 national election.

Figure 1.5: Responses to two questions in the 2021 survey titled ‘Childhood and youth facing the COVID-19 pandemic’. Source: Centro de Investigaciones Sociológicas (CIS).

(Youth Without a Future). Their main slogan was ‘*No somos mercancía en manos de políticos y banqueros*’ (‘We are not commodities in the hands of politicians and bankers’). As I explained earlier in this section, this wave of protests paved the way for political newcomers, who were able to address different parts of the electorate to garner political support. Chapter 3 delves into the interplay between the discontent and how parties built their political narratives.

Many of these disillusioned voters, perhaps in contrast to what the reader would expect, had in fact attended university. To this day, more educated workers often have a bleaker view of their future economic opportunities than those with lower levels of schooling. Figure 1.5a illustrates this trend: when asked to compare young generations’ standard of living to that of their parents, people with a tertiary education are significantly more likely to say that it is (or will be) worse. This may of course have to do with individual expectations based on their parents’ lifestyle, but the conclusions from Chapter 4 give reason to think that this pessimism among more educated workers is warranted. In the chapter, I find that younger workers who attended university, especially those aged 35 and under, receive much lower salaries than older people with university degrees, a fact that cannot simply be explained by their lower levels of work experience.

This sense of being let down, especially after having invested in an education, is what led many people to feel like ‘victims’ of the crisis and to vote for the radical left (Rendueles

and Sola, 2018). The findings in Figure 1.5b support this notion. In a 2021 survey run by the Center for Sociological Research (CIS), respondents were asked whether they agreed with the idea that young people are treated like second-class citizens, in the sense that they have less rights as well as less economic and labor market opportunities than their parents and older generations. Tellingly, a majority of respondents agreed with this statement, but differences according to the party survey respondents voted for in the 2019 election are also striking. While 70% of Podemos voters subscribed to the idea that young people are treated as second-class citizens, agreement reached only 44% among VOX supporters.

## 1.4 Overview of the PhD

This dissertation includes three papers, each attempting to answer a specific research question. Here I outline each of the articles in turn, along with a short description of their contents.

### **Chapter 2: The stories we tell ourselves: Local newspaper reporting and support for the radical right**

*Article published in Political Geography*

In this paper, I analyze the reasons behind the rising wave of support for the Spanish RRP, VOX. More specifically, I seek to discern the relative importance of economic, regional, and cultural narratives in driving the vote, also taking into account local perceptions regarding separatist movements. To understand which issues drive local voting patterns, I take advantage of the fact that geographical differences in newspaper reporting can tell us something about how local voters see the world. Consequently, I use a machine learning algorithm to mine news information from Twitter and calculate the prevalence of news topics by municipality.

I then compare the salience of local news topics with the statistics on unemployment, immigration, etc. most often used in political research. The findings suggest that views on cultural and economic matters poorly reflect socio-economic statistics. In contrast, perceptions on regional issues are much better aligned with reality. This mismatch between perceptions and reality suggests that the use of quantitative text analysis constitutes a necessary complement to already existing research.

In addition, the article pays special attention to the spatial variation in radical right vote, testing for the existence of spatial spillovers. The results of the Spatial Error Model (SEM) shed some light onto the economic-regional-cultural backlash debate. I find evidence for

three of the four potential explanations of radical right support: journalistic accounts of unemployment and poverty, regional gaps, and separatist movements were all positively associated with the radical right's electoral success. In contrast, cultural factors do not appear as influential once one controls for local demographics.

### **Chapter 3: Unemployment shocks, party narratives, and radical voting: Evidence from Spain**

This paper revisits the classical question of whether unemployment leads to radical voting, providing empirical evidence that recent unemployment shocks have contributed to current political polarization in Spain. I use an instrumental-variable strategy to show that there are different types of unemployment, and that the relationship between them and the vote in favor of radical parties is causal. To generate exogenous variation in first-time unemployment, I employ the relative size of young cohorts. This approach shows that increases in the share of people who were unemployed upon first entering the labor market were responsible for a substantial part of the radical left's recent electoral success. Using the location and timing of plant closures to instrument for industrial unemployment, I also find that unemployment among people who used to work in industry had a positive and significant effect on radical right support, although much smaller in magnitude.

Nonetheless, unemployment is not inherently polarizing and will not always lead to radical voting. The unemployed are a diverse group, and the experience of widespread unemployment simply offers an opportunity for parties to develop populist narratives that tap into other forms of culture and identity. Whether unemployment favors radical parties or not depends on how successful these narratives are in attracting a subgroup of those worried about their economic futures. In short, political supply conditions the effect of unemployment on radical voting. The fact that it is often overlooked in the literature explains why estimates of the effect of contextual-level unemployment on radical support often obtain contradictory results.

Overall, this paper demonstrates the importance of considering political supply and the heterogeneity of the unemployed when analyzing the impact of unemployment on radical voting. It provides insights into the specific mechanisms by which unemployment can contribute to political polarization, and has significant implications for policymakers seeking to address the rise of radical parties in Spain.

### **Chapter 4: Does university education still pay off? A cohort analysis of Spanish wage premiums**

Policymakers often focus on increasing access to higher education to improve the economic prospects of their citizens. In this article, I study changes in the real (adjusted for local costs of living) returns to university education in Spain since the years before the Great Recession. To start, I report relative stability in the returns to tertiary schooling between 2007 and 2017 (39-46%). But one of the contributions of the paper lies in paying attention to the heterogeneity in these returns. In doing so, I uncover large gaps between cohorts that predate the crisis, with younger workers receiving much lower returns on their university degrees than older workers.

With a methodology that allows me to disentangle cohort, time and work experience effects, I show that these gaps cannot be accounted for by differences in prior work experience. The gaps are truly staggering: workers over 35 with a tertiary degree on average earned 45% more than their lesser educated counterparts. For those under 35, the premium reached only 30%.

In addition, I find evidence of a noticeable increase in wage inequality among educated individuals. This trend is particularly apparent in younger age groups. Highly paid earners born after 1982 benefit from skills premiums as high as those of older workers, whereas those at the bottom of the wage spectrum may receive returns as low as 20%. This is of course associated with greater uncertainty in labor market outcomes for the younger generation.

Based on these findings, I study the possibility that the evolution in returns to university is linked to an increase in the relative supply of tertiary-educated workers that has been unmatched by relative demand for high-skilled workers. The application of a simple supply-demand model fits the data very well, suggesting that the ongoing university expansion that has taken place in Spain since the late 80s but also shifting sectoral patterns away from high-skill sectors explain the current patterns of wage inequality between cohorts.

## 1.5 Conclusion

The three articles presented in this dissertation explore different factors contributing to the patterns of inequality and political polarization that have plagued Spain in recent years. In particular, the thesis addresses research gaps related to the importance of local narratives in driving the success of the radical right (Chapter 2), and to the respective role of unemployment and wage inequality between generations in fostering discontent (Chapters 3 and 4), both factors that can lead to increasing political polarization and radical voting. It is my hope that both policymakers and researchers will be able to

find some valuable insight in these pages, especially if they seek to better understand the complex dynamics of politics, economics, and society in Spain.

There are four main contributions to the fields of political economy, political and economic geography, and labor economics in this thesis. I proceed to outline them below:

The first contribution relates to the quantitative analysis of narratives from a geographical perspective to understand voting patterns. In Chapter 2, I explain how local newspaper narratives can be thought of as displays of the equilibrium between political demand and supply at a sub-regional scale. To the best of my knowledge, it is the first time that such a strategy is employed in political geography. Yet, it is a powerful tool that can easily be applied to other contexts and time periods.

Chapter 2 underscores the importance of narratives about separatism, economic anxiety, and regional gaps in explaining VOX's increasing political appeal. The fact that these local narratives: 1) have an effect beyond the reality shown in socio-economic statistics; and 2) often do not align with those statistics should give us pause. The findings in the paper suggest that both should be considered when examining within-country variation in voting behavior. As a result, both researchers and policymakers should contemplate using quantitative text analysis as a complement to existing methods to better understand the disconnect between perceptions and reality, and how their interplay affects political behavior.

Related to the topic of narrative building, the second contribution in this thesis is linked to the joint analysis of political demand and supply when looking at the relationship between economic shocks and radical voting. Most current political economy research is focused almost exclusively on the former, with too little attention to the latter. Employing this approach helps to provide an explanation as to why unemployment shocks may be generating support for the radical right in Europe when, at least in theory, we might expect them to favor the radical left. Taking the case of Spain, I show that shifts in party narratives to leverage inter-generational issues linked to the labor market drive radical left support, while party narratives focusing on territorial issues linked to industrial closures can help to explain some of the vote in favor of the radical right.

The focus on inter-generational gaps constitutes another contribution in the thesis. Unlike many previous studies, Chapters 3 and 4 pay particular attention to the heterogeneity in labor market outcomes across different age groups. The overall findings underscore the importance of examining generational differences in wage differentials and unemployment, providing valuable insights into the dynamics of the labor market and policy design. Section

1.3 highlights how these dynamics generate discontent among the Spanish youth, driving support for the radical left.

The policy implications are many, as are the possible avenues for future research. Demand for highly-skilled workers in Spain has progressed very slowly, possibly due to the sectoral specialization of the economy, which has led to virtually all employment growth taking place in activities that do not necessarily require a university degree. The solution to the cohort inequality problem may therefore require a shift in focus towards activities that foster skills demand. In any case, policymakers would benefit from more research on the specific returns to different degrees, and on the quality or signaling value of attending specific higher education institutions to address between-cohort patterns of wage inequality.

Lastly, Chapter 4 adds a final methodological contribution. By adjusting wages for local costs of living, this thesis provides a more accurate reflection of the economic conditions faced by workers in different areas of Spain. To the best of my knowledge, previous studies on Spain have only used national Consumer Price Indices (CPIs) to deflate wages, which leads to an over-estimation of the returns to university education.

In summary, this dissertation sheds light on important factors that contribute to the patterns of inequality and political polarization in Spain, namely the role of local narratives, unemployment, and wage inequality between generations. The findings suggest that policymakers should focus on improving labor market conditions, creating economic opportunities, and addressing cohort inequality to prevent further political polarization. It is my hope that the findings and implications presented here will inform targeted and effective policy interventions aimed at promoting economic stability, reducing inequality, and fostering greater social cohesion in Spain.

## Chapter 2

# The stories we tell ourselves: Local newspaper reporting and support for the radical right

### 2.1 Introduction

The vote in favor of radical right parties (RRPs) has soared throughout Western democracies since the early 2000s, in what has been dubbed the ‘fourth-wave’ of the far right (Golder 2016; 2019). This resurgence has provoked both alarm and interest among some segments of the political establishment, civil society and academia. For, even with limited support in the polls, radical right outfits have proven capable of successfully introducing arguments into the political mainstream, getting parties elsewhere in the spectrum to back their policies (Inglehart and Norris, 2016).

The rise of RRPs has rekindled the debate around the reasons driving voting decisions (Mudde, 2019). Aiming to contribute to the discussion, this project focuses on one of its geographical dimensions: how, if at all, do local narratives relate to radical right voting patterns? In other words, can one gauge pro-RRP sentiment from the topics a community talks about? To answer this narrower question, I posit that local newspapers tend to reflect local divergences in narratives in the articles they publish. This may occur because journalists themselves wish to influence the narrative or because they target articles to their local audience in order to maximize profit. In both scenarios, the topics of the articles published across different geographical locations tell us something about how the inhabitants of those places see the world and can therefore provide some insight into why they vote the way they do.

This paper is thus based on the simple idea that the more news articles written on a specific

topic in a given location, the more prevalent the issue in local voters' minds. I apply this notion to the Spanish context, where the radical right has recently gained traction. To gather narratives across the Spanish territory, I apply machine learning techniques and build a new dataset with information mined from Twitter on which news topics were more prevalent in each Spanish municipality during the year before the last national election. This new dataset, matched with municipal electoral results, allows for an understanding of whether economic, regional or cultural arguments were more prevalent in areas with high shares of support for the radical right.

This article contributes to earlier research in the fields of quantitative political analysis and political geography. More specifically, it relates to one of the long-standing debates in the political literature: whether RRP political clout stems from deteriorating economic conditions or from a discontent about the cultural changes brought about by globalization (Inglehart and Norris, 2016). While the traditional works on this subject tend to take a rather 'global' perspective, focusing on individual voter characteristics and putting aside within-country variation in RRP vote, more recent research by economic geographers highlights the spatial unevenness of radical right vote (Ferrante and Pontarollo, 2020; Rodríguez-Pose, 2020; Essletzbichler et al., 2021). This unevenness has led to the emergence of a third side in the debate: the rise of the radical right is thought to bring to the fore previously unheard grievances about widening spatial inequalities and may speak to the importance of a so-called '*geography of discontent*' (Cramer, 2016; Rodríguez-Pose, 2018; McCann, 2019) (see Section 2.2 for some background information on these concepts). Finally, the analysis of narratives offers the opportunity to test an additional hypothesis specific to the Spanish context: that the radical right has benefitted from resentments linked to the increasing prominence of regional political movements in favor of independence from the Spanish state (Turnbull-Dugarte, 2019; Heyne and Manucci, 2021).

Given the data available, disentangling these arguments is not easy. One key issue with both global and regional models is that they use either personal characteristics or actual data on relevant issues – such as unemployment or immigration – as proxies for perceptions. Despite this, research in psychology suggests that people rely on heuristics or mental shortcuts rather than 'hard data' when making choices (Lau and Redlawsk, 2001). This would seem to indicate that narratives – the stories we tell ourselves and each other about how the world works – may go well beyond statistics in shaping individual (voting) decisions (Shiller, 2017). In this respect, the techniques used in this paper constitute a useful alternative to track political preferences at the local level.

The results suggest that grievances triggered by *separatism* and *economic anxiety* played the largest role in VOX's political rise. The results also show partial confirmation of the *geography of discontent* hypothesis: perceptions of large regional disparities were positively correlated with vote in favor of the radical right. Curiously, however, a higher share of news articles dealing with grievances over lack of resources/local investment tended to lower – rather than raise – radical right support. The mainstream right benefited from such sentiments instead. In contrast, support in favor of the *cultural backlash* hypothesis was far more limited, being largely washed out when controlling for local age profiles.

The rest of the article proceeds as follows. Section 2.2 provides a summary on two different strands of the literature: the first is an account of the *economic anxiety-cultural backlash* debate and the *global and local* reasons behind the success of the radical right more broadly; the second focuses on the importance of (social) media – and Twitter in particular –, both in the process of building narratives and in informing individual voting decisions. Section 2.3 includes a short description of the radical right in Spain. I subsequently discuss the chosen empirical strategy (section 2.4), compare perceptions with the socioeconomic statistics most often used in the literature (section 2.5), and present the results (section 2.6). Section 2.7 concludes.

## 2.2 Theoretical background

### 2.2.1 The reasons behind the success of the radical right

The impressive political gains made by RRP s since the 1980s have led to a large body of comparative literature that aims to explain why radical right ideologies fail in some places but take root in others. Researchers broadly agree that, especially in its initial stages, support for the radical right depends on a party being able to mobilize existing grievances or resentments (Betz, 2002). In this regard, the most recent research emphasizes the importance of globalization and the socioeconomic cleavages it has created in society. There is a lively debate, however, regarding how these issues catalyze into actual votes in favor of RRP s.

This discussion is often referred to as the *economic anxiety-cultural backlash debate*: either individual decisions to vote for the radical right owe to anxieties over the economic difficulties brought about by globalization (the *economic argument*) or to a rejection of the cultural changes that come with a more interconnected world (the so-called *cultural backlash argument*) (Inglehart and Norris, 2016; Mudde, 2019).

Until recently, this debate took a spatially blind – or rather global – viewpoint. There were many individual-level studies and cross-country comparisons, but rarely did any of them acknowledge the spatial unevenness of RRP vote within countries (Golder, 2016). This has changed in recent years. A growing body of research focuses on the *geography of discontent* – a term used to describe local feelings of resentment brought about by the territorial polarization of resources, itself an upshot of the power of agglomeration economies (Essletzbichler et al., 2018; Rodríguez-Pose, 2018, 2020; Broz et al., 2021).

As we will see, these global and local points of view are not necessarily contradictory. Evidence from other contexts suggests it is in fact possible that all these theories play a role in the rise of the radical right in Spain. This paper therefore focuses on understanding whether: a) local narratives exist across Spanish municipalities that align with each of these theories; and b) whether these narratives are able to explain the recent success of the RRP VOX (see section 2.3 for some background information on the radical right in Spain).

The following sub-sections provide a brief account of each of these theories. This framework is then used to link the theories with specific narratives (i.e. the topics of local newspaper articles) on the ground:

### **The economic argument**

Advocates of the *economic argument* emphasize globalization's role in spawning grievances related to individual economic conditions. They focus on the consequences of the rise of the knowledge economy, automation and outsourcing, the dwindling importance of unions, the rising power of multinational firms, and the implementation of neoliberal austerity policies, among other effects of globalization (see, for instance, Colantone and Stanig 2018a or Milner 2021). All these factors are linked to worsening labor conditions and increasing economic inequalities, which have created winners and losers in society. In Southern Europe in particular, both declining trust in government and the rise of RRPs have been connected to the devastating impact the Great Recession had in those countries (Foster and Frieden, 2017; Rossi, 2018).

Despite this, attempts to link support for the radical right with contextual-level unemployment – used as a proxy for the economic anxiety argument – have found inconclusive results (see Sipma and Lubbers 2018 for a meta-analysis of the literature). Furthermore, there is currently no leading explanation as to why the association is so different across studies. One should therefore consider the option that narratives – how people talk about

precariousness, poverty, and unemployment – may not coincide with what we observe in unemployment statistics. If this is so, are then narratives about the economic argument able to explain the rise in radical right support? To answer these questions, we can state as a hypothesis of interest that:

**Hypothesis 1** *Radical right support is associated with local concerns about unemployment and poverty.*

### **The cultural backlash argument**

The *cultural backlash* camp puts forward a different take on progress and globalization. According to this theory, voters do not support RRP because they worry about their economic future; rather, they rebel against a shift in societal values away from traditional ways of life and towards more individual freedom, multiculturalism, respect for diversity, and gender and racial equality (Arzheimer, 2018).

But the specific mechanisms behind this cultural backlash are still up for debate. Inglehart and Norris (2016) link these worldviews to individual authoritarian tendencies. In contrast, Schäfer (2021) compellingly shows that authoritarian values do not appear to drive populist support; it is rather attitudes towards immigration, political trust, and beliefs that the government will respond to voters' demands that matter instead.

In part because of data availability, much of the literature has focused on attitudes towards migrants. Yet, the link between immigration and support for the radical right has proven hard to trace. At the individual level, multiple studies show that radical right backers hold more anti-immigrant views than other voters (e.g. Rydgren 2008). But, at the aggregate level, the size of the immigrant community has just as often been found to have an effect on RRP support (e.g. Tabellini 2020) as no effect (e.g. Lucassen and Lubbers 2012). In this regard, research has shown that widespread beliefs about an issue – say, that there are too many migrants in a community, as in Stockemer (2016) or Alesina et al. (2018) – may exert more influence on RRP vote than the existence of the issue itself.

But the cultural backlash hypothesis goes well beyond perceptions about immigration. Views on LGBTQ+ issues are also seen as important indicators in this regard (see both Inglehart and Norris 2016 and Schäfer 2021). Feelings of social integration (or a lack thereof) are also deemed relevant (Gidron and Hall, 2019). In this sense, Bolet (2021) argues in favor of the importance of the ‘degradation of local socio-cultural hubs’. She provides evidence of a link between the loss of community centers where people socialize – pubs, in her paper – on RRP support. She connects this effect to a sense of social isolation

and a loss of cultural identity. Clearly, this approach requires some contextual adaptation: pubs do not quite play the same role in Spain as they do in the UK, but one could think of a similar dynamic taking place with churches, for instance.

One fact that should have already become clear is that the *cultural backlash* hypothesis deals with a multi-faceted phenomenon. And, as Schäfer points out: 'It is [not] obvious (...) that citizens who oppose (some form of) migration also reject same-sex marriage, female emancipation or religious pluralism' (Schäfer, 2021, p. 16). This is despite the fact that we may want to associate all of these views to social conservatism more broadly. Consequently, a hypothesis aligned with the *cultural backlash* theory would be:

**Hypothesis 2** *Radical right support is associated with local narratives focused on different types of social conservatism (e.g. centered on the topics of religion and immigration, or featuring negative reporting on feminism/LGBTQ+ issues).*

### **The geography of discontent argument**

As I mentioned above, many studies define the *economic anxiety-cultural backlash debate* from a global perspective. Nevertheless, recent political events have put local and regional issues at the forefront of the discussion (Golder, 2016). There are, after all, large gaps between local areas in the shares of populist RRP vote (see Ferrante and Pontarollo 2020 for an account of differences across European regions). Essletzbichler and co-authors report, for instance, that '[t]he populist vote shares ranged from (...) 21.3 to 75.6% in British Local Authorities and from 4.1 to 95.3% in US counties.' (Essletzbichler et al., 2018, p. 80). In this regard, there is a new conventional wisdom, in large part influenced by the media's portrayal of the political landscape in the United States and the United Kingdom, which describes RRP vote – and the populist vote, more broadly – as a mostly rural phenomenon (Mitsch et al., 2021). But, while the gaps in voting patterns between urban and rural communities do exist, the geographies of electoral outcomes are somewhat more complicated than this rather simplistic view would lead us to think (Becker et al., 2017; Essletzbichler et al., 2018; Rossi, 2018).

Recent research introduces some caveats into the urban-rural dichotomy. It rather points to the link between globalization and the discontent emanating from lagging regions, who see themselves as the victims of an economic model that has wittingly left them behind. Works on the *geography of discontent* highlight that the real or perceived economic decline outlined by the proponents of the economic argument need not be recent, or even present in voters' own lives. There is evidence that voters who live in previously well-to-do but now

declining places are more likely to vote for populist parties (Rodríguez-Pose, 2020). People in those areas may not necessarily be worried about current economic hardships; instead, they resent rising territorial inequalities and a political system that agglomerates all jobs and economic opportunities in cities, leaving their native localities to deal with long-term economic and industrial decline (McCann, 2019; Broz et al., 2021). Inhabitants in those locations are thought to resort to the ballot box after years of discontent with an economic system they see as leaving their hometowns with no resources, and therefore offering no opportunities for their neighbors and younger generations (Guilluy, 2010; Lee et al., 2018; Rodríguez-Pose, 2018; Ferreira, 2019; Rodríguez-Pose, 2020). While this change in political preferences may seem recent, it is the result of a slow-growing but deeply entrenched resentment to urban elites and the regional inequalities they are perceived to support (Cramer, 2016).

Based on this strand of the literature, we can state as a new hypothesis of interest that:

**Hypothesis 3** *Radical right support owes to grievances over regional economic disparities or to a perception that the local area does not receive enough investment/resources.*

The focus on regional disparities takes a distinctly important role in the case of Spain. Center-periphery issues have historically constituted an important cleavage in Spanish politics (Pardos-Prado and Sagarzazu, 2019). And, while some of these concerns align with the *geography of discontent* hypothesis outlined above, the 2019 elections took place at a point of particularly increased tensions around the topic of devolution of powers to the autonomous regions (Rama et al., 2021). In particular, the Catalan referendum – which took place on October 1<sup>st</sup> 2017 followed by a unilateral declaration of independence shortly thereafter – exacerbated political positions on the issue of devolution. VOX was able to capitalize on this phenomenon by advocating for a tough stance on separatists (Turnbull-Dugarte, 2019; Rama et al., 2021; Heyne and Manucci, 2021). In this regard, Turnbull-Dugarte (2019) makes a strong case for the importance of the Catalan issue on the radical right's success in subsequent regional elections. Rama et al. (2021) further suggest that this effect also translated into increased support for VOX in the November 2019 national elections. Based on this literature, an additional hypothesis of interest is:

**Hypothesis 4** *Radical right support owes to grievances over separatist movements*<sup>1</sup>.

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<sup>1</sup>Both in Catalonia, the Basque Country, and Navarre.

## Why focus on narratives?

The vast majority of the studies cited throughout this section aim to establish the validity of each argument using data on actual migration and economic conditions. While this may provide us with useful knowledge, one should keep in mind that voters' perceptions are key to determining voting decisions. If what in fact guides people's voting preferences is the prevalent narrative in their region, locality or social group, it is no wonder that evidence, in particular for the economic argument, remains elusive. Several studies in the fields of psychology and political science support this idea. People are known to behave as cognitive misers, relying on heuristics or shortcuts rather than on statistics when making decisions (Lau and Redlawsk, 2001). In addition, if they stumble upon information that clashes with their world views, voters have been shown to apply motivated reasoning – an emotionally-biased mental process that reduces cognitive dissonance by rejecting the validity of new contradictory data (Lodge and Taber, 2013). These results suggest that narratives play a role beyond socioeconomic statistics in informing voters' preferences. Consequently, understanding the rise in RRP support may require a substantive shift in focus towards the analysis of texts and other forms of communication used to build and spread narratives.

### 2.2.2 (Social) media, local narratives and the radical right

Media reporting is seen as one of the main channels through which citizens form their own perceptions about which social and economic matters are important (Lodge and Taber, 2013). While each individual will have their own experiences regarding economic and political issues, like unemployment or immigration, the media is thought to be able to influence these views through two mechanisms: agenda-setting and priming. Agenda-setting theories claim that the media, in selecting to report about certain subjects but not others, increases the salience of those topics relative to all other potential politically relevant themes. This shortlist of issues is then used by individual voters as a measuring stick with which to evaluate the performance of different political parties – in what is known as priming (Ellinas, 2018). As a result, it is possible to establish a causal link between media reporting and RRP support (see Devine and Murphy, 2020 or Foos and Bischof, 2022 for examples in the UK).

But, while much of the literature focuses on how the news media sways public perception, there is evidence that the relationship may also run in the opposite direction. The advent of the internet has led to increasing competition in media markets, reducing individual

organizations' market power. The decline of paper media and the increasing privatization of media outlets in many countries have pitted news information sources against each other in a race for advertisement revenue. These changes in the market for news have turned newspaper informational asymmetry on its head: news control used to be exclusively in the hands of journalists. Now there is evidence that audiences may also have a say (Gentzkow and Shapiro, 2010; Ellinas, 2018).

Social media plays a key role in this process. Platforms like Facebook and Twitter have been rising in importance as places where people are made aware of and consume news content (Center, 2014, 2019a). Already back in 2014, 28% of Spanish adults used social media as a source for news. This percentage was as high as 35% among 18-24 year olds (Nielsen and Schrøder, 2014). These numbers are on the rise and they reflect one of the most notable changes in the operation of the news media industry: journalists' increasing reliance on social media sites to share and promote news articles (Ju et al., 2014). This reliance has been shown to play a particularly important role for small, local newspapers (Center, 2019b). The pattern in part owes to the fact that social media makes it practical and inexpensive for newsrooms to track and cater to readers' preferences. There are several accounts of news agencies' obsession with clicks (i.e. online article visits) and how these affect the subsequent selection of news stories (e.g. Welbers et al. 2016). This would explain, for example, why newspaper coverage seems to tail, rather than precede, public perception of different economic issues (Hopkins et al., 2017).

Some authors alert that a potential shortfall of these dynamics is that it is increasingly possible 'to get the news we want and ignore the rest' (Boczkowski and Mitchelstein, 2013, p. 3). Many social media users rely on family, friends and acquaintances' recommendations to provide them with the news they care about. Some do not even appear to feel the need to click through to the news article itself; the short blurb posted on Facebook or Twitter does the job well enough (Center, 2014).

Despite these shortcomings, conversations taking place on social media shape local narratives in fundamental ways. By engaging with the news content promoted through a newspaper's Twitter feed, individuals feel connected to the world around them and develop ideas about how it functions. Social networks also allow readers to become part of the conversation, both by commenting and sharing news content (Center, 2019b; Casadei and Lee, 2020). These dynamics imply that newspapers' Twitter feeds can also be seen as a constant reflection of the equilibrium between news supply and demand in a given area. In other words, they constitute a reflection of the most prevalent worldviews in a given

location. Based on this notion, this article focuses on the use newspapers make of Twitter to understand the prevailing narratives across different localities in Spain.

### 2.3 The radical right in Spain: A brief background

Political support for the radical right in Spain is fairly recent – something that sets the country apart from most of its European neighbors. In fact, Spain features only one such outfit. Founded in 2013, VOX is the second far-right party to have gained access to Congress since the end of the Franco dictatorship in 1975. Despite crashing in its first electoral campaigns in 2015 and 2016, VOX obtained 15% of the vote in the November 2019 national election. This success was largely unexpected, and only heralded by its performance in the Andalusian and Valencian regional elections in 2018 and 2019, where VOX obtained 11% and 18% of the vote, respectively.

Akin to other European nations, Spanish vote in favor of RRPs is highly uneven across the territory (see Figure 2.1). The vote for VOX in different municipalities ranged from nil to almost 60% in some constituencies. Some of these differences are regional in nature – there are much lower levels of support in Galicia, the Basque Country, Navarre, Catalonia, and the Canary Islands. These patterns are likely to have historical origins and/or owe to supply-side arguments regarding the make-up of the political landscape prior to VOX’s foundation.

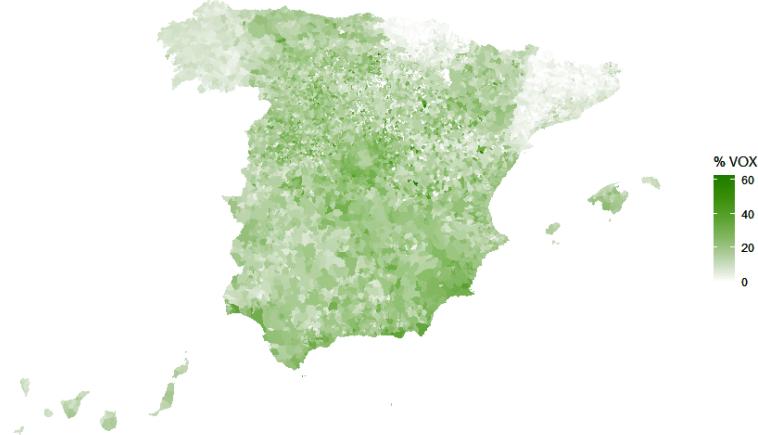


Figure 2.1: Share of the vote in favor of VOX during the November 2019 Spanish parliamentary election. Plotted from the data published by the Spanish Interior Ministry.

But, once those differences are accounted for, there still remains striking local variation. In particular, VOX was the most voted party in 283 of Spain's 8131 municipalities (3.5% of the total). Rather than clustered together, these municipalities are scattered across the national territory. Most intriguingly, they do not necessarily align with broader administrative boundaries, indicating that historical patterns are unlikely to explain the variation.

In terms of ideology, VOX is commonly classified as a radical right-wing populist party (Rooduijn et al., 2019). This description owes to an agenda blending neoliberal economic ideology with elements of nativism and an authoritarian push for the recentralization of Spain's de facto federal state (Heyne and Manucci, 2021). These elements are plainly visible in VOX's foundational manifesto, where there are multiple references to the nation state and institutional reform. Economic growth and traditional values are also mentioned, lending credence to all camps in the *economic-regional-cultural backlash debate* (VOX, 2016; Rama et al., 2021).

## 2.4 Measuring narratives

### 2.4.1 Data

This article makes use of a newly built dataset, which includes all original information published by Spanish newspapers on Twitter during the year 2018. I used a scraper to automatically visit Twitter's search page, search for a given newspaper's daily tweets within a specific time frame, and download each tweet, as well as relevant linked metadata. I undertook this process with handles corresponding to all Spanish newspapers currently in circulation – 121 in total (see Appendix 2.C for more information on the list of newspapers, their location and geographical coverage) – and then gathered all information into a single dataset. This led to a total of over 2 million tweets.

