Financial impact of a political crisis

The case of Catalonia (Spain)

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Abstract

The aim of this master thesis is to investigate how the increased uncertainty in the conflict in Catalonia from 2010 to 2018 has impacted the financial markets in Spain. In doing so, the event study methodology is applied examining the 24 most predominant events over the companies listed on the Spanish Stock Exchange (BME). To understand the complexity of the financial impact, the quantitative results are discussed in light of qualitative interviews with 6 experts in the field.

The results indicate that there is a short-term financial impact in relation to the Oct. 1st, 2017 referendum. The cumulative abnormal returns reveal that IBEX35 performs worse than DAX and FTSE100, with a different impact across economic industry sectors and a larger adverse impact for firms with headquarters in Barcelona and Madrid than firms with headquarters elsewhere. By looking at the overall impact of the remaining events, there is not enough evidence to suggest that these have made a significant financial impact. However, there is a negative short-term impact for companies that have decided to move their headquarters out of Catalonia, but they recover quickly without a prolonged effect.

The qualitative interviews reveal that the limited financial impact has two main explanations. The first reason is that most Catalan firms have a broad international geographic diversification. This creates less risk exposure towards the risen uncertainty in Catalonia and a potential sales reduction in the rest of Spain, as the firms can enter foreign markets to minimize their risk exposure. The second reason is that there is a tendency to strictly separate business and politics, prohibiting discussing the topic during work hours and wearing political symbols in the office. This helps to explain why the financial impact is not of a substantial character, since business continues as usual despite the increased uncertainty in the economy.

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1   Introduction

1.1 Aim and relevancy of the thesis

Over the last couple of years, the conflict between Spain and Catalonia has intensified, leading to a situation where many Catalans want a separation from the old kingdom. According to *Centre d'Estudis d'Opinió* (2018), the support for independence has risen from 19.4% in Jan. 2010 to 48% in Apr. 2018. Moreover, 90.2% of the 43% participating in the Oct. 1st referendum, voted yes (Pi, 2017). Considering the exclusion of votes due to police requisition, this participation rate could easily have increased to 55% (Periódico, 2017). In any case, there is a growing independence tendency in Spain's wealthiest region, Catalonia.

> *"We are living through the most serious political constitutional crisis in Spain since at least the end of the Franco regime". Oriol Bartomeus (Stothard, 2018a)*

In addition to referendums, the conflict is characterized by large demonstrations, police violence, political prisoners and a general centralization of power in the historically decentralized country (Tisdall, 2017). Nine Catalan political leaders are imprisoned and further seven are exiled, facing up to 35 years in prison if convicted (March, 2017; Reynolds, 2017).

In contrast to those representing the Basque movement, who chose violent methods in their fight for regional control - the Catalans went down a non-violent path. This gives them similarities to other separatist movements such as Scotland, Taiwan, and Quebec. Considerable amount of studies have proven that violent conflicts have a detrimental impact on the stock market (Abadie & Gardeazabal, 2003; Acemoglu, Hassan, & Tahoun, 2018; Chen & Siems, 2004; Guidolin & La Ferrara, 2010; Zussman & Zussman, 2006). However, there exists less evidence suggesting that non-violent conflicts have a similar strong negative impact. Thus, it is relevant to investigate if the non-violent conflict in Catalonia affects its financial markets, motivating my research question:

> **What is the financial impact of the conflict in Catalonia?**

Hence, the problem at hand is to investigate if this political conflict has affected the financial markets, and if so, in what way. The research question is relevant because the conflict is ongoing, and a swift solution seems far away. The uncertainty in the market will probably prevail and in questioning how to proceed in the future, it is relevant to investigate the conflict's impact so far.

1.2 Four steps in answering the research question

Throughout the thesis, I will follow four steps, which I believe are important in answering how the crisis in Catalonia has affected the financial markets in Spain.

Step 1: *Investigate and present an overview of the conflict.* This step gives an introduction to the complex political situation, building the foundation of the thesis. The aim of this step is to get acquainted with the current situation, in order to enable a strong and relevant analysis.

