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**The dog that didn't bark: on the effect
of the Great Recession on the surge of
secessionism**

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Abstract

This paper explores the relationship between the economic turmoil generated by the Great Recession and the increase of secessionism in different regions of Western countries. Some authors have stressed that the Great Recession triggered profound changes in political attitudes and preferences and, in the context of a conflict between the centre and the periphery, fuelled secessionism as a radical shift of the institutional setup. Nevertheless, other researchers have remarked that a deep recession may make voters more accommodating with the status quo and more reluctant to take radical stances. Our paper aims at contributing to this debate by analyzing the case of Catalonia. We use the variation of economic variables and data from surveys and electoral outcomes at the level of municipalities to explore the relationship between the deterioration of the economic situation (that is, the local variation in the intensity of the crisis) and the increase of preferences for secession among the Catalan population. The findings from the analysis of our empirical models do not support the hypothesis that the heterogeneous effects of the Great Recession had any significant impact on political preferences at the level of municipality in Catalonia. These findings contribute to our understanding of the effects of hard economic times on people's attitudes and behaviour.

Keywords: Great Recession, Unemployment, Secession, Economic Crisis, Catalonia

JEL codes: H77, N44

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1. Introduction

A common view among commentators and electoral pundits is that economic crises are strong determinants of decentralization demands or support for secession. Economic downturns—the argument goes—bring about popular discontent, polarize political positions and trigger centrifugal forces that fan the desire for autonomy or outright independence. Many examples of this can be found in the press, especially referred to the effects of the Great Recession in a number of European regions. One can come across sentences like “To many observers, the disintegration forces that characterize Catalonia, Scotland and Flanders are just the by-products of Europe’s economic despair” (*World Economic Forum*, August 2014)¹ or “There is nothing like unemployment and austerity to fuel the fires of secession” (*The Nation*, April 2014)², which represent a small sample of this widespread opinion.³

Despite the ubiquity of this line of reasoning, there is little research providing empirical evidence that economic bad times lead to an increase in support for secession (or even decentralization). While the grievances exacerbated by economic recessions might indeed boost secessionist support, a theoretical argument can also be made in the other way round, namely, that economic crises lead citizens to accept the status quo, as individuals deem secession as too risky and costly when economic times turn turbulent.

We aim at contributing to this debate by analyzing the relationship between the effects of the Great Recession and the increase in the support to secessionist demands in Catalonia. At least since 2010 there has been a remarkable upsurge in the support to the creation of a new Catalan independent state among the population of Catalonia (today a region of Spain). This increase, however, varies substantially across the Catalan geography. Moreover, the Great Recession had a heterogeneous impact across the Catalan territory, affecting some places more than others. We

¹ Campanella, Edoardo “Why secessionism is on the rise in Europe”, 14 August 2014. <https://www.weforum.org/agenda/2014/08/secession-scotland-catalonia-referendum-europe/>

² Hallindan, Conn “How Ethnic Tensions and Economic Crisis Have Strengthened Europe’s Secession Movements”, 9 April 2014. <https://www.thenation.com/article/how-ethnic-tensions-and-economic-crisis-have-strengthened-europes-secession-movements/>

³ There are also some observers who hold a less pervasive line of thought which plays down the role of economic factors to explain the rise of secessionism. See, for instance, Dardanelli, Paolo “Recession is only one explanation for the drive for secession”, 24 November 2012. <https://www.theguardian.com/commentisfree/2012/nov/24/recession-only-one-explanation-secession>

exploit this variability to examine the effect of the economic crisis on the increase (or decrease) in support for independence. To capture the intensity of the recession we use several economic indicators. Although some authors (see for instance Boylan, 2015 and Rico and Liñeira, 2014) have mentioned that the economic crisis could be an important factor to explain the increase of secessionism in Catalonia, there is very little academic research aiming at evaluating the validity of the hypothesis.

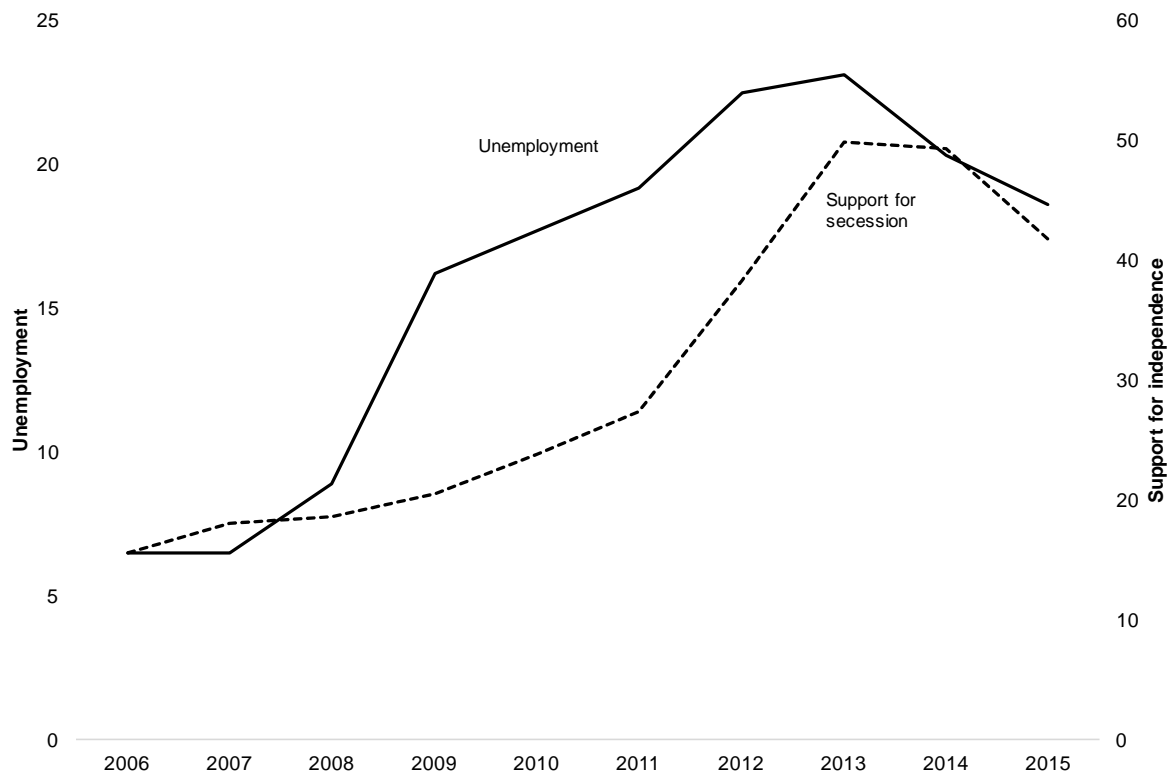
The situation in Catalonia during the period 2010-2015 makes it a clear case for our purposes. First, the economic shock of the Great Recession and its aftermath had dramatic effects in Catalonia after 2009. Many of the worst consequences of the Great Recession were felt in the labour market, but almost all economic sectors were severely affected. In addition, the economic policies put in place to fight against some of the problems created much popular discontent. Spain experienced an unpopular combination of fiscal austerity and public bailouts of substantial parts of the financial system, caused respectively by the debt and the banking crises. These additional ingredients in the economic policy recipe further contributed to social discontent and political disaffection. Second, data coming from different surveys indicate that support for independence in Catalonia grew from 15% to 50% between 2006 and 2014 and, additionally, electoral outcomes and trends in popular mobilization also point to the same direction.⁴

Figure 1 illustrates these two aspects by showing the evolution of unemployment and support for independence in Catalonia. Just “eyeballing” the graph, one might be tempted to conclude that the first factor caused the second. However, there are reasons that indicate that this causality might be spurious. When the economic crisis was in full display, the Spanish Constitutional Court curtailed Catalan self-government powers (June 2010) and a great amount of citizens started mobilizing in favour of independence. Political elites also started changing their discourse on the issue (see Cuadras-Morató, 2016 and section 3).⁵

⁴ See sections 3 and 4 for more details on the political situation in Catalonia and the opinion surveys.

⁵ Additionally one could argue that the relationship between bad economic times and support for independence was not observed back in 1993, when economic growth in Catalonia was negative (-1.1 per cent) and the unemployment rate reached values higher than 20 per cent. Then preferences for secession remained stable throughout the period.

Figure 1: Evolution of unemployment in Catalonia and support for independence (2006-2015)



Note: Unemployment data comes from Eurostat. Data for support for secession comes from the CEO surveys (see section 4 and Appendix).