Tweets in the dataset cover the whole period between January 1<sup>st</sup> and December 31<sup>st</sup> 2018. This time frame was chosen to balance the representativeness of all topics usually reported on by newspapers. The selection of a whole natural year prevents an excessive prevalence of certain topics due to the time of year (e.g. tweets on religion are particularly common during Easter, as are tweets about road traffic in the summer months). Since the number of tweets was too large for the computational capacity available, the analysis in this paper was undertaken on a 10% random sample of the initial dataset.

The new Twitter dataset is complemented by municipal-level information on the results of the November 2019 parliamentary elections and various sociodemographic characteristics.

In particular, this second dataset includes key information on election turnout as well as population levels, the share of migrants and unemployment.

### 2.4.2 Natural language processing

Data sourced from newspapers and social media is highly unstructured. Fortunately, advances in quantitative text analysis now offer the possibility to identify themes in written output. While these techniques do require an important initial effort, once the algorithm functions they can be applied to large swathes of data. In this paper, I make use of one such method to identify the main topics in tweets by different Spanish newspapers: a Naive Bayes classifier.

Naive Bayes classifiers, as many other such algorithms, make use of the ‘bag-of-words’ representation. The bag-of-words method begins by creating a single vector of word counts ( $w_j$ ) for each document ( $d_i$ ) in the dataset. The algorithm therefore operates on a very large matrix, which shows how many times each tweet ( $d_i$ , as rows) includes words from a pre-existing vocabulary set  $V$  (i.e. columns, or the list of all words in all tweets). Word order is not taken into account, and as a result grammar and syntax are deemed unimportant. While this method may seem rough, it works remarkably well in this paper’s area of interest: topic analysis (Manning et al., 2008).

The Naive Bayes classifier is based on the well-known Bayes theorem:

$$\operatorname{argmax}_{k \in \mathcal{K}} P(k|d) = \operatorname{argmax}_{k \in \mathcal{K}} \frac{P(d|k) P(k)}{P(d)}$$

The basic idea is that the algorithm leverages prior classification of a training set of tweets. Let’s take an example from the data to illustrate this. One (translated) tweet in the dataset reads:

**‘CITY The parish of Saint Mary organizes the most naval Easter mass’**<sup>2</sup>

This tweet would clearly fall under the religion category. However, for the algorithm to reach this conclusion it first needs to use the prior manual classification to calculate the most probable topic based on two main indicators: a)  $P(k)$ , or the prior probability that this tweet, regardless of its content, belongs to topic  $k$  – in this case, this is equivalent to the share of all manually labeled tweets that are classified as ‘religion’; and b)  $P(d|k)$ , or

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<sup>2</sup>In Spanish: ‘CIUDAD La parroquia de Santa Maria organiza la comunión pascual mas marinera’

the likelihood of finding this particular word combination (in any order), assuming that the right topic were indeed religion – i.e. the probability of finding the word ‘parish’ given that the tweet is about religion, times the probability that the tweet says ‘Saint’ given that it refers to religion, etc.

Naive Bayes thus assumes conditional independence. This is, the probability of word  $w_j$  given a particular topic  $k$  ( $P(w_j|k)$ ) is taken to be independent of topic  $k$  — hence the name ‘naive’. While this is certainly a strong assumption, its application often outperforms other more complicated algorithms. Precisely because the model relies on very few parameters, the variance in its estimates tends to be low. This can often compensate for the bias in the results (Hand and Yu, 2001). In addition, bias may not matter as much in cases such as this one, where the aim is simple classification according to topic and where topics have been selected to fit the classification method. More details on the functioning and training of Naive Bayes classifiers are available in Jurafsky and Martin (2020).

To train the algorithm, I first randomly ordered all tweets selected from analysis. I then manually classified the first 18,000 tweets into different topics. I set no limits in terms of topic numbers; rather, I focused on making the topics relevant to the Spanish political landscape and to the theories outlined in the literature section. This of course required trying to group tweets into categories that would be sufficiently large and distinct for the algorithm to function. The result was a classification into 28 topics (see Appendix 2.A). One of those covers the *economic argument* (‘unemployment & poverty’), three correspond to the *cultural backlash* side of the debate (‘feminism & LGBTQ+ issues’, ‘immigration’, and ‘religion’), another two topics deal with the *geography of discontent*: ‘regional gaps’ and ‘lack of resources’. The former includes tweets on depopulation and/or divergences in the political and economic development of the different regions; the latter deals with any complaints of insufficient resources or local investment. Finally, a single topic covers the ‘*separatism*’ hypothesis.

Once the topic classification was completed, I applied the algorithm to the test set. The result was a classification with 71.3% overall accuracy for the topics of interest, which could be extended to the rest of the tweets in the dataset <sup>3</sup>. In any case, the results in

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<sup>3</sup>The accuracy calculations come from a confusion matrix based on the 18,000 manually labeled tweets: the first 2,000 tweets were used as a training set and the remaining 16,000 as a test set. Mean accuracy – defined as the sum of true positives and true negatives for each topic divided by the total number of positives and negatives – was much lower for the overall classification, remaining at a mere 53%. The algorithm often confuses topics within the international and national politics categories, for instance. This is nonetheless unimportant for the purposes of this paper.

the paper remain robust when calculating topic shares only based on the 18,000 manually labeled tweets.

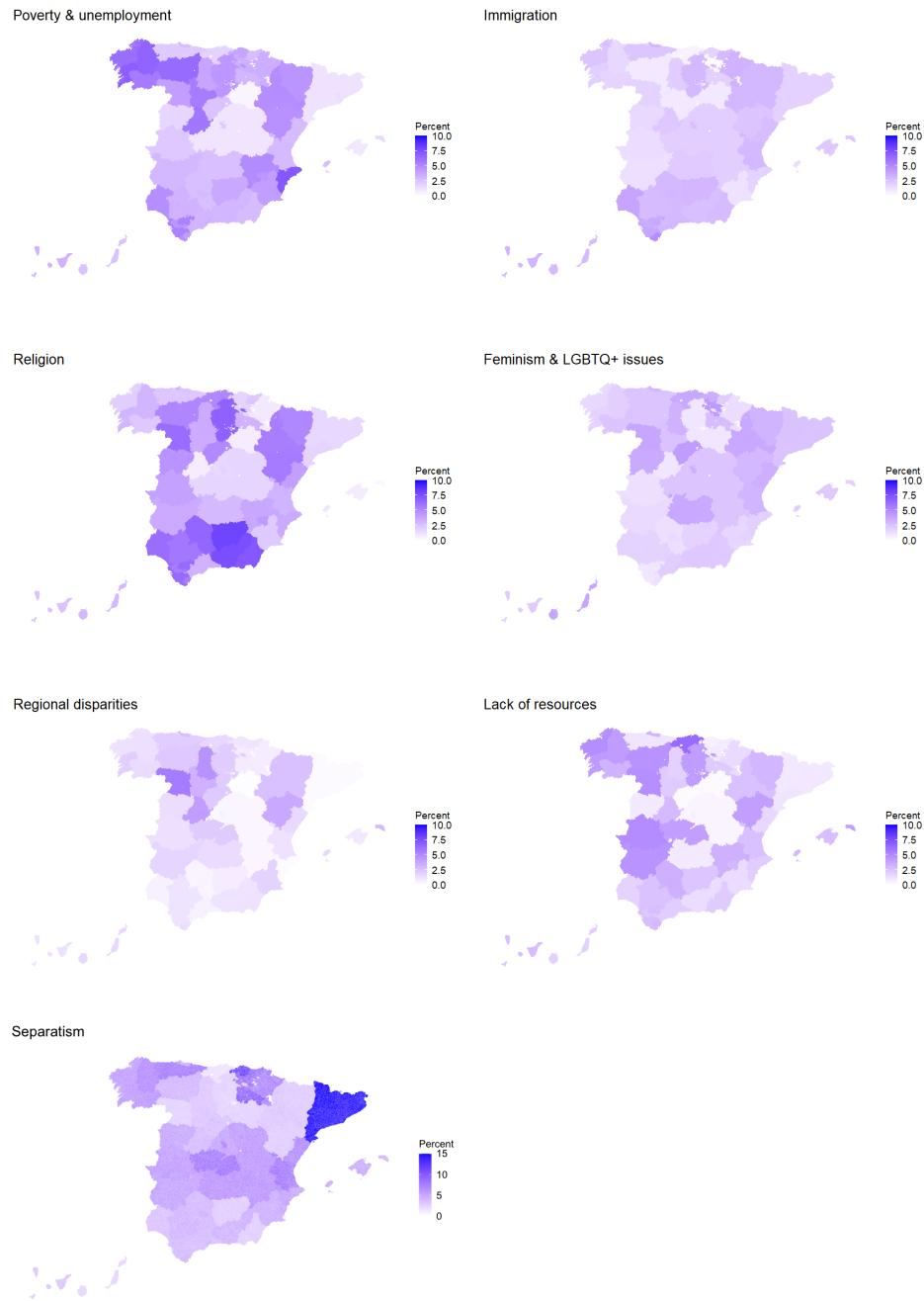


Figure 2.2: Geographical distribution of the main topics relevant to the rise of the radical right in Spain (as shares of local news tweets that correspond to each topic).

### 2.4.3 Classifying and aggregating topics by location

The Naive Bayes classifier constitutes a useful tool to determine the topic of each tweet (i.e. article). However, the analysis in this paper requires a measure of topic prevalence by location. To obtain this variable it is first necessary to match newspapers to the municipalities where they are read (see Figure 2.2 for a summary of the geographical distribution of the main topics relevant to the debate).

Spanish newspapers can be classified into four categories depending on their geographical coverage: national, regional, provincial, or local – this last category refers to a number of smaller papers that do not cover a whole province or may even cut across two different provinces. I used information in newspaper websites to determine in which municipalities each newspaper is sold. In the case of local papers where this information was not readily available, I assume that the newspaper is sold in a 20km radius from the center of the municipality where it is based. For example, the southernmost municipality in mainland Spain is called La Línea de la Concepción, located in the province of Cádiz, in Andalusia. Neighbors in this area receive five national newspapers (ABC, El Mundo, El País, La Razón, and La Vanguardia), a regional outlet (El Correo de Andalucía), three provincial journals (Diario de Cádiz, La Voz de Cádiz, and Viva Cádiz) and two local papers (Diario Área, based in La Línea de la Concepción, and EuropaSur, based in Algeciras – a nearby municipality).

Once newspapers are matched to each municipality, it is possible to calculate the share of articles that cover a specific topic by location.<sup>4</sup> Of course, different newspapers may focus on the same issue and sometimes even publish the exact same article. I do not eliminate these duplicates. The assumption here is that articles on the same piece of news indicate that the topic is more salient among the local population.

I do however account for the differences in newspaper readership between areas. Local information on newspaper readership is unavailable, but data does exist at the regional level. I make use of the ‘General Study on Media’ (‘Estudio General de Medios’ or EGM, AIMC, 2016) to generate weights that I apply to each of the local topic shares (see Annex 2.D for a stylized example). I generate a different weight for each national newspaper, as this allows to distinguish between their very marked differences in ideology. There is also a separate weight for regional and local news outlets in each region, and an extra regional weight for papers classified as urban. The final output from this process consists in a series

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<sup>4</sup>A single tweet can be equalled to a newspaper article. This is because newspapers do in fact only tweet about their own articles. Each tweet almost always includes the article’s title, sometimes followed by a subtitle.

of variables corresponding to the shares of news articles in the area that fall within topic  $k$ . For instance, in La Línea de la Concepción 4.2% of all newspaper tweets in 2018 dealt with immigration.

## 2.5 Perceptions vs. reality

In section 2.2, I made the case for the reconsideration of each side of the *economic anxiety - cultural backlash - geography of discontent* debate from the perspective of local narratives. In this section, I highlight how this approach may paint a different picture from the one conveyed by the sole analysis of socioeconomic statistics.

I proceed to outline each of the sides of the debate in turn, trying to compare perceptions with reality, and highlighting differences between both. The next section tackles all three competing claims at once.

### 2.5.1 The economic argument

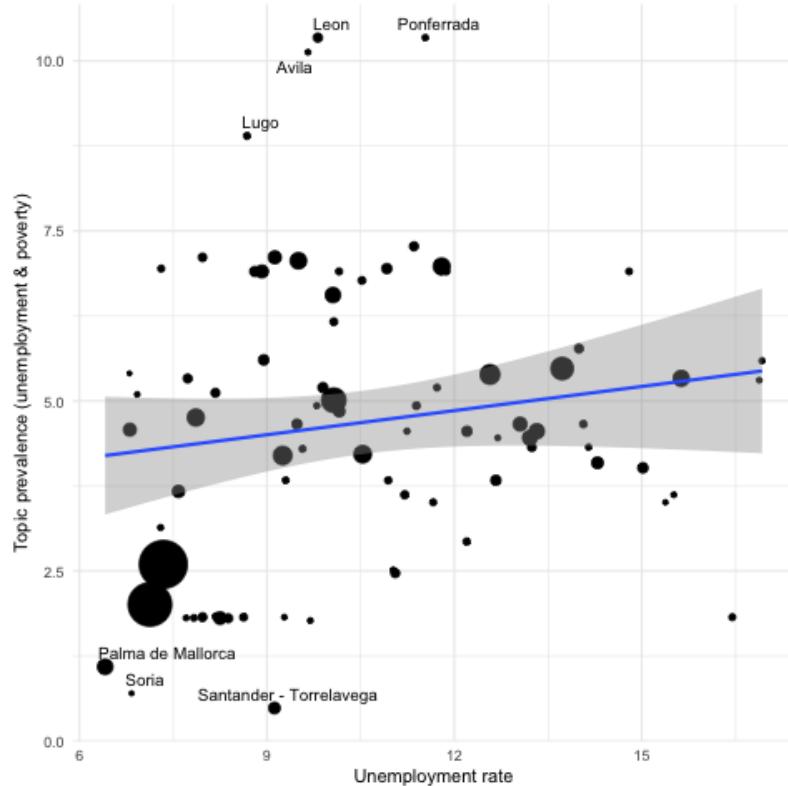


Figure 2.3: Correlation between the unemployment rate across different Spanish urban areas and the corresponding share of unemployment coverage by local newspapers. Point scale indicates population size.

Contextual-level unemployment is the most common proxy for the *economic anxiety argument* in the quantitative political literature (see Sipma and Lubbers 2018 for a meta-analysis on the topic). I am interested in how actual levels of local unemployment relate to how often newspapers read in each urban area mention unemployment. Figure 2.3 undertakes this comparison<sup>5</sup>. There is no statistically significant relationship between the portrayal of the situation by newspapers and reality. Notice as well that this result comes along with a substantial degree of unexplained heterogeneity (see the difference between Lugo and Santander, for example). These gaps between perception and reality could explain some of the diverging results found in the literature. They also lend credence to importance of focusing on narratives.

### 2.5.2 The cultural backlash argument

The *cultural backlash argument* is centered around evolving social values towards more tolerance of individual freedoms as well as gender and racial equality. Admittedly, a large number of social issues fit within this category. Despite this, the literature usually focuses exclusively on immigration, in large part because data on the number of foreigners by location is readily available.

Figure 2.4 shows the prevalence of the ‘*immigration*’ topic in relation to the actual share of foreign-born individuals across all Spanish urban areas. At the municipal level, there is a significant relationship between both variables, albeit a very weak one (Pearson’s  $r$  coefficient equals 0.06). Places like Algeciras and Cádiz may see a lot of migrants cross the border from Morocco, but newcomers tend not to stay in those urban areas. They head towards places where they may find better economic prospects. Somewhat ironically, journalists in those new locations do not give as much coverage to the issue.

Once again, perceptions matter. More news about migrants on dinghies striving to cross the Gibraltar strait may appeal to people in places marked by less cultural openness, regardless of how many migrants actually live in the urban area. It might also simply be a reality that is more salient to people living in the locations where those migrants first arrive (see Bahía de Algeciras and Bahía de Cádiz in Figure 2.4 – these are the urban areas nearest to migrants’ entry points from Morocco). This highlights the difficulty in

<sup>5</sup>The plots in subsections 2.5.1 and 2.5.2 show aggregated data at the urban area level. This approach is taken for the sake of graph readability and to favor interpretation. Unless otherwise specified in the text, the relationships shown do not change in any way when the same analysis is undertaken at the municipal level.

In the manual classification I used to build the algorithm, I use a joint ‘*unemployment & poverty*’ category. I bundled these two somewhat distinct topics together because individual newspaper tweets usually allude to them both.

distinguishing between xenophobic ideology – as RRP voters have often been labeled – and the general salience of the immigration topic, perhaps due to local circumstances. In this paper, in line with the association the literature makes between socially conservative values and radical right support, I assume that ideology is the more relevant factor.

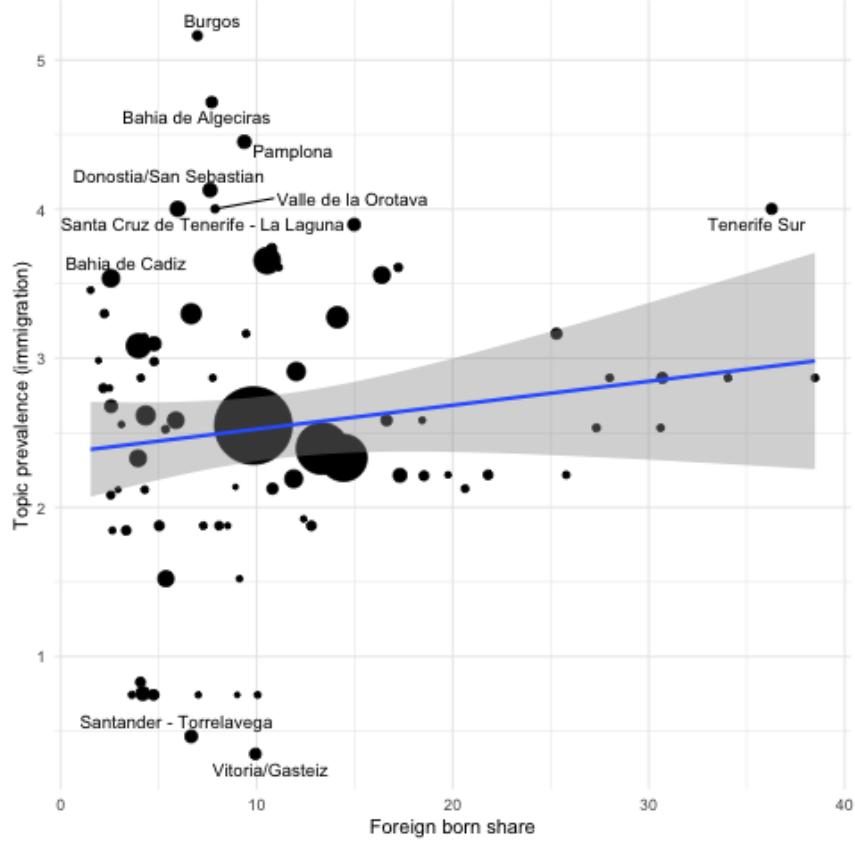


Figure 2.4: Correlation between the actual share of foreigners by urban area and the corresponding share of coverage on immigration issues by local newspapers. Point scale indicates population size.

A further advantage of analyzing narratives lies in the increased scope for nuance. All competing arguments, and in particular those related to the *geography of discontent* and *cultural grievances*, encompass a series of narratives. Immigration may indeed shape people's views on globalization and modernization, but it is only a single aspect within what is in reality a large range of socioeconomic and cultural issues. Several others are highlighted in the literature: religion, support for liberal values (in issues such as gay marriage or abortion rights), etc.

Using quantitative text analysis to classify narratives one can allow for the existence of different types of socially conservative places. Table 2.1 suggests that there may indeed exist different types of social conservatism. One may think, for instance, that if more

religious places are more socially conservative, they are bound to hold more anti-immigrant values. I do not find this to be the case across Spanish urban areas.

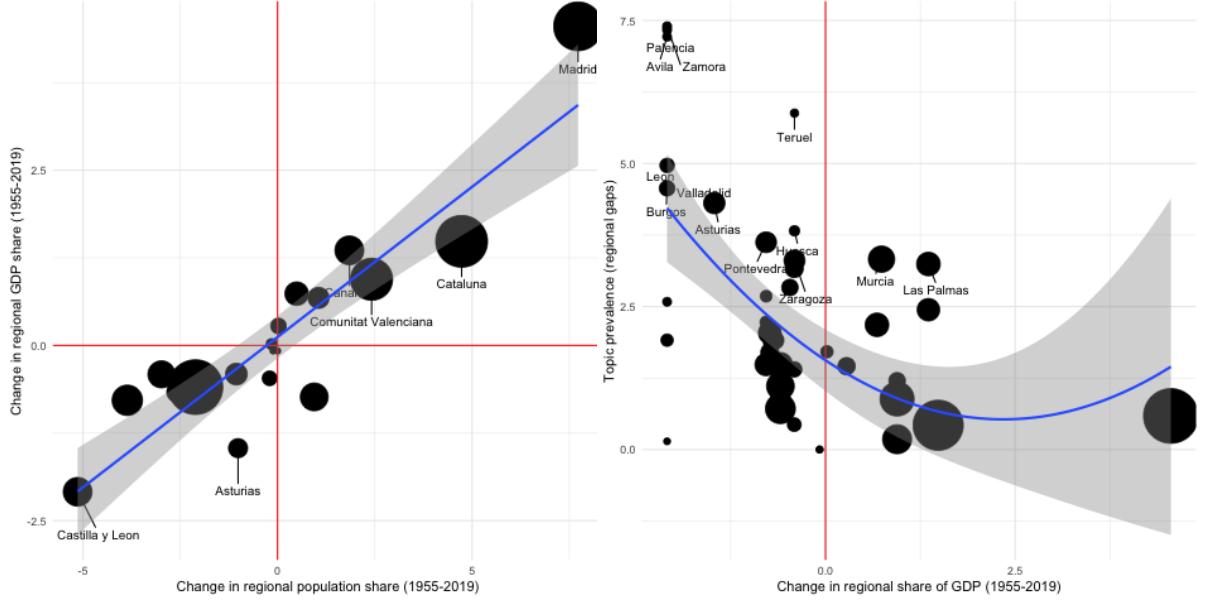
Table 2.1: Top and bottom 5 urban areas by density of the ‘*religion*’ topic. Each of the columns refers to the topic prevalence across the urban area.

Region	Religion	Immigration
Burgos	11.4%	4.3%
Segovia	9.1%	0.7%
Jaén	7.7%	2.4%
Salamanca	7.4%	0.8%
Huelva	7.4%	0.8%
<hr/>		
Ferrol	0.9%	2.9%
Soria	0.8%	0.8%
Ávila	0.8%	0.8%
Logroño	0.6%	3.5%
Vitoria/Gasteiz	0.3%	0.3%

### 2.5.3 The geography of discontent

The *geography of discontent argument* focuses on the disenchantment caused by perceptions of long-term economic decline in some localities, while those opportunities concentrate in other regions – and usually in urban areas. These graphs compare perceptions about ‘*regional gaps*’ with actual rates of depopulation and divergences in the economic development of the different regions.

Empirical evidence clearly indicates that, over the last six decades, Spaniards have moved to the country’s more economically dynamic regions (see Figure 2.5a). Some of the changes in population and GDP growth relative to other regions are staggering. These patterns are reflected in journalistic complaints regarding regional disparities, broadly understood. Figure 2.5b shows the correlation between newspaper coverage of regional divergences and long-term GDP growth. Regions with positive levels of development since 1955 are not necessarily exempt from perceptions that their region is at a disadvantage with respect to other areas in the country – this is certainly the case in Murcia and the Canary Islands (Las Palmas). But, in general, it is places that lagged behind in Spain’s remarkable developmental push that concentrate perceptions of regional divergences (Ávila, Palencia, and Zamora are cases in point). I find similar results when drawing the comparison with respect to long-term population decline (see Appendix 2.E).



(a) Relationship between long-term population growth and changes in the regional GDP shares (1955-2019). Point scale indicates population size.

(b) Relationship between newspaper coverage on regional gaps and changes in the regional share of national GDP between 1955 and 2019. Point scale indicates population size.

## 2.6 What narratives suggest about the rise of the radical right

The previous section provided an overview of how narratives linked to the three main theories aiming to explain rising support for the radical right play out in Spain. The findings highlight that the prevalence of different topics in news reporting across the country often does not match the reality of each place. Only regarding regional discrepancies (relevant for the *geography of discontent* argument) does news reporting align in a meaningful way with socioeconomic statistics.

### 2.6.1 Baseline estimations

Given the interest in perceptions and how they compare to what socioeconomic statistics say about each municipality, I now test all four hypotheses at once. I start with a simple OLS cross-sectional model that includes newspaper coverage on relevant topics and standard controls as regressors. I then proceed to make comparisons with socio-economic statistics. This baseline model can be written as:

$$y_m = \alpha + X\beta + \epsilon = \\ \alpha + \gamma \ unemp_m + \kappa \ SC'_m + \delta \ RD'_m + \sigma \ sep_m + \beta \ X'_m (+\zeta \ Z'_m) + \epsilon_m,$$

where  $m$  refers to each Spanish municipality. The dependent variable is the share of the vote in favor of the RRP VOX (or other political parties – see placebo tests in Annex 2.B). I expand on the selection of topics and other controls below:

1.  $unemp_m$  refers to the *unemployment & poverty* topic share. It is therefore associated with the *economic anxiety* camp in the literature.
2.  $SC'_m$  is a vector of topic densities linked to the *cultural backlash* side of the debate. As such, it aims to capture social conservatism. It contains the topic shares for *immigration, religion, and feminism & LGBTQ+ issues*.
3.  $RD'_m$  is a vector of topic densities associated with the *geography of discontent* hypothesis. Focusing on perceptions of disparities between regions, it includes the *regional gaps* and *lack of resources* topic shares.
4.  $sep_m$  refers to the share of articles in a municipality that speak of *separatist issues*.
5.  $X'_m$  is a vector of key demographic and political controls. These include:
  - Population density (as a logarithm): This variable aims to account for the expected rurality of the radical right vote. Nevertheless, note that earlier studies on Spain find that urban/rural status does not play a role in RRP support (Turnbull-Dugarte et al., 2020).
  - The share of the population under 35 years of age who are eligible to vote and the share of the population older than 65: These controls capture age patterns within each municipality. According to Rama et al. (2021), vote for VOX should be younger than that of other parties, even though the average voter is aged 35-55.
  - Turnout: Usually associated in the literature with the idea of protest vote (assuming a negative relationship with radical right support).
  - Vote for the mainstream right (the People's Party, or PP) in the 2016 national election: This variable tries to capture the degree to which a particular municipality leans towards a right-wing ideology.
  - Regional controls: This set of dummies aims to account for long-standing institutional and cultural differences across Spanish regions.

6.  $Z'_m$  stands for a vector of socio-demographic controls associated with the ‘reality’ of each of the sides of the debate. More specifically it includes:

- Unemployment rate: Associated with the *economic anxiety* argument. Higher rates of unemployment should, in principle, favor the radical right (see Algan et al. 2017).
- Share of foreigners: Acting as a proxy for the *cultural backlash* hypothesis. Arguably, municipalities with more foreigners should see more radical right support.
- Change in regional GDP share between 1955 and 2019: This control – unfortunately only available at the provincial level – shows the evolution in the weight that a given region plays within the overall Spanish economy. The idea is that provinces that lost economic importance since 1955 should be more prone to vote for VOX.

Table 2.2 includes the results for the baseline OLS specifications. I introduce relevant regressors in a step-wise fashion to be able to compare model performance. Column (1) begins with the simplest approach: it sets up a model that aims to predict the vote for VOX based on the different (relevant) narratives as well as some basic demographic and voting statistics. Reading the table from left to right adds layers of complexity <sup>6</sup>. Column (2) includes key demographics as well as the main proxies available to account for the ‘reality’ of the key sides of the debate. Column (3) is the preferred specification, combining the previous two approaches. Columns (4) and (5) are robustness checks: they try to account for the ideology inherent to each municipality by adding a control for earlier vote in favor of the mainstream right.

Let’s start with the discussion of some key socio-demographic controls. A first striking element, in contrast with evidence from other European countries (e.g. Stockemer 2016), is that the coefficient of the natural logarithm of population density is positive <sup>7</sup>. This result holds across all specifications. Indeed, the rise of the radical right in Spain is not limited to rural areas. In fact, VOX obtained an average vote of 14.8% across all Spanish cities with more than 250,000 inhabitants, a percentage that is not statistically different from the national average of 15%.

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<sup>6</sup>All variables in Table 2.2 – other than population density – should be read as percentages, with 1% being included in the data as 1 rather than as 0.01. Therefore, the first coefficient in Column (1), for example, should be read as: a 1-percentage-point (p.p.) increase in the share of local articles about unemployment and poverty is associated with a rise in support for VOX of 0.14 p.p.

For an intuitive sense of coefficient size, refer to Appendix 2.A, which includes the 28 different topics across which the algorithm classified tweets and their average prevalence across the whole of Spain.

<sup>7</sup>A specification that includes instead controls for the logarithm of population along with a rural/urban dummy leads to insignificant results in the latter, as in Turnbull-Dugarte et al. (2020).

Table 2.2: Baseline OLS regressions

	<i>Dependent variable:</i>				
	VOX vote share				
	(1)	(2)	(3)	(4)	(5)
Unemp. & poverty	0.144** (0.073)		0.124* (0.073)	0.250*** (0.067)	0.224*** (0.067)
Religion	0.068 (0.092)		0.041 (0.091)	0.020 (0.084)	0.016 (0.084)
Immigration	−0.525*** (0.194)		−0.336* (0.194)	−0.254 (0.178)	−0.166 (0.178)
Feminism & LGBTQ+	0.076 (0.194)		0.170 (0.193)	0.461*** (0.178)	0.477*** (0.178)
Regional gaps	0.408*** (0.131)		0.398*** (0.130)	−0.022 (0.121)	−0.019 (0.120)
Lack of resources	−0.416*** (0.115)		−0.312*** (0.115)	−0.097 (0.106)	−0.066 (0.106)
Separatism	0.437*** (0.116)		0.586*** (0.117)	0.515*** (0.106)	0.571*** (0.107)
Pop. density (log)	0.308*** (0.054)	0.284*** (0.054)	0.258*** (0.055)	0.357*** (0.049)	0.312*** (0.051)
Voting-age pop. under 35	0.063*** (0.021)	0.056*** (0.021)	0.039* (0.021)	0.037* (0.020)	0.021 (0.020)
Pop. over 65	−0.134*** (0.011)	−0.125*** (0.011)	−0.133*** (0.011)	−0.233*** (0.010)	−0.232*** (0.010)
Turnout	−0.081*** (0.010)	−0.067*** (0.010)	−0.073*** (0.010)	−0.096*** (0.009)	−0.089*** (0.009)
Unemp. share		−0.004 (0.016)	−0.023 (0.016)		0.017 (0.015)
Foreign share		0.093*** (0.010)	0.098*** (0.011)		0.053*** (0.010)
Δ GDP share (1955-2019)		0.317*** (0.119)	0.291** (0.125)		0.179 (0.115)
PP vote share (2016)				0.232*** (0.006)	0.229*** (0.006)
Regional controls	Yes	Yes	Yes	Yes	Yes
Observations	8,129	8,129	8,129	8,129	8,129
R <sup>2</sup>	0.496	0.495	0.501	0.577	0.578
Adjusted R <sup>2</sup>	0.494	0.494	0.499	0.575	0.577

*Note:*

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

In contrast, the age coefficients do align with earlier literature. Rama et al. (2021) points out that, while not the most popular party among the youngest voters, a sizeable proportion of this demographic chose to vote for the radical right. Consistently with this finding, Table 2.2 shows that municipalities with younger (eligible-to-vote) populations were more likely to display stronger levels of support for VOX. The opposite was true of older municipalities – with an effect that is both quite strong and significant across all specifications.