Step 2: *Define the sample period, events of interest and selection criteria for securities in the analysis. Then, gather the relevant data.* This step defines the sample period and analyzes the events of interest. It also creates a data set containing security prices, daily returns, and manually collected stock characteristics such as headquarter location and CEO study place location.

Step 3: *Conduct the empirical analysis; calculating abnormal returns related to the events identified in step 2.* This step is the cornerstone of the thesis, where the impact of the events is analyzed. Organized as a funnel, it first analyzes widely, investigating the performance of the Spanish stock index IBEX35 compared to European indices. Then, it narrows down the approach, analyzing the conflict at industry and firm level.

Step 4: *Draw insights from qualitative interviews with Spanish businesspeople and compare these observations with the results in step 3.* This last step expands the understanding of the financial impact of the crisis in Catalonia by adding in-depth perspectives from active actors in the economy. These results are integrated in the empirical analysis, where I discuss the quantitative findings in light of the qualitative interviews.

By following the four steps above, this paper provides an in-depth analysis of the financial impact of the political situation in Catalonia. The main finding is that the Oct. 1st referendum is the single most important event, with the largest financial impact. In addition, there is a short-term negative effect for companies moving their headquarters out of Catalonia.

Moreover, the impact of the remaining events is not of significant character, which has two main explanations according to the businesspeople interviewed. First, most Catalan companies have a broad international geographic diversification, which limits the risk exposure towards the rest of Spain. Second, business and politics are strictly separated, implying that the conflict is a social issue rather than an economical one.

1.3 Contribution of the research

Prior studies investigating the financial impact of political conflicts have attracted the interest of academics for decades. In the following, I present those who are the most relevant to my contribution.

First, Durán & Trillas (2016) use event studies investigating the conflict in Catalonia. They analyze events spanning from 2010 to 2015 and do not find evidence for adverse stock price effects due to political announcements. They do, however, find indications suggesting that street demonstrations negatively affect stock returns, but only to a limited degree. My contribution is relevant as I find that the Oct. 1st referendum impacts the stock market and investigate its characteristics over dimensions such as headquarter location and economic industry sector.

In addition, Pons-Benaiges (2017) uses event studies investigating the Catalan referendum in 2014. This study finds no market reaction due to the referendum, which is different to my results where I find short-term financial impacts on the stock markets due to the conflict, probably as a consequence of its escalation in 2017.

Furthermore, Perles-Ribes et al. (2018) analyze the political instability of Catalonia in the tourism sector. They find that the events in the final quarter of 2017 led to less tourist arrivals and a reduction in tourist spending in the region. This is different to the impact on the tourist sector on the companies listed on the stock exchange. Arguably because they have a large international exposure and are less effected by the conflict than strictly Catalan firms.

Moreover, Castells & Trillas (2013) employ event studies investigating the surprising outcome of the political election in Spain, 2004. They do not, however, find evidence of a stock market effect. Their study has similarities to mine as it considers the majority of the daily traded stocks in Spain and performs event studies analyzing them.

This is also the case for Abadie & Gardeazabal (2003) who find that firms with a significant part of their business in the Basque country have a positive performance when ceasefire becomes conceivable. This is similar to my study in the way they classify stocks into "Basque" and "non-Basque", comparable to my investigation of firms with headquarters in Catalonia and CEO study place location, trying to establish ties to Catalonia.

Moreover, Beaulieu, Cosset, & Essaddam (2006) find that the increased uncertainty due to the referendum in Quebec in 1995, where they voted on a potential separation from Canada,

adversely affects the stock returns of firms in the region. This is similar to my results for the Oct. 1st referendum in Catalonia.

Finally, He, Nielsson, & Wang (2017) investigate the economic effects of the political conflict between Taiwan and mainland China. They find that important events have an adverse effect on stock prices, with a larger impact on firms supporting the Taiwanese pro-independence party. Their approach has similarities to mine, albeit focusing on a distinct conflict. Similar to them, I find that the important event, Oct. 1st, has an adverse stock price effect.