All in all, did the intensity of the economic crisis lead to an increase in support for independence? Our research plan is to take advantage of the variation of economic variables (real income, employment, unemployment, and number of firms) and data from surveys and electoral outcomes at the level of municipalities in Catalonia in order to explore whether there is any relationship between the surge of secessionism and the main economic effects of the Great Recession. Thus, our empirical models capture the quantitative effects of the economic consequences of the Great Recession on the recent growth of support for independence in the political preferences of the Catalan citizenry. In this particular sense, this article also relates to a body of recent research on the political reactions triggered by the Great Recession (see, for instance, Hernandez and Kriesi, 2016).

Despite the popularity of the argument amongst many political commentators, our findings do not support the hypothesis that there is a relationship between the negative economic consequences of the Great Recession and the increase in

support for independence among the citizens of Catalonia. Higher levels of destruction of jobs, disappearance of firms, or reduction of income in different municipalities do not appear to lead to higher increases in secessionist support. Results are robust across the different dimensions of the economic crisis and the different model specifications. In this sense, our research suggests that the pro-secession tide in Catalonia might not recede when the economy gets better, unless there are also further changes in the political situation in Spain.

2. Theory

The literature offers three main explanations to understand why some individuals support the creation of a new State, while others are opposed to it. A first strand of research has analyzed the relationship between support for secession and attitudes or partisan preferences. This includes, for instance, the study of the connection between backing for independence and attitudes towards the European Union (Dardanelli, 2005) or how the probability of supporting secession varies when individuals consider different alternative institutional arrangements (Serrano, 2013a). As for parties, previous works have mainly analyzed how party strategies shape citizens' preferences for secession (Richez and Bodet, 2012; Willems, 2014).

A second group of scholars have looked at the role of regional identity/ies and its relationship with pro-secessionist predisposition (Serrano, 2013b). The point of departure is that the regional versus "statist" dimension is the main factor driving individual's support for secession (Hooghe and Marks, 2004; Paasi, 2009, Guinjoan and Rodon, 2016a). Finally, and most importantly for this article, secession has also been associated with the economic dimension.

The link between support for independence and economic factors has been traditionally conceptualized in three interrelated ways. Firstly, high levels of support for independence have been considered to be associated with individual economic deprivation. For instance, Rico and Liñeira argue that "the rise of Catalan secessionism may thus be a particularised manifestation of the growing political dissatisfaction that was ultimately produced by the economic crisis [...] the pro-independence tide will therefore probably recede as the economy recovers" (2014: 273). In Scotland, previous research (McKendrick et al, 2014) has shown that the

increase in secessionist sentiment is partly due to the harsh austerity measures implemented in the region during the eighties. Overall, according to this reasoning, people suffering the effects of the economic crisis cease to trust the central institutions and, as a result, they start considering breaking up the status quo and embrace the necessity to create a new State. This line of argument is connected with research that has documented a positive link between economic vulnerability and hostility toward immigrants or high support for populist parties, especially when analyzing the effects of economic downturns (Hernández and Kriesi, 2016). For this reason, secessionism in Catalonia and other European regions has often been considered a populist movement and regarded as a by-product of the harshness of the economic effects of the Great Recession.

Secondly, and related to the first point of view, increasing support for independence has been shown to be linked to positive expectations about the future of the region's economy. Although these expectations also have a role to play during good economic times, it is likely that they are regarded as more important during economic downturns. The basic tenet of this line of reasoning is that pro-secessionist individuals tend to think that the economy (and, as a result, their economic status) would be better-off if the region was able to create its own State (Blais, 1992; Clarke et al, 2004; Howe, 1998; Boylan, 2015). In other words, people will opt for an independent state if they perceive it can serve to achieve their economic goals.

Thirdly, a bad economy, and the austerity measures associated to it, has been shown to increase political recentralization measures (Bolgherini, 2014). If this is the case, the reversal of decentralization can polarize the centre-periphery cleavage and provide an argument for regionalist parties that accommodation is not possible and that contestation is the only way forward (Muro and Vlaskamp, 2016). Although the effect of the economy would be in this case indirect, it might be that the interaction between a shock in people's economic situation and recentralization measures can further exacerbate secessionist concerns. Or, in other words, since recentralization affects everyone in the region, its effects on secessionist demands should be higher in places where the economic shock has been more severe.

Despite the popularity of these arguments, the academic evidence that validates them is mixed. For instance, at the aggregate level, Sorens (2005) found that the economic opportunities brought about by globalization are positively related to

secessionist vote growth. Serrano (2013a) showed that those wanting a high degree of fiscal autonomy for the Catalan region are significantly more likely to support independence. Muñoz and Tormos (2015) portrayed a different picture. Using a survey experiment, they showed that economic considerations play an independent role on support for secession, but only for citizens with ambivalent identity positions and for those who have no party identification, or are supporters of parties with less clear-cut stances on the issue. Similarly, and using data for Catalonia, Guinjoan and Rodon (2016b) show that, although support for independence grew for all socio-economic groups during the period 2008-2014, this growth was larger (smaller) for employed (unemployed) individuals and middle and high (low) income groups. Furthermore, the empirical evidence provided by Boylan (2015) seems to show that the increase of independence aspirations “do not seem to materialize from poor outlooks on the region’s economic performance or employment status”, which goes against the idea that the Great Recession and higher unemployment rates are the main culprits of the surge of secessionism in Catalonia.

Summing up, the empirical evidence on the relationship between the effect of economic crisis and secessionist demands is far from being compelling. On top of this, one could argue that the theoretical case for it is not conclusive either. Thus, while most previous works emphasize the existence of a relationship between economic crisis and secessionist demands, they do not contemplate that a theoretical connection can also be made between economic crises and the acceptance of the status quo. A rich tradition of psychological research, going back to Fromm (2001[1941]), argues that insecurity and uncertainty, as plausible by-products of job or income losses, are associated with adopting conservative stances and acceptance of the status quo. In other words, economic instability makes people more willing to submit to authority and accept the current state of events. Indeed, previous evidence has failed to show that crisis induce political reforms (Drazen and Easterly, 2001, Galasso, 2014). If this argument holds, we should expect secessionist support to be stable (or even diminish) during bad economic times. Under economic recessions, people face uncertainty and may consider that the cost of secession is too high to bear (Fernandez and Rodrik, 1991 and Volpato et al, 2017). Previous research on Quebec confirms this logic by showing that attitude

toward risk-taking was a contributing factor in the outcome of the 1995 referendum (Nadeau et al. 1999).

All in all, the jury is still out on whether economic crises increase support for independence. This link is precisely what we aim at studying using the case of the Great Recession in Catalonia.

3. Catalonia 2006-2015: a changing landscape

3.1. Political landscape

Although there had always been social organizations and political parties favoring the secession of Catalonia since the restoration of democracy in Spain in 1978, opinion surveys and electoral outcomes systematically indicated that only a minority of the population gave support to the independence of the region until 2010. Until that year, the proportion of Catalan citizens who manifested a preference for independence in opinion polls was never higher than 20 per cent. Since 2010, though, this figure has augmented dramatically and surveys today suggest that the support for independence is rarely below 45 per cent (Figure 1). On a similar note, electoral outcomes have also experienced radical changes. The number of MPs in the Catalan Parliament elected under an openly secessionist platform went from 14 in 2010 to an absolute majority of 72 after the election of 2015.⁶

Many authors have mentioned the long and convoluted process of elaboration, negotiation and approval of the Reform of the Statute of Autonomy of Catalonia (2004-2010) as a turning point in the recent history of the political relationship between Catalonia and Spain. The whole process ended in June 2010 with a judgement of the Spanish Constitutional Court which declared unconstitutional important parts of the Statute. This ruling is regarded by many as a key moment in the emergence of secessionism in contemporary Catalan politics. One of its first consequences was a massive demonstration in Barcelona.

The process had started in September 2005, when the new Statute was approved in the Catalan Parliament by an overwhelming majority of MPs. Then the Statute was taken to the Spanish Parliament where it was discussed, amended to a large extent, and approved. Finally, it was submitted to referendum to the Catalan electorate in

⁶ The total number of seats in the Catalan Parliament is 135.