One may see the support for VOX as a form of protest vote. The negative turnout coefficient would seem to support this view<sup>8</sup>. Negative turnout coefficients have been cited in the literature as an argument in favor of the idea that citizens vote for the radical right in protest against mainstream parties rather than because they stand behind radical right values (Smets and van Ham, 2013).

Column (1) then includes estimations for the key parameters of interest: the coefficients for each of the narratives. Overall, I find clear evidence in favor of both the *economic anxiety* and *separatism* camps. The results also show partial confirmation of the *geography of discontent* hypothesis. Support in favor of *cultural backlash* is more limited, being largely washed out when controlling for local age profiles. The next paragraphs provide more detail on each of these results.

As expected, *perceived economic deprivation* fosters radical right support. The coefficient for the share of local articles dealing with unemployment and poverty remains positive and significant across all specifications. Furthermore, the narrative appears to have an effect beyond the reality of local unemployment. Adding controls for the actual unemployment rate – see Column (3), for instance – does not provide significant results, while the narrative coefficient remains significant throughout.

The role of *cultural backlash* is less clear. As is perhaps to be expected, the inclusion of controls for local demographics does away with most of the cultural effects. As a result, all specifications show that local narratives about religion do not appear to play a role in RRP support. In the case of immigration, the effect drops in significance as one adds controls; it also features the opposite sign than was initially theorized. This is surprising, given the key role that immigration plays in VOX’s rhetoric (Rama et al., 2021). However, it should be noted that the actual share of migrants in a location does appear to foster support for the radical right – see Column (3). The pattern found in immigration is therefore the

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<sup>8</sup>Excluding this control from the regression does not alter the significance or size of the rest of the coefficients in any meaningful way.

opposite of the one found for economic anxiety: in this case reality seems to trump the effect of the narrative.

For its part, feminism & LGBTQ+ issues only appear relevant to the vote in favor of VOX when controlling for local right-wing ideology. And, in that case, the topic was associated with higher, rather than lower, levels of support for the radical right. This result, while initially surprising, can easily be explained by a shortcoming of the current methodology. The algorithm correctly classifies tweets by topic; it, however, does not capture the sentiment conveyed in the tweet. In the case of the feminism & LGBTQ+ category, a sizeable proportion of the articles either use polarizing language or completely deride rather than support liberal values<sup>9</sup>. This suggests that the feminism & LGBTQ+ category topic should instead be interpreted as a measure of social conservatism.

The results also provide some evidence in favor of the *geography of discontent* hypothesis. A higher share of articles about the prevalence of regional gaps was indeed associated to better voting outcomes for the RRP VOX. In contrast, municipalities with more articles dedicated to a lack of resources invested in an area were less likely to support the radical right. Much of the benefit from these feelings seems to have accrued to the mainstream right rather than to VOX. These results are robust to the inclusion of a control to proxy for the real long-run (1955-2019) performance of different provinces. In contrast, controlling for the local vote for the mainstream right in 2016 does away with these effects, a fact that suggests that the People's Party was capitalizing on these issues before the advent of VOX.

Finally, we come to the importance of narratives about *separatism* in driving VOX's support, a hypothesis first proposed in Turnbull-Dugarte (2019). The evidence in this case is unequivocal: the local share of articles on separatist issues is strongly linked to support for the radical right in Spain. This finding is robust to any changes in the econometric specification – see Columns (1) and (3)-(5). The placebo tests included in Annex 2.B reinforce this same idea: talk of separatist issues benefitted the radical right exclusively, with Podemos, PSOE and PP all featuring effects in the opposite direction.

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<sup>9</sup>See, for example, the following negative tweet: 'Mendez de Vigo about the 8M [demonstrations] Some preach and the rest of us actually provide'. There are also plenty of examples of polarizing articles: 'Opinion mllopezcastro1 writes about the sexist poem dedicated to Irene Montero [prominent politician affiliated to the radical-left party Podemos].'

The challenge in generating a classification that reliably identifies both topic and sentiment is complicated by the choice of Spain as a country of study. The development of sentiment classification algorithms is largely focused on English, with very limited options in Spanish. In addition, out of the alternatives available, many rely on literal translation from English (Angel et al., 2021). This makes implementation more difficult – especially on on cultural topics, where journalists often employ irony as a mode of communication. For this reason, improvements on the algorithm are left to future work.

The reader may be also be wondering about the model performance of narratives compared to more traditional socio-economic controls. A quick comparison of the  $R^2$  between columns (1) and (2) would initially suggest there is not much of an advantage in using narratives. In reality, the similarity of goodness-of-fit measures in this case owes exclusively to the inclusion of regional controls. Of course, regional controls are necessary in these setting to account for the very important and long-standing institutional, historical, and cultural differences between all Spanish regions. However, models clean of any other controls show an adjusted  $R^2$  of 0.26 for the narratives compared to 0.11 for the ‘hard statistics’. This indicates two things: 1) the narratives are very regionalized in nature, to the point that almost all of the effect can be absorbed by the regional dummies; however, 2) tracking narratives can help to explain elements that are very important in driving the vote but that would otherwise just be ascribed to inherent regional differences. In other words, a text analysis approach provides insight into the ‘why’ behind regional differences in the vote.

### 2.6.2 A spatial approach

The simpler OLS model does not take spatial spillovers into consideration. It would only be natural to think that narratives spread more easily between contiguous municipalities. If this is true, then the necessary assumption that neighboring observations are independent from each other is violated. To overcome this problem, I make use of spatial econometric techniques. Following LeSage (2014), I consider a nested spatial (Manski) model with the following structure:

$$\begin{aligned} y &= \rho W_y + X\beta + WX\theta + u \\ u &= \lambda Wu + \epsilon, \end{aligned}$$

where the dependent variable and  $X\beta$  matrix are the same as in the OLS version above <sup>10</sup>. In all cases,  $W$  is a queen matrix of spatial weights, where the mean number of neighbors equals 6. The model allows for local spillovers to neighboring municipalities through a matrix of spatially lagged topic densities ( $WX$ , which for simplicity is constructed using average values).  $WY$  represents the average vote share in favor of VOX across a given municipality’s neighbors. Notice that this allows for global effects, since a change in the vote for VOX in a given municipality would generate a feedback loop that could potentially

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<sup>10</sup>In fact, OLS is the simplest version nested within the Manski model.

affect all municipalities, establishing a new equilibrium in the long run. Finally,  $Wu$  stands for spatially lagged residuals.  $\rho$ ,  $\theta$ , and  $\lambda$  are, along with  $\beta$ , coefficients to be estimated.

Elhorst (2014) explains in detail how different types of spatial econometric models are nested within the Manski model. Given the difficulty in estimating all parameters at once, he also proposes some tests – to use alongside theoretical understanding of the subject – to work out which of the nested models is best suited to a given research question. In this sense, there is a key difference between local and global models: the distinction owing to whether endogenous interaction and feedback effects between spatial units are present (LeSage, 2014). Given the nature of political choices, I lean towards a local model. This is because one can easily think of local narratives affecting voting outcomes in nearby municipalities, but it seems unlikely that changes in voting shares in a single municipality could spread through a feedback loop across the whole country. This insight then points towards using the Spatial Durbin Error model (SDEM) as a starting point (where  $\rho = 0$  in the system of equations outlined above). Alternative options include the Spatial Error Model (SEM, where  $\rho = 0$  and  $\theta = 0$ ), the Spatially Lagged X model (SLX, where  $\rho = 0$  and  $\lambda = 0$  instead), and OLS (where all  $\rho$ ,  $\theta$ , and  $\lambda$  are set to 0), all of which are special cases of SDEM.

The main goal in comparing these models is to find a stable econometric specification that can lead to evidence in favor or against each of the sides of the *economic anxiety - cultural backlash - geography of discontent - separatism* debate. I use maximum likelihood (ML) to run the estimations and follow the model selection process outlined in Elhorst (2014). AIC and Likelihood Ratio tests point in the direction of SEM, although I report all nested local models in Table 2.3 for completeness.

The general results are very much in line with what has already been outlined in the previous subsection<sup>11</sup>. But this paper also aims to uncover any evidence of spatial spillovers in the relationship between narratives and the vote in favor of the radical right. The key parameter of interest here is  $\lambda$  – also referred to as a spatial autocorrelation coefficient. This term features in the preferred specification in column (3), as well as model (4). It captures the effect of any shocks to the residuals of a municipality's neighbors. Lambda, in other words, stands for any situation where unobserved shocks follow a spatial pattern, or where unobserved determinants of the vote for VOX are spatially autocorrelated. It could be interpreted, for instance, as a spatial pattern of right-wing political ideology. As

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<sup>11</sup>Note that the interpretation of the marginal effects in the SLX and SDEM models requires the joining of each of the coefficients and the lags. Table 2.3 shows the direct marginal effects. A table including the breakdown by direct and indirect effects from those (non-preferred) models is available in Appendix 2.G.

Table 2.3: Results from the Spatial Error Durbin Model

<i>Dependent variable:</i>				
	<i>VOX vote share</i>			
	OLS (1)	SLX (2)	SEM (3)	SDEM (4)
$\lambda$			0.36951***	0.35364***
Unemp. & poverty	0.124* (0.073)	0.120 (0.218)	0.125* (0.074)	0.241 (0.232)
Religion	0.041 (0.091)	0.028 (0.260)	0.038 (0.128)	0.041 (0.287)
Immigration	−0.336* (0.194)	0.978** (0.486)	−0.490* (0.269)	0.677 (0.577)
Feminism & LGBTQ+	0.170 (0.193)	0.517 (0.408)	0.213 (0.267)	0.527 (0.568)
Regional gaps	0.398*** (0.130)	−0.874** (0.365)	0.329* (0.182)	−0.805** (0.407)
Lack of resources	−0.312*** (0.115)	0.240 (0.260)	−0.272* (0.159)	0.060 (0.346)
Separatism	0.586*** (0.117)	0.368** (0.154)	0.500*** (0.160)	−0.136 (0.345)
Unemp. share	−0.023 (0.016)	0.016 (0.020)	−0.031* (0.017)	−0.032* (0.017)
Foreign share	0.098*** (0.011)	0.082*** (0.015)	0.082*** (0.012)	0.078*** (0.012)
$\Delta$ GDP share (1955-2019)	0.291** (0.023)	−0.015 (0.024)	0.100*** (0.032)	0.083 (0.070)
Socio-demographic controls	Yes	Yes	Yes	Yes
Spatial lags	No	Yes	No	Yes
Observations	8,129	8,129	8,129	8,129
(Pseudo) R <sup>2</sup>	0.499	0.385	0.515	0.515
AIC			51,384.4	51,465.7
LR test (p-value)			< 0.001	0.2276

Note:

\*p&lt;0.1; \*\*p&lt;0.05; \*\*\*p&lt;0.01

expected, there is a strong positive spatial dependence in the data. Despite this, the sign and significance of the coefficients does not change with respect to the OLS specification.

## 2.7 Conclusion

This paper contributes to the political and regional literature on the reasons behind the rising wave of support for RRP. I provide empirical evidence for the main theoretical explanations on the rise of the radical right in Spain and seek to discern the relative importance of economic and regional arguments compared to a potential cultural backlash against globalization and modernization. I also take into account relevant local political theories, analyzing the role played by local perceptions regarding separatist movements. To do so, I take advantage of a simple idea: that geographical differences in newspaper reporting reflect local narratives, and therefore understanding these can help us determine which issues drive local voting patterns.

The focus on narratives is important. The vast majority of studies in quantitative political geography assume that perceptions closely track socioeconomic statistics. I show some evidence against this piece of conventional wisdom. One of the main contributions of this paper lies in the new use of text data to determine the equilibrium of voter preferences in a given location. To gauge these preferences, I apply a well-known machine learning algorithm to news information mined from Twitter. I then use the aggregated results to calculate the prevalence of news topics by municipality. Based on this new dataset, I first try to understand whether newspaper coverage of an issue matches reality. I am able to make comparisons with topics related to unemployment, immigration, and long-term population and economic decline. The findings suggest that views on cultural and economic matters poorly reflect socioeconomic statistics. In contrast, perceptions on regional issues are much better aligned with reality.

The mismatch between perceptions and reality suggests that the use of quantitative text analysis constitutes a necessary complement to already existing research. Of course, one key difficulty lies in the fact that the disconnect between reality and what people believe is likely to play out differently across different contexts. It also need not remain constant over time. Ideally, one would want to track narratives over time and space, as this would provide much better insights on which topics drive RRP vote. This article constitutes but a first step in that direction.

This paper also pays special attention to the spatial variation in radical right vote. It follows Essletzbichler et al. (2021) in testing for spatial spillovers where the literature usually

focuses on a-spatial analysis. This helps to reduce some relevant concerns about omitted variable bias. In fact, the inclusion of unobserved local spillover effects substantially improves the fit of the model, better accounting for the strong positive spatial dependence between unobservables.

The results of the preferred Spatial Error Model (SEM) shed some light onto the *economic-regional-cultural backlash debate*. I find evidence for three of the four explanations of radical right support: journalistic accounts of unemployment and poverty, regional gaps, and separatist movements were all positively associated with the radical right's electoral success. Nonetheless, there are some caveats. Cultural factors do not appear as influential as separatism and regional forces in driving the vote once one controls for local demographics. This is in large part due to the effect of feminism and LGBTQ+ issues, which tilt the balance in favor rather than against the radical right. Upon scrutiny, I find this surprising result owes to the fact that many of the articles that talk about women and LGBTQ+ issues do so in a negative tone. The algorithm is currently unable to distinguish between both groups. In addition, complaints over lack of resources did not fuel the rise of VOX. They favored the mainstream right (Partido Popular) instead.

A final disclaimer. The empirical specification used in this article need not reflect causal effects. Nonetheless, research in the fields of marketing, education and psychology, among others, indicate that people respond very strongly to changing narratives. Yet, unequivocal proof is hard to come by: local narratives and voting patterns are likely to be intertwined in ways we may never be able to account for. Despite this, I hope that earlier references to research on this topic in the fields of human geography, psychology, and political science, as well as the use of a new methodology that uses quantitative text analysis in an attempt to understand local narratives, have served to convince the reader that the approach is an interesting one that warrants further exploration. Future work should focus on tracking narratives over time and complementing the topic models with sentiment analysis.

## 2.A Topics used to train the Naive Bayes algorithm

Table 2.4: List of topics used to program the Naive Bayes algorithm

	Topics	Debate position	Mean topic prevalence
1	Agriculture and farming	NA	2.4%
2	Business	NA	3.7%
3	Crime & accidents	NA	7.8%
4	Culture	NA	3.9%
5	Economy	NA	3.9%
6	Education	NA	3.7%
7	Entertainment	NA	4.0%
8	Environment	NA	2.9%
9	Feminism and LGBTQ+	Cultural backlash	2.9%
10	Health	NA	3.6%
11	Holidays and celebrations	NA	1.9%
12	Infrastructure & urban planning	NA	3.8%
13	Immigration	Cultural backlash	3.6%
14	International	NA	3.6%
15	Lack of resources	Geography of discontent	3.2%
16	Local business	NA	1.8%
17	Local government	NA	3.3%
18	National politics	NA	3.9%
19	Poverty & unemployment	Economic argument	3.8%
20	Regional gaps	Geography of discontent	2.5%
21	Regional politics	NA	3.9%
22	Religion	Cultural backlash	3.7%
23	Separatism	Separatism	3.6%
24	Society & gossip	NA	3.8%
25	Sports	NA	4.0%
26	Science & technology	NA	3.5%
27	Tourism	NA	3.6%
28	Weather	NA	3.7%

## 2.B Placebo tests

Table 2.6: Placebo tests

	<i>Dependent variable:</i>			
	Podemos	PSOE	PP	VOX
	(1)	(2)	(3)	(4)
Unemp. & poverty	0.201*** (0.060)	0.431*** (0.115)	-0.432*** (0.107)	0.144** (0.073)
Religion	-0.173** (0.076)	-0.154 (0.145)	-0.072 (0.135)	0.068 (0.092)
Immigration	0.452*** (0.160)	1.058*** (0.306)	0.017 (0.284)	-0.525*** (0.194)
Feminism & LGBTQ+	0.258 (0.160)	2.411*** (0.306)	-0.444 (0.284)	0.076 (0.194)
Regional gaps	-0.664*** (0.108)	-1.654*** (0.207)	0.919*** (0.192)	0.408*** (0.131)
Lack of resources	0.303*** (0.095)	1.081*** (0.182)	-1.055*** (0.169)	-0.416*** (0.115)
Separatism	-0.414*** (0.096)	-0.653*** (0.183)	-0.739*** (0.170)	0.437*** (0.116)
Pop. density (log)	0.513*** (0.045)	0.474*** (0.085)	-0.024 (0.079)	0.308*** (0.054)
Voting-age pop. under 35	-0.188*** (0.018)	0.167*** (0.034)	-0.018 (0.031)	0.063*** (0.021)
Pop. over 65	-0.199*** (0.009)	0.097*** (0.017)	0.389*** (0.016)	-0.134*** (0.011)
Turnout	-0.044*** (0.008)	-0.054*** (0.016)	0.105*** (0.015)	-0.081*** (0.010)
Observations	8,129	8,129	8,129	8,129
R <sup>2</sup>	0.290	0.483	0.698	0.495
Adjusted R <sup>2</sup>	0.288	0.482	0.697	0.493

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 2.C Newspapers included in the study

Table 2.7: List of Spanish newspapers included in the analysis

	Newspaper	Headquarters	Coverage
1	Diario De Sevilla	Andalucía	provincial
2	Abc De Sevilla	Andalucía	provincial
3	El Correo De Andalucía	Andalucía	regional
4	Viva Sevilla	Andalucía	provincial
5	Sur	Andalucía	provincial
6	La Opinión	Andalucía	provincial
7	Málaga Hoy	Andalucía	provincial
8	Viva Málaga	Andalucía	provincial
9	El Noticiero	Andalucía	provincial
10	Diario De Cádiz	Andalucía	provincial
11	La Voz	Andalucía	regional
12	Viva Cádiz	Andalucía	provincial
13	Diario De Jerez	Andalucía	local
14	Viva Jerez	Andalucía	local
15	Europa Sur	Andalucía	local
16	Área	Andalucía	local
17	Ideal	Andalucía	regional
18	Granada Hoy	Andalucía	provincial
19	Córdoba	Andalucía	provincial
20	El Día De Córdoba	Andalucía	provincial
21	La Voz De Almería	Andalucía	provincial
22	Diario De Almería	Andalucía	provincial
23	Jaén	Andalucía	provincial
24	Viva Jaén	Andalucía	provincial
25	Huelva Información	Andalucía	provincial
26	Viva Huelva	Andalucía	provincial
27	Heraldo De Aragón	Aragón	regional
28	El Periódico De Aragón	Aragón	regional
29	Diario Del Alto Aragón	Aragón	provincial
30	Diario De Teruel	Aragón	provincial
31	La Nueva España	Asturias	provincial

32	El Comercio	Asturias	local
33	La Voz De Avilés	Asturias	local
34	Última Hora	Baleares	provincial
35	Diario De Mallorca	Baleares	local
36	Ara Balears	Baleares	regional
37	Majorca Daily Bulletin	Baleares	local
38	Diario De Ibiza	Baleares	local
39	Periódico De Ibiza	Baleares	local
40	Menorca	Baleares	local
41	El Diario Montañés	Cantabria	regional
42	Alerta	Cantabria	regional
43	Diario De León	Castilla y León	provincial
44	La Nueva Crónica	Castilla y León	provincial
45	El Norte De Castilla	Castilla y León	regional
46	Diario De Valladolid	Castilla y León	provincial
47	La Gaceta	Castilla y León	provincial
48	Diario De Burgos	Castilla y León	provincial
49	El Correo De Burgos	Castilla y León	provincial
50	La Opinión	Castilla y León	provincial
51	Diario Palentino	Castilla y León	provincial
52	Diario De Ávila	Castilla y León	provincial
53	El Adelantado	Castilla y León	provincial
54	Heraldo Diario De Soria	Castilla y León	provincial
55	La Tribuna De Toledo	Castilla-La Mancha	provincial
56	Lanza	Castilla-La Mancha	provincial
57	La Tribuna De Ciudad Real	Castilla-La Mancha	provincial
58	La Tribuna De Albacete	Castilla-La Mancha	provincial
59	El Faro De Hellín	Castilla-La Mancha	local
60	La Provincia	Canarias	provincial
61	Canarias 7	Canarias	regional
62	El Día	Canarias	provincial
63	Diario De Avisos	Canarias	regional
64	La Opinión De Tenerife	Canarias	provincial
65	La Vanguardia	Cataluña	urban
66	El Periódico De Catalunya	Cataluña	regional

67	Ara	Cataluña	regional
68	Diari De Sabadell	Cataluña	local
69	Diari De Terrassa	Cataluña	local
70	Regió 7	Cataluña	local
71	Diari De Tarragona	Cataluña	provincial
72	Més	Cataluña	provincial
73	El Punt Avui	Cataluña	provincial
74	Diari De Girona	Cataluña	provincial
75	Segre	Cataluña	provincial
76	La Mañana	Cataluña	provincial
77	El Faro	Ceuta	provincial
78	El Pueblo	Ceuta	provincial
79	Melilla Hoy	Melilla	provincial
80	El Faro	Melilla	provincial
81	Hoy	Extremadura	regional
82	La Crónica De Badajoz	Extremadura	provincial
83	El Periódico De Extremadura	Extremadura	regional
84	La Voz De Galicia	Galicia	regional
85	El Ideal Gallego	Galicia	provincial
86	La Opinión	Galicia	provincial
87	El Correo Gallego	Galicia	regional
88	Diario De Ferrol	Galicia	local
89	Diario De Pontevedra	Galicia	provincial
90	Faro De Vigo	Galicia	provincial
91	Atlántico	Galicia	local
92	Diario De Arousa	Galicia	local
93	El Progreso	Galicia	provincial
94	La Región	Galicia	provincial
95	El País	Madrid	national
96	Abc	Madrid	national
97	El Mundo	Madrid	national
98	La Razón	Madrid	national
99	20 Minutos	Several	urban
100	Expansión	Madrid	urban
101	Cinco Días	Madrid	urban

102	El Economista	Madrid	urban
103	La Verdad	Murcia	regional
104	La Opinión	Murcia	regional
105	Diario De Navarra	Navarra	regional
106	Diario De Noticias	Navarra	regional
107	La Rioja	La Rioja	regional
108	Noticias De La Rioja	La Rioja	regional
109	El Correo	País Vasco	regional
110	Deia	País Vasco	provincial
111	El Nervión	País Vasco	provincial
112	El Diario Vasco	País Vasco	provincial
113	Gara	País Vasco	provincial
114	Noticias De Gipuzkoa	País Vasco	provincial
115	Berria	País Vasco	local
116	Kronika	País Vasco	local
117	Diario Noticias De Álava	País Vasco	provincial
118	Levante	Comunidad Valenciana	regional
119	Las Provincias	Comunidad Valenciana	provincial
120	Información	Comunidad Valenciana	provincial
121	Mediterráneo	Comunidad Valenciana	provincial

From the list, three village newspapers had no Twitter account and are therefore not present in the dataset. Sports newspapers – including Spain’s most-read newspaper, Marca – have not been included in the list given that the range of issues they cover has no direct incidence on the topics of interest for this article.

## 2.D Aggregating tweets by municipality

This appendix includes a stylized example of how tweets are aggregated at the municipality level. Let's take the manual labeling of tweets (so that the numbers are not as cumbersome) for the religion topic in the municipality of La Línea de la Concepción, in Cádiz (Andalusia), as in the body of the paper.

The table below indicates the newspaper each article comes from, the total number of articles manually labeled in the municipality (606 in this case), and the number of articles about religion. The number of articles on religion for each paper is multiplied by the regional readership share – of course the assumption here is that all of Andalusia reads *El País* or *ABC* at the same rate, which unfortunately is the only data source available in this regard. This number is then split by the total number of articles in the municipality. The total share of articles in the municipality on religion equals the overall sum of these weighted shares. This process is repeated for all other topics of interest across all municipalities.

Table 2.8: Tweet aggregation for the religion topic (La Línea de la Concepción)

Newspaper	All tweets	Religion tweets	Share	Readership weight	Weighted share
<i>El País</i>	606	9	1.5%	8.4%	0.1%
<i>La Vanguardia</i>	606	8	1.3%	0.0%	0.0%
<i>El Mundo</i>	606	4	0.7%	5.3%	0.0%
<i>ABC</i>	606	7	1.2%	16.4%	0.2%
<i>La Razón</i>	606	6	1.0%	4.5%	0.0%
Regional & local	606	22	3.6%	65.5%	2.4%
Urban	606	0	0.0%	0.0%	0.0%
				<b>Total</b>	<b>2.8%</b>

## 2.E Additional plots

### Cultural backlash argument

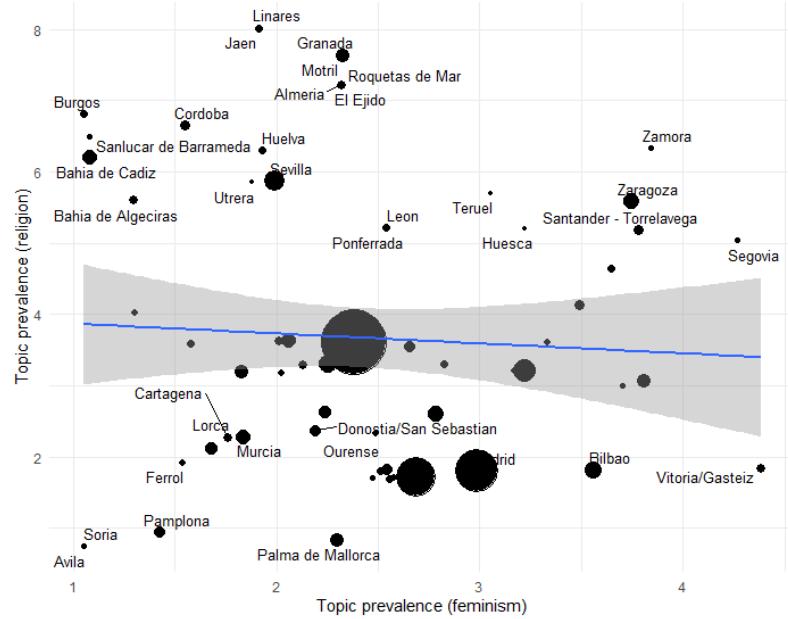


Figure 2.6: Scatter plot showing the correlation between newspaper coverage at the urban area level on religious issues and on issues of feminism and gay rights (no significant relationship).

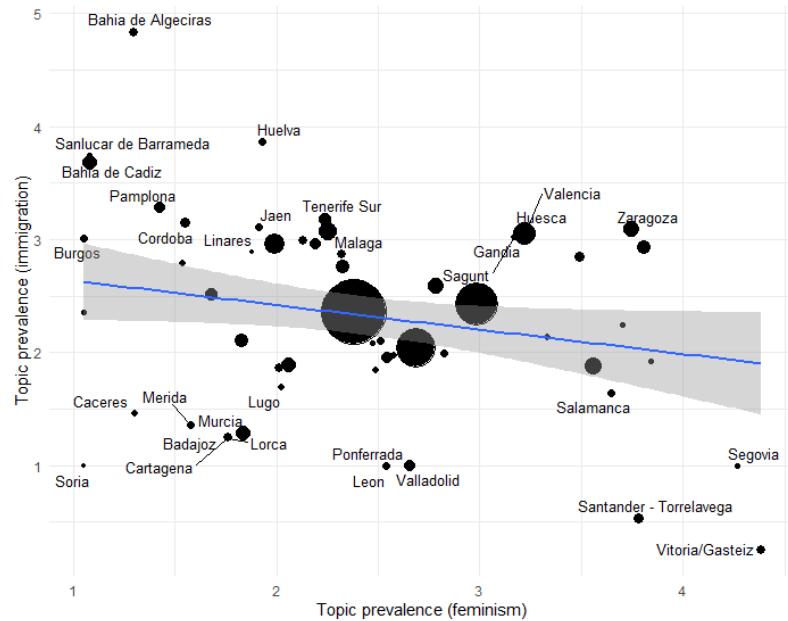


Figure 2.7: Scatter plot showing the correlation between newspaper coverage at the urban area level on immigration and on issues of feminism and gay rights.

## Geography of discontent argument

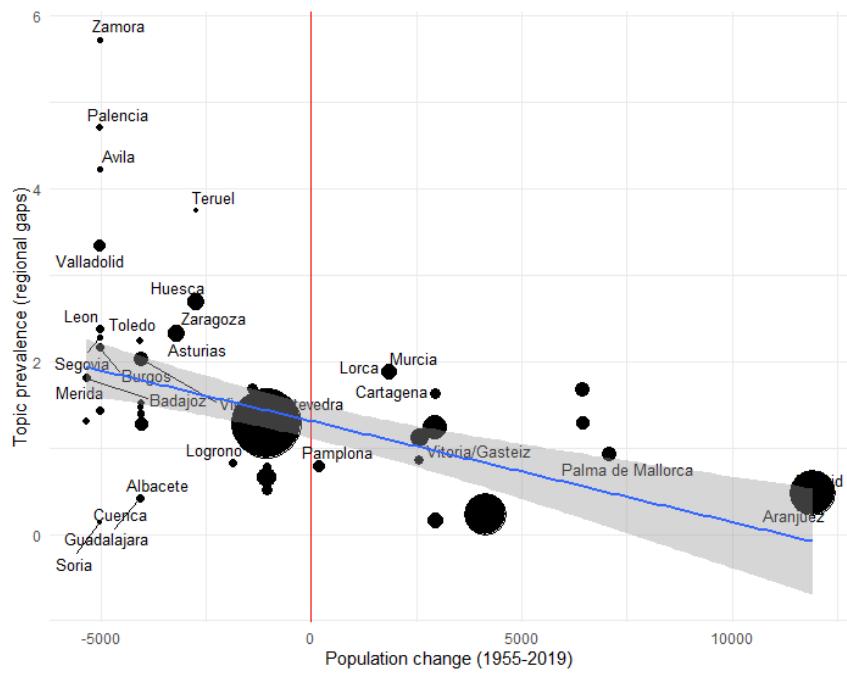


Figure 2.8: Scatter plot showing the correlation between newspaper coverage at the regional level on regional gaps and actual long-term population change across regions.

## 2.F Robustness check: Prior radical right vote does not influence topic densities in 2018

Table 2.9: The vote for the radical right in the 2016 election does not predict the topics communities talk about in 2018.