1.4 Research approach

In this report, I apply the event study methodology investigating the event's effect using financial market data. The analysis compares IBEX35's performance to European stock indices, and investigates the events effect across economic sectors, headquarter locations, and CEO study place location. In addition, I examine the stock market reaction of firms moving their headquarters out of Catalonia. For the purpose of this study, primary data is collected from interviews that has been conducted with 6 Catalan businesspeople. The results of these interviews are analyzed in relation to the result from the event study, in order to provide relevant insights regarding the financial effects of the conflict in Catalonia.

1.5 List of experts

As part of the qualitative research in step 4, I conducted in-depth interviews with six Spanish executive businesspeople[1]. Their comprehensive opinions add great value to my thesis, as they actively participate in the Catalan and Spanish economy. All interviews are completed in person and the results are translated from Spanish to the utmost of my ability.

Joan Hortalà, President of the Barcelona Stock Exchange since 1993. As an expert in the field and with extensive knowledge of the Catalan economy, Mr. Hortalà acknowledges my findings of no significant financial impact on the stock market due to the conflict in Catalonia, except

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[1] In the qualitative part, I conduct individual, in-person interviews with six businesspeople. To maximize the value from the interviews, I perform three types of preparation identified by Wilkinson & Young (2004). First, the logistics of the interview are prepared. This includes agreeing on a date and time, exchanging contact information and finally agreeing on a suitable location to undertake the interview. Second, the physical properties of the interview are prepared. This consists in asking the informants for permission to record, organizing a proper interview location and choose an adequate dress code for the interview. Last, I mentally prepared myself by making an interview guide to make the process efficient and structured. This being said, I let the interview objects deviate from the guide to enhance a rich flow of information. The interview guide is found in the appendix both in Spanish and in English (Appendix page J and K).

the short-term effect surrounding the Oct. 1st event. In addition, he offers interesting reflections of why this is the case and explains that most Catalan stocks have a large international exposure making them more vulnerable to global events than to the political situation in Catalonia.

Jose Luis Galipienso Anglés, Partner and Managing Director of Auren. As director of a large Spanish consulting company with approximately 2800 employees, Mr. Galipienso provides insights of how the conflict has influenced both Auren as a company and their broad range of clients, both in Catalonia and the rest of Spain. The clients are mostly small and medium enterprises (SMEs), which is the most typical business size in Catalonia and therefore indirectly provides a great representation of the region's economy.

Albert Santamaria, Founding Partner of Auren. By drawing on his extensive experience in the Spanish economy, Mr. Santamaria elaborated on the conflict's impact together with Mr. Galipienso. It was a very interesting interview which enhanced my comprehension of the financial impact caused by the conflict in Catalonia.

Joaquin Vilá, General Director of Laboratorios SEID. From the pharmaceutical company with headquarters in Llicà de Val, close to Barcelona, Mr. Vilá contributes with insights on how the conflict has affected his company as well as the industry as a whole, drawing on his large experience operating in the Catalan and Spanish economy.

Roger Gonzalez Esteve, Sales Director at Sàbat-Lligats Metal·lics. From the manufacturing industry in the village of Sant Sadurni d'Anoia around an hour from Barcelona, Mr. Gonzalez offers valuable insights of how the conflict in Catalonia has impacted the cava industry and his company. Sàbat-Lligats creates muselets and bottle caps for sparkling wine and consequently has clients in Catalonia, the rest of Spain and abroad. Consequently, Mr. Gonzalez provides me with important insights regarding relations with suppliers and distributors in different regions.

Salvador Bricollé, CMO at AVASA Group. The group has 90 associating firms with more than 1.400 employees and headquarters in Barcelona. With broad experience in the tourism and travel sector, Mr. Bricollé provides me with extensive insights of how the conflict in Catalonia has impacted this sector. He explains that there is a tendency to separate business and politics and explains that the tourist industry remains mostly unaffected by the conflict.