June 2006 and ratified by 74 per cent of voters. Despite this, the main Spanish conservative party (PP), fiercely opposed to the new Statute of Autonomy since its inception, decided to take substantial parts of it to the Constitutional Court. All this was done in the middle of a deteriorated political climate, because the new Statute was not well received by ample sectors of Spanish society. Many (including most Spanish political parties) considered that devolution was going too far, parts of the Statute were contrary to the Spanish Constitution and accused the project of lack of solidarity due to its financial provisions.

Meanwhile the debate in the street was gradually moving from autonomy to independence and in September 2012 there was a massive demonstration (1.5 million people participated according to local and regional authorities) under the slogan “Catalonia, a new State of Europe”.⁷ Additionally, the holding of a self-determination referendum became the new bone of contention between the Catalan and Spanish governments. While the former was committed to it as one of its main political priorities, the latter was vehemently opposed to it.

The Catalan government and Parliament were unsuccessful to reach a political agreement with their Spanish counterparts to allow for the holding of a non-binding referendum and, in the end, were forced to look for alternative ways of convoking the electorate to the polls. Thus, in November 2014 a so-called “popular consultation” (unofficial referendum) took place and 2.3 million people voted on the independence of Catalonia. Later, the Catalan government decided to call an early election on September 2015 and frame it as a de facto vote on Catalan independence. Voting for the two lists that explicitly had independence in their electoral manifestos would be the equivalent to a ‘Yes’ in a self-determination referendum. In the end it was, again, a form of ‘imperfect referendum’, which made the interpretation of its outcome highly controversial. With 47.8 per cent of the votes going to the ‘Yes’ option, 39.1 per cent of voters to the ‘No’ and 11.5 per cent to other options whose proponents explicitly refused their being added to any of the two main contenders, both the pro-independence and pro-union camps claimed victory, arguing respectively that the ‘Yes’ (47.8) and the non-‘Yes’ (50.6) had prevailed.

⁷ The total population of Catalonia at the time was slightly above 7.5 million.

3.2. Economic landscape

The years before the Great Recession were characterized as a period of remarkable prosperity. The rate of economic growth in Catalonia reached an annual average of 3.7 per cent during the period 2002-2007 (comparing favorably with a rate of 2.3 per cent for the whole European Union). Also, average yearly employment growth for the same period reached 4 per cent (1.3 per cent for the EU), which allowed the unemployment rate to reach unprecedented low values (6.5 per cent).

Suddenly things turned sour and the economic and financial international climate became extremely unfavorable. This, together with some huge built-in imbalances of the Catalan economy (especially a huge speculative real state bubble that crashed catastrophically) foreboded a very traumatic economic adjustment. Indeed, the “economic shock” of the Great Recession and its aftermath had dramatic effects. For a start, after negative growth every year during the period 2008-2013 (with the only exception of 2010 when positive growth reached a meager 0.6 per cent), in 2015 levels of real GDP were still below the 2007 values (Figure 2). The labor market was gravely affected by the new situation. After a very severe process of employment destruction during which more than 17 per cent of jobs existing in 2008 had been wiped out in 2013 (Figure 3), the unemployment rate reached a yearly maximum of 23.1 per cent that year (Figure 1). Additionally, the low levels of economic activity during the period caused the reduction of the number of firms operating in Catalonia (Figure 4).

Figure 2: Evolution of real GDP in Catalonia, Spain and the EU (2006=100)

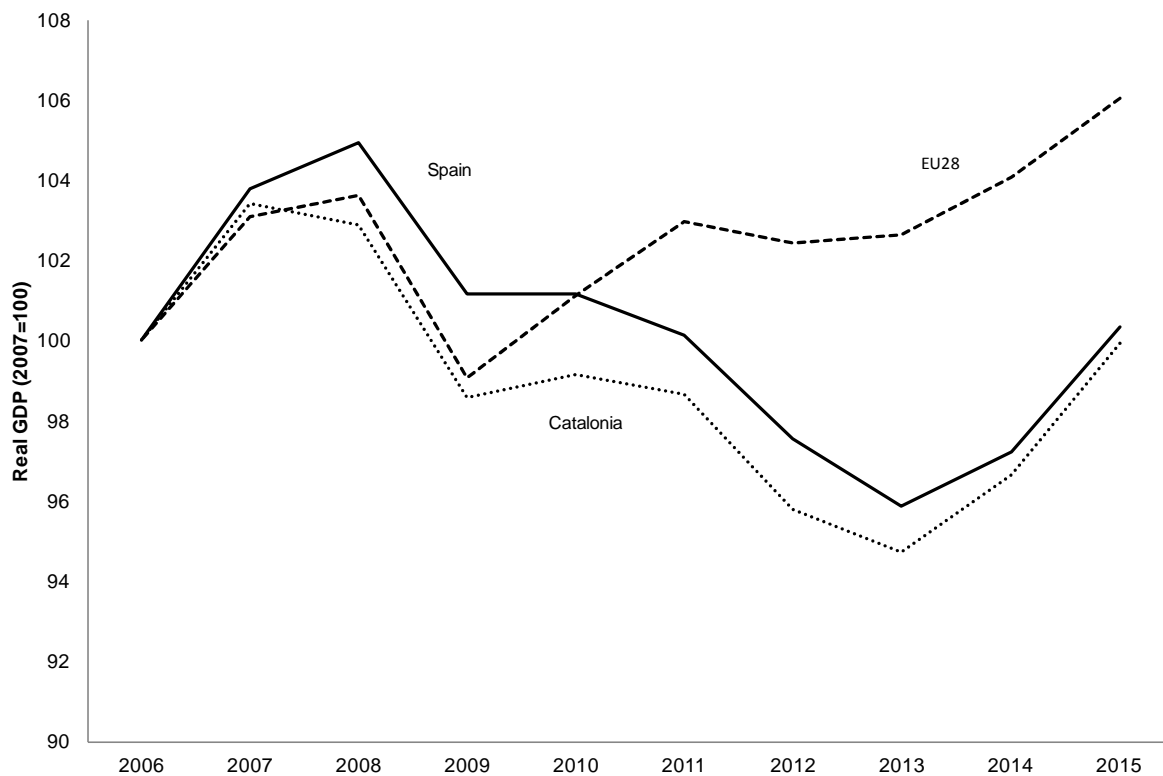


Figure 3: Evolution of employment in Catalonia, Spain and the EU (2006=100)