	<i>Dependent variable:</i>					
	Unemployment		Immigration	Religion	Regional gaps	Lack of resources
	& poverty	Feminism				
	(1)	(2)	(3)	(4)	(5)	(6)
Pop. density (log)	0.159*** (0.018)	-0.081*** (0.011)	0.072*** (0.009)	-0.240*** (0.026)	-0.048*** (0.015)	0.129*** (0.017)
Voters under 35	0.012 (0.007)	0.009** (0.005)	-0.022*** (0.004)	0.036*** (0.011)	-0.023*** (0.006)	0.101*** (0.007)
Pop. over 65	0.017*** (0.004)	0.005* (0.002)	-0.010*** (0.002)	-0.003 (0.006)	0.012*** (0.003)	0.048*** (0.004)
Rad. right (2016)	-0.008 (0.041)	-0.015 (0.025)	-0.098*** (0.021)	-0.069 (0.061)	-0.056 (0.035)	-0.236*** (0.039)
Observations	8,129	8,129	8,129	8,129	8,129	8,129
R <sup>2</sup>	0.070	0.035	0.039	0.086	0.215	0.089
Adjusted R <sup>2</sup>	0.070	0.035	0.038	0.085	0.214	0.089

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## 2.G SLX and SDEM results: Marginal effects

Table 2.10: SLX marginal effects

	Direct	Indirect	Total
Unemp. & poverty	0.120*	-0.868	-0.748
Religion	0.028	0.007	0.036
Immigration	0.978**	-1.603**	-0.625***
Feminism & LGBTQ+	0.517	-0.389	0.128
Regional gaps	-0.874**	1.538***	0.664***
Lack of resources	0.240	-0.823**	-0.583***
Separatism	0.368**	0.986***	1.353***
Unemp. Share	0.016	0.445***	0.461***
Foreign share	0.082***	0.183***	0.265***
GDP share (1955-2019)	-0.015	-0.023	-0.038***

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 2.11: SDEM marginal effects

	Direct	Indirect	Total
Unemp. & poverty	0.241	-0.227	0.014
Religion	0.041	0.116	0.158
Immigration	0.677	-1.182	-0.505
Feminism & LGBTQ+	0.527	-0.671	-0.144
Regional gaps	-0.805**	1.431***	0.626**
Lack of resources	0.060	-0.486	-0.426**
Separatism	-0.136	0.784**	0.649***
Unemp. Share	-0.032	0.034	0.002
Foreign share	0.078***	0.056**	0.134***
GDP share (1955-2019)	0.083	-2.103	-2.020

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## Chapter 3

# Unemployment shocks, party narratives, and radical voting

### 3.1 Introduction

Rising polarization and the increasing appeal of radical movements have characterized the political landscape in Europe over the past decades (Mudde, 2019). Radical right and left parties have emerged or gained force since the Great Recession, thriving both in terms of votes and political clout (Algan et al., 2017; Hopkin, 2020). While several competing explanations for this phenomenon exist, one of the most prominent attributes the rise in radical voting to mounting economic insecurity across large segments of society. This economic plight is often framed as a direct consequence of the current wave of globalization (Antonucci et al., 2017; Autor et al., 2020a; Guriev and Papaioannou, 2020; Rodrik, 2021).

A long list of papers asks the question of whether contextual unemployment – i.e. whether the area where an individual lives faces higher unemployment – leads to more radical voting (Algan et al., 2017; Rooduijn and Burgoon, 2018; Vasilopoulos et al., 2021; Dehdari, 2022, among many others)<sup>1</sup>. For the most part, the literature agrees with this notion, although depending on the context there is conflicting evidence that points in the opposite direction (see Sipma and Lubbers, 2018 for a review). This paper offers an explanation for those seemingly contradictory findings by emphasizing the role of political supply (i.e., the narratives that radical parties use to gain support) in mobilizing voters worried about unemployment.

Recent literature tends to study the vote in favor of radical parties solely from the demand side (Golder 2016; Inglehart and Norris 2016; Algan et al. 2017; Colantone and Stanig 2018a; Autor et al. 2020a, among many others). In looking at the direct relationship

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<sup>1</sup>Although most research focuses on the rise of the radical right than on radical voting as a whole.

between local unemployment and the share of the vote in favor of radical (right) outfits the assumption is that the unemployed, because of their nature, must constitute a homogeneous group facing the same incentives to vote for a specific party. I argue against this idea, rather taking unemployment (or other economic) shocks as turning points that generate disenchantment with the status quo and therefore offer an opportunity for new (or old) parties to claim their space (i.e., for political supply to shift). In other words, unemployment creates conditions in which radical parties of all forms can develop, which can easily lead to a polarization of the electorate <sup>2</sup>. Consequently, in this paper I examine whether distinct types of unemployment lead to varying levels of support for radical parties.

One key contribution in this paper comes from analyzing the relationship between unemployment and radical voting by paying attention both to political supply and demand. To do so, I first focus on ascertaining whether party narratives tap into the experience or worry of unemployment in different ways. If this is the case, then I can ask the main question: conditional on party narratives, does unemployment boost support in favor of radical parties? This paper answers these two questions in turn taking Spain as an example. Spain constitutes a particularly interesting case study for these issues because, despite having suffered from very high rates of structural unemployment since the 80s, it experienced limited support in favor of radical parties until recent years <sup>3</sup>. The turning point came with the Great Recession, a time when three entirely new parties (Ciudadanos, Podemos, and VOX <sup>4</sup>) entered the political fray, completely disrupting the previous two-party system. With unemployment reaching new heights – 27% of the workforce in the first quarter of 2013 –, mounting discontent gave these new parties an opening. But electoral narratives around unemployment and other core issues related to the crisis were heterogeneous and, as a result, so was the vote.

I start the analysis by trying to understand the heterogeneity in party responses to the issue of unemployment in the years following the financial crisis. I apply a simple quantitative text analysis technique to determine which words were most often mentioned alongside the term ‘unemployment’ across all tweets published by official party accounts in the three

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<sup>2</sup>In this regard, political demand can be thought of as existing but generally undefined, in the sense that it tends to claim for some unspecified solution, narrative, or scapegoat to the problem (in this case, of a tanking labor market). Of course, movements in political supply will not always be successful, which means that unemployment need not automatically lead to radical party success. That is, without the right narrative, political discontent would remain untapped and there would be no subsequent rise in radical voting.

<sup>3</sup>Izquierda Unida (United Left), a communist outfit founded in 1986, has had a stable presence in Congress since its first elections. But at the height of its popularity in 1996 it only obtained 10.5% of the vote.

<sup>4</sup>Out of these three, only the last two can be considered as populist (Rooduijn et al., 2019).

months before each national election <sup>5</sup>. This approach gives a sense of the distinct narratives advanced by both radical and mainstream parties over time. I pay particular attention to which of the unemployment narratives targeted a subset of voters rather than the electorate as a whole, as this helps in the process of building testable hypotheses about how unemployment might impact the vote. When focusing on radical politics, I use the two largest radical parties in the country as proxies. The results of this analysis suggest that, when speaking of unemployment, Podemos has historically employed a narrative hinging on youth joblessness while VOX focused on the plight of changing demographics and paid more attention to the need for industrial redevelopment.

Based on these party narratives, I turn the focus towards the composition of unemployment. I posit that, in the Spanish case, different kinds of unemployment have led to divergent radical party support. This would imply that, rather than benefiting a single party, unemployment as a whole has fostered political polarization. I test these hypotheses using municipal-level data on the sectors jobless people used to work in before losing their employment. Here, I once again distinguish between radical right and radical left vote. In line with party narratives, the results show that unemployment upon first entry in the labor market favors the radical left, while the effect of jobs lost in industry accrues to the radical right. The effect – particularly for the radical left – is large and significant, and I show that the relationships are causal with an instrumental-variable (IV) strategy. More specifically, I instrument first-time unemployment with the relative size of birth cohorts of potential voters who are young (18-25 years-old) at the time of each national election. In the case of industrial unemployment, I build an IV based on the location and timing of large plant closures.

These results highlight a potential channel through which unemployment shocks can generate support for radical right parties. In principle, one would assume that unemployment would increase support for greater redistribution and government support, policies that have historically been attached to the left of the political spectrum. Yet experiences in other European countries suggest that the radical right has been reaping those benefits instead (Mudde, 2019; Rodrik, 2021). Shifts in political supply combined with the unemployment shock can explain this pattern, as in recent years radical right parties – and VOX among them – have featured a rhetoric loaded with protectionist and interventionist proposals (Schumacher and van Kersbergen, 2016; Rama et al., 2021).

The rest of the paper is structured as follows. Section 3.2 includes a brief account of

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<sup>5</sup>Starting with the election in 2011, as none of the parties had Twitter accounts before that date.

the economic causes of radical voting, paying particular attention to the question of why RRP<sub>s</sub> seem to be gaining more from economic shocks than RLP<sub>s</sub>. Section 3.3 provides some context on radical voting in Spain, linking the experience of unemployment to political supply. Section 3.4 describes the empirical strategy and discusses the results. Section 3.5 concludes.

### **3.2 Why do people vote for radical parties? What we know about the role of economic shocks**

In this section I review the literature on the economic causes of radical voting. To do so, I combine elements of theories on populism, anti-EU voting, and radical right support. I do not delve into the (vast) literature on the role of culture (see Bornschier 2018 or Broz et al. 2021 for more detailed reviews). This is not out of a sense that cultural factors do not matter. A growing body of evidence in fact indicates that economic shocks are often mediated by sentiments associated with culture and identity (Rodrik, 2021)<sup>6</sup>. Nevertheless, this paper focuses on the role of unemployment in driving radical support. As a result, the well-known *economic anxiety-cultural backlash* debate falls outside of its scope.

In the following paragraphs, I discuss what the literature says about the role of economic shocks – mostly linked to globalization – in triggering or aggravating already existing political polarization. To frame the discussion, I structure this brief review around two of the key questions in the radical voting literature: first, what is the role that economic shocks play in radical party success? And secondly, why have radical right parties (RRP<sub>s</sub>) been doing so much better than parties to the far left (RLP<sub>s</sub>) in recent years?

#### **The economic causes of radical voting**

In large part, the literature on the economic causes of radical voting has focused on the individual characteristics of voters. The general consensus identifies the average radical voter as white, younger, and belonging to the working- or ‘squeezed-middle’-classes (Lucassen and Lubbers, 2012; Antonucci et al., 2017; Becker et al., 2017; Rooduijn et al., 2017). These characteristics tend to make this hypothetical voter more vulnerable to the economic shocks stemming from globalization. Exposure to these shocks is thought to instil perceptions of individual positional deprivation in relation to other groups in society

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<sup>6</sup>Purely cultural factors may also be of importance in their own right. Tabellini (2020) shows how xenophobia may drive radical right support even when economic conditions are good for natives and in fact improve with the arrival of migrants.

(Gest et al., 2018; Burgoon et al., 2019) as well as discontent over unfulfilled expectations of upward social mobility relative to earlier generations (Kurer and Staalduin, 2022). It is these ‘left-behind people’ or ‘losers of globalization’, the theory argues, who, after years of discontent, resort to the ballot box to air their grievances (Golder, 2016; Rodrik, 2018).

In partial opposition to the theories about individual characteristics, a series of authors have emphasized the importance of location (i.e. context) in determining voter preferences (Rodríguez-Pose, 2018; Colantone and Stanig, 2019; McCann, 2019; Broz et al., 2021; Essletzbichler et al., 2021; Jambrina-Canseco, 2023). They all note that radical voters tend to co-locate in space. Plainly, this *geography of discontent* could either owe to the tendency of similar people to cluster together – in which case individual characteristics should suffice to account for the geography of radical voting – or to the contextual characteristics of the places voters live in.

With economic activity agglomerating in cities, much of the discontent is coming from areas (many of them rural) left behind economically (Rodríguez-Pose, 2018; Dijkstra et al., 2020). In this sense, Rodríguez-Pose (2020) speaks of a *revenge of places that don't matter*: voters living in previously advantaged locations that are now plagued by economic and industrial decline are more likely to support populist parties. This finding suggests that, although voters have their idiosyncrasies, they all react to a set of common local economic conditions and their vote is likely to be swayed by these experiences. As a result, the effects of globalization on voting patterns may be better understood from the perspective of the community rather than the individual.

Both in the individual- and community-level stories, globalization is often singled out as the main culprit. There are multiple accounts of the localized effect of trade liberalization and offshoring on radical party support – mostly of the right-wing kind (Milner, 2021; Rodrik, 2021). Autor et al. (2020a) use China’s accession to the WTO to draw out the causal link between import competition from low-wage countries and the polarization of American politics. In a similar vein, Colantone and Stanig (2018b) find that European districts facing stronger import shocks tallied higher shares of the vote in favor of RRP. In the UK, areas battered by global competition were more likely to vote for Brexit (Colantone and Stanig, 2018a) and individuals living in them have been shown to hold more authoritarian worldviews (Ballard-Rosa et al., 2021).

Other papers go beyond trade to focus on other aspects of globalization. Anelli et al. (2019) and Milner (2021) confirm the notion that robots have stimulated the appetite for RRP across Western Europe. McCann (2019) links spatial inequality to a UK (pro-Brexit)

*geography of discontent*. The importance of the crisis has also been featured: Fetzer (2019) argues the Brexit referendum result would have been different were it not for the austerity measures taken in the UK during the crisis years. Similarly, Foster and Frieden (2017) emphasize a decline of trust in political institutions across European countries since the advent of the financial crisis.

One of the commonalities of all these facets of globalization is that they often conduce to large-scale unemployment. Consequently, another set of papers studies the role of contextual-level (i.e. local) unemployment – regardless of its root cause – in fostering support for radical parties (Bjørklund 2007, Algan et al. 2017, Becker et al. 2017, Essletzbichler et al. 2018, Rooduijn and Burgoon 2018, and Vasilopoulos et al. 2021, among others)<sup>7</sup>. Yet, on this score research findings remain mixed. Most studies highlight a positive correlation between levels of unemployment and populist votes – especially of the radical-right kind –, but many others find a null effect, or even point to a negative relationship (Sipma and Lubbers, 2018).

Placing the onus on aggregate unemployment might be missing the mark. As Sipma and Lubbers (2018) suggest, new research should focus not on the main effect of unemployment on radical support, but on the conditions under which unemployment may have an effect. Some recent papers, like Rooduijn and Burgoon (2018) or Bolet (2021), are already exploring different sources of heterogeneity in electoral responses to unemployment. This piece of research complements their efforts. Despite this, I look at the problem from a much simpler starting point: do all types of unemployment lead to radical politics? In this paper I provide evidence that suggests they do not. I show that, in the case of Spain, industrial unemployment has had an outsized effect on RRP support; meanwhile, unemployment among people trying to enter the labor market for the first time favored RLPs. I argue that this cleavage mimics political supply, as it matches the positioning taken by each radical party on key issues for those subgroups of unemployed people. Understanding political supply is therefore key to untangling the links between unemployment and radical support.

## Why does globalization seem to favor the radical right?

A large portion of the evidence reported in the paragraphs above draws from theoretical and empirical research on the rising appeal of the radical right. In part, this bias owes

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<sup>7</sup>A long tradition supports the notion that unemployment – whether at the individual or community level – constitutes a key factor driving political discontent. Back in 1981, Frey and Weck pointed to the remarkable correlation between the rise in German unemployment between 1930 and 1933 and skyrocketing support for the Nazi party.

to the fact that since the turn of the century RRP<sup>s</sup> have seen a revival across Western countries which remains (generally) unmatched by RLPs (Mudde, 2019; Rooduijn et al., 2019). Moreover, the Brexiteers' win in the United Kingdom's referendum to leave the European Union and Donald Trump's victory in the United States' presidential election in 2016 put a magnifying glass on the rising wave of radical right support. Both of these events were dubbed populist victories and sparked a boom in research on the reasons that led voters to support them <sup>8</sup>.

Many of these works deal with the concepts of populism, anti-EU sentiment, or radical party support without making distinctions between left- and right-wing outfits (Mudde and Kaltwasser, 2018). Radical left and right voters have been shown by the political literature to share some commonalities – chief among them a penchant for a populist rhetoric and a discontent with the traditional political landscape. But, beyond these factors linked to mistrust in political institutions and some shared socioeconomic characteristics, there exist fundamental differences between these two types of voters that can make it challenging to think of them as a unified phenomenon (McClosky and Chong, 1985; Rooduijn et al., 2017). RLP voters are more likely to identify as working-class, hold higher levels of education than voters from other parties, and – similarly to voters from the mainstream left – tend to value the principles of altruism and equality, which they believe the government has a role in upholding (Ramiro, 2016). RRP voters are in turn more likely to describe themselves as middle class, hold intermediate (rather than high) levels of education, and adhere to nativist worldviews (Rama et al., 2021).

Thinking of radical right and left voters in terms of what makes them distinct rather than similar may help to answer a key unanswered question: why are RRP<sup>s</sup> doing so much better than RLPs? It may seem remarkable that grievances stemming from a discontent with globalization and its distributional effects have benefitted radical right outfits rather than the radical left. RLPs usually advocate for redistributive policies, which should cushion the blow for some of the *losers of globalization*. Moreover, they have historically been associated with unions and the labor movement, which are responsible for many of the advances in workers' rights over the 20<sup>th</sup> century.

Changes in political supply are fundamental in understanding RRP<sup>s</sup>' political edge. Recent years have seen RRP<sup>s</sup> blend their archetypal anti-migrant rhetoric with protectionist and interventionist economic proposals. This shift helps to explain their recent appeal among working-class voters who would otherwise lie outside of their 'traditional' base (Schumacher

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<sup>8</sup>Some authors have taken issue with whether these movements can be described as populist (see Mudde and Kaltwasser 2018).

and van Kersbergen, 2016; Röth et al., 2018). Rodrik (2021) posits that RRP<sub>s</sub> have been able to leverage economic shocks to tap into up-to-recently dormant cultural preferences to generate a convincing narrative. There are reasons to think that economic and technological forces provide opportunities to catalyze cultural backlash, even if culture and identity themselves are slow to evolve (see, for example, Cerrato et al. 2018, Hays et al. 2019, and Baccini and Weymouth 2021). Nevertheless, this does not counter the possibility that the radical left could use (and may be using) the same strategy.

In line with this idea, Rodrik (2018) offers a more general approach: narratives that highlight differences with migrants or minorities lead to right-wing populism; narratives that focus on income inequality spawn radical left support. This approach is in fact complementary to the argument provided by Rooduijn et al. (2017) about the similarities and distinctions between radical left and right voters. One may therefore think of radical parties as attracting voters from a larger pool of *globalization losers*. All these voters are concerned with current economic conditions, but different subgroups will lean left or right based on: a) whether their identity is more in line with the mainstream left-right characteristics (e.g. ideals of equality and altruism vs. nativism, respectively), and b) whether a political outfit is able to build a convincing narrative around any contemporaneous economic shock. In other words, economic shocks offer opportunities to overhaul the status quo, but political supply is key in radical party success.

### 3.3 Radical voting in Spain

#### Unemployment and the rise of radical parties

Spain constitutes a particularly interesting case study on the rise of radical parties. Despite being plagued by high levels of unemployment since the 80s, the country saw remarkably low levels of radical voting until the 2015 national election. Until 2011, the political landscape was dominated by two mainstream parties: the Socialist Workers' Party (PSOE) to the left and the People's Party (PP) to the right (see the evolution of the vote shares across elections in Table 3.1). The radical right was almost non-existent until the most recent election, likely because memories of the Franco dictatorship – who governed Spain from 1939 until his death in 1975 – were still fresh in voters' minds. The radical left has had a stable parliamentary presence since Spain's transition to democracy, but never did it earn as much support as in recent years.

The Great Recession had a considerable impact on the vote. As in other European coun-

Table 3.1: Vote shares by election and party

	2008	2011	2015	2016	2019 (Nov)
<b>PP</b>	39.9	44.6	28.7	33.0	20.8
<b>PSOE</b>	43.9	28.8	22.0	22.7	28.0
<b>Radical left</b>	4.9	7.9	25.6	22.2	15.7
Podemos	0.0	0.0	20.7	21.1	12.9
<b>Radical right</b>	0.2	0.3	0.3	0.2	15.1
VOX	0.0	0.0	0.2	0.2	15.1
<b>Cs</b>	0.2	0.0	13.9	13.1	6.8
<b>Other</b>	10.9	18.4	9.5	8.8	13.6

tries, disapproval of the economic policies backed by mainstream parties likely played an important role in radical parties' growth (Kriesi, 2014). Two key populist parties emerged between December 2013 and January 2014: VOX (the second radical-right party to attain representation in the Spanish Congress) and Podemos (a radical-left outfit propelled by the '15-M' and '*Indignados*' – outraged in Spanish – movements). Both parties appeared as unemployment reached its peak (see Figure 3.1); both would also grow to become strong contenders in subsequent elections, bringing together the radical vote on each end of the political spectrum. Despite this, their trajectories developed very differently: while Podemos enjoyed popularity straight away, VOX did not gain traction across the country until the 2019 elections (see Table 3.1).

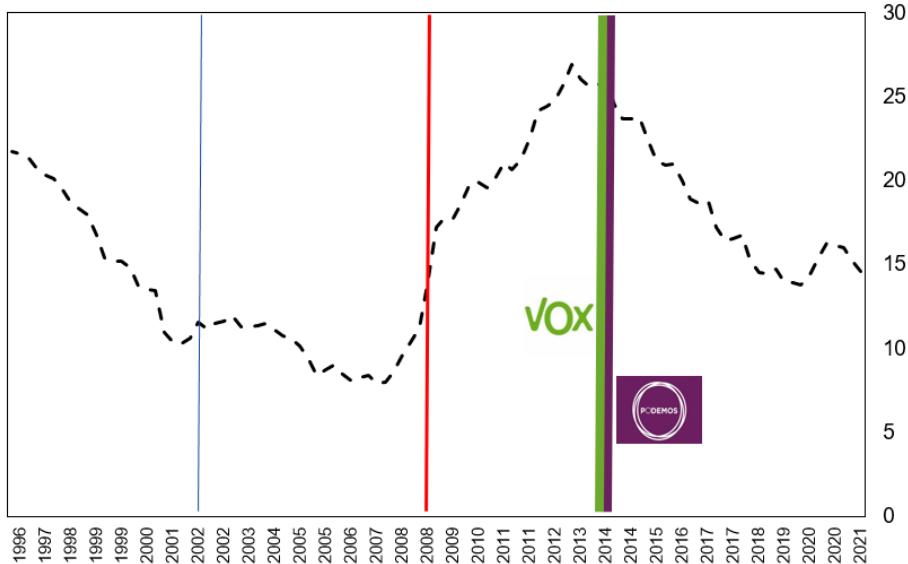


Figure 3.1: Unemployment rate (%), 1996-2021). The vertical lines mark the introduction of the Euro, the start of the financial crisis in Spain, and the appearance of VOX and Podemos in the Spanish political landscape.

Much has been written about the rise of both parties, especially VOX. In line with the description of other radical right voters in the rest of Europe, most VOX voters are male, aged between 30 and 45, high school graduates, and enjoy above-average levels of income. VOX's views on economic matters are traditionally right-wing – they eschew taxes and advocate for a smaller state –, a position that may attract voters who label themselves as middle class (Rama et al., 2021). Interestingly, the typical VOX voter does not consider that their personal economic conditions have worsened in recent years, although they do believe that Spain's economic and political circumstances are deteriorating (Heyne and Manucci, 2021). VOX is also aligned with European RRP's in other elements of its agenda, following a nativist, right-wing populist narrative and emphasizing the need for law and order in a country plagued by both internal and external threats ('la casta/dictadura progre' – 'the progressive caste/dictatorship' – and immigrants, respectively). The need to uphold traditional values and anti-feminism feature prominently in its communications, particularly on social media (Heyne and Manucci, 2021). In addition, the party takes advantage of salient local issues, being staunchly in favor of the recentralization of Spain's de-facto federal structure (*autonomías*) and of taking a hard stance on the Catalan issue (Turnbull-Dugarte, 2019).

Podemos voters are similar to VOX's in some respects: they too believe economic conditions in Spain are worsening and, at least during the party's initial years of success, rallied behind the idea of 'the people' or 'those below' pitched against 'la casta' – a term originally coined by Pablo Iglesias (Podemos's former leader and co-founder), but since then abandoned and taken up in a new format by VOX (Rendueles and Sola, 2018). 'La casta' as a concept and its broad definition<sup>9</sup> exemplifies Podemos' transversalist and populist approach to politics. Even if most of its electorate comes from the traditional left, its inclusive language in the years after the crisis likely helped it to win over more centrist voters (Rendueles and Sola, 2018).

Despite these commonalities, Podemos voters are in many ways distinct from VOX supporters: they tend to be better-educated (over 30% of them hold university degrees) and are more likely to live in cities (Rama et al., 2021)<sup>10</sup>. Rendueles and Sola (2018) point out that Podemos relied on the support of very specific societal groups, at least ahead of the 2016 election: students, unemployed people, and temporary workers – largely equally split

<sup>9</sup>Or lack thereof; in its rhetoric Podemos sometimes spoke about 'the 99%'

<sup>10</sup>This stands in contrast with VOX voters, who – also unlike RRP voters in other European countries – are as likely to live in cities as in the countryside (Turnbull-Dugarte et al., 2020). Voters' educated and urban natures might also make them more receptive to Podemos' liberal discourse, often centered around multiculturalism and LGBTQ+ and women rights.

between the service class, skilled and unskilled manual workers, and non-manual workers. These individuals tended to describe their personal economic situation as bad; yet, interestingly, a large part of Podemos' vote came from the middle-income bracket. While seemingly contradictory, this finding may align with the lived experiences of 'middle-class youths whose expectations have been let down. (...) The recurrent figure of the victim of the crisis was the young man with several careers and a Master's degree, who has to go abroad in search of work' (Rendueles and Sola, 2018, p. 41-42). This 'unfulfilled expectations' thesis can in fact help to understand the strong causal effect outlined in section 3.4.2, as worries about unemployment upon first entering the labor market are likely to have been extremely widespread in the aftermath of the financial crisis.

### **Political supply: Narratives around unemployment**

A key premise in this paper is that economic shocks offer an opportunity to radical parties. Their success will depend on their building narratives that win over specific subgroups of the population who have been hit by those economic shocks or are worried about their implications, even if they have not been directly affected. Table 3.2 highlights how unemployment and economic problems have been constant concerns for Spanish voters over the past 15 years. The table reports aggregated responses to a recurring survey undertaken by the Center for Sociological Research in Spain, where the researchers ask respondents to name the top 3 problems besetting Spanish society. The table only reports results for the months in which there was a national election. Unemployment consistently claims the number 1 spot. Already in March 2008, 46% of surveyed respondents listed unemployment as one of the top 3 issues, although the topic became much more prevalent in the collective psyche with the advent of the financial crisis. The 'economic problems' response follows a similar pattern, reaching 48% of all respondents in November 2011 – even if it has since then dropped to third place.

Table 3.2 also evidences growing discontent with how politics functions. Starting from a scant 6% in 2008, by 2019 almost half of the respondents listed politicians, political parties or politics more broadly as one of the top 3 problems plaguing the country. This increase has coincided with rising political polarization, defined by the success of new entrants at both ends of the political spectrum (see Table 3.1).

With mounting political discontent and unemployment as a common grievance, it is key to understand how each of the parties caters to voters worried about unemployment and adverse economic circumstances. Here, I report the results of a simple quantitative text analysis of all tweets shared from the official accounts of the 4 main political parties in

Table 3.2: Most pressing societal problems (% of all respondents). The results correspond to a multi-response, unprompted question in the CIS (Center for Sociological Research) Barometer, a monthly, nationally representative survey aimed at assessing public opinion on current topics of interest. The question is phrased as: ‘Which is, in your view, the most important problem that currently exists in Spain? And the second most important? And the third?’. The data shown in this table corresponds to the months in which national elections took place.

	2008	2011	2015	2016	2019
Unemployment	45.8	83	79.8	76.4	60.3
Politicians as a group, political parties, and politics	6.3	22.6	14.8	21.1	45.5
Economic problems	39.4	48.2	24.4	25.1	30.4
Corruption	0.2	5.4	38.8	44.9	18.4
Terrorism (ETA)	36.9	3.7	0.1	0.2	0

Spain. To make sure the narratives were likely to have had an effect on electoral voting, I restrict the analysis to tweets posted within three months before each national election <sup>11</sup>. This amounts to a total of 69,818 tweets.

The approach relies on a very simple algorithm based on word associations. After some basic text processing <sup>12</sup>, I look for the series of words that each party most often mentions in tweets that include the word unemployment (‘paro’ or ‘desempleo’ in Spanish). For each party, I report only the five words with the largest associations to unemployment, or less if the association lies below 0.25. This gives a sense of the general narrative that each of the parties is building around the concept of unemployment. It should be noted, nonetheless, that high correlations do not necessarily imply that the topic of unemployment is very salient in the overall party narrative. Very often the opposite is true: for instance, because VOX tends to talk less about economic issues on Twitter than, say, Podemos, the former’s associations tend to be larger <sup>13</sup>.

The results in Figure 3.2 show very clear patterns. Let us first start with the mainstream parties. On the mainstream left, PSOE highlights the importance of long-term unemployment and appears to draw links between the experience of unemployment and precarious jobs. Towards the right of the political spectrum, the PP’s party narrative simply refers to declining rates of unemployment. This is perhaps to be expected, as the party was in

<sup>11</sup>Data only includes tweets from the 2011 election onwards. This is because PSOE and PP joined Twitter in 2009, and VOX and Podemos joined in 2013 and 2014, respectively.

<sup>12</sup>I remove URLs, accents, punctuation, numbers, and stopwords from the tweets. The term stopwords refers to a set of very commonly used words that do not convey any key meaning in a sentence (e.g. ‘the’ in English or ‘el’ in Spanish).

<sup>13</sup>Narratives in Twitter tend to be far more polarized and cover a narrower sets of topics than those discussed in party manifestos. This means that an issue may be very salient in the manifesto but not so much on Twitter.

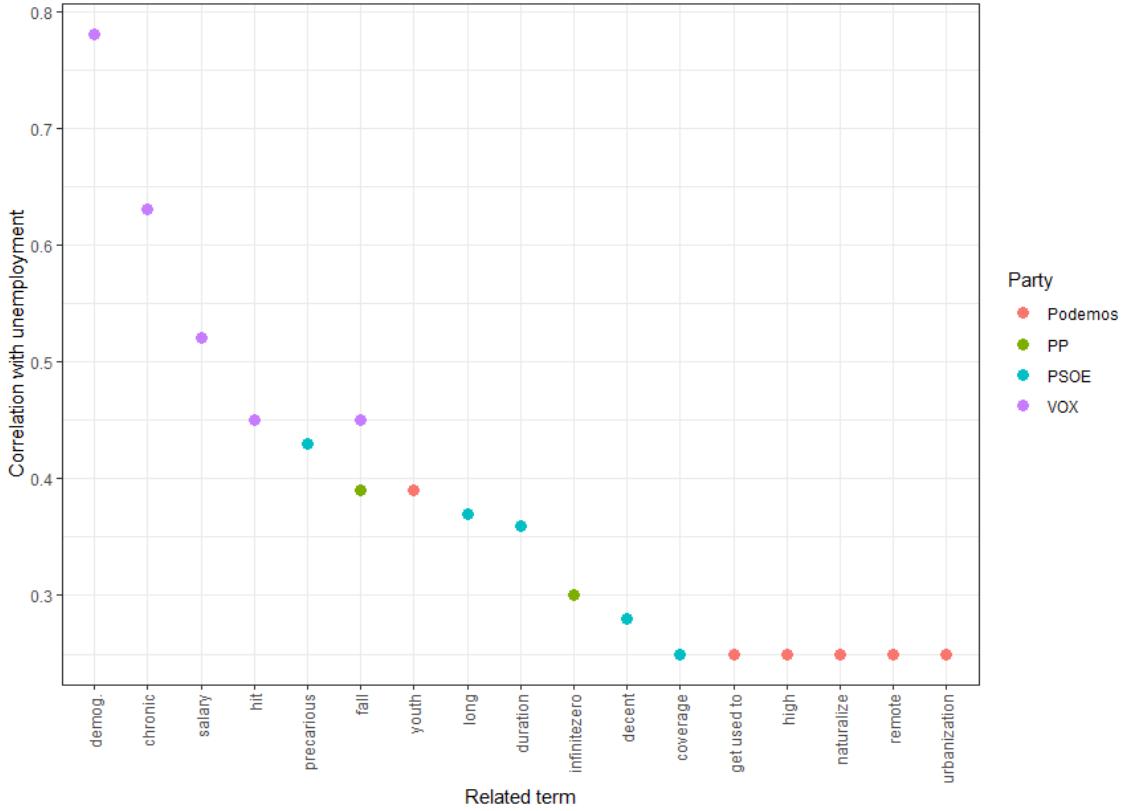


Figure 3.2: Main word associations for the term ‘unemployment’. The graph summarizes the relationships present in tweets published from each of the party’s official Twitter accounts 3 months prior to any of the last 4 national elections (2011 -2019).

power during most of the period of study – between 2011 and 2018. Interestingly, both of these narratives deal with the unemployed as a relatively homogeneous group.

