

The Cost of Political Uncertainty: Evidence from Catalonia

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July 2022

Highlights

- We study the political uncertainty created by demands for more autonomy or independence using the Catalan-Spanish negotiation for the Catalan Statute and the unilateral quest for independence.
- Using 2017 Catalan survey data, we estimate that entrepreneurs, concerned about the business environment, favored the status quo over independence
- Using an event approach methodology, we estimate negative stock market reactions to the approval of the Catalan Statute and to the 2017 referendum for (mostly tradable) Catalan firms.

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Nationalist demands for more autonomy or independence create uncertainty. Negotiated agreements over shared legal, administrative and fiscal responsibilities between central and regional authorities are associated with political uncertainty. Unilateral moves towards full independence create deep political uncertainty. We use two empirical methodologies to evaluate the costs of the uncertainty associated with the Catalan-Spanish negotiation for the Catalan Statute and with the demand for independence. 2017 Catalan survey data suggest that entrepreneurs, concerned about the business environment, favored the status quo over independence. Using an event approach methodology, we estimate that the immediate stock market reaction to the approval of the Catalan Statute was negative for (Catalan) firms in the tradable sector. The large political uncertainty due to the 2017 referendum had an even stronger negative stock market effect on all Catalan firms. Our findings are suggestive of costly political uncertainty from quests for more autonomy or independence.

Keywords: autonomy, independence, joint administrative responsibility, event approach methodology

JEL Classifications: H77, D72, G14

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1. Introduction

A quest for independence surfaces in many regions of Europe (Griffiths, 2017, Roeder 2018, Sambanis and Milanovic, 2014). Nationalistic demands for self-determination have many drivers. A strong regional (or “national”) identity may create a demand for independence from a culturally different central state, particularly when linguistic, religious or historical differences are present (Hechter, 2013, Pattie et al., 1999, Smith, 2000, Sorens, 2012). Economics matter too (Bartkus, 1999). Economic trade-offs determine the incentives for regions with a strong cultural entity, placed near the border of the country, to secede (Sorens, 2005, Alesina and Zhuravskaya, 2011). Independence allows regions to target welfare and public programs, such as education, to local needs and culture (Oates, 1972, Alesina and Spolaore, 2003) and to stop fiscal transfers to poorer regions (Bolton and Roland, 1997, Dalle Mulle, 2018). Yet, access to larger domestic markets and cost sharing in the provision of national public goods may be lost.

In the last two decades, globalization has reduced the economic cost of independence. The existence of supranational institutions, such as the WTO and the EU, may guarantee access to international markets in a low conflict environment also to regions seeking autonomy (Alesina et al., 2000). Globalization has also contributed to increase spatial inequality (Ezcurra and Rodríguez-Pose, 2013). This regional economic divergence may exacerbate redistributive conflicts across regions in centralized states (Shankar and Shah, 2003, Lee and Rogers, 2019). Moreover, the recent economic crisis has made inter-regional fiscal transfers more salient, forcing central governments to conceding more fiscal federalism and decentralization (Haimanko et al., 2005, and Desmet et al., 2011, Boylan, 2015).¹

¹ Whether this represents a halt to the process of independence or, on the opposite, a step towards final independence remains an open question (Cederman et al., 2015, Bakke, 2015).

The transitions towards more autonomy requires a negotiation between the central state and the region seeking autonomy that may create tensions between these political bodies. Negotiated agreements typically produce shared fiscal and policy authority (Rodden, 2004) that create uncertainty. The sharing of legal and administrative responsibilities may lead to more bureaucracy and even higher taxes, if double or joint (regional and central) fiscal burdens are imposed. Additional uncertainty emerges regarding which organizational bodies, at regional and/or national level, will be in charge of monitoring and enforcing rules (Guidi et al. 2020). Political uncertainty may stem from these bodies trying to favor central or regional players. This overall ambiguity harms the business environment (Rodrick, 2000). A much deeper political uncertainty follows radical, unilateral moves towards full independence. Access to (previously) domestic markets and public procurements has to be re-discussed with the central government. Access to foreign markets depends on international treaties and requires negotiations with international organizations (the EU, in the case of European countries, or the WTO). Hence, unilateral quests for independence create large uncertainty about economic outcomes that depend on political negotiations and that affect companies located in the seceding region.

This paper uses two methodologies to study the political uncertainty associated both with demand for more autonomy and with the unilateral quest for independence in a globalized environment. First, we examine the role of political uncertainty in shaping individual preferences towards more autonomy and independence. We contrast the preferences of entrepreneurs, more concerned about the economic impacts on the business environment, and of natives in the region, more likely to be moved by cultural and nationalistic factors. Second, we provide a quantitative assessment of the economic effects of political uncertainty by considering stock market reactions to crucial events for national and regional firms.