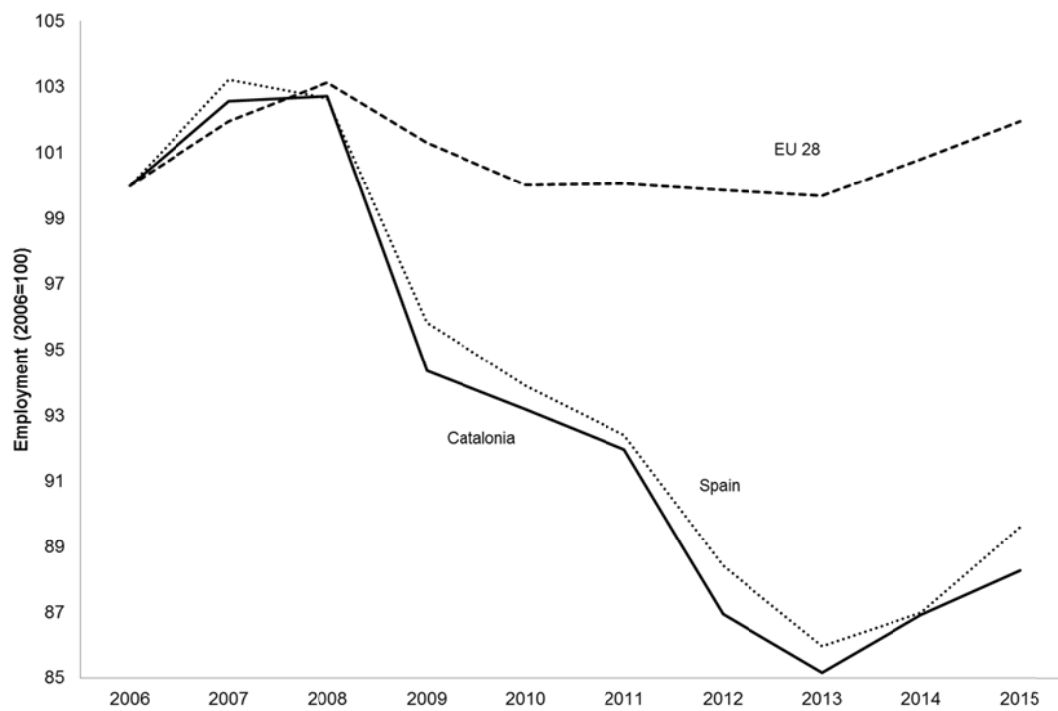
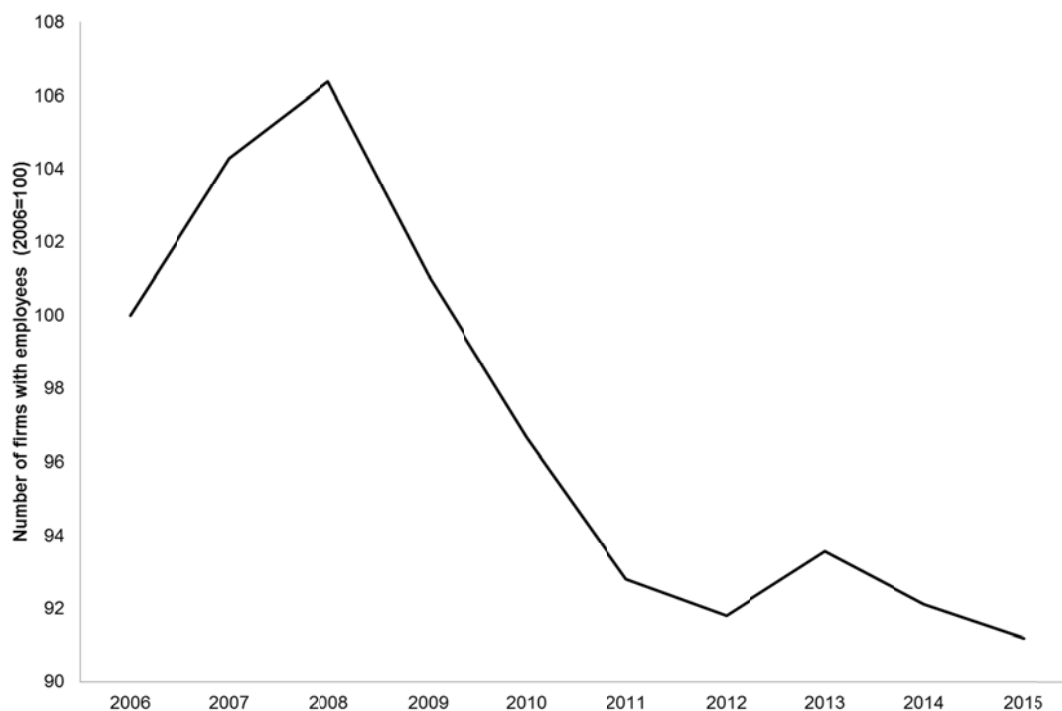


Figure 4: Number of firms with employees in Catalonia (2006=100)



Sources: Figure 2 and 4 (Idescat), Figure 3 (Eurostat).

The reduction of economic activity caused a huge decrease in fiscal revenues and forced the regional government to enact public spending cuts. Public employees saw their salaries fall and the quantity and quality of essential public services provided at the regional level suffered as a consequence of the austerity measures. All this fueled discontent among the population and, in the pro-secession camp, spurred the old debate about the net fiscal flows from Catalonia to the rest of Spain and the potential fiscal dividend from independence (see Cuadras-Morató, 2016, chapter 6).

Although the scars left by the Great Recession were still visible, things started going back to normality and economic growth resumed in 2014 (2 per cent) and 2015 (3.4 per cent) and, thanks to this, the unemployment rate receded to lower levels (18.6 per cent), still more than 12 points higher than pre-recession levels. Nevertheless, it is very likely that, for some time, they will remain at higher levels than before the start of the Great Recession.

4. Data

4.1. *Dependent variable*

This article exploits the heterogeneous impact of the Great Recession on different municipalities and analyzes whether this economic shock is related with variations in secessionist support. In order to test this, we first need to measure the difference in the support for independence before and after the economic crisis. This task faces two main challenges. First, compared to Scotland or Quebec, where secessionist preferences were directly revealed after an official referendum took place, Catalans have not yet voted in an official consultation and, therefore, data on the support for secession mainly comes from surveys, measuring citizens' attitudes rather than actual behavior. Second, support for secession is traditionally measured at the regional level and data at lower levels of geographical aggregation is scarce or does not exist.

Considering these challenges, we measure support for secession in three different ways.⁸ First, we estimate it by combining surveys and official election results. Second, we capture it using georeferenced surveys at the municipality level. Finally, to complement our arguments, we also turn to surveys to measure individuals' support for independence.

Our first measure is based on the combination of electoral results and information extracted from surveys. The logic is as follows. On a first step, we take data on the secessionist support among voters of the different political parties in 2006 and in 2015 in each of the four Catalan provinces—Barcelona, Tarragona, Girona, and Lleida. This is done using all surveys published by the Centre of Opinion Studies (CEO) in 2006 and in 2015. We consider independence supporters those who answered “An Independent State” to the question “What do you think that the relationship between Catalonia and Spain should be?”.⁹ On a second step, we gather electoral results at the municipality level for the 2006 and 2015 Catalan

⁸ See sources and other details of all variables in the Appendix.

⁹ The other options are: “A Region of Spain”, “An Autonomous Community”, and “A federal State within Spain”. Although this question underestimates secessionist support by not directly asking about individual's intended behaviour in a referendum of independence, it has been consistently asked since 2004. In 2012, the CEO institute started asking about the intended vote in a referendum of independence. If we use this other question, our results do not change.

elections. Finally, on a third step we combine the information from surveys and election results and calculate the percentage of pro-independence supporters for each party and add all of them to have the aggregate number for each municipality. For instance, let's consider that in a given municipality party A has received 100 votes and party B 200 votes. We know from surveys that, in the specific province where this municipality is located, 30 per cent of party A and 51 per cent of party B supporters are in favour of independence. Therefore, support for secession would equal to 132 votes (43 per cent).¹⁰

This process allows us to estimate support for independence at the municipality level in 2006 and 2015. Furthermore, we carry out the estimation in two different ways: first, considering only electoral support for all parties and, second, adding abstainers. The first indicator estimates the percentage of secessionist supporters among voters while the second takes into account the whole electoral census.

Table 1 shows the first step of this estimation process, that is, support for independence across parties in 2006 and 2015. In 2006 only 14 per cent of respondents were in favour of independence, although this percentage varied substantially across parties. Overall, support for secession did not have the majority among any party's electorate. Conversely, in 2015 support for independence had increased substantially and it hit 41.1 per cent on aggregate. The appendix provides details of all political parties and their stance on the independence debate.

¹⁰ One caveat of this approach is that, in each of the provinces, survey respondents from urban areas may be overrepresented and, therefore, estimated support for secession mainly reflects preferences from cities. Although this does not seem to be the case in the CEO surveys, as a robustness check we also weighted support for secession in non-urban areas to better reflect the urban-rural divide. Results are virtually the same.

Table 1: Support for independence by party choice

	2006	2015
CiU	15.4	n.a.
ERC	41.1	n.a.
JxS	n.a.	83.4
PSC	6.8	1.4
ICV-EUiA / CSQP	5.4	10.7
PP	1.4	2.0
C's	1.0	1.2
CUP	n.a.	76.6
Other	0.7	16.1
Blank/Null	0.7	7.9
Abstention	15.4	17.1
Total	14.0	41.1

Source: Centre for Opinion Studies. 2006: Opinion Barometer 363. 2015: Opinion Barometer 804. <http://ceo.gencat.cat/>