Let us now delve into the narratives of the parties at both ends of the political spectrum. Podemos features one main term that consistently appears in their tweets about unemployment: youth. This is, most of their framing of the issue of unemployment relates to how it affects young people. This fact is also particularly salient in their manifesto for the 2015 elections – coinciding with the time when the party enjoyed most electoral success (Podemos, 2015). Based on this finding, we can state as a hypothesis of interest that:

**Hypothesis 5** *Higher local rates of youth unemployment or unemployment upon first entering the labor market generate support for the radical left.*

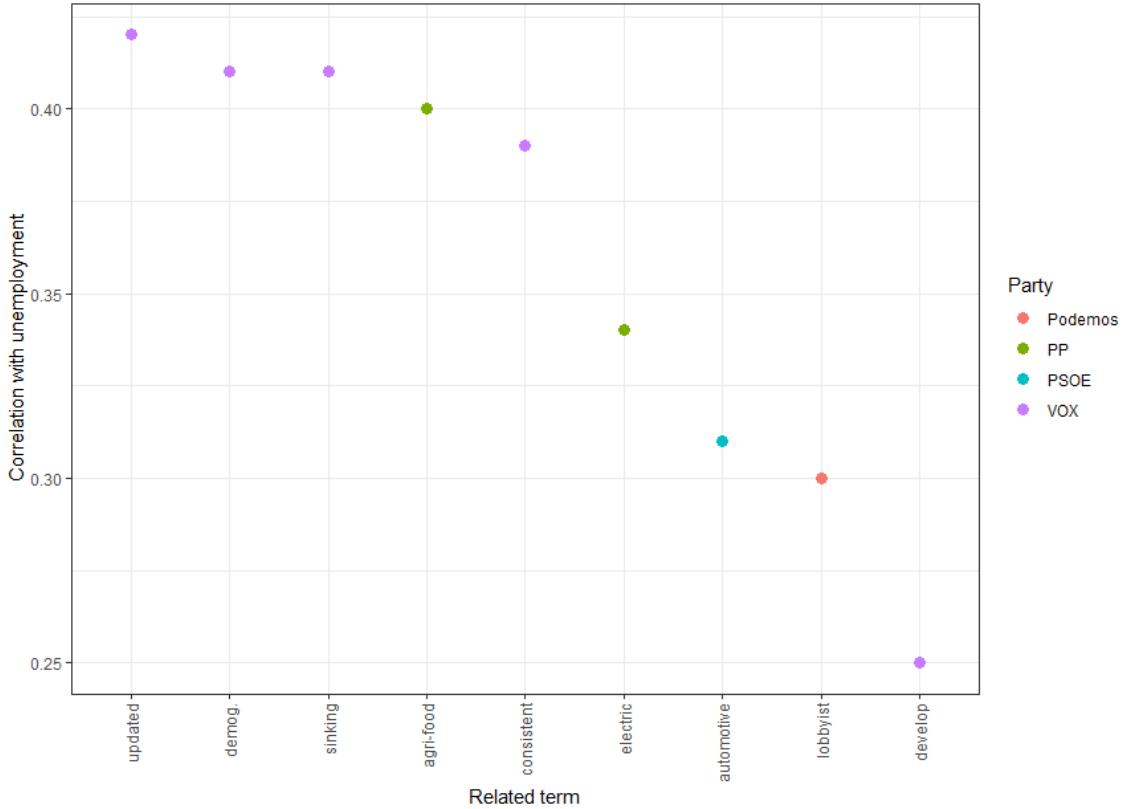


Figure 3.3: Main word associations for the term ‘industry’.

VOX’s narrative is a bit more convoluted. The two terms that are most often linked to unemployment are a version of ‘demography’ (i.e. ‘demographic’, ‘demography’, etc.) and ‘chronic’. The latter, as well as the connection to salaries, does not necessarily provide a distinct narrative – notice that it appeals to similar interests as PP and PSOE. But the former appears to build a connection between unemployment and demographic change. Employing the same strategy on the term ‘demog.’ supports this notion: the other 3 words – other than ‘unemployment’ and ‘chronic’ – with the highest associations with demography are ‘salary’, ‘misery’, and ‘industry’. This in fact aligns with mentions of a push for reindustrialization in VOX’s most recent manifesto (VOX, 2019). Nonetheless, reindustrialization has become a common policy objective in recent years. Both PP and PSOE also make constant references to this issue in their manifestos. As a result, even if mainstream parties do not appear to make a direct connection between unemployment and reindustrialization, it would be helpful to understand differences in how each of the parties would tackle an industrializing effort.

Figure 3.3 provides some insight on how each party views industrial development. Two key facts become clear: first, Podemos is the only party that explicitly rejects industry,

speaking of it as ‘lobbyist’. Second, PP and PSOE appear to focus on specific sectors – agri-food and electric, and automotive, respectively. Only VOX speaks of industry as a sector that is sinking and is linked to demographic change. Based on this simple associations, we may want to test whether:

**Hypothesis 6** *Higher local rates of industrial unemployment help to build support for the radical right.*

## 3.4 Results

From here on, to test the hypothesis outlined in the previous section, I focus on estimating the role that different types of unemployment have played in the increasing polarization of Spanish politics. I study this relationship in two stages. First, I look for evidence of a link between job losses and radical party support without delving into the issue of causality (subsection 3.4.1). I find that, while on the surface contextual unemployment does not appear to have generated political polarization, job losses in industry and young people’s difficulties upon entering the labor market indeed appear to have fueled support for radical right and left parties, respectively. I then turn to the causal estimation of these parameters in subsection 3.4.2.

### 3.4.1 Some kinds of unemployment fuel political polarization

Based on the narratives around unemployment and industrial decline outlined in section 3.3, I gather unemployment data from the National Public Employment Service (SEPE, according to its initials in Spanish). This dataset includes unemployment numbers broken down by the sector workers belonged to before being laid off. More specifically, for each municipality there is information on the total number of unemployed individuals who used to work in agriculture, industry, construction, services, or never had a job prior to entering the unemployment ranks.

Let us first start with the most common approach in the literature: a baseline two-way fixed effects (TWFE) specification for the link between unemployment and the share of the vote in favor of radical parties:

$$vote_{mt} = X_{mt} \gamma + \beta unemp'_{mt} + \lambda_m + \delta_t + \epsilon_{mt},$$

where  $vote_{mt}$  refers to the share of the vote that went to radical parties – either the radical

left (largely Podemos since 2015) or the radical right (overwhelmingly VOX since 2019) – in municipality  $m$  at time  $t$  (i.e. across the 2008, 2011, 2015, 2016, and 2019 elections). I group parties within the radical left and right families to have baseline against which to compare Podemos and VOX. For a breakdown of the parties included as part each radical family see Annex 3.B.

$unemp'_{mt}$  is the variable of interest: the share of the total working-age population (25-64 years old) classified as unemployed.

$X_{mt}$  includes a series of control variables aiming to account for factors the literature has found relevant to radical party support and that may confound the relationship of interest. Their summary statistics are available in Annex 3.A. There are 5 different elements in the vector:

- Population controls: Employment options are more abundant in more densely populated areas. At the same time, radical right voting has been shown to follow an urban/rural dichotomy – see Becker et al. (2017) on Brexit or Dijkstra et al. (2020) on anti-EU sentiments. Given its role as a confounding factor, I include log population as a control in all specifications.
- Age controls: The anti-EU vote has been described as older (see Dijkstra et al. 2020), while the radical left appears to be more popular among younger voters and the radical right features more of a mixed profile (Rama et al., 2021). Municipality age profiles are also key in determining unemployment shares: notice, for instance, that the share of older voters can also be interpreted as expressing the political interests of pensioners – who are, by definition, not unemployed. I therefore control for the share of the voting population under 35 as well as the share of voters who are older than 65 years old.
- Turnout: Support for radical parties is often understood as a protest vote (Rooduijn et al., 2017). This means that turnout can act as a mediator between unemployment and radical voting. To account for this mechanism, all specifications include turnout as control, which stands as a proxy for the general political engagement of the electorate in a given election year. Nonetheless, I have run alternate models excluding turnout and this does not alter the results of the paper in any meaningful way <sup>14</sup>.
- Local economic conditions: Income levels are likely to correlate with different types of unemployment, while also potentially driving the discontent that may push indi-

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<sup>14</sup>These calculations are available upon request.

viduals in a given municipality to vote for radical parties. Consequently, I add mean levels of income at the municipality level to all specifications <sup>15</sup>.

- Immigration controls: There is ample literature on the role of immigration in driving support for radical parties, especially to the right of the political spectrum. This variable is intended as a simple control to account for the likely exposure of inhabitants of a specific municipality to non-natives.

Table 3.3: Baseline TWFE regression for the effect of overall unemployment on radical-party vote

	(1) All radical	(2) Radical left	(3) Radical right
Log 25-64 population	12.633*** (0.574)	11.836*** (0.542)	0.796* (0.388)
Share of voting pop. under 35	-0.274*** (0.021)	-0.200*** (0.020)	-0.074*** (0.012)
Share of voting pop. over 65	0.121*** (0.024)	0.199*** (0.022)	-0.078*** (0.014)
Turnout	0.167*** (0.012)	0.317*** (0.011)	-0.150*** (0.007)
Foreign	-0.380*** (0.054)	0.148* (0.068)	-0.528*** (0.073)
Log income per capita	-0.067 (0.479)	-5.620*** (0.353)	5.553*** (0.470)
Unemp. rate	0.033 (0.018)	0.039** (0.015)	-0.006 (0.010)
N	40,590	40,590	40,590
Municipality FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N clusters	8,127	8,127	8,127

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 3.3 includes the results of this simplest baseline specification. In order to place the analysis in context, I will first discuss the controls. Their signs and significance remain stable throughout the analysis. Therefore, for the sake of simplicity, I do not report them in later tables, only indicating they have been included in the computation. Overall, findings align with the description of radical voting depicted in Rama et al. (2021). The

<sup>15</sup>As with turnout, excluding income from the regressions does not alter the main results of the paper. However, I keep it in the model because it helps with the framing of the instrumental variable strategy outlined in the next subsection.

coefficients indicate that the vote for the radical left in Spain is clustered around more populated areas, while the radical right is not as rural as comparable movements elsewhere in Europe. Age profiles also matter for the geography of radical voting. Municipalities with larger shares of young voters do not favor radical parties – not an unexpected finding if we consider that both the modal Podemos and VOX voter are between 30 and 45 years old. In contrast, municipalities with higher shares of older voters appear to favor radical left parties, a surprising – albeit robust – result. From the angle of the protest vote, radical right support is associated with lower turnout, while the opposite is true of radical left voting. In addition, richer municipalities with less migrants favor the radical right; meanwhile, the radical left performs better in poorer municipalities where a higher share of the population was born outside of Spain.

But the key finding in Table 3.3 is that unemployment rates have no statistically significant effect on radical voting (see the coefficient in Column 1). Columns 2 and 3 extend the analysis along the left-right divide. In the case of the radical right, the coefficient remains insignificant. Only the radical left appears to have seen a statistically significant – if minute – gain: a 10 p.p. increase in unemployment is associated with a rise in the vote for the radical left of 0.4p.p, all other controls being held constant. A model where the unemployment rate is interacted with the share of foreigners in the municipality produces similar results. Based on this analysis, we would conclude that unemployment did not do much to generate political polarization, as only the radical left was able to capitalize on it, and only to a very small extent.

One may wonder how this is possible, given the evidence that unemployment is at the forefront of the issues that worry Spanish voters. A possible answer presents itself if we consider that those concerned about unemployment are far from constituting a homogeneous group. Here is where the evidence outlined in Section 3.3 comes in: each radical party has built a different narrative around unemployment. This means that, for the purposes of radical voting, we should not expect the effect of unemployment to be homogeneous, or even to always favor the same (radical) party.

To understand whether the reality behind those narratives has an effect on the vote, I now specify a model where the unemployment rate is decomposed in its different sub-components: previous employment in agriculture, industry, construction, services, or first-time unemployed<sup>16</sup>. In other words, I run a horse race between different types of un-

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<sup>16</sup>This division is of course arbitrary, but it is relevant in the case of Spain simply because two of the categories closely match radical party narratives about economic development and unemployment.

employment, aiming to verify whether the subgroups each party targets indeed favor the radical outfit espousing the matching narrative.

Table 3.4: Baseline TWFE regression of radical vote on the different types of unemployment

	(1) All radical	(2) Radical left	(3) Radical right
Share of industrial unemp.	0.278*** (0.063)	0.103 (0.058)	0.175*** (0.034)
Share of first-time unemp.	0.410*** (0.071)	0.644*** (0.068)	-0.234*** (0.034)
Share of agricultural unemp.	-0.379*** (0.048)	-0.363*** (0.049)	-0.016 (0.030)
Share of construction unemp.	0.081 (0.044)	0.221*** (0.038)	-0.140*** (0.026)
Share of services unemp.	0.015 (0.022)	-0.012 (0.020)	0.028 (0.015)
N	40,590	40,590	40,590
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Municipality FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Year FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
N clusters	8,127	8,127	8,127

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

As expected, the results in Table 3.4 indicate there is substantial heterogeneity in municipal voting patterns depending on which type of unemployment is most prevalent locally. From the regression output, it becomes clear that industrial unemployment favors the radical right, while a higher share of unemployment among those who have never held a job and those working in construction brings about support for the radical left. No other type of unemployment appears to trigger support for radical parties. The results are either statistically insignificant (as with the share of unemployed having previously worked in the service sector) or show a negative sign (e.g. the share of unemployed exiting the agricultural sector is negatively associated with the vote for the radical left, while construction unemployment exhibits a similar relationship with radical right support).

Unsurprisingly, these groups match the party narratives described in section 3.3 and therefore confirm the stated hypotheses. This suggests that future research aiming to explain the role unemployment plays in driving support for radical parties should first understand how political supply targets the unemployed or those worried about the societal consequences

of unemployment. I only remain agnostic in the case of construction unemployment. Even though it is likely to reflect the effect of Podemos's popularity among young voters at the height of the crisis, no party has built a specific narrative around the fate of construction workers <sup>17</sup>. Nonetheless, the placebo tests included in Annex 3.C indicate that this type of unemployment benefited the mainstream right (PP) more than it did the radical left.

### 3.4.2 The causal effect of unemployment on political polarization

The estimates reported in Table 3.4 need not describe a causal relationship. The TWFE strategy does exploit within-municipality variation, which helps to rule out the influence of any time-invariant, municipality-specific characteristics in the relationship between unemployment and radical voting. These may include the region the municipality belongs to, long-term depopulation since 1960 until 2008, or urban infrastructure in a particular municipality. But it does not deal with any time-varying, municipal-level confounders, such as, say, changes in local costs of living or in local corruption levels. Another potential issue, although far less likely, is that of reverse causality: the possibility that higher shares of support for radical parties instead lead to more local unemployment. Finally, one may also be concerned about measurement error, as Social Security statistics will certainly not take into account individuals who take up employment in the informal economy, but these people may still be sensitive to narratives about unemployment. I devote the next two subsections to the implementation of an instrumental-variable (IV) strategy to deal with these issues.

#### First-time unemployment

To explore the causality in the relationship between first-time unemployment and radical left vote, I develop an IV approach that makes use of the size of local birth cohorts. Research in labor and population economics suggests that birth cohort size affects subsequent levels of unemployment and wages upon entering the labor market (Bertola et al., 2007). My strategy is therefore to exploit the variation in the relative sizes of those cohorts just entering the labor market (individuals between 18 and 25 years old at the time of a national election) as a source of exogenous variation in first-time unemployment. More specifically, I build the instrument as the sum of all local births in municipality  $m$  between 18 and 25 years before each national election, i.e.:

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<sup>17</sup>At the beginning of the period of study, in the year 2008, over 35% of construction workers were younger than 30 years old, and almost 70% were under 40. Those shares had gone down to 9% and 34%, respectively, by the year 2018 (Source: Spanish Labor Force Survey).

$$\text{Relative cohort size}_{mt} = \frac{\sum_{a=18}^{25} \text{births}_{m(t-a)}}{\text{pop}_{m(t-18)}} * 100,$$

where  $t$  indicates election year and  $a$  stands for age. An example may help to clarify this. Let us focus on the calculation of the relative size of the young (aged 18-25) cohort for the  $t = 2008$  election. To create the instrument, I sum up all births between the years 1983 (i.e.  $t - a = 2008 - 25$ ) and 1990 (i.e.  $2008 - 18$ ) for municipality  $m$  and divide this sum by the total population of the municipality in 1990.

This identification strategy is based on two main assumptions. First, the relative cohort size does affect local first-time unemployment. The first-stage result reported in Table 3.6 shows that this is indeed the case: larger relative cohort sizes are associated with more first-time unemployment. The first-stage regression indicates that relative cohort size explains roughly 10% of the variation in the rates of first-time unemployment, an interesting finding in its own right <sup>18</sup>. To provide more evidence that the relative cohort size does not constitute a weak IV, I also report the heteroskedasticity-robust Kleibergen-Paap F statistic for weak instruments in Table 3.6. It is large enough to suggest that we can reject the null hypothesis of a weak instrument.

Second, the exclusion restriction also needs to hold. Conditional on the controls included in the regression (go back to Table 3.3 to see them listed), relative cohort size should have no impact on radical voting except for its effect through first-time unemployment. Notice here that the specification controls for the average level of income in each municipality, an approach that helps to rule out the economic channel (i.e. bias generated by the fact that the relative size of birth cohorts may be associated with local wages or other economic conditions aside from unemployment). Having discarded the economic route, the main

Table 3.5: Mean relative cohort sizes and radical left vote by year

Year	Relative cohort size	Radical left vote
2008	6.81	3.49
2011	6.23	5.60
2015	5.68	18.58
2016	5.55	16.58
2019	5.36	12.12

<sup>18</sup>Of course, differences in the relative size of birth cohorts are not the only – or the main – cause of variation in the rate of unemployment upon first entry in the labor market. But for this strategy to function the only requirement is that they generate some level of exogenous variation.

concern left is that the relative size of birth cohorts could be associated with levels of social capital, which could in turn influence the level of support for radical parties. In such a case, the IV estimates would be assigning the effect of social capital on radical left support to first-time unemployment. Yet I believe this is an unlikely outcome and that the exclusion restriction is likely to hold. In Table 3.5 one can see that the relative size of birth cohorts has been consistently declining over time. This would be in line with an extension of Putnam's theory whereby social capital is progressively being eroded (Putnam, 2000). One might think that smaller birth cohorts could be associated with declining participation in communal activities, an indicator of the weakening of the networks of relationships that shape society. This weakening of social ties could well explain some of the vote in favor of radical parties. But if this were the case, we would expect to see a monotonic relationship in the data: as cohorts become smaller, vote for the radical left becomes more prominent. Yet, this is not the relationship shown in Table 3.5 or in the reduced-form equation in Table 3.6. Instead, the regression shows that, on average, larger cohorts vote more for the radical left. In contrast, the radical left vote does appear to closely track the pattern drawn by first-time unemployment rates.

The last column in Table 3.6 reports the causal estimate of the impact of first-time unemployment on radical left support. The coefficient, at 10.9, is statistically significant at all levels and much larger than the OLS estimate included in column 1. The key question here is whether the IV estimate makes quantitative sense. Controlling for all other factors in the model, a one-percentage-point (p.p.) increase in first-time unemployment leads to a jump in the vote for the radical left of about 11 p.p. This value may seem extraordinarily high, but one should note that the average rate of first-time unemployment in the data is 0.78%, so a 1 p.p. difference in the variable constitutes in fact a very high increase.

The large difference between the IV and OLS results also suggests that measurement error in the first-time unemployment variable is likely to be more relevant in this case than omitted variable bias or reverse causality <sup>19</sup>. This should come as no surprise. Many young people do not bother to register their unemployed status with the Social Security system if they have not worked before. This is because under the Spanish benefits system they are not entitled to any unemployment insurance payments, as one needs to have contributed for at least a few months in order to qualify for unemployment aid. This translates into a measure of first-time unemployment that is biased towards 0.

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<sup>19</sup>The main alternative would be an omitted variable that is negatively correlated with the level of first-time unemployment. For the reasons given in the previous paragraph, this does not seem likely.

Table 3.6: IV estimation of the effect of first-time unemployment on the radical (left) vote

	(1) TWFE	(2) First-stage	(3) Reduced-form	(4) Second-stage
Share of first-time unemp.	0.644*** (0.068)			10.877*** (1.364)
Relative cohort size		0.052*** (0.005)	0.564*** (0.051)	
Controls				<i>Yes</i>
Municipality FE				<i>Yes</i>
Year FE				<i>Yes</i>
Weak ident. (Kleib.-Paap)				$F = 115.128$
Number of clusters				8,126
Observations	40,590	40,589	40,589	40,589

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In addition, what matters for the vote in favor of the radical left today is presumably not only contemporary first-time unemployment, but also past first-time unemployment. The measure of first-time unemployment used in this study is therefore not able to capture the full effect, making the estimate larger. Consequently, the 15-fold difference should be taken as an upper bound. But, in any case, the estimate in Table 3.6 implies a substantial, but not implausibly large, impact of differences of first-time unemployment on support for the radical left.

### **Industrial unemployment**

I now turn to the causal relationship between industrial unemployment and vote in favor of the radical right. I once again employ an IV strategy, but this time I exploit the exogenous variation created by the announcement of the closure of large industrial plants across the Spanish territory.

Plant closures have been a feature of the last few decades across developed countries (Rodrik, 2016). Both globalization and automation have contributed to this trend, although regulation and investment (including state aid) are likely to have also played a role (Guriev and Papaioannou, 2020). In this regard Spain is no exception. Figure 3.4 illustrates the remarkable drop in manufacturing employment that has taken place over the past decades. But the Spanish case is particularly interesting because the deindustrializing trend has been both sudden and relatively recent. Across most OECD nations, the origins of deindustrialization can be traced back to the 1970s (Broz et al., 2021). Not so in Spain, where the push for development took place during that decade. The sharpest drop instead occurred after 2007, coinciding with the onset of the financial crisis.

To identify plant closures, I take advantage of a dataset built by the EU agency Eurofound. This agency is responsible for the European Restructuring Monitor (ERM), a project that regularly tracks the employment impact of large restructuring events across Europe. They maintain a record of all sorts of restructuring events but, since I am only interested in those that would be able to generate industrial unemployment, I keep only events classified as closures, bankruptcies, offshoring, relocations, and outsourcing of manufacturing firms operating in Spain. For the sake of simplicity, I will refer to all of these as plant closures from now on. It is important to note that Eurofound not only registers events that have already taken place, but rather tracks closures that may be just announced or in progress but have been picked up by media articles – usually by large national or regional newspapers. This in effect guarantees that the local population has been made aware of each closure.

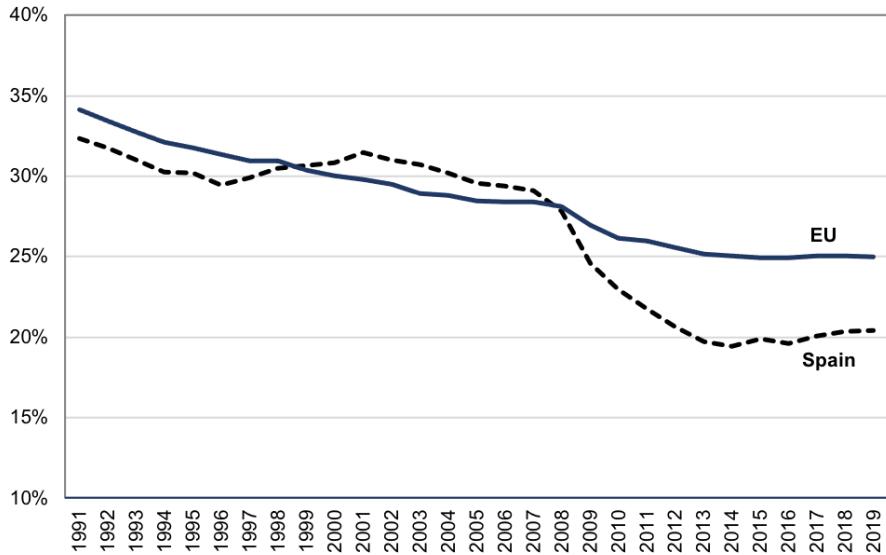


Figure 3.4: Share of manufacturing employment (Spain and European Union average, 1991-2019)

Between 2008 and 2019, there were a total of 92 large plant closures across the Spanish territory. On average, each of them would have laid off a minimum of 220 employees, a large enough number to make a difference in local industrial unemployment levels. I take the simplest possible IV strategy, and build a dummy variable that is set to 1 if a plant closure takes place in municipality  $m$  in year  $t$ . The dummy remains on in the years following a closure until the end of the period of study. If municipality  $m$  happens to belong to an urban area (e.g. the Madrid metro area is composed of 52 municipalities, and Barcelona's of 165), the closure dummy is applied to all municipalities in the city. This is to account for the fact that those municipalities in effect belong to the same local labor market.

As with the previous IV, two main requirements need to be met. First, relevance: plant closures should have an impact on local industrial unemployment. Unsurprisingly, Column 2 in Table 3.7 indicates that this is so. The announcement of a plant closure leads to higher levels of unemployment among people who used to work in industry. Both the R-squared of the first-stage regression – at 0.105 – and the Kleibergen-Paap F statistic – 71.218 – suggest that weak instrumentation is not an issue.

Table 3.7: IV estimation of the effect of industrial unemployment on the radical (right) vote

	(1) TWFE	(2) First-stage	(3) Reduced-form	(4) Second-stage
Share of industrial unemp.	0.175*** (0.034)			1.847** (0.652)
Plant closure		0.173*** (0.020)	0.319** (0.109)	
Controls				<i>Yes</i>
Municipality FE				<i>Yes</i>
Year FE				<i>Yes</i>
Weak ident. (Kleib.-Paap)				<i>F</i> = 71.218
Number of clusters				8,126
Observations	40,590	40,589	40,589	40,589

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Second, the exclusion restriction: holding all controls constant, the plant closure dummy should only affect radical right vote through the industrial unemployment channel. As in the previous specification, controlling for the average level of income in the municipality should shut down the economic avenue. Here, the main remaining concern is that the announcement of a closure could have a direct impact on voting behavior, perhaps related to a decrease in tax revenue and a subsequent drop in the quality or availability of social services. While the cycle of ‘agglomeration reversal’ may indeed start with a plant closure <sup>20</sup>, I argue here that the period of study covered – 12 years – is too short to generate direct effects from the closure to radical right vote.

I report the result of the IV estimation in Column 4 of Table 3.7. The coefficient suggests that, conditional on all controls, a 1 p.p. increase in industrial unemployment leads to a 1.8 p.p. rise in favor of the radical right. This effect is, once again, substantial but not very large, as the mean industrial unemployment rate stands at about 1% of the local population. IV estimates are also larger than those coming from OLS. In this case, for the reasons discussed above, the possibility remains that an omitted variable, such as quality of public service provision, is negatively correlated with industrial unemployment. This omitted variable would lead to a downward bias in the OLS estimate, explaining the difference in the results.

### 3.5 Conclusion

This paper contributes to the literature in quantitative political analysis and economic geography on the economic drivers of radical voting. I provide empirical evidence that, in the Spanish context, recent unemployment shocks have generated political polarization. Employing an instrumental-variable strategy, I show that the relationship between different types of unemployment and the vote in favor of radical parties is causal. I make use of the relative size of young cohorts to generate exogenous variation in first-time unemployment. This approach shows that increases in the share of people who were unemployed upon first entering the labor market was responsible for a substantial part of the radical left’s recent electoral success. Similarly, using the location and timing of plant closures to instrument

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<sup>20</sup>Examples such as the Rust Belt in the United States or industrial towns in the north of England often come to mind as places that enjoyed an age of splendor followed by catastrophic decline. The disintegration of local industry set off an all-too-familiar chain of events: with labor demand plummeting, wages fell, labor force participation dipped, and young people started to leave in the hope of finding better economic opportunities elsewhere. As depopulation set in, house prices declined and public service provision worsened. In other words, localized deindustrialization led to a process of reverse agglomeration.

for industrial unemployment, I find that unemployment among people who used to work in industry had a positive and significant – although smaller – effect on radical right support.

This does not mean that unemployment is inherently polarizing or will always lead to radical voting. Rather, I argue that the unemployed are rarely a homogeneous group. Consequently, the experience of widespread unemployment simply offers an opportunity for parties (new or old) to develop populist narratives – perhaps also tapping into other forms of identity politics. Whether unemployment favors radical parties or not simply depends on how successful these narratives are in attracting a subgroup of those worried by their economic futures. In short, unemployment shocks give an edge to those trying to shake up the political landscape, but this requires that parties are able to supply the right narrative targeting the right group of voters.

This is a simple but important message to carry forward: political supply matters because it conditions the effect of unemployment on radical voting. The fact that it is often ignored in the literature explains why estimates of the effect of contextual level unemployment on radical support often obtain contradictory results. Although this study focuses on the Spanish context – given its fraught relationship with unemployment – similar empirical approaches can be applied across Western democracies and elsewhere. In this regard, Twitter constitutes a good source for the analysis of political supply and, given their differences in focus, it is a suitable complement to party manifestos and congressional speeches.

This paper also has significant implications for Spanish policymakers, highlighting the importance of initiatives to solve the persistence of unemployment – and precarious working conditions more broadly. The lack of economic opportunities, in particular for younger generations and for those living in industrial towns that may become *places that don't matter*, is only making the political landscape more polarized.