Our empirical analysis exploits the sequel of political and legal events in the Spanish-Catalan relation over the last two decades. This represents the perfect environment to analyze the effects of political uncertainty associated both with inter-governmental negotiation for more autonomy and with unilateral quest for independence. First, Spain belongs to a highly integrated economic area – the EU and the Eurozone. While seeking independence from Spain, some pro-independence politicians may expect to keep access to the EU market and to maintain the common currency – the Euro. Second, Spain features a high level of intergovernmental conflict between the central state and the regions, particularly Catalonia (Börzel and Rzel, 2002). Third, this long sequel featured periods associated with different degrees of political uncertainty. Between 2003 and 2006, the Catalan and the Spanish (socialist) governments negotiated a new Catalan Statute that modified the sharing of legal and administrative responsibilities between Catalonia and Spain. Limited political tension surfaced at this time. Uncertainty was mostly related to whether the joint Catalan-Spanish responsibility over crucial infrastructures, such as ports, and a perspective double tax collection would lead to more bureaucracy, higher taxes or to favoring Catalan or Spanish players. A ruling of the Spanish Constitutional Court in 2010 that modified the Statute largely limited this uncertainty. Yet, a strong demand for independence emerged during the Great Recessions, when fiscal transfers to the central government became more salient and more painful (Bel, 2015). In 2017, the Catalan government promoted a referendum on independence, which was declared unconstitutional by the Spanish Constitutional Court. Political uncertainty mounted. The associated economic uncertainty concerned future access of Catalan firms to the Spanish (and EU) markets and public procurements, in case of independence. The referendum took place on October 1st 2017, despite the large presence of the Spanish national police to prevent it. Based on its results, few weeks later, the Catalan Parliament declared independence, but the Spanish Senate transferred all powers on Catalonia to the Spanish Government and called for snap elections.

To examine the possible costs of political uncertainty, we use two different methodologies. First, we exploit survey data from the Catalan Barometer of political opinions. We focus on the preferences of entrepreneurs and of individuals with a Catalan background (born in Catalonia or from Catalan parents) over the Catalan Statute, in 2005, and over Catalan independence, in 2017. In forming their preferences, entrepreneurs are more likely to consider the effect of uncertainty on the business environment, while people with a Catalan background may care more for cultural and linguistic factors. Our findings suggest that entrepreneurs favored the status quo over Catalan independence, while individuals with Catalan parents preferred fiscal decentralization and independence.

Second, we study the economic effects of political uncertainty, by using an event approach methodology that estimates the immediate stock market reaction to the occurrence of relevant events. Under the assumption of efficient capital markets, any new information provided by these events on the future economic perspectives of Catalan and non-Catalan Spanish firms should immediately be reflected in their stock market prices. Several important events have occurred during these fifteen years, as reported in Table 1. We apply our methodology to all of them, to test the effects of political uncertainty. We focus in particular on four events that were unanticipated or whose outcome was ex-ante uncertain: the approval of the Catalan Statute by the Spanish Parliament on May 2006; the 2010 ruling of the Constitutional Court emending the Statute; the 2017 Catalan referendum of independence; and the subsequent Catalan Parliament declaration of independence, followed by the Spanish Senate response. The first two events represent the outcome of a negotiated process between Spanish and Catalan authorities – thus being associated with low political risk. The latter two events relate to the unilateral quest for independence, which created high political uncertainty. We measure the stock market reaction for Catalan and non-Catalan Spanish listed companies. This event methodology was initially used in finance, but has

gained popularity also in other fields to assess the impact of political connections (Acemoglu et al., 2016), civil wars (Guidolin and La Ferrara, 2007) and terrorist attacks (Abadie and Gardeazabal, 2003). Standard single-factor market models (Kothari and Warner, 2007) are used to estimate the returns that companies would obtain in absence of these events. The abnormal returns – defined as the difference between actual and estimated returns during an event window – measure the market reaction to the news conveyed by the event for a specific firm. To evaluate the effects for Catalan and non-Catalan Spanish listed companies, we thus calculate their cumulated abnormal returns following specific events and test whether they are significantly different from zero. Our empirical evidence suggests that Catalan firms in the tradable sectors posted negative returns after the initial approval of the Catalan Statute by the Spanish Parliament, but positive returns after the ruling of the Constitutional Court. The political uncertainty associated with the October 2017 events prompted even stronger stock market reactions. Large negative abnormal returns emerged for Catalan firms after the referendum. This result is in line with Esteller-Moré and Rizzo (2021) that also found a strong, negative financial reaction to the October 2017 events, with a significant amount of short and long-term bank deposits leaving Catalonia. Our analysis identifies also large positive abnormal returns after the contemporaneous declaration of Catalan independence and the reaction by the Spanish Senate.

The paper proceeds as follows. The next section introduced the theoretical background, Section 3 discusses political uncertainty in Catalonia. Sections 4 and 5 present the empirical analysis, respectively on survey data and using an event study approach. Section 6 concludes.

2. Theoretical Background

Cultural, linguistic and religious elements are certainly important in the identity narrative used by nationalistic parties to demand self-determination (Hechter, 2013, Pattie et al., 1999, Smith, 2000,

Sorens, 2012, Serrano, 2013). However, economic motives are used in the public discourse too (Bartkus, 1999). Efficiency gains from increased competitiveness and better governance are often claimed. According to this argument, providing more autonomy to a region that is more fiscally sound and efficient than the central state may lead to lower taxes on regional businesses and taxpayers (Rodriguez-Pose et al., 2009). Richer regions gain also from stopping the transfer of resources towards poorer regions, which the redistribution of tax revenues in centralized state typically entails. Decentralization also allows regions to target health, education and welfare programs to local needs, customs and culture (Beland and Lecourse, 2008). Of course, by becoming independent, a region faces also economic costs, since it gives up the insurance against idiosyncratic regional economic shocks, the sharing of the financial burden of providing national public goods and the access to larger markets. Moreover, the international status enjoyed as a region of a state, for instance being part of the European Union, of the EURO area or of the WTO, may be lost with independence, and the influence in the international scene may be reduced, as small countries typically have less bargaining power in international negotiations (Schneider, 2011).