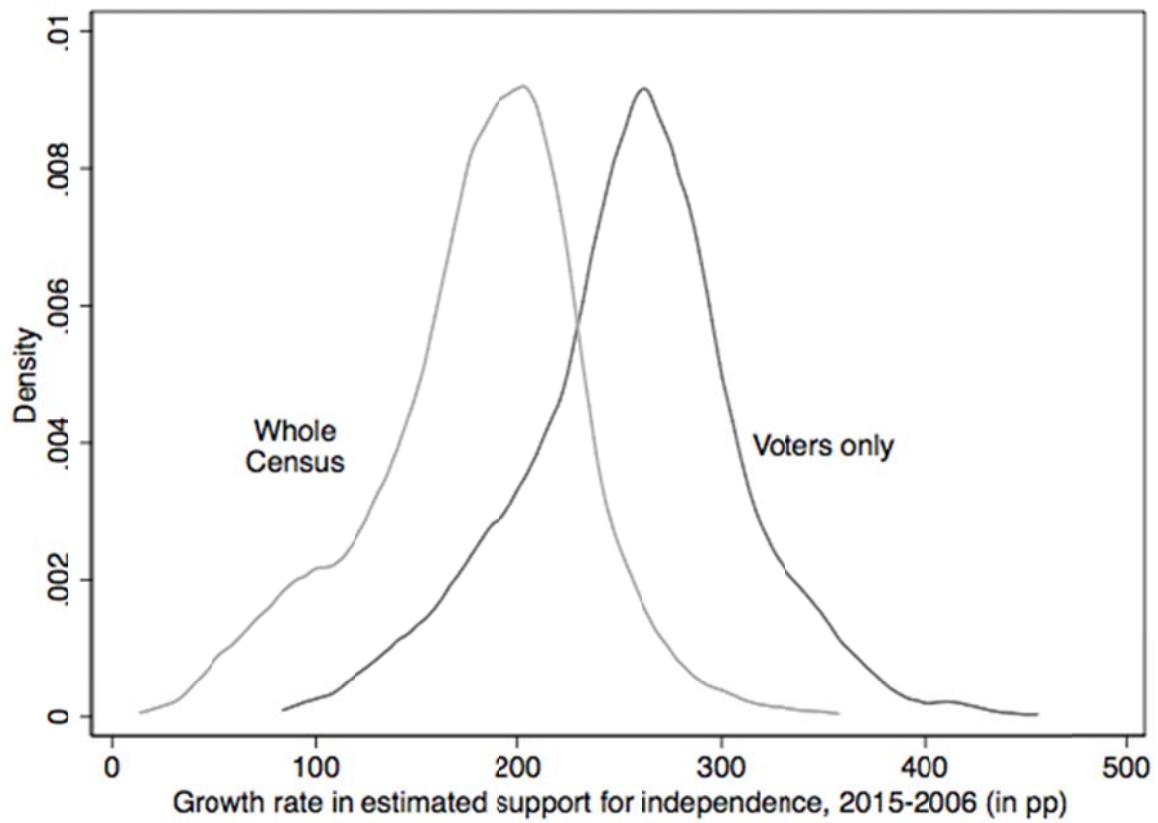
Not applicable (n.a.) if the party did not run.

As explained before, we used the figures in Table 1 and combined them with official electoral results in order to estimate the proportion of pro-secession voters at the municipality level in 2006 and 2015. Finally, we calculated the growth rate between both percentages.

Figure 5 illustrates the distribution of the growth rate of support for independence between 2006 and 2015. It shows that the value of the mode of the distribution is around 255 per cent (when we only consider voters) or 180 per cent (when we also consider abstainers).¹¹ While the increase in secessionist support is remarkable, there is also substantial variation across municipalities (see also Figure A in the Appendix).

¹¹ Since both estimations provide similar results, from this point onwards we will focus on the latter.

Figure 5: Distribution of the growth rate of estimated support for independence between 2006 and 2015



Source: Estimated support for secession: Centre for Opinion Studies. 2006: Opinion Barometer 363. 2015: Opinion Barometer 804. Electoral data is retrieved from the Catalan Ministry of Governance and Public Administration.

http://governacio.gencat.cat/ca/pgov_ambits_d_actuacio/pgov_eleccions/pgov_dades_electorals/

Notes: (1) Both graphs use a kernel density estimation. (2) As explained in the text, support for independence is estimated through a combination of electoral results and preferences expressed in surveys. The “voters only” figure include preferences of those that voted for any option in 2006 or 2015. The “whole census” kernel density graph adds abstainers’ preferences to the previous calculation. Positive values indicate that support for independence has increased between 2016 and 2005.

Our second measurement of the dependent variable captures support for secession at the municipality level as expressed directly in surveys. CEO surveys published in 2006 and 2015 contain information about the residence of respondents, which allows us to estimate the percentage of support for secession in different municipalities.¹² We calculate the percentage of respondents that want “An Independent State” on the

¹² We use four surveys published in 2006 (8,400 cases) and five in 2015 (10,000 cases).

territorial preference question in each of the municipalities appearing in the surveys. Unfortunately, not all Catalan municipalities were (randomly) included in them and, for some cases, the number of respondents was very low. While the first concern should be alleviated by the design of the survey (CEO performs stratified random samples with territorial quotas), the second may bias our results by including municipalities in which the variation is not correctly estimated. In order to deal with this problem, we select only municipalities in which the number of interviewed individuals was higher than 15 ($n=228$).¹³

Our third and final variable measures support for secession at the individual level. Using the CEO surveys, we create a dummy variable that identifies whether an individual supports secession (1) or not (0). The main explanatory variable is also a dummy identifying whether an individual is unemployed (1) versus the rest (0). We do this for each year between 2006 and 2015.

4.2. Independent variables

There are several economic variables which potentially reflect the negative impact of the Great Recession in Catalonia and are available on at least a yearly basis at the level of municipality. These are related to unemployment, employment, number of firms and gross disposable household income. The first three are available for all municipalities (946 observations) and the fourth is only available for all municipalities bigger than 5,000 inhabitants plus a few others (211 observations).

4.2.1. Unemployment

The data on unemployment available at municipality level is “registered unemployment”, that is, the number of workers who are registered as unemployed in the public job service offices of the regional government. This data is accessible for the whole period 2006-2015,¹⁴ during which the number of registered unemployed workers more than doubled and rose above half million in 2015.

4.2.2. Employment

¹³ If we move up or down the 15 cases threshold results are still robust.

¹⁴ The figures for aggregate unemployment rates in section 3 correspond to “estimated unemployment” (that is, number of unemployed workers based on the Labour Force Survey). This is not available at the level of municipalities.

The number of affiliated workers to the Social Security residing in the municipality is taken as the measure to approximate employment. The data is available since 2008. More than 9 per cent of total employment disappeared during the period 2008-2015.

There is another measure of employment which is the number of affiliated workers to the Social Security based on the location of the corresponding contribution account (which normally matches the establishment where the worker is employed). The obvious disadvantage of this measure is that many employees counted in one location this way might not reside (and, hence, vote) in the same place. The main advantages are that in this case the data is available for the whole period 2006-2015 and that there is information about additional characteristics of workers, in particular, the economic sector and size of the company where they work.

4.2.3. Number of firms

The number of firms in each municipality is approximated by the number of contribution accounts to the Social Security. Firms may use a single contribution account for all their workers in a province or have a different contribution account for each establishment they have in the province. This means that the figure is only an approximation of the number of firms in each municipality because some firms might have an establishment in one location and no contribution account there if its workers are associated to a contribution account of the same firm in a different location. Despite this drawback, the information on contribution accounts is the best available data to approximate the number of firms situated in a given municipality. This data is accessible for the whole period 2006-2015, during which the total number of firms decreased by more than 12 per cent.

The data on employed and unemployed workers and quotation centers is available quarterly. In order to compute the difference between 2006 (or 2008) and 2015, we choose the value corresponding to the third quarter (September) because the regional elections took place in this month and also to avoid seasonality problems.

4.2.4. Gross Disposable Household Income

The Statistical Office in Catalonia (Idescat) publishes an estimation of the Gross Disposable Household Income for all municipalities larger than 5,000 inhabitants plus all the county ("comarca") capitals. This data is only available for the period 2008-2013, during which per capita income decreased by 4.3 per cent in Catalonia.