### 3.A Summary statistics

Table 3.8: Summary statistics for the main variables of interest

	Mean	SD	Min	Max	N
All radical	14.24	12.30	0.00	97.33	40590.00
Radical left	11.27	10.92	0.00	97.33	40590.00
Radical right	2.97	6.78	0.00	82.76	40590.00
Log 25-64 population	5.90	1.92	0.00	14.46	40590.00
Share of voting pop. under 35	18.03	6.65	0.00	55.43	40590.00
Share of voting pop. over 65	32.69	11.37	0.00	85.71	40590.00
Turnout	74.78	7.76	2.11	103.57	40590.00
Foreign	8.56	5.32	0.65	77.62	40590.00
Log income per capita	9.85	0.32	8.62	11.08	40590.00
Share of first-time unemp.	0.78	0.93	0.00	15.38	40590.00
Share of agricultural unemp.	0.85	1.27	0.00	41.67	40590.00
Share of industrial unemp.	1.14	1.20	0.00	21.71	40590.00
Share of construction unemp.	1.47	1.66	0.00	33.33	40590.00
Share of services unemp.	6.13	4.06	0.00	55.56	40590.00
Relative cohort size	5.93	2.81	0.00	20.00	40590.00
Plant closure	0.08	0.27	0.00	1.00	40590.00

### 3.B Radical party breakdown

Table 3.9: Radical left parties, 2008-2019 Spanish national elections

Election	Radical left
2008	IU, BNG, EA, PCPE, POSI, LI-LITCI, N Som
2011	IU-LV, BNG, PCPE, Anticapitalistas, UCE, POSI, +MAS+
2015	Podemos, En Comú, Podemos-Compromís, Podemos-En Marea, IU-UPeC, EH Bildu, NOS, PCPE, PCOE, +MAS+
2016	Podemos-IU-Equo, ECP, Podemos-Compromís-EUPV, Podemos-En Marea-Anova-EU, BNG-Nós, EH Bildu, PCPE, PCOE, IZAR
2019 (Nov)	Podemos-IU, Podemos-EU, ECP-Guanyem el Canvi, BNG, CUP-PR, PCPE, PCTE, PCOE, EH Bildu, IZQP, IZAR

Table 3.10: Radical right parties, 2008-2019 Spanish national elections

Election	Radical right
2008	FE de las JONS, DN, AES, España2000, FA, AuN, FRENTE, MFE
2011	PxC, España2000, FE de las JONS, DN, DNE
2015	VOX, FE de las JONS
2016	VOX, FE de las JONS, PxC, FE
2019 (Nov)	VOX, FE de las JONS

### 3.C Placebo tests

Table 3.11: Placebo tests

	(1) Podemos	(2) PSOE	(3) PP	(4) VOX
Share of industrial unemp.	0.035 (0.046)	-0.023 (0.051)	-0.212** (0.067)	0.158*** (0.034)
Share of first-time unemp.	0.180*** (0.052)	-0.028 (0.062)	-0.120 (0.073)	-0.239*** (0.034)
Share of agricultural unemp.	-0.332*** (0.046)	0.264*** (0.044)	0.080 (0.050)	-0.031 (0.029)
Share of construction unemp.	-0.065 (0.035)	-0.070* (0.035)	0.191*** (0.046)	-0.145*** (0.025)
Share of services unemp.	0.023 (0.018)	-0.046* (0.022)	-0.066** (0.025)	0.018 (0.014)
N	40,590	40,590	40,590	40,590
Controls	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N clusters	8,127	8,127	8,127	8,127

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## Chapter 4

# Does university education still pay off? A cohort analysis of Spanish wage premiums

### **Mileurista**

Said about a person: Receiving a monthly salary of around 1,000€ and being in a position that does not meet one's own professional expectations.

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*Royal Spanish Academy*

### 4.1 Introduction

On August 20<sup>th</sup> 2005, Carolina Alguacil wrote a letter to the editor of *El País*, one of Spain's largest journals. At the time a 27-year-old publicist, she titled her piece: 'I am a *mileurista*'. In it she explained the plight of a young generation that, despite holding 'a university degree, (...) speaking foreign languages, having completed post-graduate studies, Master's degrees, and short courses (...) does not earn more than 1,000€ [a month], with no extra pay, and God forbid you complain' (Alguacil, 2005). Her message resonated with

the general public. So much so that, by 2012, the Royal Spanish Academy – the institution in charge of standardizing Spanish as a language – included *mileurista* as an entry in the dictionary.

More than 15 years later – after the Great Recession, the Euro crisis, and the COVID-19 pandemic – talk of wage inequality and of limited opportunities for educated young workers has not died down. The situation is often attributed to the convulsion of the period: it is known that wage inequality increased in Spain during the crisis years (Bonhomme and Hospido, 2017; Sanz-De-Galdeano and Terskaya, 2020) and that the cohorts that finished their university studies during this time experienced important and persistent earnings losses (Fernández-Kranz and Rodríguez-Planas, 2018). And yet Carolina Alguacil's op-ed preceded the financial crisis and in fact coincided with a time of bonanza in the Spanish economy.

This paper studies how shifts in the supply of tertiary education in Spain have contributed to the evolution of wage differentials by education and birth cohort since the years before the Great Recession <sup>1</sup>. In doing so, it contributes to the very prolific literature on the evolution of wage inequality in different contexts. Most of this research has focused on skyrocketing levels of inequality in the United States since the 1980s, which in large part result from a steadily rising college premium (Goldin and Katz, 2007; Autor et al., 2008; Acemoglu and Autor, 2011). Despite this, the (relatively limited) evidence coming from Europe shows mixed results, with premiums rising only in the UK, and stagnating or declining in other continental European countries (Freeman and Katz, 1995; Machin and Reenen, 2007; Doepke and Gaetani, 2020). Given the lack of consensus on why the US and continental Europe diverge so much in this regard, a comparison with Spain can prove particularly insightful.

The approach towards the study of wage differentials selected in this paper incorporates two important adjustments. First, given the general public's focus on the topic, the estimation strategy pays particular attention to heterogeneity in the returns to education. In other words, contrary to much of the literature that focuses on aggregate returns to university degrees, I ask Carolina Alguacil's question: are young university-educated workers worse off than their older counterparts? The unadjusted wage gaps by age reported in Figure 4.1 suggest that they might be. Spanish workers over 50 used to earn almost 50% more than those below the age of 30 in 2006. Even though this gap has diminished over time, the difference remains sizeable and considerably higher than in many other developed

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<sup>1</sup>Earlier estimates from 1985 to 2000 can be found in Pijoan-Mas and Sánchez-Marcos (2010).

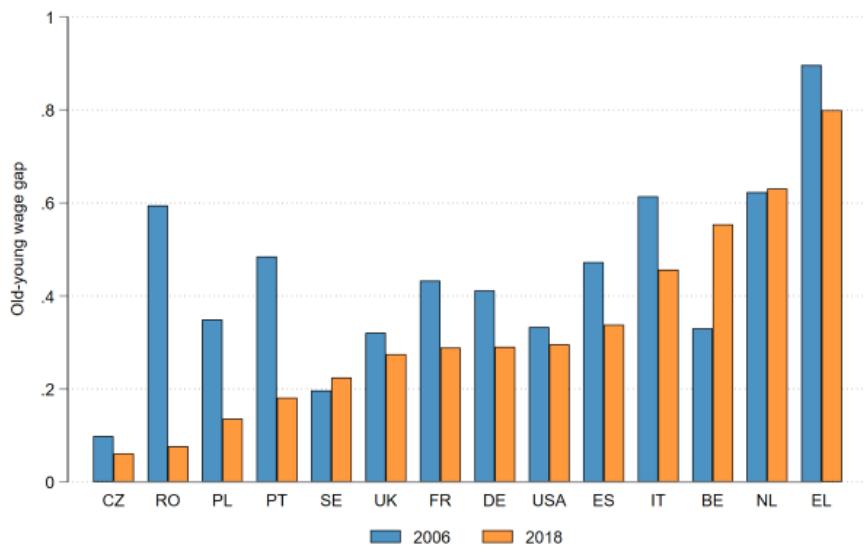


Figure 4.1: Unconditional median hourly wage gaps between older (above 50 years old) and younger (under 30) full-time workers (as a percent change over young workers' salaries) in selected European countries and the United States. European data comes from the Structure of Earnings Survey (SES), an EU-wide harmonised survey focused on collecting structural data on gross earnings and hours paid, easily accessed through Eurostat. Data for the US is from the Current Population Survey (CPS). It also includes information on full-time workers, but gaps are computed on weekly wages, and young workers are defined as those under 35 and older workers as people aged 55 years old and over.

economies, especially those in northern and eastern Europe. Yet Figure 4.1 indicates Spain is no anomaly. In 2018, its wage gap between older and younger workers was very similar to those reported for the largest economies in Europe – see the United Kingdom, France, Germany, and Italy – and the United States. Note also that the Netherlands, Belgium, and Greece all feature much larger differences in pay by age.

Evidently, much of the gap in wages between older and younger workers simply responds to differences in labor market experience. An important contribution in this paper lies in being able to disentangle cohort, time, and work experience effects. This is possible thanks to the availability of very detailed data on the employment contracts that individual workers held over time, which allows for the calculation of actual days worked over the course of each individual’s lifetime <sup>2</sup>. As a result, I do not employ the assumption usually found in the literature that experience equals age minus time spent in schooling. This is particularly important in a country like Spain, with high rates of structural unemployment.

The second key adjustment is related to how much a worker’s salary buys depending on where they live. Earlier papers in this strand of the literature deflate wages using national Consumer Price Indices (CPIs). I take inspiration from Moretti (2013) and make use of recently released rental and consumption data to adjust earnings for local costs of living. Local living costs are built into the decision of whether or not to attend university, as jobs for university graduates and high school dropouts are not evenly distributed across the territory. As such, deciding to go to university may automatically imply a posterior location choice. It therefore makes sense to take local costs of living into account when comparing premiums by cohort and level of skill.

In this paper I provide evidence for the existence of very distinct cohort patterns in the premiums paid for a university degree. These dynamics have gone largely unnoticed in the literature, with the exception of Glitz and Wissmann (2021)’s recent analysis for Germany and Verdugo (2014)’s for France. The wage gaps in Spain are large in size and cannot be accounted for as returns to prior work experience. While the university premium remained relatively stable at around 39-46% between 2007-2017, the aggregate figure hides important generational variation. In 2017, workers over 35 (i.e. born between 1952 and 1981) with a tertiary degree on average earned ~45% more than their lesser educated counterparts. For those under 35 (born in the 80s and early 90s), more educated workers were paid only ~30% more than their peers with lower levels of schooling. This difference in pay was also not, as is often suggested in the media, caused by the financial crisis. In fact, in line with

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<sup>2</sup>Unfortunately, these calculations do not account for time spent working in the shadow economy, as the data is sourced from the Spanish Social Security system.

the suggestive evidence in Figure 4.1, wage gaps between older and younger workers were even larger back in 2007, with the premium for older workers in the range of 48% and that of younger workers at half that value.

In addition to lower university premiums for younger workers, I find evidence of rising within-group wage inequality among the educated. Here, once again, differences in returns to skills are more pronounced among younger cohorts. Top earners (above the 75<sup>th</sup> percentile) born in 1982 and after receive skills premiums as high as those of older workers; but for young people located elsewhere on the conditional wage distribution they are significantly lower, and can fall below 20%. In effect, this translates into a widening earnings distribution and added wage uncertainty for younger generations. The fact that the differences in returns are becoming larger could point to a potential difference either in the quality or in the signalling value of attending specific universities, or in the returns to the degrees younger people choose to study.

But the main hypothesis I investigate in this paper is a simpler one: that the evolution in returns to university is linked to an increase in the relative supply of tertiary-educated workers that has been unmatched by relative demand for high-skilled workers <sup>3</sup>. To test this hypothesis, I employ the by-now standard model developed by Card and Lemieux (2001) to study trends in wage inequality between different age and skill groups and apply it to Spain. I find evidence that birth cohorts are in fact imperfect substitutes <sup>4</sup>, which indicates that university premiums are in fact being strongly influenced by changes in each cohort's relative supply.

Despite this, the issue does not only lie with an increased relative supply of educated workers. I also find evidence of weak, although rising, demand for high-skill workers. The strength of this demand is similar to the estimates reported for France and for Spain during an earlier time period (1995-2010), but much smaller than in the cases of Germany and the United States. Given that increases in relative supply are already fixed in the short-to medium-term, it may therefore make sense to consider Spain's sectoral specialization to try to make better use of the current workforce's skillset <sup>5</sup>.

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<sup>3</sup>University education has become far more common in Spain in recent decades, with the largest expansion taking place during the 90s and into the 2000s. The data used in this paper only partially includes the cohorts graduating after this larger expansion. What this suggests is that the dynamics shown in this paper are likely to exacerbate as the years pass by.

<sup>4</sup>In other words, individuals belonging to different birth cohorts are not perfectly substitutable in the labor market, even if they have the same level of education and skills. This means that the relative supply of workers from different birth cohorts affects wage inequality, and changes in the supply of one cohort may not be fully offset by changes in the supply of another.

<sup>5</sup>Despite this, more research is needed regarding the quality of different universities and the returns to specific degrees.

The rest of the article is organized as follows. Section 4.2 summarizes key features in the wage inequality literature, especially as they pertain to the returns to university education. Section 4.3 outlines the key policy changes that have transformed the tertiary education sector in Spain. Section 4.4 describes the data I use for the analysis, including an explanation of the adjustment of wages to local costs of living. Section 4.5 takes a look at the evolution of the college premium, outlining the importance of generational divides. Section 4.6 studies the evolution of the university premium across the conditional wage distribution. Section 4.7 studies the role of the relative supply of tertiary-educated workers in driving cohort patterns in the returns to university degrees. Section 4.8 discusses the findings as a whole, outlining policy implications and suggestions for future research.

## **4.2 Understanding the evolution of the education-related wage gap**

Wage inequality has been on the rise across several developed nations since the 1980s. Much of the research focuses on the United States – see Acemoglu and Autor 2011 for a review –, although similar patterns have been found in the United Kingdom (Machin and Reenen, 2007) and Germany (Goldschmidt and Schmieder, 2017; Dustmann et al., 2009). Spain joined these ranks only relatively recently. Bonhomme and Hospido (2017) and Sanz-De-Galdeano and Terskaya (2020) report marked increases in wage inequality since 2006, a pattern they ascribe to the effect of the crisis on the bottom half of the wage distribution. Earlier decades were characterized by the opposite trend: Pijoan-Mas and Sánchez-Marcos (2010) document a drop in individual labor earnings inequality between 1985 and 2000, a finding confirmed by Lacuesta and Izquierdo (2012) for the period between 1995 and 2006.

The gap in remuneration between workers with and without university education constitutes a key dimension in these patterns of wage inequality (Katz and Autor, 1999). In particular in the US and the UK, the return to tertiary education has trended ever upward, regardless of increasing shares of the population attending and graduating from college (Goldin and Katz, 2007; Acemoglu and Autor, 2011). More recent research suggests that even higher premiums accrue to American workers who decide to undertake post-graduate studies (Lindley and Machin, 2016).

But the education-related wage gap has evolved differently across countries. Several nations in continental Europe, such as Germany, Italy or Austria have seen college premiums flatten

or even decline over time (Fersterer and Winter-Ebmer, 2003; Jappelli and Pistaferri, 2010; Doepke and Gaetani, 2020). In Spain evidence also suggests that returns to university education may have been waning. Pijoan-Mas and Sánchez-Marcos (2010), for instance, link some of the drop in wage inequality between 1985 and 2000 to a declining university premium. There are, however, no accounts of how these dynamics have evolved in more recent years, and especially since the financial crisis. One contribution of this paper is to provide evidence in this regard.

The literature has ventured several explanations for such sharp variation in returns to education across countries. One theory posits that differences in wage-setting institutions can have a large influence on the size of wage gaps between education groups. Especially in Europe, institutions such as the minimum wage, the rates of unionization, or more generous unemployment benefits should help to boost wages for low-skilled workers, thus limiting earnings gaps between the university-educated and other workers (Dinardo et al., 1996; Acemoglu, 2003; Dustmann et al., 2009; Autor, 2014; Biewen and Seckler, 2017). Their effect thus tends to impact inequality through the bottom half of the wage distribution.

An alternative – or complementary – explanation for rising college premiums is the one I test in this paper, which highlights shifts in the relative supply and demand of college-educated workers compared to those who did not attend university (see, for instance, Katz and Murphy, 1992; Acemoglu, 2003; Autor et al., 2020b; or Glitz and Wissmann, 2021). Most commonly, this is illustrated with the canonical model developed in Katz and Murphy (1992), which employs a CES-production function to link supply and demand factors to wage premiums. The model features two skill groups, which perform two different types of imperfectly substitutable occupations. The demand for specific skills is directly linked to technology, which is both exogenous and assumed to be factor-augmenting – i.e., it makes at least some workers more productive and no one worse off. Changes in technology are what translates into skill-biased technological change, which empirical research suggests tends to complement high-skilled workers (Spitz-Oener, 2006; Acemoglu and Autor, 2011). As a result, in the empirical application of the model labor demand is usually assumed to take the form of a linear trend <sup>6</sup>, so wage differentials respond to movements in the relative

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<sup>6</sup>This is in fact a very strong assumption that is only partly supported by the data. Recent work emphasizes the possibility that labor demand may not trend upward. Autor et al. (2021), for instance, find that the pernicious effects of international trade on labor outcomes are largely concentrated among less-educated workers. This may in part explain why the earnings of high school graduates and dropouts have been, at least in the United States, falling in real terms over the past decades. Yet the canonical model does not allow for this possibility. Despite this, the simple set up in Katz and Murphy (1992) still performs remarkably well. Autor et al. (2020b) show how it is able to accurately track the evolution of the college premium in the United States for almost two centuries.

supply of high-to-low-skill workers: the wage differential between the former and the latter will increase when the supply of university graduates slows down relative to that of high school graduates. In the case of the US, the growth rate of people attending university has been linked to demographic and policy factors, such as the size of the baby-boom generation and the expansion of higher education in the 1960s (Murphy and Welch, 1989; Macunovich, 1999; Card and Lemieux, 2001). I discuss how these patterns differ from those found Spain in section 4.8.

By studying the heterogeneity across cohorts, I build on Card and Lemieux (2001)'s improvement on the canonical model to account for the evolution of wage inequality between age and education groups. The findings in this paper are also related to a series of more recent studies that focus on cohort patterns in the returns to university education, such as Reinhold and Thomsen (2017), Antonczyk et al. (2018), and Glitz and Wissmann (2021) for Germany, Verdugo (2014) for France, and Rienzo (2017) for the UK <sup>7</sup>. In the same spirit as this analysis, Carrasco et al. (2015) stress the importance of the increased supply of skilled-workers for the compression of the wage structure in Spain between 1995 and 2006. This paper extends their analysis in time, emphasizing the importance of cohort effects and the potential implication for young workers in Spain. In this respect, these findings complement those in Bentolila et al. (2021), who highlight the fact that young workers' employment and earnings losses during recessions are not compensated during the subsequent upturns. Finally, Pascual-Sáez and Lanza-Leon (2022) and Dolado et al. (2000) focus on the role of over-education, which has been on the rise in Spain and is associated with crowding-out and with important earnings losses among graduates whose job and education levels are mismatched.

### 4.3 The Spanish university system

Despite being home to some of the oldest universities in Europe, until relatively recently the Spanish workforce was characterized by very low levels of education. In 2004, roughly 55% of adults aged 25 to 64 had at most reached a lower secondary level of schooling – equivalent to staying in education until the age of 14 –; an extra 20% had finished high school (see Figure 4.2). This stood in stark contrast to other parts of the EU, where the norm was holding a high school diploma (47%) and lower levels of education were far less common (32%).

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<sup>7</sup>Although this latter study shows, in agreement with evidence from the US, rising university premiums for younger workers that are in fact larger than those of their older counterparts.

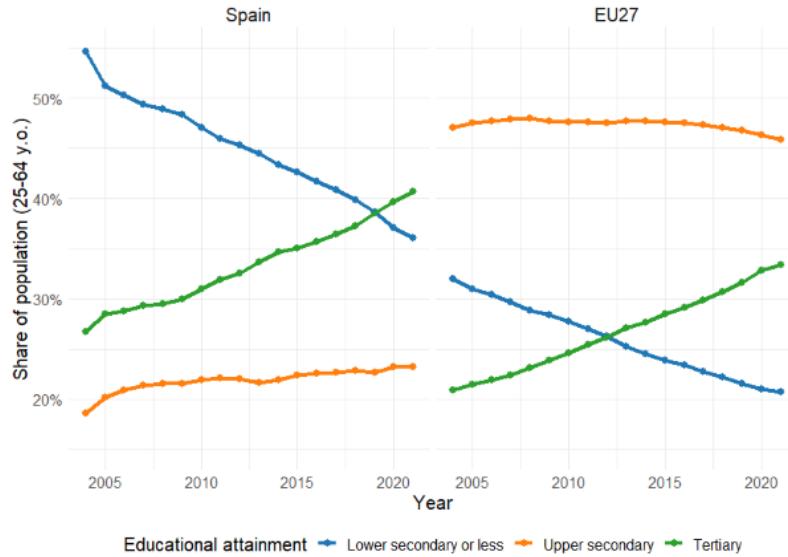


Figure 4.2: Share of the 25-64 year-old population by level of educational attainment, EU27 and Spain. Source: Eurostat

But the supply of university graduates in Spain has soared over the past decades. Figure 4.2 depicts a substantial increase – of 14 p.p. since 2004 – in the share of the Spanish workforce with a tertiary degree; the resulting share in 2021 exceeds 40%, well above the EU average of 33%. These numbers reflect a series of long-term efforts directed at boosting the educational attainment of the Spanish population, many of which focused on tertiary education (Losada and Máiz, 2005).

Some of the largest investments were linked to the opening of new universities, a process that started in the late 60s (Dolado et al., 2000). The expansion of the university offer took place across four large waves (see Figure 4.3): an earlier wave between 1968 and 1973, a progressive expansion between the late 70s and 1980s, a flurry of openings throughout the 1990s, and another large wave after 1999 – the latter only including private universities.

With each new wave university education became more accessible. Not only were more places available for different degrees (see Figure 4.4 for an overview of the disciplines young people have chosen to study over the past 35 years), but the provision of tertiary education became progressively less geographically concentrated. The waves between the late 70s and 90s in particular brought universities to areas where there had been no local options to obtain tertiary degrees (see Figure 4.3). For local teenagers, this translated into the possibility to attend university while living at home – in effect a subsidy to the cost of university attendance. This brought about the polarization of Spanish education: the

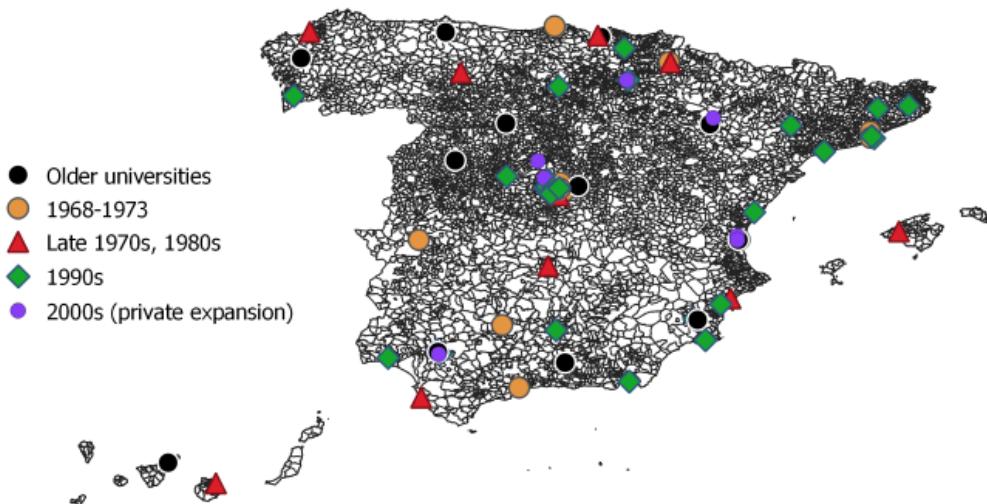


Figure 4.3: Spanish university expansion

share of tertiary educated workers soared, while older workers – who already held stable jobs – remained at much lower levels of educational attainment.

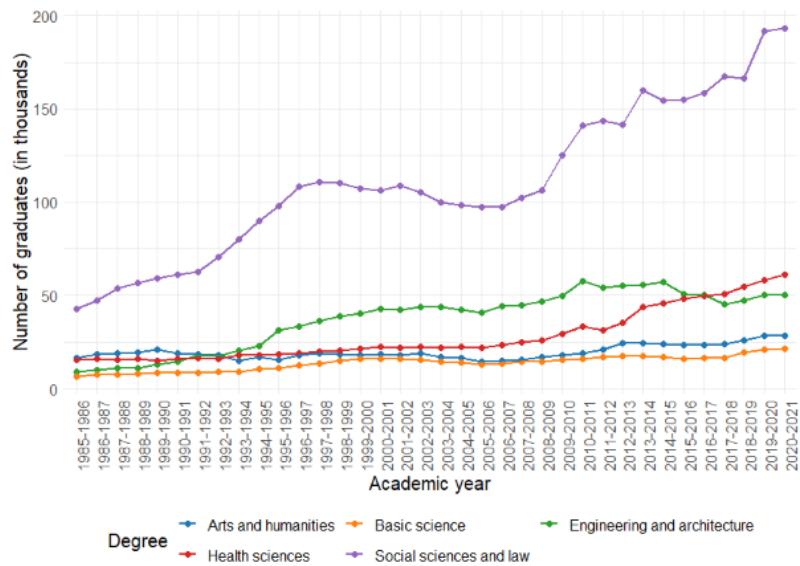


Figure 4.4: Number of university graduates, by academic year and branch of degree studied (1985-2021). Source: INE

The increases in relative supply of educated workers analyzed in this paper correspond to the two middle waves of university expansion, and only partially include the cohort affected by the private wave<sup>8</sup>. While the expansion in the 90s was quite rapid and opened

<sup>8</sup>The study includes individuals born between 1952 and 1992.

universities in areas where access had previously been limited, the – even larger and still ongoing – wave in the 2000s will likely exacerbate the generational effects shown in this paper. It is in particular noteworthy that both of these surges in university offer, but especially the last one, greatly amplified the number of graduates in the social sciences – and to a lesser extent in the health sciences (see Figure 4.4). This concentration of graduates by field of study has the potential to affect the already important rate of mismatches between educational attainment and job prospects highlighted by Pascual-Sáez and Lanza-Leon (2022). Despite the importance of the topic, I leave the impact of field of study and university quality on the university premium to future research.

## 4.4 The data

Throughout this paper, I use data from three different sources. Earnings and other employment information come from the Continuous Sample of Employment Histories (also known as ‘Muestra Continua de Vidas Laborales’ or MCVL). Wage adjustments to account for local costs of living make use of a new dataset built by merging recently released data on rental prices by the Spanish Ministry of Transportation (de Transportes Movilidad y Agenda Urbana, 2020) with information on consumption by province provided by the Spanish Statistical Institute (INE).

### 4.4.1 The Continuous Sample of Employment Histories

The MCVL is an administrative dataset with information on a 4% non-stratified random sample of the Spanish population registered with the Social Security system within each reference year. This includes individuals in work (both employees and self-employed), unemployment benefit recipients and pensioners, amounting to around 1.1 million observations per wave. The dataset merges Census, Social Security (SS) and income tax records, providing detailed information on labor earnings, days worked as well as firm and individual characteristics.

The MCVL data has been collected every year since 2004 <sup>9</sup>. Individuals included in a given wave who remain registered with the SS system are tracked over time. The MCVL records their changes in employment since their first registration – or since the year 1980, if they entered the system at an earlier date. Since individuals are bound to drop out of the

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<sup>9</sup>Although labor earnings information is only available from 2007.

sample, new members are added with each wave, so that the dataset remains representative of the target population.

Using the MCVL, I set up a panel of workers for the period between 2007 and 2017. The data focuses exclusively on employed individuals. I have information on each person's type of labor contract (permanent or of fixed duration), work schedule (full-time or part time), number of hours worked as a share of a full-time equivalent position, occupation, and labor earnings<sup>10</sup>. Additionally, the MCVL also features information on personal characteristics taken from the Spanish Census (or Padrón Continuo). This includes data on gender, age, nationality, municipality of residence, and level of education. Based on these characteristics, I introduce some sample restrictions. First, I exclude data for individuals younger than 25 and older than 65. Restricting the dataset in this way reduces the likelihood of employment gaps due to enrollment in formal education and retirement. The resulting dataset covers the cohorts born between 1952 and 1992. Second, I exclude workers living in the Basque Country and Navarre. These workers do not fall under the General Regime of the SS Administration and, as a result, their labor earnings data is not available. Lastly, I exclude any workers who have been in work for less than 30 days throughout the whole period of study.

#### 4.4.2 Adjusting wages to local costs of living

Location is a key factor that is often neglected in the wage inequality literature. Where an individual lives is important to the university premium debate for two reasons: first, any nominal wage differentials stemming from obtaining a university degree should be seen as an average that can be significantly lowered – or raised – depending on whether one lives in a more expensive or cheaper location; second, location is a hidden choice built into the decision of whether or not to attend university. When an 18-year-old decides to go to university, attached comes an expectation that, once they finish their studies, they will need to move – presumably to a bigger city – in order to access higher-paying jobs.

Yet, the documented gaps in earnings between tertiary-educated workers and their less-skilled counterparts do not usually take into account the vast differences in cost of living that exist across places. Notable exceptions include Black et al. (2009), Moretti (2013), Lindley and Machin (2014), and Rienzo (2017). All of these studies report important spatial

<sup>10</sup>There are two measures of labor earnings in the MCVL: a set coming from SS records and another matched from tax files. Given that the former is top- and bottom-coded, I make use of the uncensored data from tax records to construct the dataset. This restricts the number of years available – as SS wage data goes back to 1980 –, but ensures the reliability of the information throughout the whole wage distribution.

differences in education-related wage differentials in the UK and the US. They show that the relative supply of college-educated versus high school-educated workers went up faster in cities where educational attainment levels were higher to begin with <sup>11</sup>. To the best of my knowledge, no such analysis exists for other continental European countries.

The impact of costs of living on wage inequality is likely to follow a similar pattern in Spain. This is because, as the first graph in Figure 4.5 shows and similarly to the US or the UK, the share of university-educated individuals has risen faster in areas that already featured higher levels of educational attainment back in 2011. This is, more educated workers are sorting together. Similarly, they appear to be moving towards more expensive places (see the second graph in Panel 4.5). As a result, we would expect the university premium to drop significantly when accounting for local costs of living <sup>12</sup>.

For this reason, all calculations in this paper are based on local real wages – i.e. wages adjusted to take into account living costs in the worker’s municipality of residence. I build local consumer price indices (CPIs) and use them to adjust the labor earnings records in the MCVL. Employing local CPIs rather than a single national CPI to adjust for inflation allows for a much better comparison of living standards across the country. Nonetheless, for the sake of clarity and completeness, I replicate all the estimations shown in the following sections using nationally-adjusted wages and report them in Annex 4.D.

Estimating real wages at the local level requires information on local consumption patterns. I obtain regional data on the evolution of the typical consumption basket over time from the INE. I use this information to distinguish between non-housing and housing consumption, which I incorporate as weights into the local CPI. I then build the CPI from two other sources. Provincial data on the relative prices of other (non-housing) goods and services is published yearly by the INE <sup>13</sup>. Local rental prices come from the ‘Índice de alquiler de vivienda’, a dataset released in 2020 by the Spanish Ministry of Transportation. This dataset was built by combining tax records with information on the Spanish land registry. It is hosted on a public website and can be visualized on an interactive map <sup>14</sup>. This set-up is meant to allow citizens to check rental prices in their local area and thus be able to make better informed decisions when looking for an apartment. The raw data provides

<sup>11</sup>Presumably, this could translate into a decrease in welfare for urbanites, leading to an overall reduction in the real college premium gap. But, according to Diamond (2016), college-educated workers’ preferences for the amenities usually found in cities mean that the growth in inequality is in reality larger than what the wage gap alone would indicate.

<sup>12</sup>The comparison in subsection 4.5 confirms this hypothesis.