In the public discussion, less attention has been devoted to other economic costs that may occur along the paths towards self-determination, resulting from political uncertainty. Ambiguities in the application of norms and regulations may emerge in negotiated patterns towards more autonomy. These processes require the region seeking autonomy and the central government to agree on which issues should be fully decentralized, feature co-responsibility or remain at central level. These procedures have the advantage of limiting political tensions between the negotiating parties. In fact, compromises are often reached by allowing for joint responsibility over key infrastructures, sectoral policies, such as transports, housing and economic development, and fiscal revenue collection (Albrechts et al., 2003). However, these arrangements create uncertainty, since the actual application of joint bureaucratic procedures may be administratively cumbersome or ambiguous

defined, and central or regional bodies may try to favor their own players. These are problematic aspects. Intergovernmental conflicts between regional and national authorities are frequent in federal states. Despite the presence of several institutions for conflict resolution, appeals to the Constitutional Courts on these matters are not rare. This emerging uncertainty is detrimental to firms that are fiscally located in the regions seeking more autonomy and to domestic firms in the tradable sector that operate in these regions. These firms may be subject to double bureaucratic burdens – deriving from regional and national regulations – to uncertainty on the future development of infrastructures and of spatial planning (Colomb and Tomaney, 2020), to higher taxes, originating from the joint fiscal authorities, or to unfair competition if national or regional players obtain more favorable treatments.

Yet, a much more substantial political uncertainty emerges during a process of unilateral quest for independence. This uncertainty concerns the political actions that the seceding region and the national state may take. Besides providing legal and political responses to the threats of secession, national states may retaliate to increase the economic costs of independence. Trade flows may be hindered by boycotts against the seceding regions' products (Pollins, 1989).² Firms based in the seceding region may lose access to (formerly) domestic markets. The national state may limit access to public contracts or public procurements. Additionally, firms from the seceding regions may lose privileged access to foreign markets based on bilateral trade agreements signed by the national state or on national state's membership to organizations or institutions, such as the WTO and European Union (Comerford and Rodríguez Mora, 2019). Overall, this political uncertainty is detrimental for firms based in the region seeking independence (Esteller-Moré and Rizzo, 2021).

² Liberal theories suggest instead that economic interdependence reduces the risk of political conflicts across countries (Maoz, 2009). Parties would thus employ soft bargaining strategies to avoid clashes that may lead to inefficient economic consequences.

In our empirical analysis, we will thus test the hypothesis that political tensions are detrimental to firms in the region seeking autonomy or independence, albeit to a different extent, depending on the degree of political uncertainty.

3. Political Uncertainty in Catalonia

The negotiation process to redefine the political status of Catalonia began on *October 2003*, when several Catalan parties proposed to draft a new Catalan Statute (event I). On *September 30th 2005*, the Catalan Parliament approved a proposal of the new Statute (event II), which included the official recognition of Catalonia as a nation, a new division of competence between the regional and the central government and greater control over fiscal matters. A year later, on *May 10th 2006*, the Spanish Parliament approved an emended version of the new Statute (event III). On *June 18th 2006*, the emended version of the statute obtained a large popular approval in a referendum in Catalonia (event IV). This process for more autonomy was not uncontroversial. A long negotiation between the Spanish (socialist) government and the Catalan parties took place on the Statute, with changes to the original version provoking street protests in Barcelona and the opposition of the Esquerra Republicana de Catalunya, ERC. Despite a comfortable approval vote in the Lower House (189 votes in favor and 154 against), the final ballot in the Spanish Senate was close: 128 votes in favor, 125 against (mostly from the People's Party) and 6 abstentions (mostly from ERC).

The approval of the Catalan Statute created uncertainty. The Statute introduced joint responsibility over Catalan infrastructures, such as ports,³ and the reference to a Catalan fiscal authority for tax

³ Article 140 established exclusive competence of the Catalan regional authority over ports, airports and other transport infrastructures located in Catalonia, unless they are deemed of general interest. In this case, Article 140 determines that the Catalan government (Generalitat) seats in the national bodies governing the Catalan infrastructures of general interest and participates to their management and planning.

collection.⁴ Together with agriculture and environment, these are the issues generating more contention between the Spanish central state and regional executives (Harguindeguy et al., 2020). This uncertainty is particularly relevant for firms operating or paying taxes in Catalonia, which face the risk of additional bureaucratic costs and higher taxes. The Statute created also some degree of political uncertainty, since political tensions between Catalonia and other regions of Spain affected consumers' choices. A boycott of Catalan products took place in many Spanish regions – mostly South, East and the Madrid municipal area – in 2005, with the sales of Catalan Cava – a sparkling white wine largely identified with Catalonia, dropping by 8% (Cuadras-Morató and Raya, 2016). The idea of a full flagged Catalan independence became widespread with the Great Recession, as the strong fiscal adjustments, requested by the EU rescue plan, were imposed on the regional governments.⁵ This situation made the fiscal transfer from Catalonia to the central government more salient (Bel, 2015). In 2012, on the National Catalan Day, 1.5 million people gathered in Barcelona demanding Catalan independence. Two months later, parties supporting Catalan self-determination obtained a majority of seats in the Catalan parliament. This electoral result effectively disconnected the indirect rule linking local leaders to the central power (Siroky et al., 2020). On *November 9th 2014*, a non-binding informal consultation took place in Catalonia (event VI). The pro-independence side won, but the results were largely disregarded at the national level. In 2015, pro-independence parties won again a majority of seats in the Catalan Parliament and promised to prioritize Catalonia's path towards independence. Instead, the Spanish (conservative) central government kept a hard line against Catalan independence. Political hostilities reached higher levels

⁴ Article 204 established the creation of a Catalan Fiscal Agency (Agencia Tributaria de Catalunya) that, within two years, should form a consortium of equals with the Spanish Fiscal Agency (Agencia Estatal de Administración Tributaria). Both Agencies establish the rules for tax declarations in Catalonia.