4.3. Control variables

Finally, our empirical models also control for some important factors at the municipality level that can affect the relationship between economic indicators and support for secession. The first key control is the percentage of population born outside Catalonia. As previous literature has consistently shown (Serrano, 2013; Rodon, 2015), this variable captures an important part of the variation in secessionist support. The second control is the percentage of population who are 65 years and older. Support for secession is negatively related to age (Muñoz and Tormos, 2014) and, therefore, it is plausible to think that support for secession grew less in municipalities where the percentage of elderly population is higher. The third control, population density, aims at tackling the urban-rural divide. According to previous works (Rodon, 2015), support for secession is higher in less dense rural regions than in the urban parts. The fourth indicator controls for whether the mayor after the 2011 local election belonged to a pro-sovereign party (CiU, ERC or CUP) or otherwise. Secessionist opponents have repeatedly accused pro-independence parties to use the institutions to promote secessionism. If this were true, it would be advisable to control for a (supposedly) higher increase in secessionist support in places where pro-sovereign parties govern and a lower increase in places where they do not. Finally, an important control is the vote share obtained by CiU and ERC in 2006.¹⁵ As explained before, our outcome of interest is the growth rate in the estimated support for independence between 2006 and 2015, an indicator based on information extracted from surveys and official election results. Controlling for the vote share of these parties in 2006 is important in order to avoid automatic effects and to consider the baseline level of support for secession. Some changes in the way we measure support for secession between 2006 and 2015 are simply caused by the “automatism” of the changes in the percentage of voters for each party who, as surveys indicate, support independence (even if, for example, there was not any change in electoral behaviour, i.e., the percentage of votes to each party did not change at all). This means that the variation in support for independence could depend strongly on the initial vote share for each political party in 2006, which is the

¹⁵ These two parties competed separately in the 2006 election and formed the bulk of JxS, the main pro-secession coalition in the 2015 election.

reason for including the control. As for the baseline level, it is important to control for the initial level of secessionist support. In some municipalities secessionist support was already high in 2006, a ‘ceiling effect’ that limits the secessionist growth rate. Conversely, in some municipalities support for secession in 2006 was low and, therefore, the statistical increase in support for secession was much more likely.

Our empirical strategy is based on conventional OLS regressions. In addition, models include region fixed-effects, which effectively mean that we are comparing growth rate variation in municipalities within a specific region.¹⁶

Table 2 summarizes our variable of interest, the main independent variables and the control variables. Table A in the Appendix provide the sources of all variables.

Table 2: Summary of the variables

	Mean	Sd	Min	Max	N
Growth rate in estimated support for independence, 2006-2015	180.41	51.42	13.56	358.06	946
Growth rate of unemployed, 2006-2015	63.11	98.11	-100	1400	926
Growth rate registered to the Social Security 2008-2015	-5.22	12.71	-45.25	57.61	922
Growth rate registered to the Social Security 2006-2015 (construction sector)	-39.66	68.00	-100	1500	927
Growth rate in per capita gross disposable household income 2008-2013	-10.05	13.42	-39.87	20.93	211
Growth rate in quotation centres 2006-2015	1.67	42.51	-75	400	944
Percentage of people born outside Catalonia (2015)	10.39	6.02	0.76	37.62	946
Percentage of citizens 65 or more (2015)	21.32	6.36	7.54	50.98	946
Population density 2015	398.66	1456.65	0.57	20336.37	946
% pro-sovereign vote 2006	62.15	12.44	19.28	92.19	946
Mayor’s sovereignty opinion on independence	73% of mayors belong to a pro-sovereignty party				946

Notes: (1) Sources in the Appendix. (2) We dropped two municipalities that were created between 2006 and 2015.

¹⁶ Regions correspond to *vegueries*, administrative territorial jurisdictions that represent symbolic areas of reference. There are 7 *vegueries*. If we employ other geographical areas (such as provinces) results are robust.

5. Results

This section contains the main empirical results. Models M1 to M5 in Table 3 run different specifications with the independent variables tackling different dimensions of the impact of the Great Recession. M1 includes the growth rate of unemployed workers between 2006 and 2015, M2 the growth rate of workers registered to the Social Security between 2008 and 2015 (our proxy for employment), and M3 the growth rate of registered workers in the construction industry (a sector severely affected by the economic crisis) between 2006 and 2015. As the estimated coefficients illustrate, none of the indicators is statistically significant. M4 includes the growth rate of per capita gross disposable household income between 2008 and 2013. The coefficient reveals that the growth rate in household income over this period is negatively related to the growth in support for secession. In other words, in municipalities where the household income increased at high rates (or decreased at slower rates), support for secession increased at relatively moderate rates (as shown in Figure 5 support for secession increased in every municipality). However, this model is based on a smaller number of municipalities ($n=211$), the time period for which data are available is different and the relationship is only significant at the 90 per cent level. Finally, M5 includes the growth rate of quotation centres between 2006 and 2015. The coefficient is again not statistically significant.

All in all, our empirical models do not show a systematic statistically significant relationship between the (heterogeneous) impact of the economic crisis and variation in secessionist support.

As for the control variables, they behave in the expected direction. The percentage of the population born outside Catalonia is negatively related to the growth in secessionist support. When the population born outside the region increases one point, the growth rate of secessionist support between 2006 and 2015 decreases about 6 points (secessionist support increased everywhere and, therefore, this negative coefficient effectively means that secessionist support increase was lower). The percentage of population aged 65 or more has a positive coefficient: in places where the number of citizens older than 65 is higher, secessionist support grew more. This result indicates is that support for secession grew relatively faster among

this demographic group than in other groups traditionally more inclined to back demands for independence. Population density has a negative coefficient, indicating that secessionism grew less in densely populated areas. As for municipalities governed by a pro-sovereignty mayor, secessionist support increased more, although the relationship is only significant at the 90 per cent level. Finally, the variable vote share obtained by pro-sovereign parties in 2006 behaves inconsistently, although it is generally positive.¹⁷

¹⁷ The vote share received by pro-sovereign parties in 2006 is positively correlated with pro-sovereign mayors. When we remove the second variable, the coefficient of the vote share received by pro-sovereign parties is always positive and significant. All the other results are robust.

Table 3: The effect of the economic crisis on the growth rate of preferences for secession

	M1	M2	M3	M4	M5
Δ Unemployed 2006-2015	0.003 (0.01)				
Δ Registered to the Social Security 2008-2015		-0.05 (0.093)			
Δ Registered to the Social Security 2006-2015 (Construction sector)			-0.016 (0.015)		
Δ Gross disposable household income 2008-2013				-0.287+ (0.153)	
Δ Quotation centres 2006-2015					0.035 (0.025)
% population born outside Catalonia	-5.810*** (0.287)	-5.899*** (0.285)	-5.611*** (0.289)	-5.759*** (0.583)	-5.631*** (0.287)
% population 65 or more	1.629*** (0.203)	1.528*** (0.228)	1.435*** (0.203)	3.391*** (0.57)	1.361*** (0.200)
Population density	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	0.000 (0.001)	-0.002** (0.001)
Pro-sovereignty mayor	6.268* (2.503)	6.337* (2.473)	5.500* (2.518)	4.561 (2.986)	6.668** (2.531)
Vote share obtained by pro-sovereign parties in 2006	-0.034 (0.143)	-0.028 (0.141)	0.111 (0.142)	0.995** (0.299)	0.067 (0.141)
Region Fixed-Effects	✓	✓	✓	✓	✓
Constant	216.27 (12.27)	218.68 (12.21)	206.06 (12.17)	120.64 (23.84)	211.52 (11.93)

Observations	926	922	927	211	944
R-squared	0.66	0.668	0.65	0.857	0.647

Standard errors in parentheses

+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Note: The dependent variable is the growth rate of estimated support for independence at the municipality level between 2006 and 2015. The strategy to compute it relies on a combination between surveys and electoral data (see details in the Data section).

As explained in section 4, to check for the robustness of our results we employ an alternative version of the variable that measures secessionist support at the municipality level. Using georeferenced surveys, we were able to calculate the percentage of people supporting “An Independent State” both in 2006 and 2015. As before, we also calculated the growth rate between these percentages. Although we lose a fair amount of observations, this measure can be interpreted as a more direct indicator of support for secession. In addition, the 229 municipalities for which we have information in the surveys represent most of the Catalan territory and population (observations are fairly balanced across space).

Descriptive data shows that the growth of support to independence varies substantially across municipalities. In almost all of them the growth rate is positive. However, while in some places the growth rate is modest (in 25 per cent of the municipalities independence support grows by less than 70 per cent), in others the increase is significant (in 25 per cent of the municipalities the growth rate is higher than 277 per cent).

When we employ this alternative measurement, results are consistent with what we found in Table 3. As displayed in Table 4, none of the economic indicators, which contemplate different dimensions of the effect of the Great Recession, is significant.