In the following section, I first provide the reader with a short brief background of the conflict, which creates the foundation for the rest of the thesis. Second, I explain how the data has been collected. Third, I present the empirical analysis and compare these results with my interview findings. Finally, I present the conclusions of the master thesis.

2 Background: Conflict at glance (step 1)

In this section, I briefly introduce the political situation and discuss some prevalent economical aspects of a potential Catalan independence.

Even though the conflict has intensified recently, tensions between Catalonia and the rest of Spain have existed for centuries. The Spanish region of Catalonia started to take shape already in the 9th century, when the county of Barcelona, along with other counties in the area, were used as a buffer zone between the Frankish Empire and al-Andalus[2] (Pons, 2018). Despite being under the rule of many governments since then, a Catalan identity has been formed, with a proper language and a unique cultural heritage.

Today many Catalans fight to preserve this heritage, with the unpleasant memories of the Franco era where the Catalan autonomy, language and culture were repressed by force (Mortimer, 2017). Although Spain has a large regional diversification of power, the recent tendency is that the central government preponderates Catalonia, ignoring its regional autonomy (Castro, 2013). During the referendum Oct. 1st, 2017, when the national police used violence to stop the illegal vote, many drew historical parallels to the time during the dictatorship. The politicians putting this in motion are now either in exile or in prison awaiting their sentences, facing up to 35 years if convicted for rebellion (March, 2017; Reynolds, 2017). This creates frustration among Catalans and an unsolved conflict.

That being said, economic arguments have often been at the heart of the debate, where the main argument is that Catalonia pays too much taxes to the Spanish public sector without seeing sufficient regional investments in return (BBC, 2018). An independent Catalonia would give the region control of its own taxes and public spending, which some argue would improve the welfare in the region (Ayadi et al., 2015).

Former regional minister, Castells, claims that political aspirations tend to influence academic studies regarding the independence debate, even from prestigious researchers (Amat et al., 2014). Researchers with pro-Spain affiliations argue that an independent Catalonia would have disastrous consequences and researchers with pro-Catalonia affiliations argue that they would be minimal.

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[2] al-Andalus is the name of the Muslim-ruled Spain.

For this reason, I investigate how an independent Catalonia would look like ceteris paribus, to provide an objective overview of the hypothetical country. Figure 1 presents Catalonia compared to EU-28 countries.
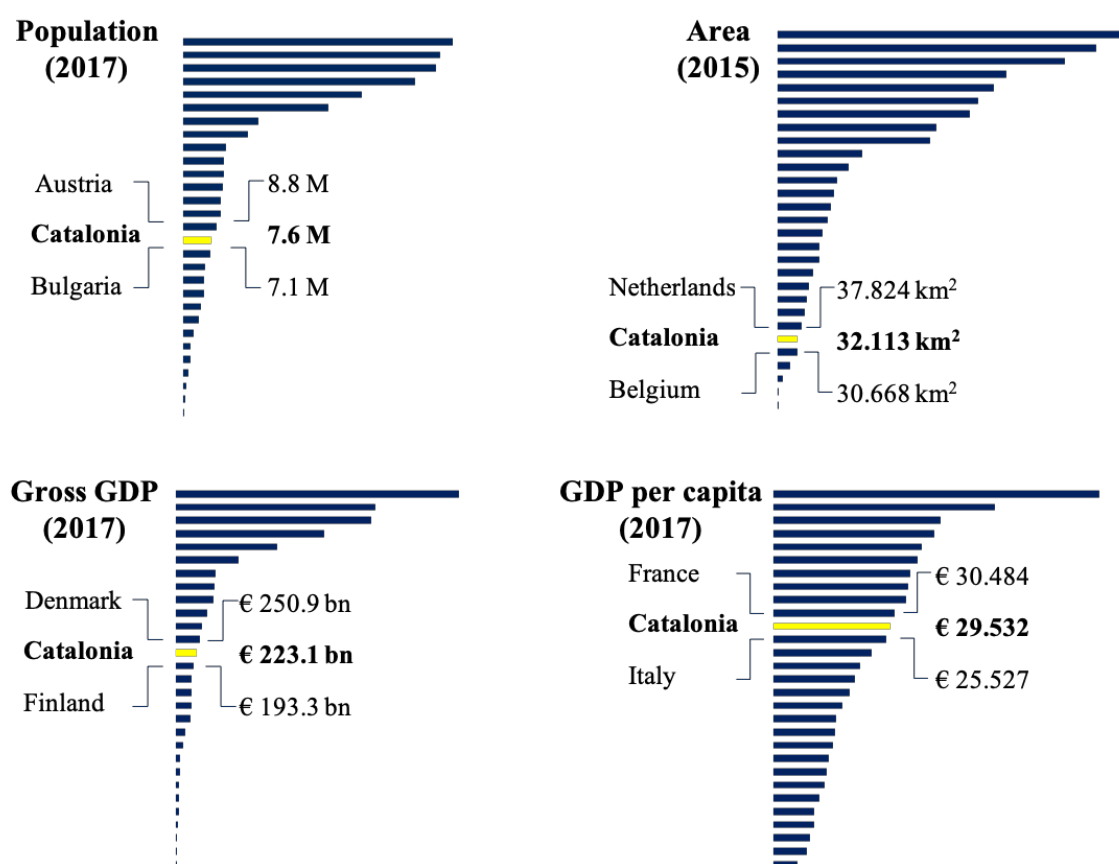
Figure 1: Country profile of an independent Catalonia, ceteris paribus (source: Appendix Table 1)