⁵ In Catalonia, over the 2011-14 period, overall public spending dropped by 10.7%, with a drop of 24% in health and of 9% in education (Conde-Ruiz et al. 2017).

on *June 9th 2017*, when the Catalan Prime Minister, Carles Puigdemont, announced a referendum on the self-determination of Catalonia (event VII) to be held on October 1st. A law allowing referendum to take place was passed by the Catalan Parliament on *September 6th 2017* (event VIII), and it was immediately suspended by the Spanish Constitutional Court, which also prohibited public officials from taking part in the organization of the referendum. Despite the referendum on Catalan independence being ruled unconstitutional and the strong intervention by the national policy, on *October 1st 2017*, Catalan voters massively tried to cast a ballot (event IX). Registered turnout at the referendum was 43%, with 90.2% of the voters in favor of independence. The results had no legal bearing, but a strong political valence. In the following days, pro-independence parties signed a declaration of independence, but refrained from bringing it to the Catalan Parliament. The Spanish Prime Minister, Mariano Rajoy, imposed a deadline for the Catalan government to clarify its official position on independence. Meanwhile, some Catalan companies started to relocate their headquarters outside of Catalonia. On *October 27th 2017*, in a plenary session of the Catalan Parliament, with a majority of 70 votes to 10, the declaration of independence was ratified and announced. Few hours later, the Spanish Senate approved, with a majority of 214 votes to 47, the enforcement of Article 155 of the Spanish Constitution, which empowered the Spanish central government to dismiss the Catalan Parliament and to appoint a Spanish representative to restore the rule of law in Catalonia (event X). Snap local elections were called for December 22nd. Few days later, the Spanish Constitutional Court suspended the declaration of independence and the Spanish attorney general charged several Catalan politicians, including the Catalan Prime Minister, Carles Puigdemont, with alleged sedition and rebellion.

4. Evidence on Individual Preferences: Survey Data

To study the effects of political uncertainty, we use data from the Barometer of political opinion. This survey, run in Catalonia by CEO (Centre d'Estudis d'Opinion) – a research center on public opinions of the Generalitat de Catalonia, poses several questions on the role of Catalonia in Spain. We exploit data from the June 2005 Barometer (#293) and from the June 2017 Catalan Barometer (#857). The first survey took place three months before the vote on the Catalan Statute in the Catalan Parliament and allows to assess individual preferences on some outcomes of the negotiated process. The second wave took place three months before the October 2017 referendum and allows to assess individual preferences on Catalan independence and on the referendum. We focus on the preferences of the entrepreneurs, since they have a clear interest at considering how political uncertainty affects the business environment. We focus also on individuals being born in Catalonia or having Catalan parents, since their preferences over these issues may depend on their cultural and linguistic identity (Chernyha and Burg, 2012, Muñoz and Tormos, 2015, Criado et al., 2018).

In the June 2005 survey, respondents were interviewed about the Catalan Statute. They were asked what was more important for the future of Catalonia among the following options: (i) a new system of financing;⁶ (ii) the Catalan Statute; (iii) both; or (iv) neither one. Using this question, we create a dummy variable for new system of financing only. We consider also the ordering from less to more autonomy (i.e., from new system of financing only to Catalan Statute only to both). Respondents were also asked which role Catalonia should have among: (i) a region of Spain; (ii) an autonomous region; (iii) a state in a federal Spain or (iv) an independent state – where autonomous region represents the status quo. We consider an ordering of preferences from less (i) to more independence (iv). Summary statistics are reported in Table A.1 (Panel A) in the Online Appendix.

⁶ According to the existing fiscal arrangement in 2005, almost all tax revenues were collected at the central level. The spending responsibilities of the autonomous regions were financed through direct transfers from the central state.

Overall, using the (unconditional) 2005 survey data, it appears that a large majority (41.6%) of the interviewed favored the status quo, i.e., Catalonia as an autonomous region in Spain; a small minority (7.7%) preferred Catalonia as a Spanish region; a third of the interviewed envisaged it as a State in a federal Spain and 17.7% supported independence. However, different preferences are expected to emerge among entrepreneurs and individuals being born in Catalonia or having Catalan parents.

The 2005 Barometer has data on self-employed that include entrepreneurs and professionals (with other employment categories being: employed, retirees, students, else). While the preferences of the professionals may be in line with those of the entrepreneurs, if their career possibilities depend on the business environment, professionals may also benefit from more autonomy, if new jobs become available in the regional bureaucracy. Hence, by using the variable self-employed, our estimates of the effect of political uncertainty may be downward biased. As for cultural aspects, we expect Catalan respondents to favor more autonomy – hence, both the Catalan Statute and a new financing system – and independence. In our probit and ordered probit regressions, we control for education (no high school, high school diploma and college graduates), religiosity (yes or no), gender and age group. We use Catalan provinces fixed effects.