<sup>13</sup>The dataset can be accessed here: <https://www.ine.es/jaxiT3/Tabla.htm?t=22565&L=0>

<sup>14</sup><https://www.mitma.es/vivienda/alquiler/indice-alquiler/>. Information is disaggregated to the Census tract level

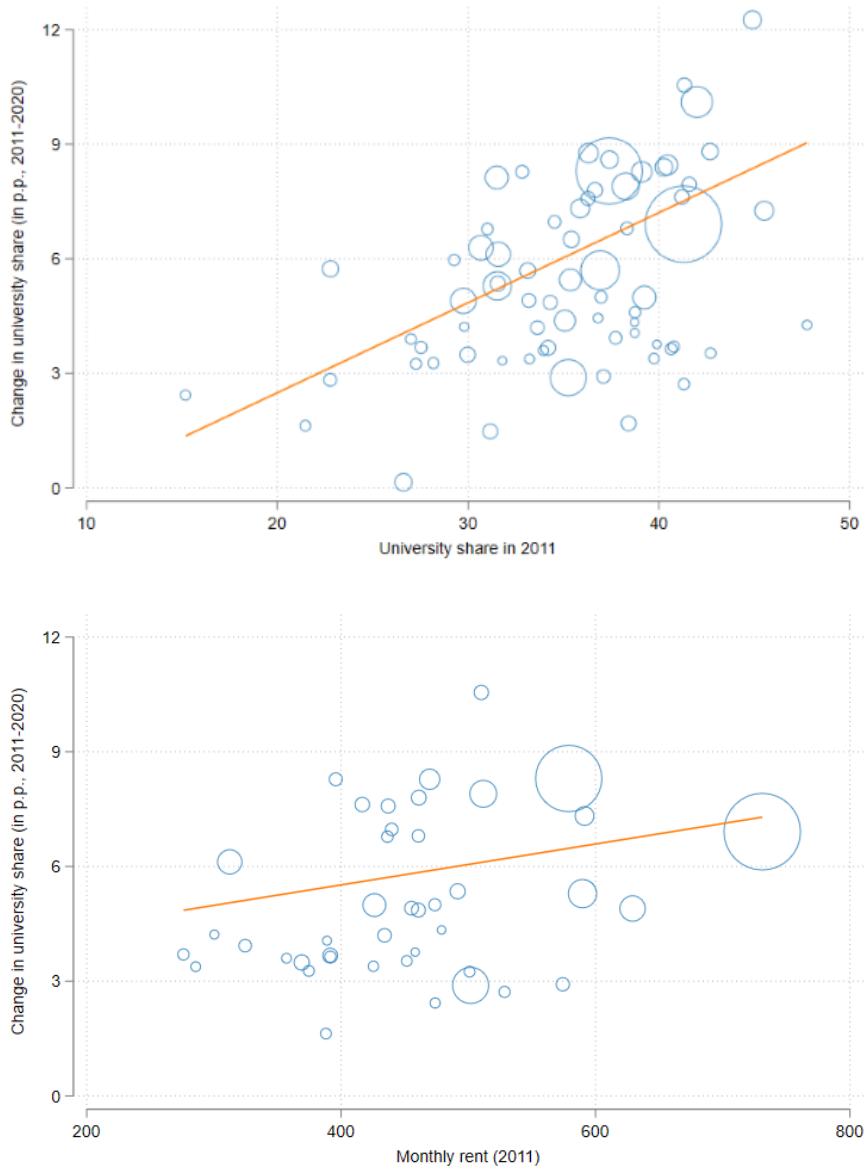


Figure 4.5: Relationship between the change (in p.p.) in the share of university-educated workers across Spanish cities, and their respective shares of tertiary-educated workers and average monthly housing costs at the beginning of the period (in 2011). Data corresponds to Functional Urban Areas (FUA) as defined by the Spanish Statistical Institute (INE). Bubble size indicates total population in the FUA. Monthly rent refers to the average monthly rent paid for a median-sized apartment ( $89m^2$  across the sample) in the year 2011.

information on the median apartment and house size as well as the relevant prices per square meter <sup>15</sup>. For more detailed information on the methodology employed to build the local CPIs, please consult Annex 4.A.

## 4.5 Hidden variation in the university premium

This section describes the evolution of wage differentials between workers who obtained a university degree – at any level: from three-year programs to PhDs, as long as they hold a diploma – and their peers with lower levels of formal education. I start by looking at the overall premium (subsection 4.5.1) to have a baseline against which to compare all other results. As mentioned earlier, throughout the paper I focus on estimates obtained using wages adjusted with a local CPI. Here I devote some time to explaining how this approach affects the estimation of the wage gaps between more and less educated workers. In subsection 4.5.2, I delve into the main research question regarding the importance of when a given individual was born, describing the stark differences in return to university education by cohort.

### 4.5.1 The evolution of the university premium

I begin with a pooled specification that shows the evolution of conditional wage differentials by education group between 2007 and 2017. I employ a general version of the Mincer earnings function including relevant control variables (Mincer, 1974). As is usual in the literature, I do not include other determinants of wages such as sector of employment, tenure in the firm, or occupation, since those may themselves be influenced by educational attainment (see Angrist and Pischke 2008 or Moretti 2013). This leads to the following approach:

$$\ln w_{ict} = \sum_{j=1}^4 \beta_j X_{ict} + \beta_5 uni_{ict} + \sum_{k=6}^K \beta_k uni_{ict} \times \delta_t + \delta_t (+\gamma_c) + \mu_{ict} \quad (4.1)$$

where  $\ln w_{ict}$  stands for the natural logarithm of real monthly wages – either locally or nationally adjusted – for individual  $i$  in location  $c$  and year  $t$  <sup>16</sup>.  $X_{ict}$  is a vector of explanatory variables, including gender, foreigner status, and a second-order polynomial

<sup>15</sup>Information on the 25<sup>th</sup> and the 75<sup>th</sup> percentiles are also available for each of these variables.

<sup>16</sup>Locations ( $c$ ) follow the urban area classification outlined in de la Roca and Puga (2017). Rural locations remain in the sample. They are grouped together by province and given a new 'urban area' code.

of (actual) experience (in years).  $uni_{ict}$  is a dummy variable, which turns on for those individuals with university education. This is then followed by the variable of interest, an interaction between the college dummy and year fixed-effects ( $uni_{ict} \times \delta_t$ ). Alternative specifications based on real wages adjusted with the standard national CPI in Figure 4.6, Table 4.1, and Annex 4.D also include Functional Urban Area (FUA) fixed-effects ( $\gamma_c$ ) <sup>17</sup>.

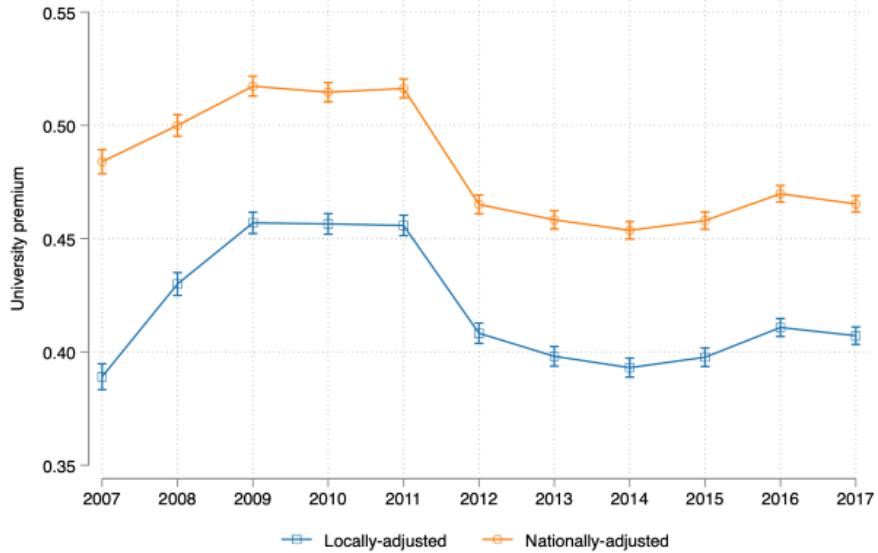


Figure 4.6: Evolution of the university premium in Spain (2007-2017). Results are based on the specification in Equation 4.1 using locally- and nationally-adjusted real wages.

The results of this pooled specification are presented in Figure 4.6. The plot describes the conditional difference in wages between individuals with some form of tertiary education and the rest of workers for every year in the data. According to the preferred specification, the returns to university education in the period of study rest between 39% and 46%, with a clear increase that partly overlaps with the financial crisis. The returns slowly return to their previous trend from 2012 and remain stable until 2017.

Figure 4.6 and Table 4.1 also outline the differences between wages adjusted with local and national CPIs. The most striking conclusion stemming from this comparison is that employing nationally-adjusted wages leads to an overestimation of the returns to university education. For example, in 2017, the conditional difference between university graduates and workers with lower educational attainment was 48% when adjusting wages with a national CPI but just 39% when employing a local CPI. This 9 p.p. gap is in line with

<sup>17</sup>These are not in the preferred specification because they wash away much of the variation generated by employing local CPIs to adjust wages. However, when using a national CPI, it makes sense to account for worker location, as this reflects strongly on individual wages.

Table 4.1: Baseline panel (corresponding to the specification in equation 4.1)

	(1) Log real wage (local CPI)	(2) Log real wage (national CPI)
Female	−0.173*** (0.001)	−0.160*** (0.000)
Foreign	−0.183*** (0.001)	−0.135*** (0.001)
Experience	0.021*** (0.000)	0.019*** (0.000)
Experience <sup>2</sup>	−0.000*** (0.000)	−0.000*** (0.000)
Uni. premium (2007)	0.389*** (0.003)	0.484*** (0.003)
Uni. premium (2017)	0.407*** (0.004)	0.465*** (0.003)
Year FE	<i>Yes</i>	<i>Yes</i>
Urban Area FE	<i>No</i>	<i>Yes</i>
N	6,122,930	6,122,930

Standard errors in parentheses

The specification also includes interaction terms between the university dummy and all other years.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

those found in Moretti (2013) for the United States. Such a pattern suggests that highly educated workers in fact tend to cluster around more expensive areas, which in Spain can be found in the two largest cities but also in some middle-size towns away from them<sup>18</sup>. Notice as well that, while the estimates obtained using national CPIs indicate the university premium has fallen since the years before the financial crisis, taking into account where people live suggests it has in fact remained stable.

The adjustment with local CPIs also affects the foreign coefficient quite strongly (see Table 4.1). This suggests that immigrants pay a penalty because they usually live in more expensive areas – presumably in the largest cities. In contrast, the labor market penalty attached to being female or the experience premium appear relatively stable in both specifications (at around -17% and 2%, respectively).

#### 4.5.2 Inequality within the college group: Generational divides

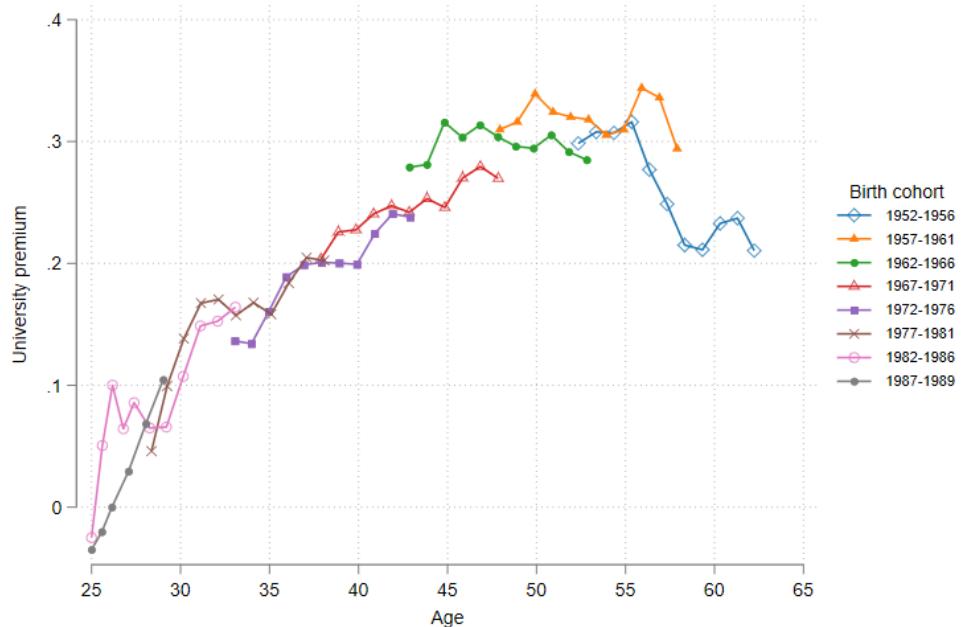


Figure 4.7: Evolution of the university premium in Spain, by age (2007-2017).

While the mean conditional wage gap between workers who attended and skipped college stood at roughly 40% between 2007 and 2017, there were staggering age differences hidden behind this number. To illustrate this, I plot the detrended university premium – without taking experience or any other controls into account, but netting out a polynomial trend

<sup>18</sup>The figures in Panel 4.5 underscore this point.

in the data that aims to account for time (i.e., year) effects – by age for different birth cohorts. This allows for the comparison of two continuous cohorts’ university returns when they were the exact same age. The resulting plot is shown in Figure 4.14 and it illustrates two main points. First, some kind of break takes place from the 1967-71 (red hollow triangles) cohort onwards. Older cohorts (green circles and orange triangles – excepting the very oldest) receive much higher returns to university schooling at every age. This break happens to coincide with the start of the largest university expansion program in Spain, which commenced in 1989 with the opening of 3 universities in the Canary Islands, Galicia, and Madrid (refer back to section 4.3 for background information). In other words, the cohort in red would have been the first to have been able to take advantage of the increased number of places available to study in the new universities opening each year across the country. Second, from that cohort onwards, younger cohorts do slightly worse than their older counterparts at the same age, although the differences are very small – and, in the case of the cohorts born during the 70s virtually non-existent. The gaps start widening again with the 1982 cohort (pink hollow circles), coinciding once again with the next wave of university expansions – this time comprised of private institutions.

The patterns shown in Figure 4.14 support Carolina Alguacil’s complaint about young university-educated workers receiving lower wages. However, this pattern could respond to several competing explanations: a) there is some mechanism in the labor market that assigns lower salaries to younger people – perhaps because they are less productive, less scarce, or because they lack labor market organization; or b) younger workers are paid less because they lack work experience, which would imply that they will earn more money as they spend more time at work.

Separating age from labor market experience is therefore key to answering the question at hand. In a country like Spain, with notoriously high levels of structural unemployment, the relationship between age and experience may not be as strong as one would initially assume. The labor economics literature tends to use (*age - years of schooling - 6*) as a proxy for work experience. Table 4.5 in Annex 4.B suggests this may not be a good idea in the case of Spain: as expected, average experience increases with age, but so does the associated standard deviation as cohorts become progressively older. It is therefore of extreme importance to be able to separate the experience effect from the cohort effect. I am able to solve this problem thanks to the quality of the data, which, as indicated in Section 4.4, includes work histories, allowing for the calculation of the exact number of days each individual has worked over their lifetime.

To understand whether the returns to university education outlined in Figure 4.6 hide important differences by cohort, I run the model in Equation 4.1 for different birth cohorts. I split the sample in 4 groups: an older cohort (born in 1952-1961), a middle-age cohort (born in 1962-1971), an older young cohort (born in 1972-1981), and a younger cohort (born in 1982-1992). These last two cohorts share the distinctive feature that they would have been able to benefit from the last two waves of university expansions – having taken place over the 90s and the private expansion from the year 2000 onwards. The cutoff between them is made so that it highlights exactly the distinction between these two waves<sup>19</sup>. The results are reported in Figure 4.14.

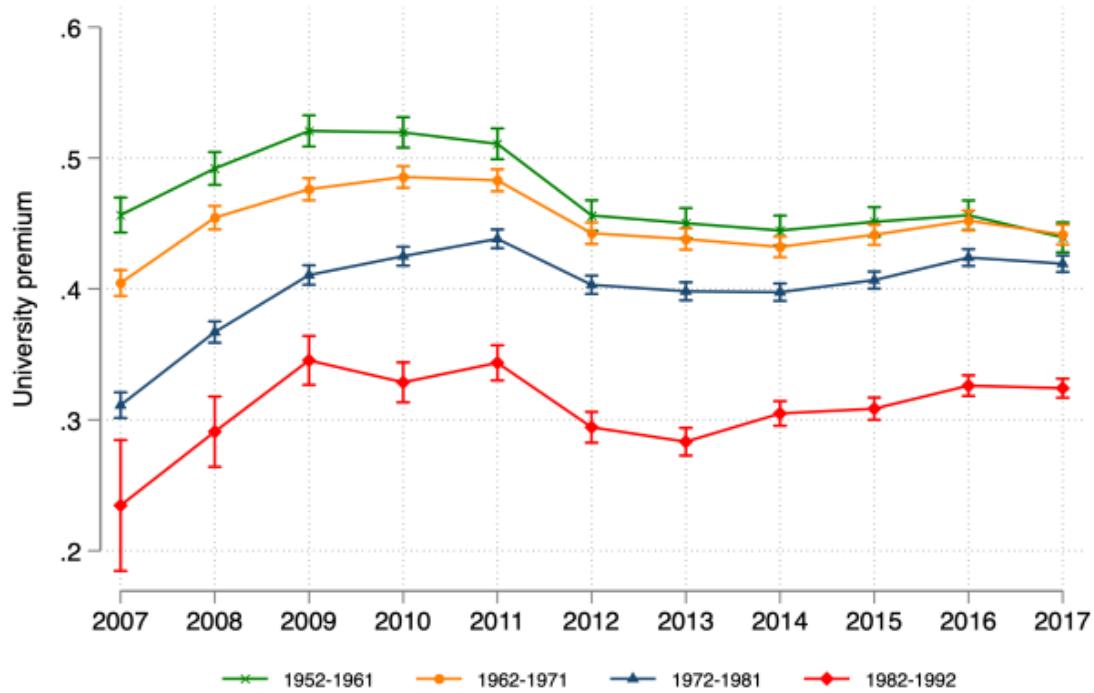


Figure 4.8: Evolution of the university premium in Spain, by cohort (2007-2017). Results are based on the specification in Equation 4.1 run separately for each of the three samples.

The estimates show a very large gap in the returns to education obtained by younger and older workers. At the end of the period of study, the average worker born between 1952 and 1961 received returns for their university degree of around 44% relative to individuals with lower educational attainment. In contrast, workers born after 1981 merely gained 32% over their peers with lower levels of education. Remember that these differences already account for the effect of actual work experience, and therefore suggest decreasing between-

<sup>19</sup>Although the private expansion starting in the year 2000 is still ongoing

group wage inequality for younger generations. In other words, university education pays much less than it used to.

The gap in returns to education between cohorts has in fact decreased since 2007, a time when university-educated older workers enjoyed mean wages that were around 48% higher than those of their less-educated counterparts (24% for the youngest group). Estimates indicate that between-group wage inequality in fact increased for the younger cohort over the period of study. In contrast, all other cohorts saw their education-related wage gaps converge after the crisis. Nonetheless, these patterns may mask diverging education returns at different points among each of those wage distributions. I address this issue in the next subsection.

## 4.6 Rising dispersion among the educated

Given the large variability in the results by cohort, I devote this section to understanding the effect of a university education at different percentiles of the wage distribution. This analysis highlights a widening in the distribution of returns to university education over time, even as the results at the mean appear to remain relatively stable over the period of study. In this part of the analysis I make use of quantile regression, an estimation technique that offers added flexibility over OLS estimators by making it possible to analyze the effects of an explanatory variable on the whole conditional wage distribution (see Koenker and Bassett 1978, Koenker and Hallock 2001, Angrist and Pischke 2008 for further details).

I assume the following specification:

$$Q_\tau(\ln w_i) = \alpha(\tau) + \beta_1(\tau) \text{uni}_i + \sum_{j=2}^J \beta_j(\tau) x_{ij} \quad (4.2)$$

where  $\tau$  describes each conditional quantile of the wage distribution ( $\in (0, 1)$ ).  $\ln w_i$  still stands for the natural logarithm of monthly wages for individual  $i$  in the years 2007, 2009, 2014, and 2017; and  $X_{ij}$  is the same vector of explanatory variables, including gender, foreigner status, and a polynomial of real labor market experience. I focus on the coefficient  $\beta_1(\tau)$ , which describes the return to university education at different quantiles of the conditional wage distribution. Note that the  $\beta$ s are now functions that depend on the quantile where one runs the estimation: here I use 0.1, 0.25, 0.5, 0.75, and 0.9.

Given the distribution function of  $\ln w_i$  for a given year, the  $\beta$ s at a given quantile can be obtained by solving the following minimization problem:

$$Q_\tau(\ln w_i|X_i) = \underset{\beta_j(\tau)}{\operatorname{argmin}} E[\rho_\tau(\ln w_i - \alpha(\tau) - \sum_{j=1}^J x_{ij} \beta_j(\tau))], \quad (4.3)$$

where:

$$\rho_\tau(u) = (\tau - 1(u \leq 0))u \quad (4.4)$$

This function  $\rho_\tau$  is a type of loss function, also called the ‘check function’ due to its shape when plotted. It assigns asymmetric weights to the error depending on the quantile as well as the overall sign of the error.

Figure 4.9 presents the results of the quantile regression analysis for the years 2007, 2009, 2014, and 2017<sup>20</sup>. Holding a university degree raised median wages by about 43%. Returns at the median lie slightly above those reported using OLS in the previous section. Wage differentials by education group are lowest at the bottom of the conditional wage distribution; they steadily increase from the 25<sup>th</sup> percentile, only to remain relatively stable from the median onwards. Yet this general trend has shifted during the period of study, namely at the very top of the distribution. Within-group wage inequality was already quite striking in 2007. During the crisis, it kept the same shape, with the premium simply shifting upward and then returning to its earlier level. Despite this, along with economic recovery came rising within-group wage inequality. In other words, the distribution of returns to university schooling widened, with the gains accruing to the top of the wage distribution.

One may wonder: who are the university-educated workers at the bottom of the conditional wage distribution in Figure 4.9? The calculations in subsection 4.5.2 suggest many are likely to have been born after 1981. To ascertain this, I compute model 4.2 once again, adding an interaction between the university dummy and a categorical variable splitting workers into a younger, two middle-aged, and another older cohort. Figure 4.15 shows the results. As expected, returns to university are overall lower for younger workers. Interestingly, this is true at all levels of the distribution, except for the very bottom and at the very top, where

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<sup>20</sup>These years were chosen as signposts for the period before the financial crisis (2007), the time when the recession hit the Spanish labor market (2009), the subsequent recovery years (2014), and the end of the period of study (2017)

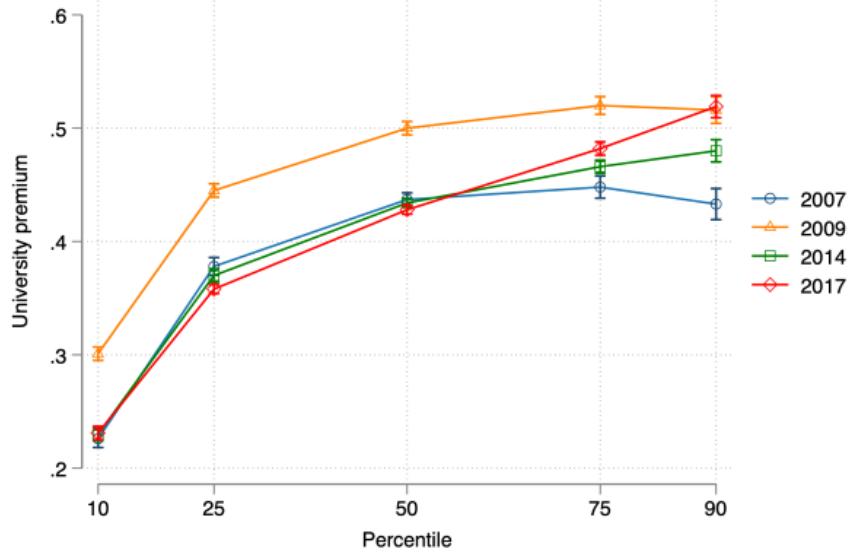


Figure 4.9: Quantile regression coefficients for university education at the 0.1, 0.25, 0.5, 0.75, and 0.9 percentiles over time. Results are based on the specification in Equation 4.1 run separately for each year.

– despite some changes over time – the conditional wage differentials by level of education are similar for both the young and the old (see Figure 4.10d).

The graphs in Panel 4.15 also show signs of an important growth in within-group wage inequality, with the slopes of the lines for the young and both middle-age cohorts consistently increasing between 2007 and 2017. These rises are much more pronounced for the youngest cohort: note how the red line (with crosses) in Figure 4.10a is almost flat, yet becomes steeper with the financial crisis in a trend that continues all the way up until 2017. In contrast, for the older cohort, not only are educational returns higher; they also remain comparable for the top half of the conditional wage distribution. This pattern indicates far less uncertainty in the labor outcomes attached to embarking in a university education. In this regard, the increases in within-group inequality may signal vast differences in returns owing to the quality of education at the institution workers' attended, to the prestige of each university, or to sorting on individual ability <sup>21</sup>.

<sup>21</sup>This pattern matches the well-documented results for the United States, Germany, and the UK (see Katz and Autor 1999, Acemoglu and Autor 2011 and Antonczyk et al. 2018, among many others).

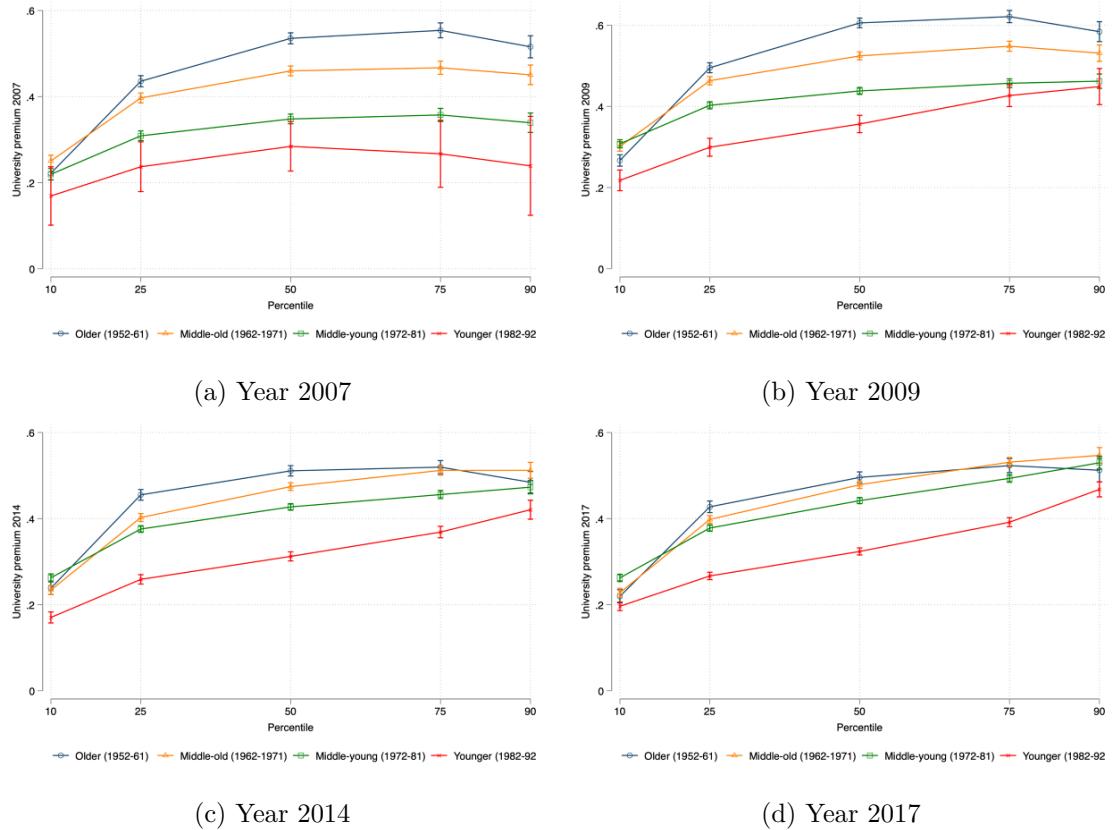


Figure 4.10: Quantile regression coefficients for university education at the 0.1, 0.25, 0.5, 0.75, and 0.9 percentiles, by cohort (years 2007, 2009, 2014, and 2017). Results are based on the specification in Equation 4.2 run separately for each of the three birth groups.

## 4.7 The role of relative supply

One logical explanation for the decrease in returns to education among younger workers relates to changes in the relative supply of university-educated individuals. As described in section 4.3, Spain has seen a steady increase in the share of young people attending university. Had this growth in relative supply outstripped relative demand for high-skilled workers, we would in fact expect to see a drop in the university premium. To understand whether this is the main driving force behind the patterns shown in section 4.6, I follow the analytical framework developed in Card and Lemieux (2001) – itself an extension of Katz and Murphy (1992) –, which studies the evolution of returns to university schooling allowing for between-cohort variation in those returns <sup>22</sup>.

### 4.7.1 Modelling relative supply shifts

The model in Katz and Murphy (1992) views aggregate output at time  $t$  ( $Y_t$ ) as a function of university-educated labor ( $U_t$ ), labor that did not attend university ( $L_t$ ), and two factor-augmenting efficiency parameters or technology shifters  $\theta$  – one for each type of labor. As in the existing literature, I write this function assuming Constant Elasticity of Substitution (CES), with  $-\infty \leq \rho = 1 - \frac{1}{\sigma_E} \leq 1$ , where  $\sigma_E$  is the elasticity of substitution between workers who did and did not attend university.

$$Y_t = (\theta_{ut}U_t^\rho + \theta_{lt}L_t^\rho)^{1/\rho} \quad (4.5)$$

In this form, the equation implies perfect substitutability between workers that belong to the same education group. But, in order to be able to ask Carolina Alguacil's question, one needs to be able to differentiate between different cohorts of, say, college workers. Card and Lemieux (2001) relax the perfect substitutability hypothesis by thinking of university and non-university labor as two further CES subaggregates, so that:

$$U_t = \left( \sum_c^C \left( \alpha_{uc} U_{ct}^\phi \right) \right)^{1/\phi} \quad (4.6) \qquad L_t = \left( \sum_c^C \left( \alpha_{lc} L_{ct}^\phi \right) \right)^{1/\phi} \quad (4.7)$$

These functions make us think of each educational group as the sum of the labor inputs

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<sup>22</sup>This approach is in fact quite standard in the literature – see Autor et al. (2008), Dustmann et al. (2009), Autor et al. (2020b), or Glitz and Wissmann (2021) for more applications.

coming from each birth cohort. Once again, each cohort-education group has its own relative efficiency parameter  $\alpha$ , now assumed not to vary with time. In addition,  $\phi$  is a function of the partial elasticity of substitution between cohorts  $c$  belonging to the same education group  $E \in \{u, l\}$ , so that  $\phi = 1 - \frac{1}{\sigma_C}$ .