Table 4: The effect of the economic crisis on preferences for secession (surveys)

	M6	M7	M8	M9	M10
Δ Unemployed 2006-2015	0.06 (0.393)				
Δ Registered to the Social Security 2008-2015		2.26 (1.924)			
Δ Registered to the Social Security 2006-2015 (Construction sector)			-0.212 (0.606)		
Δ Gross disposable household income 2008-2013				-0.527 (2.356)	
Δ Quotation centres 2006-2015					-0.281 (1.139)
% population born outside Catalonia	4.735 (5.336)	5.373 (5.277)	4.313 (5.311)	-3.479 (8.82)	4.298 (5.385)
% population 65 or more	-9.007* (3.72)	-6.183 (4.426)	-8.973* (3.721)	3.043 (8.865)	-9.071* (3.724)
Population density	0.01 (0.007)	0.011 (0.007)	0.01 (0.007)	0.005 (0.007)	0.01 (0.007)
Pro-sovereignty mayor	50.553 (35.44)	49.915 (35.313)	50.645 (35.422)	83.957+ (45.916)	50.723 (35.446)
Vote share obtained by pro-sovereign parties in 2006	1.292 (2.726)	0.779 (2.737)	1.252 (2.714)	-2.402 (4.246)	1.269 (2.715)
Constant	92.772 (231.962)	85.345 (227.532)	90.431 (229.289)	175.753 (329.986)	97.233 (228.075)
Region Fixed-Effects	✓	✓	✓	✓	✓

Observations	228	228	228	127	228
R-squared	0.09	0.09	0.09	0.13	0.09

Standard errors in parentheses

+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

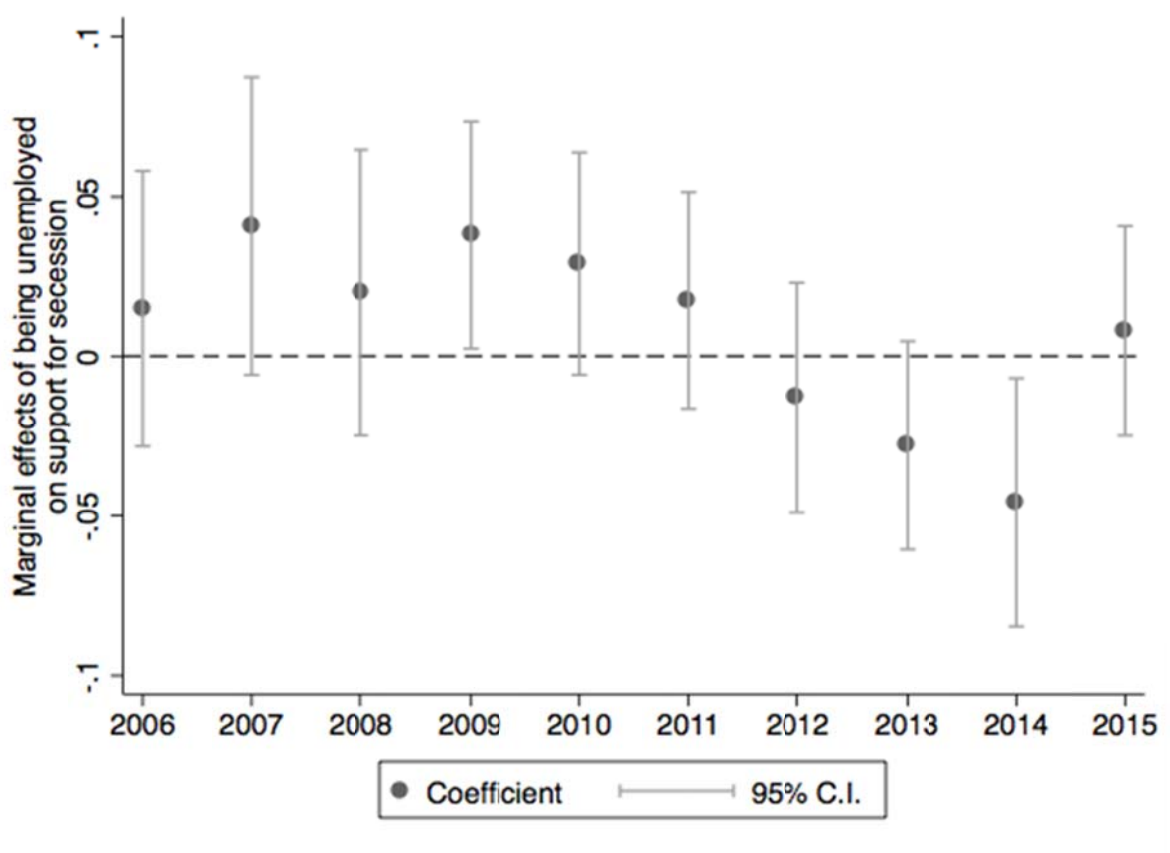
Note: The dependent variable is the growth rate of support for independence at the municipality level. Support for secession is extracted from different surveys carried out by the CEO institute (see details in the Data section).

A final concern about the previous analyses has to do with the aggregate nature of the data. Changes in secessionist support over time might be going towards different directions, which might cancel out the effect at the aggregate level. In addition, aggregate changes may mask different individual changes (the well-known ecological fallacy problem). Thus, in the final part of the analysis we turn to individual-level data. Using the CEO surveys for each year between 2006 and 2015, we estimate the marginal effect of being unemployed (versus the alternative situations) on support for secession.¹⁸

Figure 6 plots the coefficients together with the 95 per cent confidence intervals. Results are generally consistent with the aggregate analyses. Being unemployed does not have a statistically significant impact on secessionist support. The coefficient is only significant in 2009 and in 2014. However, they go in opposite directions: not having a job is positively related to support independence in 2009 and negatively related in 2014. Overall, there is not a significant systematic effect of being unemployed on the likelihood of supporting independence.

¹⁸ Logit models include several control variables. Operationalization and full estimates are included in the Appendix.

Figure 6: The effect of unemployment on support for secession (marginal effects)



Note: Coefficients represent the marginal effect of being unemployed on individual's support for secession. They have been extracted from a logistic regression in which the dependent variable is whether the respondent's main territorial preference is secession (1) versus the rest (0). The main explanatory variable is a dummy that distinguishes whether the respondent was unemployed (1) or not (0). All models control for respondent's national identity, left-right self-placement, gender, age, and household income. Operationalization and sources can be found in the appendix.

All in all, we could not find any relationship between the effects of the economic crisis and secessionist support. This is true when we look at different dimensions of the Great Recession and different ways to measure support for secession and when we use different levels of analysis. Furthermore, we have run several additional robustness checks in order to control for plausible confounders.

First, we divided the municipalities into different quartiles, according to population. Most of Catalan localities are very small and secessionist support may follow different dynamics in small towns as compared to urban areas. This approach,

however, leads to the same results: the effect of the economic variables remains statistically not significant, irrespective of the municipality size.

Second, we employed additional economic indicators that, while being less accurate, reflect relevant dimensions of the Great Recession. In particular, since the construction industry was severely affected by the economic consequences of the crisis, it seems appropriate to look at the growth rate of buildings initiated and finished and the growth rate of the quotation centres in the construction industry. In both cases the results are exactly the same. In addition, when we include other controls in the models, such as the percentage of citizens who speak Catalan, the percentage of foreigners residing in the location or party polarization at the municipality level (measured as the difference between the percentages of votes received by pro- and anti-sovereignty parties), results also remain unaffected.

Finally, we ran different model specifications to check for further robustness of our findings. When we run different models, such as a censored regression model or a geographically weighted regression, results are also consistent.

6. Conclusions

There is little doubt that the impact of the Great Recession in many Western countries has transcended the realm of the economy and has had important consequences in many other social dimensions. In particular, there is a growing body of literature that studies the political reactions it has triggered in different countries. The impact of the Great Recession on the upsurge of secessionism in different European regions has often been mentioned in the press and political commentary and, yet, has been almost absent of this line of research. This paper contributes to filling this hole in the literature by analyzing the Catalan case, which is nowadays, together with Scotland, the most pressing example in the world of a strong secessionist movement in a liberal democracy.

The existence of a relationship between the economic turmoil generated by the Great Recession and the increase of secessionism is not completely obvious from a theoretical point of view. On the one hand, many authors have stressed that the Great Recession triggered profound changes in political attitudes and preferences fueling voters' discontent with the political system and, in the context of a conflict between the centre and the periphery, favoring secessionism as a radical shift of the institutional setup. On the other hand, a deep economic recession may make voters more accommodating with the status quo and more reluctant to take radical stances which might be regarded as too risky in a context of economic insecurity. Our paper intends to evaluate empirically this hypothesis and in this sense represents a welcome contribution to this strand of literature.

The fact that there are very few cases of strong secessionist movements in the Western world makes it difficult to use cross-sectional international data to implement a meaningful empirical test of the hypothesis. In our paper, we take a different approach and use the variation of economic variables and data from surveys and electoral outcomes at the level of municipalities in Catalonia to explore whether there is any relationship between the surge of secessionism and the main economic effects of the Great Recession.¹⁹

¹⁹ Other recent research also studies the relationship between political attitudes and economic variables using territorial data (see, for instance, Dippel et al, 2015 on the relationship between international trade and voting behavior in Germany or Elsayyad and Hanafi, 2014 on the economic determinants of electoral behavior in Egypt).