We run a probit regression on the support for a new system of financing only and an ordered probit regression, in which the order of preferences goes from less to more autonomy. Results in Table 2 (column 1) show that self-employed are 8% more likely to support a new financing system. However, they are not significantly affected by the ordering of the degree of autonomy (columns 2-4). Instead, respondents with Catalan parents want more autonomy: they are 9% more likely to support both the Statute and a new financing system (column 4). Table 2 reports also the results of an ordered probit regression, which ranks the role of Catalonia from less to more independence – namely from a region of Spain, to an autonomous region (the status quo), to a state in a federal Spain, to full

independence. Respondents with Catalan parents are 13.3% more likely to favor independence (column 8) and 14.7% more likely to oppose the status quo (column 6). No significant effect emerges for the self-employed, although coefficients are positive for the less autonomous outcomes and negative for the more autonomous outcomes (columns 5-8). These findings suggest that, prior to the approval of the Statute by the Catalan Parliament in 2005, self-employed (i.e., entrepreneurs and professionals) welcomed economic improvements in the financing method to Catalonia, but had no strong preferences on the role of Catalonia. On the contrary, respondents with Catalan parents strongly support fiscal self-determination and independence.

To assess the role of political uncertainty during the unilateral quest for independence, we use the 2017 wave and analyze preferences over Catalan independence and autonomy around the time of the Referendum. Respondents were asked whether they were in favor of holding the referendum and what they would vote (yes, no, abstention). This question was particularly salient in 2017, given the upcoming referendum on independence. As in the 2005 wave, they were also asked which role Catalonia should have: (i) a region of Spain; (ii) an autonomous region; (iii) a state in a federal Spain or (iv) an independent state. Using these questions, we construct two dummy variables respectively for being in favor of holding the referendum and for voting yes and an outcome variable for the ordering on the role of Catalonia, from less to more autonomous.

Overall, comparing the (unconditional) 2005 and 2017 survey data, it emerges that preferences over the role of Catalonia largely changed. In 2017, a relative majority supported independence (37.6% vs 17.7% in 2005), a third of the interviewed favored the status quo (Catalonia as an autonomous region in Spain), a small minority (5.7%) preferred Catalonia to be only a Spanish region; and 23.6% a State in a federal Spain. As for the 2005 survey, however, different preferences are expected for entrepreneurs and individuals being born in Catalonia or having Catalan parents.

In the 2017 wave, entrepreneurs were specifically identified and distinguished from other employment categories (professionals, employed, retiree, students, else). Again, we expect them to be more concerned with the effect of political uncertainty on the business environment. We expect individuals born in Catalonia and having Catalan parents to be in favor of independence, of holding the referendum and of voting yes. This wave has also data on (self-reported) risk aversion, measured as the respondent's willingness to take risk on a 0 (high willingness) to 10 (low willingness) scale. We expect more risk averse individuals to oppose independence, due to the increase in political uncertainty. In our regression analysis, we control for education (no high school, high school diploma and college graduates), self-declared social class (very low, low, medium and high), gender, age group, marital status, number of children and religiosity (yes or no). We use Catalan provinces fixed effects. Summary statistics are reported in Table A.1 (Panel B) in the Online Appendix.

Results in Table 3 (column 1 and 2) show that respondents born in Catalonia or with Catalan parents strongly supported holding a referendum and voting yes, while more risk averse individuals preferred no independence and no referendum. The preferences of the entrepreneurs for holding a referendum and for voting yes were not statistically different from those of employed individuals. Turning to the preferences on the role of Catalonia, from less to more independence, entrepreneurs were 11.5% more likely to support the status quo (column 4), i.e., autonomous community, and 16.7% less likely to favor independence (column 6). Instead, respondents with Catalan parents were 21.5% more likely to prefer independence (column 6) and 14.7% less likely to support the status quo (column 4). Despite the growing popular support for independence, entrepreneurs (and risk averse individuals) were thus more conscious. In the next section, we use an event study approach to examine how well grounded their concerns were.

5. Market Reactions to Political Uncertainty: Event Study

To evaluate the market reactions to political uncertainty associated with the recent paths respectively towards more autonomy – through the Catalan Statute – and towards independence – through the referendum -- we use an event study approach.

Several important events occurred along those paths. Table 1 summarizes ten crucial moments, related to the Catalan Statute between 2003 and 2010 (events I-V) and to the referendum between 2014 and 2017 (events VI-X). Not every event provided new information. In some cases, the informational content of the event could have been anticipated, so that no stock market reaction should thus be expected. We focus on four events, which can be argued to be ex-ante unanticipated or uncertain, but report the results of the analysis for all ten events in Table A.3 in the Online Appendix. The first event is the approval, with a narrow margin, of the Catalan Statute by the Spanish Senate (event III). The second event (event V) is the Constitutional Court ruling, which came long after the appeal by the People's Party. The third crucial event is the referendum on October 1st 2017 (event IX). In this case, the magnitude of the popular turnout for a (unconstitutional) referendum and the violent reaction by the national police were largely unexpected. The final event(s) took place on October 27th 2017 (event X), when the Catalan Parliament made its declaration of independence and the Spanish Senate reacted using Article 155. Also in this case, there were many doubts about the final decision by the Catalan Parliament – albeit perhaps less so about the Spanish reaction. These last two events were characterized by an unprecedented level of political uncertainty.