Next, the model claims the usual assumption that wages in each education group are determined by their respective marginal products of labor. Then the university premium can be expressed as:

$$\frac{w_{ct}^U}{w_{ct}^L} = \frac{\frac{\partial Y_t}{\partial U_{ct}}}{\frac{\partial Y_t}{\partial L_{ct}}} = \frac{\theta_{ut} \cdot U_t^{\rho-\phi} \cdot Y_t^{1-\rho} \cdot \alpha_{uc} \cdot U_{ct}^{\phi-1}}{\theta_{lt} \cdot L_t^{\rho-\phi} \cdot Y_t^{1-\rho} \cdot \alpha_{lc} \cdot L_{ct}^{\phi-1}} \quad (4.8)$$

This expression can be further simplified. It is also helpful to take logarithms:

$$\frac{w_{ct}^U}{w_{ct}^L} = \ln\left(\frac{\theta_{ut}}{\theta_{lt}}\right) + (\rho - \phi) \ln\left(\frac{U_t}{L_t}\right) + \ln\left(\frac{\alpha_{uc}}{\alpha_{lc}}\right) + (\phi - 1) \ln\left(\frac{U_{ct}}{L_{ct}}\right) \quad (4.9)$$

If one then assumes that the relative employment ratios ( $\frac{U_t}{L_t}$  and  $\frac{U_{ct}}{L_{ct}}$ ) are exogenous – an issue I turn to in subsection 4.7.2 –, equation 4.9 is equivalent to the following expression, where  $\epsilon_{ct}$  stands for any extra source of variation in the cohort-specific education wage gap:

$$\ln\left(\frac{w_{ct}^U}{w_{ct}^L}\right) = \ln\left(\frac{\theta_{ut}}{\theta_{lt}}\right) + \left(\frac{1}{\sigma_C} - \frac{1}{\sigma_E}\right) \ln\left(\frac{U_t}{L_t}\right) + \ln\left(\frac{\alpha_{uc}}{\alpha_{lc}}\right) - \frac{1}{\sigma_C} \ln\left(\frac{U_{ct}}{L_{ct}}\right) + \epsilon_{ct} \quad (4.10)$$

This last equation indicates that the gap in wages between people who did and did not attend university depends on: 1) the relative factor-augmenting use of technology, 2) the overall (i.e. for all cohorts) relative supply of tertiary-educated workers, 3) the cohort-specific relative supplies of university labor. In this setting, there would be no visible cohort effect if either  $1/\sigma_C = 0$  (meaning that workers from different cohorts are perfect substitutes) or if the rate of growth of cohorts remains roughly constant over time.

## 4.7.2 Model implementation

### Elasticity between cohorts

The implementation of Card and Lemieux (2001)'s model requires two distinct stages. First, I focus on calculating an estimate for  $\sigma_C$  (the partial elasticity of substitution between cohorts), which it is possible to derive from equation 4.10 with the following specification:

$$\ln \left( \frac{w_{ct}^U}{w_{ct}^L} \right) = \delta_c + \lambda_t - \frac{1}{\sigma_C} \ln \left( \frac{U_{ct}}{L_{ct}} \right) (+ \text{unemp}_{ct}) + e_{ct} \quad (4.11)$$

I collapse the data into 780 labor groups, distinguished by year (2007-2017), education level (university vs. lower levels of schooling), and year of birth (1952-1989). The labor supplies in each of the groups correspond to the sum of the (actual) number of days worked by the whole group. Table 4.7 shows the results of this first step in the estimation procedure: a regression of the university wage premium by cohort on the relative supply of tertiary-educated workers for each cohort along with time ( $\lambda_t$ ) and cohort ( $\delta_c$ ) effects. Notice that the time effects absorb the first two terms in equation 4.10 – i.e., the effect of changes in efficiency and in aggregate supply across education groups. In addition, cohort effects capture differences in productivity across cohorts – the ratio of  $\alpha$ s. The first two columns in Table 4.7 show alternative specifications including year effects and a linear time trend, respectively. Column 3 adds a control for annual unemployment rates by cohort. This intends to account for the very large differences in rates of unemployment by age, a factor that goes against the assumption that the relative labor supply ratios are exogenous. Finally, I try to tackle the endogeneity in relative labor supplies more directly: Column 4 shows the results of a 2SLS specification where the relative supply of tertiary-educated workers from each birth year is instrumented by the difference in the number of open universities in the year when that cohort turned 18 and the number of open universities in 1970 – the year when the first cohort in the sample, born in 1952, turned 18.

Table 4.2: Model estimation Step 1: determining the elasticity of substitution between cohorts ( $\sigma_C$ )

	(1) Uni. premium	(2) Uni. premium	(3) Uni. premium	(4) Uni. premium
Relative cohort supply of tertiary-educated workers	-0.083*** (0.017)	-0.079** (0.025)	-0.102*** (0.017)	-0.184*** (0.009)
Trend		0.013*** (0.002)		
Cohort unemployment rate			-0.010*** (0.002)	-0.014*** (0.001)
Cohort effects	Yes	Yes	Yes	No
Year effects	Yes	No	Yes	Yes
Instrument	No	No	No	Yes
Weak ident. (Kleib.-Paap)				$F = 168.3$
N	390	390	390	390
R2	0.99	0.98	0.99	0.98

Standard errors in parentheses

The first 3 specifications are fitted using weighted least squares with weights being inversely proportional to the variance of estimated wage premiums. The last column is estimated using 2SLS.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

In all, there is clear evidence of imperfect substitution between worker cohorts. The parameter estimates in Table 4.7 lie between -0.08 and -0.18, which translates into an elasticity of substitution between cohorts (or birth years) of between approximately 5.5 and 12. These values are higher than Card and Lemieux (2001)'s estimates for Canada, the United Kingdom and the United States although they are in the range of the estimates reported for France in Verdugo (2014) and for Germany in Glitz and Wissmann (2021). Still, these international comparisons should be take with caution, as relevant works in this area refer to time periods preceding 2007.

The preferred estimate in Table 4.7 is the last one (column 4) and also the largest, associated with an elasticity of substitution of 5.3. This IV identification relies on two key assumptions. First, that the increase in the number of universities available to each cohort has an effect on the relative supply of skilled labor. Table 4.6 in Annex 4.C shows that this is so: an extra university opening is associated with a rise in the relative supply of university-educated workers of 1 p.p. With an R2 of 79%, the first-stage regression explains a large part of the variation in the cohort-specific relative supply <sup>23</sup>. Second, the exclusion restriction requires that, conditional on the controls included in Step 1, university openings should have no impact on the university premium except for their direct effect through the increase in the relative supply of tertiary-educated workers. Here, the only potential concern would be that, as a university opens, the local area where it is located could see job creation precisely in occupations that require a tertiary degree – either directly, because the university would need to hire professors and other administrative staff, but also perhaps indirectly through the creation of companies that undertake work for the university. While this is very likely to be the case at the local level, notice that the instrument is in fact operating at the national level. Therefore, even if 3 universities open in the same year, generating a couple of thousands of jobs, the effect at the national level should be negligible. In addition, local multipliers would also generate jobs that require no tertiary schooling – selling coffee on campus, for example – diluting even more the potential direct effect from the university opening to the cohort-level university premium.

There is yet another interesting element to discuss in Table 4.7. Similarly to the US and the UK, the linear trend and the year effects both show a pattern that is increasing over time (see the result from column 2). These increasing returns could appear in response to a technological shock – since the year dummies absorb the parameter  $\log(\frac{\theta_{ut}}{\theta_{lt}})$  – or to the effect of changes in the aggregate relative supply of workers <sup>24</sup>. Nonetheless, the reported

<sup>23</sup>The Kleibergen-Paap F statistic for weak instruments provides further evidence that the instrument is not weak.

<sup>24</sup>Between these two the former appears more likely as, as I have discussed in previous sections, the overall

effects – although significant – are quite small, potentially indicating that the demand for high-skilled workers is rising at a much slower speed than in the United States. In this regard, values reported here are more akin to those found in prior studies focused on France and on Spain during an earlier period.

### **Elasticity between aggregate education groups**

Armed with an estimate of  $\sigma_C$ , it is now possible to calculate the cohort specific efficiency parameters from the numerator and denominator of equation 4.8. Note that:

$$\ln w_{ct}^U + \frac{1}{\sigma_C} U_{ct} = \ln \theta_{ut} + \left( \frac{1}{\sigma_C} - \frac{1}{\sigma_E} \right) \ln U_t + \frac{1}{\sigma_E} \ln Y_t + \ln \alpha_{uc}; \quad (4.12)$$

and similarly for the lower-skilled group:

$$\ln w_{ct}^L + \frac{1}{\sigma_C} L_{ct} = \ln \theta_{lt} + \left( \frac{1}{\sigma_C} - \frac{1}{\sigma_E} \right) \ln L_t + \frac{1}{\sigma_E} \ln Y_t + \ln \alpha_{lc}, \quad (4.13)$$

where the first three terms on the right-hand side of each equation can be accounted for with year dummies. This procedure allows for the calculation of the cohort-specific efficiency parameters (the  $\alpha$ s). Combining the estimates for these  $\alpha$ s and  $\sigma_C$  one can build the aggregate supply indexes  $U_t$  and  $L_t$  from equations 4.6 and 4.7. Then, having calculated all elements in equation 4.10, I proceed to the second stage in the estimation process: uncovering the  $\sigma_E$  estimate (the elasticity of substitution between workers who did and did not attend university).

In this last stage, I estimate the full model as shown in equation 4.10. I follow Katz and Murphy (1992) and others in using a linear time trend to absorb the effect of the technology term  $\frac{\theta_{ut}}{\theta_{lt}}$ . The resulting specification takes the following form:

$$\ln \left( \frac{w_t^U}{w_t^L} \right) = \beta_0 + \beta_1 t + \beta_2 \ln \left( \frac{U_t}{L_t} \right) + \epsilon_t. \quad (4.14)$$

Table 4.8 presents this final estimate. The estimated parameter for the relative supply is quite large, indicating an elasticity of approximately 5. This value is similar to those reported by Carrasco et al. (2015) for the 1995-2010 period and by Glitz and Wissmann (2021)

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share of educated individuals has increased markedly relative to the lesser-skilled over time. I discuss this issue in section 4.8

for Germany. Despite this, I am skeptical of an OLS estimation on 11 non-independent yearly observations. Yet, since the main objective of this paper is to discuss the gaps in the university premium between cohorts, this does not take away from the main message in the previous subsection: that older and younger workers are very imperfect substitutes, a fact that can in large part be explained by the rapid push in favor of university education since the late 80s.

Table 4.3: Model estimation Step 2: determining the elasticity of substitution between education groups ( $\sigma_E$ )

	(1)
	Uni. premium
Aggregate relative supply	-0.211*** (0.012)
Trend	0.020*** (0.003)
N	11
R2	0.99

Standard errors in parentheses

The specification is fitted using weighted least squares with weights being inversely proportional to the variance of estimated wage premiums. It does not include a constant term.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

## 4.8 Discussion

Rising inequality across developed nations over the past decades has triggered a large body of academic research, much of it centered around the university premium. This focus in large part stems from the fact that there is often a close relationship between inequality in labor incomes and returns to university schooling (Autor, 2014). Spain is no exception in this regard: the large drop in inequality between 1985 and 2000 in part owed to a decreasing university premium (Pijoan-Mas and Sánchez-Marcos, 2010); in contrast, as inequality rose during the crisis years (Sanz-De-Galdeano and Terskaya, 2020), so did the wage differential between educated and lower-skilled workers. Despite this, this latest increase was short-lived, with the local-cost-of-living-adjusted university premium returning to pre-crisis levels – at approximately 40% – by 2017.

But this seeming stability in returns to university education hides large cohort gaps that predate the crisis. This may come as no surprise to young generations of Spaniards, many of which share Carolina Alguacil’s perception that, despite their efforts to increase their educational attainment, they have the cards stacked against them. Throughout the period

of study, younger workers – especially those aged 35 and under – were paid much lower returns on their university degrees than their older counterparts. The differences are truly striking: on average, the expected increase in salary for workers born before 1982 from attending university is approximately 45%; this figure lies at just  $\sim 30\%$  for those born after that year. This gap is not just caused by differences in work experience – a factor I am able to control for, as the data I use in this paper allows to track individuals work histories over time.

The timing of the shifts in the university premium suggests that the large university expansion that took place since the late 80s, and is still ongoing, could in part be responsible for these patterns. I apply the by-now traditional model in Card and Lemieux (2001) to the Spanish case to understand the effect of these large increases in the relative supply of tertiary-educated workers on the university premium. I pay particular attention to the elasticity of substitution between workers of different cohorts, as this is the main point in Carolina Alguacil's popular op-ed from 2005. The results indeed suggest that there exists imperfect substitutability between birth cohorts. In other words, younger and older workers do not perfectly replace each other in the labor market, even if they have the same level of education and experience. Consequently, I document a causal negative relationship between the rising relative supply of university-educated (younger) workers and shifts in the skill premium by cohort.

But the drop in the university premium does not affect all young workers equally. Studying the heterogeneity in skill returns across the wage distribution, I find rising within-group wage inequality among the educated, particularly among younger cohorts. Top earners born in 1982 and after receive skills premiums as high as those of older workers, but for young people at the bottom of the conditional wage distribution returns can be lower than 20%. These findings suggest a widening earnings distribution and added wage uncertainty for younger generations. As a result, where an individual goes to university, the degree they complete, and other factors related to individual ability take an added level of importance when determining the labor outcomes of young people choosing to attend university. These patterns are likely to exacerbate over time, as a new wave of – now private – university openings is ongoing, and more of those young workers have yet to enter the labor market.

An interesting question is why, as the supply of skills skyrocketed in Spain, demand for highly-skilled workers appears to have progressed very slowly. Previous literature has highlighted the importance of the duality of the Spanish labor market, where jobs with very high stability and relatively high pay coexist with very short-term contracts with

little prospect of employment stability or of acquiring any form of firm-specific human capital (Bentolila et al., 2021). This is certainly an important issue, and one that warrants further exploration. But there is another perhaps more important one that can explain why the demand for skills appears to be much slower compared to other countries: sectoral specialization.

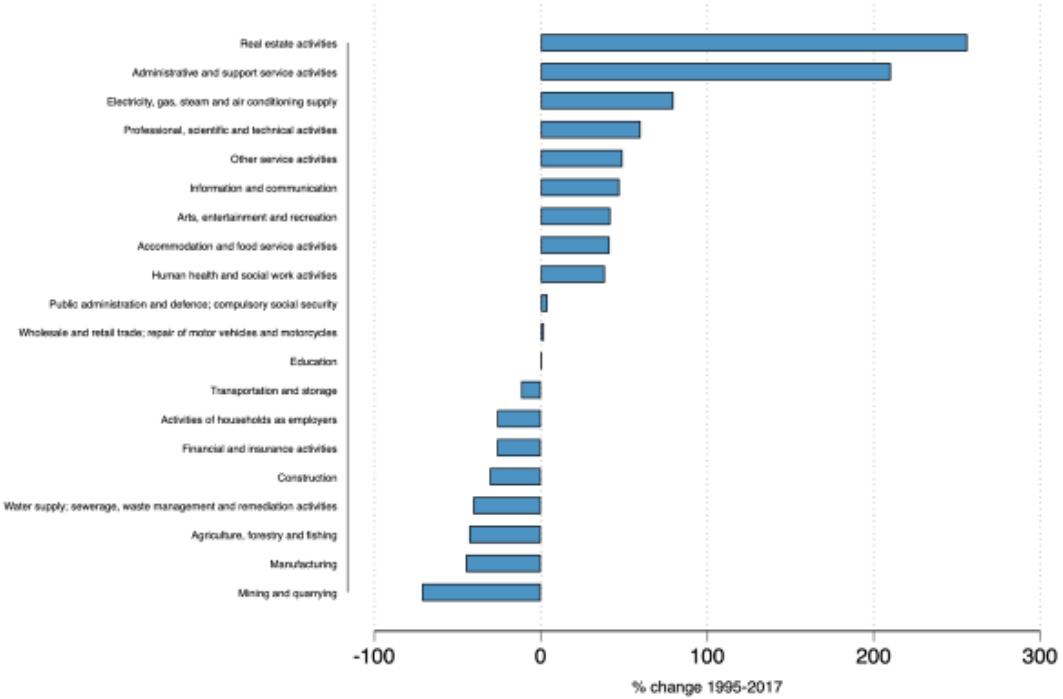


Figure 4.11: Change in employment by sector, 1995-2017

Figure 4.11 outlines changes from 1995 to 2017 in the share of employment in each sector of the economy. 1995 is the year in which the 1971/72 cohort would have finished university<sup>25</sup>. Notice that virtually all employment growth has taken place in activities that need not require a university degree: real estate, administrative and support activities, or the hospitality industry. This pattern explains why, even if technological changes were similar to those found in the US or the UK, relative demand for skills was much lower. Given that the relative supply of university-educated workers is likely to increase over the next years – as a further university expansion is already under way –, what this suggests is that the solution to the cohort inequality problem may require a shift in focus towards activities that foster – not dampen – skills demand. Nonetheless, regardless of the demand-side strategy, research on the supply side is still needed: information on the returns to different degrees

<sup>25</sup> Ideally, we would want a comparison with an even earlier year but the data was not available.

and on the quality or signalling value of attending specific higher education institutions should be helpful to policymakers keen on addressing between-cohort patterns of wage inequality.

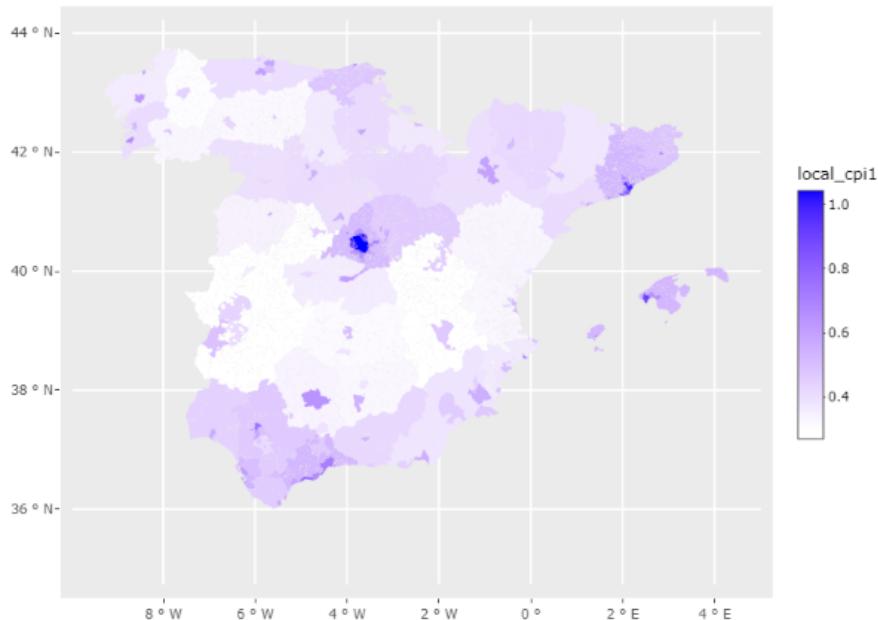
## 4.A Adjusting wages with local CPIs

### 4.A.1 Local Consumer Price Indices

While both governments and the labor economics literature usually adjust wages for inflation using a national CPI, it will be quite evident for anyone living in Spain that the country's mean monthly salary does not buy the same basket of goods and services in Madrid as it would in Extremadura – one of Spain's less densely populated regions. The difference in prices is particularly stark when it comes to the cost of housing, with the median monthly rent of a  $90m^2$  apartment in Madrid almost tripling that of an equivalent apartment in Mérida – Extremadura's capital. The scale of these price differences suggests that employing locally-adjusted wages would give a much more complete picture on the patterns of wage inequality across the territory.

In this paper I provide inequality measurements that take these differences in local prices into account. I adjust individual earnings using a Cost-of-Living Index (or CPI) that is specific to the worker's municipality of residence. Through this process, I allow for both the cost of housing and the cost of other goods and services to vary across localities (see the results of this process in Figure 4.12).

Figure 4.12: Differences in living costs, year 2016



$$localCPI_{mt} = \alpha_{rt}HC_{mt} + (1 - \alpha_{rt})NHC_{mt} \quad (4.15)$$

Each local (municipal) CPI is defined as the weighted sum of the local cost of housing and non-housing consumption (see Equation 4.15). The weights  $\alpha$  and  $1 - \alpha$  are taken from the regional-level estimates published by the INE every year – this is, they vary by Autonomous Community and over time. Table 4.4 shows the main consumption categories that are taken into account for the calculation of the regional CPIs<sup>26</sup>. The most important component is housing, which (nationally) accounted for over 35% of average expenditure in the year 2016. This is also the category that has concentrated the most resources over time: the share of average income going to housing rose by 6 percentage points since 2007. Food, leisure and transportation follow at much lower percentages of consumption – 17.3%, 15.2% and 11.4%, respectively. All other categories feature weights under 7.5%.

Table 4.4: Average share of income spent on each of the CPI consumption categories (INE, 2020)

Consumption category	2007	2016
Housing & utilities	29.6%	35.6%
Food & drink	16.8%	17.3%
Leisure	17.1%	15.2%
Transportation	15.1%	11.4%
Clothing	7.1%	5.4%
Healthcare	2.9%	3.8%
Communication	2.9%	2.9%
Education	0.77%	1.2%
Other	7.7%	7.3%

I use municipal rental prices from the ‘Índice de alquiler de vivienda’ as a proxy for the cost of housing ( $HC_{mt}$ )<sup>27</sup>. Notice, however, that rental data in rural areas is relatively sparse. To solve this problem, I group all rural municipalities within each province (i.e. municipalities not belonging to any of the 83 urban areas officially designed by the INE) and assign them the same local CPI. The price of non-housing goods and services ( $NHC_{mt}$ ) is also allowed to vary by province, based on estimates by the INE.

<sup>26</sup>For simplicity, the table shows the average weights across all Spanish regions.

<sup>27</sup>While it is true that a large percentage of the population in Spain owns their home, there are advantages to focusing on the rental market. Fundamentally, one should not forget that houses are an asset; this means that their price depends both on the actual cost of the house but also on the market expectations regarding how much their value will rise in the future (Poole and Ptacek, 2005).

Finally, all local CPI calculations are normalized, with the municipality of Madrid in the year 2016 set to 1. This allows for the index to vary both across locations and over time.

## 4.B Relationship between age and years of experience

Table 4.5: Experience summary statistics, by age group

	Mean	SD
Born 1982-1992	5.912	3.581
Born 1972-1981	10.525	5.366
Born 1962-1971	17.322	7.856
Born 1952-1961	24.944	10.450

#### 4.C IV estimation of $\sigma_C$

Table 4.6: IV estimation of Step 1's  $\sigma_C$

	(1) First-stage	(2) Reduced-form	(3) Second-stage
# of open universities at birth year - # in 1952	0.023*** (0.002)	-0.004*** (0.000)	
Relative cohort supply of tertiary-educated workers			-0.184*** (0.009)
Cohort effects			<i>No</i>
Year effects			<i>Yes</i>
Instrument			<i>Yes</i>
Weak ident. (Kleib.-Paap)			$F = 168.3$
N	390	390	390
R2			0.98

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

#### 4.D Estimations using nationally-adjusted CPIs

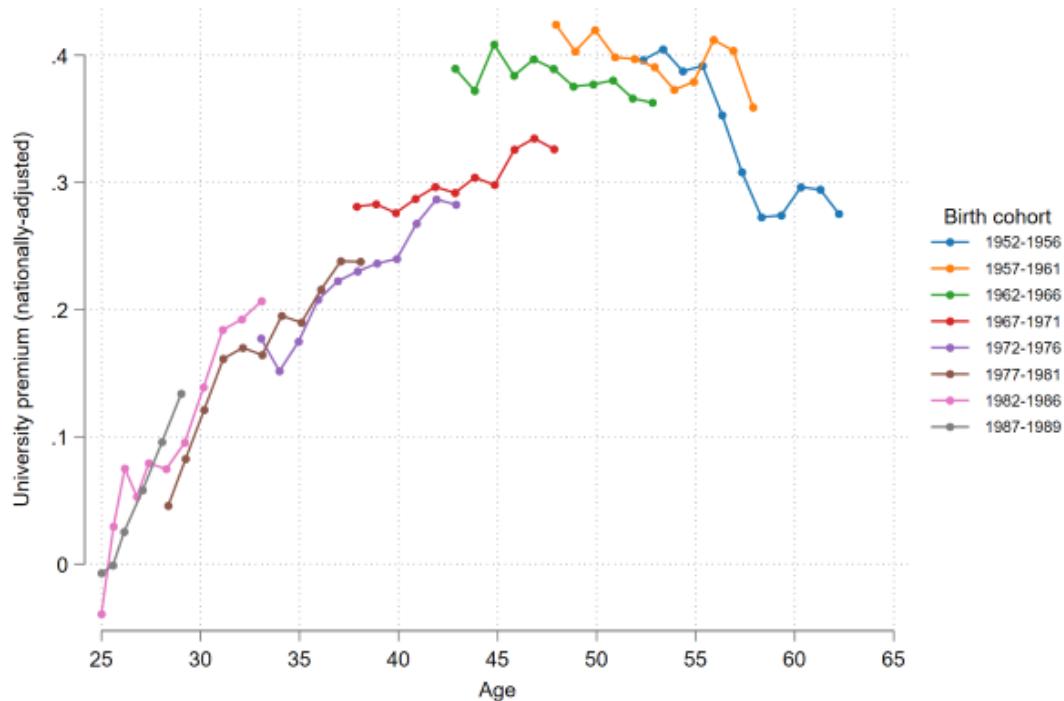


Figure 4.13: Evolution of the university premium in Spain, by age (2007-2017). Wages are adjusted using the national CPI.

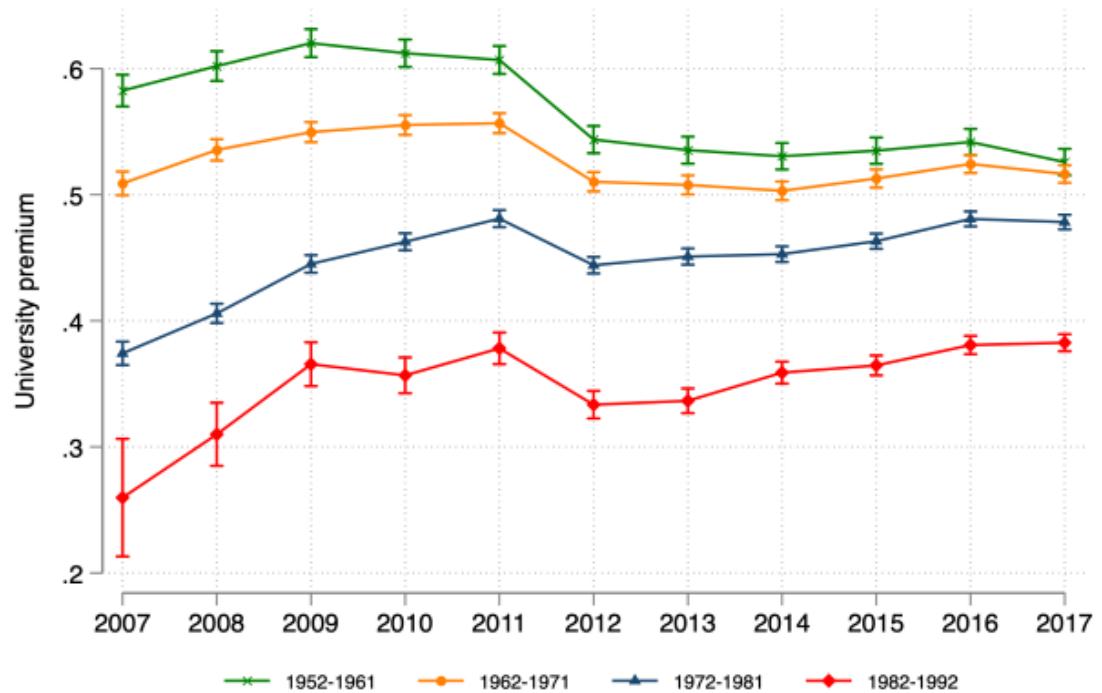


Figure 4.14: Evolution of the university premium in Spain, by cohort (2007-2017). Wages are adjusted using the national CPI.

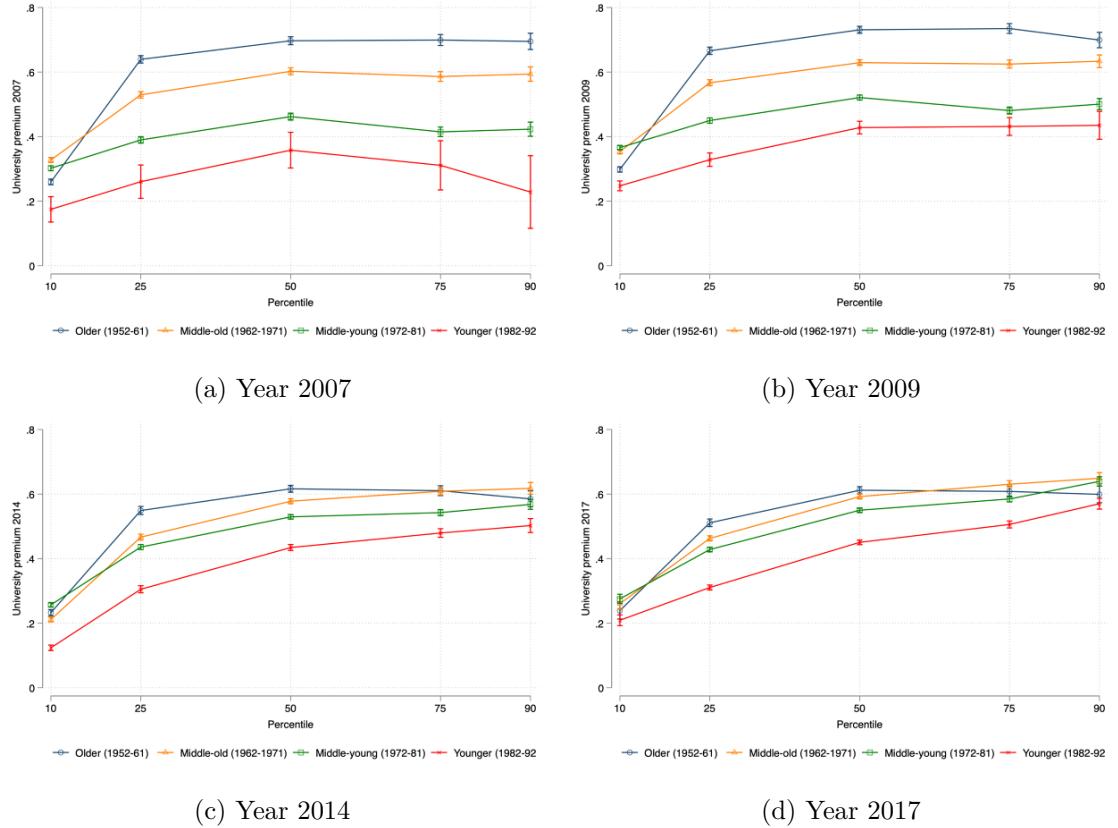


Figure 4.15: Quantile regression coefficients for university education at the 0.1, 0.25, 0.5, 0.75, and 0.9 percentiles, by cohort (years 2007, 2009, 2014, and 2017). Results are based on the specification in Equation 4.2 with an interaction between cohort and the university dummy. Wages are adjusted using the national CPI.

Table 4.7: Model estimation Step 1: determining  $\sigma_C$ 

	(1) Uni. premium	(2) Uni. premium	(3) Uni. premium	(4) Uni. premium
Relative cohort supply of tertiary-educated workers	-0.108*** (0.023)	-0.104*** (0.028)	-0.137*** (0.023)	-0.256*** (0.011)
Trend		0.018*** (0.003)		
Cohort unemployment rate			-0.015*** (0.002)	-0.018*** (0.002)
Cohort effects	Yes	Yes	Yes	No
Year effects	Yes	No	Yes	Yes
Instrument	No	No	No	Yes
Weak ident. (Kleib.-Paap)				$F = 168.3$
N	390	390	390	390
R2	0.99	0.98	0.99	0.98

Standard errors in parentheses

The first 3 specifications are fitted using weighted least squares with weights being inversely proportional to the variance of estimated wage premiums. The last column is estimated using 2SLS. Wages have been adjusted using a national CPI.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table 4.8: Model estimation Step 2: determining  $\sigma_E$

	(1)
	Uni. premium
Aggregate relative supply	-0.257*** (0.010)
Trend	0.025*** (0.002)
N	11
R2	1.00

Standard errors in parentheses

The specification is fitted using weighted least squares with weights being inversely proportional to the variance of estimated wage premiums. It does not include a constant term. Wages have been adjusted using a national CPI.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

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