The results of our empirical models indicate that there is not any relationship between economic variables and support for secession at the level of municipalities. Neither of the different dimensions of the economic crisis that we operationalize (unemployment, firms' closures, income loss...) has a statistically significant effect on the variation of secessionist support. Moreover, this outcome is robust to the different specifications we tried and is compatible with additional results obtained using survey data at individual level.

These findings open some avenues for further research: First, future works will need to dig into how people's expectations shape their secessionist preferences. Our findings, together with previous experimental evidence (Muñoz and Tormos, 2014), show that the "objective" state of the economy does not seem to cause an effect on people's preferences for secession. If there is any such effect, this might run through people's expectations or a long-term process difficult to capture with existing data.

Second, all of the existing evidence aimed at explaining secessionist support point to a significant and greater effect of other covariates, such as identity and the role of partisan heuristics. Future research may design causal identification strategies to identify the effect of some of these factors, as well as the moderating role of the economy.

Finally, our research sheds some light on the current debate between those who think that the pro-secession tide in Catalonia is a by-product of the Great Recession and might recede as the economy gets better and those who argue that it is a symptom of a deeper political conflict and, as such, will probably stay the same unless there are political big changes in Spain.

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Appendix

Table A: Variables employed in the empirical analyses

Variable	Source
Election results 2006 and 2015	Department of Government. Generalitat de Catalunya http://governacio.gencat.cat/ca/pgov_ambits_d_actuacio/pgov_eleccions/pgov_dades_electorals/
CEO surveys	Centre d'Estudis d'Opinio. http://ceo.gencat.cat/ceop/AppJava/pages/index.html Surveys employed: 2006: BOP 346, 358, 363, 367. 2007: BOP 375, 391, 400, 404. 2008: BOP 412, 419, 447, 466. 2009: BOP 485, 499, 518, 544. 2010: BOP 555, 581, 600, 612. 2011: BOP 631, 652, 661. 2012: BOP 677, 694, 705. 2013: BOP 712, 723, 733. 2014: BOP 758, 746. 2015: BOP 774, 795, 804.
Unemployed	Generalitat de Catalunya http://observatoritreball.gencat.cat/ca
Registered to the Social Security	Generalitat de Catalunya http://observatoritreball.gencat.cat/ca
Gross disposable household income	Idescat, http://idescat.cat/
Quotation centres	Generalitat de Catalunya http://observatoritreball.gencat.cat/ca
% population born outside Catalonia	Idescat, http://idescat.cat/
% population 65 or more	Idescat, http://idescat.cat/
Population density	Idescat, http://idescat.cat/
Pro-sovereignty mayor	Department of Government. Generalitat de Catalunya

Table B. Variables employed in the individual-level model

Variable	Categories
Support for secession	1: Supports secession, 0: he/she does not support secession
Unemployed	1: Unemployed seeking for a job, 0: Other employment status categories
Subjective National Identification	1 ("I feel only Spanish") to 5 ("I feel only Catalan")
Ideology	1 ("Extreme left") to 10 ("Extreme right")
Gender	1 Men, 0 Women
Monthly household income (after taxes)	1 ("Less than 1000 euros") to 6 ("More than 5000 euros")
Age	
Vegueria	7 different regions

Table C. Political parties

Party	Description
CiU – Convergència i Unió (2006)	Coalition of two centre right regionalist parties (CDC and UDC). It ruled the regional government during the periods 1980-2003 and 2010-2015. Since 2010, in favour of holding a referendum of independence. Since 2012, CDC was favorable to independence, but UDC was not. The coalition came apart in 2015.
ERC – Esquerra Republicana de Catalunya (2006)	Pro-independence left. Favorable to independence since the 1980s.
JxS – Junts pel Si (2015)	Electoral coalition between CDC, ERC and other small parties. Created before the 2015 Catalan election. Favorable to independence.
PSC (2006 and 2015) – Partit dels Socialistes de Catalunya	Social democrat. Catalan branch of the Spanish socialist party. Against independence.
ICV-EUiA (2006) / CSQP (2015) – Iniciativa per Catalunya Verds-Esquerra Unida i Alternativa / Catalunya Si Que es Pot	Left and green coalition. Ambiguous position towards independence (it has no official position). According to its manifesto, the party is in favour of holding a referendum on independence, but only if it is agreed between the regional and the central governments.
PP – Partido Popular (2006 and 2015)	Right-wing party. Against independence.
C's – Ciudadanos (2006 and 2015)	Liberal centrist. Against independence.
CUP – Candidatura d'Unitat Popular (2015)	Anti-capitalist left. Favorable to independence.

Table D. Election results 2006 and 2015

Party	2006		2015	
	% votes	Seats	% votes	Seats
CiU	31,52	48		
ERC	14.03	21		
PSC	26.82	37	12.72	16
JxS			39.59	62
PP	10.65	14	8.49	11
ICV-EUiA	9.52	12		
CSQP			8.94	11
C's	3.03	3	17.9	25
CUP			8.21	10
Turnout	56.04		74.95	

Table E. The effect of being unemployed on support for secession (logit models)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Unemployed	0.128 (0.18)	0.31* (0.17)	0.16 (0.18)	0.28** (0.13)	0.21* (0.13)	0.12 (0.12)	-0.08 (0.12)	-0.23* (0.13)	-0.39** (0.17)	0.07 (0.15)
Age	-0.23*** (0.04)	-0.20*** (0.04)	-0.12*** (0.04)	-0.15*** (0.05)	-0.20*** (0.04)	-0.29*** (0.04)	-0.16*** (0.03)	-0.13*** (0.04)	-0.11** (0.05)	-0.11*** (0.04)
National Subjective Identification	1.44*** (0.05)	1.51*** (0.05)	1.61*** (0.05)	1.63*** (0.05)	1.61*** (0.05)	1.67*** (0.05)	1.85*** (0.05)	2.27*** (0.06)	2.38*** (0.09)	2.27*** (0.07)
Ideology	-0.08*** (0.02)	-0.09*** (0.03)	-0.08*** (0.03)	-0.15*** (0.03)	-0.17*** (0.03)	-0.09*** (0.03)	-0.12*** (0.03)	-0.08** (0.04)	-0.05* (0.03)	-0.13*** (0.03)
Gender	-0.07 (0.07)	-0.10 (0.08)	0.05 (0.08)	0.07 (0.08)	0.04 (0.07)	-0.01 (0.07)	-0.07 (0.07)	0.01 (0.09)	0.45*** (0.12)	0.15 (0.09)
Income	-0.16*** (0.03)	-0.11*** (0.03)	-0.11*** (0.03)	-0.10*** (0.03)	-0.11*** (0.03)	-0.17*** (0.03)	-0.05* (0.03)	-0.08** (0.04)	-0.03 (0.02)	0.02 (0.02)
Constant	-5.84*** (0.27)	-6.16*** (0.28)	-6.75*** (0.29)	-6.64*** (0.28)	-6.10*** (0.26)	-5.92*** (0.25)	-6.63*** (0.25)	-7.80*** (0.30)	-8.28*** (0.44)	-8.19*** (0.36)
N	6,219	5,434	5,328	5,249	5,333	5,240	5,290	4,338	2,598	3,798
Pseudo R2	0.2191	0.2304	0.2515	0.2610	0.2704	0.2834	0.3159	0.4292	0.4683	0.4667

Source: BOP surveys as specified in Table A.

Standard errors in parentheses

+ p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Note: All models are logistic regressions with support for secession (1 favorable; 0 against) as the outcome. The main explanatory variable is “unemployed”, a dummy that distinguishes whether the respondent was unemployed (1) or not (0). The other control variables are operationalized as follows: age (continuous variable), national subjective identification (from 1 “I feel only Spanish” to 5 “I feel only Catalan”), Ideology (1 “Extreme left” to 10 “Extreme right”), Gender (1 “Men”, 0 “Women”), and Income (1 “monthly household income equals less than 1000 euros” to 6 “monthly household income is higher than 6500 euros”). These models have been employed to calculate the marginal effects illustrated in Figure 7.

Figure A: Spatial distribution of growth rate of estimated support for independence between 2005 and 2016