5.1 Methodology and Data

The objective of this event study approach is to examine the market reactions to these events – separately for Catalan and non-Catalan Spanish listed companies. This methodology relies on calculating the abnormal returns of securities of Catalan and non-Catalan Spanish companies in the

financial market. For each single company, abnormal returns are measured as the deviations of the actual returns from the normal (i.e., estimated) returns. Hence, according to our theoretical framework, the approval of the Catalan Statute (event III) should drive negative extra-returns, particularly for Catalan companies in the tradable sector, to the rise in political uncertainty. The ruling of the Constitutional Court (event V), by reducing this uncertainty, should instead bring positive extra-returns. The large increase in political uncertainty caused by the referendum (event IX) should lead to negative results for all companies (including Spanish ones), while the Spanish Senate reaction three weeks later (event X) that reduced this uncertainty should be associated with positive extra-returns.

Our main data consists of daily market closing prices for all Catalan and non-Catalan Spanish companies listed in the Madrid Stock Exchange and IBEX35 index closing prices, from 2003 to 2017. Data are available on Datastream. Companies are categorized as Catalan, if their headquarter is in Catalonia and/or they have a considerable portion of their economic activity in Catalonia. Over our period of analysis, new companies were listed, while some old ones abandoned the Madrid Stock Exchange. The final number of listed companies used in the analysis ranges from 90 to 101. A complete list of the companies and their partition into Catalan and non-Catalan Spanish is in the online appendix.⁷

To calculate the normal returns, we follow a standard approach in this literature (Kothari and Warner, 2007) and use a single-factor market model, in which the daily returns of each stock are assumed to be linearly related to the market return. For each company i , we thus estimate the following equation:

⁷ The daily price of some of these companies' stocks did not change, perhaps because only few (or no) market transactions were made. In our baseline specification, we dropped the companies, whose stocks experienced no price change during more than one third of our period of interest. Results with data for all companies are reported in the Online Appendix (Table A.4) and are line with findings from our baseline specification.

$$R_{i,t} = \alpha_i + \beta_i R_{M,t} + \varepsilon_{i,t} \quad (1)$$

where $R_{i,t}$ and $R_{M,t}$ represent respectively the daily stock return of company i and the market return at time t . The market index is represented by the IBEX-35. For each company, these daily returns are calculated from the daily closing prices of the stocks as follows:

$$R_{i,t} = \log(P_{i,t}) - \log(P_{i,t-1}) \quad (2)$$

where $P_{i,t}$ represents the daily closing price at time t for the stock of company i and analogously for the IBEX-35.

The estimated parameters $\hat{\alpha}_i$ and $\hat{\beta}_i$ in equation (1) for each company i are then used to calculate the abnormal returns at time t for the stock of company i as follows:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{M,t} \quad (3)$$

Finally, for each company i , we obtain the cumulated abnormal returns over an event window that begins at day S and finishes at day F by summing the corresponding abnormal return over the relevant event window:

$$CAR_{i,S,F} = \sum_{t=S}^F AR_{i,t} \quad (4)$$

In line with the existing literature, we use an asymmetric seven-day period $[-1,+5]$ that allows enough time for market reactions.

An important decision in these event studies is to establish the time period, before the event, over which to estimate the parameters $\hat{\alpha}_i$ and $\hat{\beta}_i$ in equation 1. We use a period of 200 days prior to the event to reduce the overlapping between the estimation period for an event and the event window of previous events. In the robustness analysis (see Table A.5), we report results also for estimation periods of 150 and 250 days prior to the event.

To evaluate the economic impact of our crucial events, we run the following OLS regression, with no constant:

$$CAR_{i,S,F} = \gamma CAT_i + \delta SP_i + \sum_j \varphi_j I_{j,i} + \varepsilon_{i,t} \quad (5)$$

where $CAR_{i,S,F}$ represents the cumulative abnormal return for the stocks of firm i , CAT_i and SP_i are dummies respectively for Catalan and non-Catalan Spanish companies and $I_{j,i}$ are industry fixed effects. According to the Industry Classification Benchmark (ICB), firms may belong to: basic material, consumers' good, industrials, oil and gas, technology, consumers' services, financial, health care, telecoms and utilities. The former five industries constitute the tradable sector, the latter five the non-tradable. Hence, positive (negative) values of γ and δ indicate positive (negative) cumulative abnormal returns following an event respectively for Catalan and non-Catalan Spanish firms, after controlling for industry specific characteristics.

The economic effects of these events may differ across sectors. Difference may emerge between tradable and non-tradable sectors. To capture this possible difference, we run the following OLS specification:

$$CAR_{i,S,F} = \gamma CAT_i + \delta SP_i + \rho TR_i + \varepsilon_{i,t} \quad (6)$$

where TR_i is a dummy variable indicating that firm i is in the tradable sector (basic material, consumers' good, industrials, oil and gas and technology). Finally, to estimate the role of the tradable sector separately for Catalan and non-Catalan Spanish firms, we run the following OLS specification:

$$CAR_{i,S,F} = \gamma CAT_i + \delta SP_i + \rho TR_i + \sigma CAT_i * TR_i + \varepsilon_{i,t} \quad (7)$$

with an interaction term between the Catalan dummy variable, CAT_i , and the tradable dummy variable, TR_i .

Summary statistics are reported in Table A.2 in the Online Appendix

5.2 Results

Table 4 presents the results on the economic impact of the four main events in the Catalan-Spanish relation. For each of the four episodes, column 1 shows the estimates of the cumulative abnormal returns (CARs) for Catalan and non-Catalan Spanish companies, after controlling for industry fixed effects, as in eq. 5, column 2 reports the estimates of eq 6, which includes a dummy variable for tradable, and column 3 presents the results of the estimates of eq. 7, which allows for an interaction term between the Catalan dummy variable and the tradable dummy variable.⁸

The approval of the Catalan Statute by the Spanish Senate on *May 10th 2006* (event III) is associated with a large reduction in the CAR of both Catalan and non-Catalan Spanish firms (event III, column 1), respectively 5.4% and 4.5%. Introducing a dummy for the tradable sector (event III, column 2) shows that this reduction is largely concentrated among tradable firms. Estimates in column 3 shows no statistically significant difference between Catalan and non-Catalan Spanish tradable firms. However, albeit not significant at conventional levels, the sign of the interaction term between the Catalan dummy variable and the tradable dummy variable is negative and sizable (-2.8%). Taken together, these findings suggest that the approval of the Catalan Statute by the Spanish Senate led to negative stock market responses for tradable firms – particularly, for Catalan ones.

The ruling of the Spanish Constitutional Court (event V) on *June 28th 2010* eliminated the possibility of creating a Catalan authority for fiscal collection and reduced political uncertainty. Table 4 (event V, column 1) shows positive extrareturns for Catalan firms (+3.7%), but no effect for Spanish firms. Evidence in column 2 suggests that the positive stock market reaction came from tradable firms. Among those firms, no significant difference emerges between Catalan and non-Catalan Spanish firms (event V, column 3). Yet, again, although not significant at conventional levels, the sign of the coefficient of the interaction term between the Catalan and the tradable dummy variables is positive

⁸ Table A.3 in the appendix presents the estimates of eq. 5 for all ten events described in Table 1.

and sizable (3.1%). These findings suggest that the positive market reaction to the Constitutional Court ruling came mostly from Catalan firms in the tradable sector.

The other two events (IX and XX) took place in October 2017 and are related to the Catalan independence that induced large political uncertainty. Results in Table 4 (event IX, column 1) show that the episodes of the *October 1st 2017* referendum largely reduced the CAR of Catalan firms (-5.1%). The effect on Spanish firms is not statistically significant, although the estimate is negative and sizable (2.8%). Evidence in columns 2 and 3 shows that these negative impacts are not concentrated on firms in the tradable sector (nor on Catalan firms in the tradable sector). This strong negative market reaction is perfectly in line with our theoretical framework and with the results from the survey data that suggested entrepreneurs to prefer the status quo.

The declaration of independence by the Catalan Parliament on *October 27th 2017* and the immediate enforcement of Article 155 by the Spanish Senate increased the CAR of Catalan firms increased, +4.8% (event X, column 1) – thereby compensating almost exactly the losses suffered with the referendum (event IX). Spanish firms also enjoyed positive CARs: +3.7%. This positive impact was not concentrated on firms in the tradable sector (nor on Catalan firms in the tradable sector).

Our findings are robust to several modifications in our baseline specification. Table A.4 in the Online Appendix shows the results using all available data for all companies, i.e., not dropping those companies that featured little variation in the daily price of their shares. A comparison of Tables 4 and A.4 shows that our main results are not driven by trimming the data of companies with little price variation, although no effect of the ruling of the Constitutional Court emerges when using all data. Table A.5 in the Online Appendix reports the results on the economic impact of the four main events in the Catalan-Spanish relation, when we use respectively 150 days (panel A) and 250 days (panel B) prior to the event as the period for the estimation of the relevant parameters, instead of

200 days as in the baseline specification. A comparison of Tables 4 and A.5 shows that all our findings are robust to this change in the estimation window.

6. Conclusions

Even in Western Europe, a heated debate has taken place over the economic costs and benefits for regions (e.g., Scotland, Catalonia, South Tirol) to become independent. In a highly integrated world, supranational institutions, such as the EU, provide access to larger markets and contribute to equalize legislations, thereby reducing the economic benefits previously associated with being part of a nation. Yet, the transition towards more decentralization or outright independence still creates costly uncertainty. More autonomy requires establishing joint responsibility over bureaucratic and fiscal procedures. How these regional and central bodies will act and interact is uncertain. Quests for full independence create tensions between the region seeking independence and the national state. Therefore, political uncertainty largely increases. Our findings suggest that entrepreneurs tend to prefer the status quo and that the political uncertainty associated with more autonomy and independence may be detrimental to the business environment.

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Table 1

Event	Date	Description
I	<i>October 31st 2003</i>	Catalan parties propose to draft a new Statute to redefine the political status of Catalonia
II	<i>September 30th 2005</i>	Catalan Parliament approves a proposal of the new Statute
III	<i>May 10th 2006</i>	Spanish Parliament approves an emended version of the new Statute
IV	<i>June 18th 2006</i>	emended version of the Statute approved in a referendum in Catalonia
V	<i>June 28th 2010</i>	Spanish Constitutional Court emends the new Statute
VI	<i>November 9th 2014</i>	Informal consultation on the political future of Catalonia takes place. Results are largely disregarded at the national level
VII	<i>June 9th 2017</i>	Catalan government Prime Minister announces a referendum on the self-determination of Catalonia to be held on October 1 st
VIII	<i>September 6th 2017</i>	Catalan parliament approves a law allowing the referendum to take place
IX	<i>October 1st 2017</i>	Unconstitutional referendum on independence held in Catalonia. National police forcefully tries to stop the vote
X	<i>October 27th 2017</i>	Catalan Parliament declares independence based on the referendum results. Spanish Senate enforces Article 155 of the Spanish Constitution and dismisses the Catalan government

Note: in bold the events analyzed in detail in our event study in section 4. Empirical results from our event study for all the events are reported in Table A.3 in the Online Appendix.

Table 2: Preference over Catalan Autonomy in 2005 (Marginal Effects)

VARIABLES	(1) New fin System	(2) New fin system	(3) Catalan Statute	(4) Both	(5) Spanish region	(6) Auton region	(7) State in fed Spain	(8) Indep state
Born in Cat	0.040 (0.031)	-0.022 (0.033)	-0.005 (0.008)	0.027 (0.040)	-0.026** (0.012)	-0.047** (0.020)	0.031** (0.014)	0.043** (0.019)
Cat parent	-0.091*** (0.028)	-0.074** (0.030)	-0.017** (0.007)	0.091** (0.036)	-0.082*** (0.011)	-0.147*** (0.019)	0.096*** (0.011)	0.133*** (0.018)
Self empl	0.079** (0.036)	0.056 (0.038)	0.013 (0.009)	-0.069 (0.047)	0.015 (0.014)	0.026 (0.025)	-0.017 (0.016)	-0.024 (0.023)
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	Probit	Ord Probit	Ord Probit	Ord Probit	Ord Probit	Ord Probit	Ord Probit	Ord Probit
Obs.	1,887	1,638	1,638	1,638	1,752	1,752	1,752	1,752

Individual Controls: education level (no high school, high school diploma and college graduates), religiosity (yes or no), gender, labor force status (unemployed, other in labor force, student, retiree, other not in labor force) and age group (18-34, 35-49, 50-64, 65+). Excluded categories: not born in Catalonia, without a Catalan parent, employed. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Probit regression in column 1. Ordered probit regression in columns 2-4 with ordering of tools of autonomy: New financing system, Catalan Statute, both. Ordered probit regression in columns 5-8 with ordering of Role of Catalonia: province, Autonomous Region, State in federal Spain, Independent state.

Table 3: Preference over Catalan Independence in 2017 (Marginal Effects)

VARIABLES	(1) Favorable to Referendum	(2) Vote for Independence	(3) Spanish region	(4) Autonomous region	(5) State in federal Spain	(6) Independent state
Born in Catalonia	0.204*** (0.033)	0.158*** (0.034)	-0.035*** (0.009)	-0.076*** (0.019)	0.000 (0.002)	0.111*** (0.028)
Catalan parent	0.194*** (0.028)	0.238*** (0.026)	-0.068*** (0.010)	-0.147*** (0.018)	0.001 (0.004)	0.215*** (0.025)
Risk averse	-0.030*** (0.005)	-0.038*** (0.005)	0.007*** (0.001)	0.015*** (0.003)	-0.000 (0.000)	-0.022*** (0.004)
Entrepreneur	0.040 (0.102)	-0.122 (0.106)	0.053** (0.023)	0.115** (0.050)	-0.000 (0.003)	-0.167** (0.073)
Individual Controls	yes	Yes	yes	yes	yes	yes
Province FE	yes	yes	yes	yes	yes	yes
Specification	Probit	Probit	Ord Probit	Ord Probit	Ord Probit	Ord Probit
Observations	1,355	1,355	1,355	1,355	1,355	1,355

Individual Controls: education level (no high school, high school diploma and college graduates), married (yes or no), number of kids, religiosity (yes or no), gender, labor force status (unemployed, professional, other in labor force, student, retiree, other not in labor force), social class (low, medium, high) and age group (18-24, 25-34, 35-49, 50-64, 65+). Excluded categories: not born in Catalonia, without a Catalan parent, employed. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Probit regressions in columns 1-2. Ordered probit regression in columns 3-6 with ordering of Role of Catalonia: province, Autonomous Region, State in federal Spain, Independent state.

Table 4: Event Study Results

VARIABLES	Event III			Event V			Event IX			Event X		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Catalan	-0.054** [0.024]	-0.017 [0.013]	-0.003 [0.018]	0.037** [0.019]	0.013 [0.012]	0.000 [0.014]	-0.051** [0.025]	-0.034*** [0.012]	-0.042*** [0.014]	0.048*** [0.015]	0.026** [0.012]	0.029* [0.017]
Non-Catalan	-0.045* [0.023]	-0.007 [0.007]	-0.009 [0.007]	0.012 [0.015]	-0.012** [0.006]	-0.009* [0.006]	-0.028 [0.024]	-0.012** [0.006]	-0.010* [0.006]	0.037** [0.015]	0.013** [0.006]	0.012** [0.006]
Tradable		-0.028*** [0.010]	-0.025** [0.011]		0.016** [0.008]	0.010 [0.008]		-0.006 [0.010]	-0.010 [0.011]		0.011 [0.009]	0.013 [0.010]
Tradable * Catalan			-0.028 [0.026]			0.031 [0.023]			0.020 [0.024]			-0.010 [0.023]
Industry FE	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Observations	90	90	90	93	93	93	99	99	99	99	99	99
R-squared	0.334	0.264	0.271	0.204	0.105	0.128	0.343	0.168	0.174	0.278	0.204	0.205
P-Value (Cat=Non Cat)	0.534	0.468	0.734	0.041	0.037	0.517	0.050	0.066	0.042	0.312	0.300	0.355

Estimates of the cumulative abnormal returns for Spanish and Catalan firms, using regressions in eq. 5 (columns 1), eq. 6 (columns 2) and eq. 7 (columns 3). Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1.