As of now, the potential country would have a population of approximately 7.5 million people and a GDP per capita of €29.532 (Eurostat, 2017a, 2017b; INE, 2017). This means that it would be the 16th largest EU country by population and the 12th richest per capita. However, with an area of 32.113 km², Catalonia's surface area is not even 1% of the EU-28. Yet, it is comparable to important European countries such as Denmark, Holland or Belgium.

Ayadi et al. (2015), argue that an independent Catalonia would be beneficial for the region in the long run, under all cases analyzed. They find that ending Catalonia's net fiscal transfer to Spain would have a strong positive impact on the Catalan economy. However, they also explain that the short-term economy would be dominated by uncertainty, high interest rates and a volatile investment environment.

Another negative consequence is the border effect, which predicts that the simple existence of borders lowers the trade between two countries, all other variables equal (Amat et al., 2014, p. 33). For instance, Rodríguez (2012), claims that trade volumes between Spain and Catalonia

would be reduced to the levels between Spain and Portugal, which are 80% lower than Spain and Catalonia, resulting in a 9% reduction of the Catalan GDP. On the other hand, Antràs (2012) and Amat (2013), offer different results, estimating that it would not fall that low. Instead they estimate that the net-effect on the Catalan GDP would rather be a decrease between 1-2.2%.

Furthermore, an independent Catalonia could also provoke extensive boycotts throughout Spain, both by consumers and through suppliers and distributors, creating challenges for Catalan firms. Cuadras-Morató & Raya (2016) find that there is a tendency of Spanish costumers to boycott Catalan products of symbolic value, such as cava. This creates the risk of reduced sales in the rest of Spain, especially for firms with typical Catalan products.

Moreover, an independent Catalonia would also bring upon an internal challenge inside Catalan firms, where companies could find themselves in a locked situation: If they officially take one side of the conflict, this might create anger with employees having opposing viewpoints, and if they abstain from taking a position this could create frustration with employees having very strong opinions in either direction. In sum, an independent Catalonia is likely to bring upon quite intangible challenges that might rise the management cost of firms in the region.

By having introduced the conflict and discussed some of the economic aspects of an independent Catalonia, the foundation of the thesis is built. Next, I elaborate on how the data is collected.

3 Data and events of interest (step 2)

In this section, I first explain the most important events in the Catalan conflict since Jan. 2010. Then, I elaborate on the data used in this study. Figure 2 outlines the structure of this section.
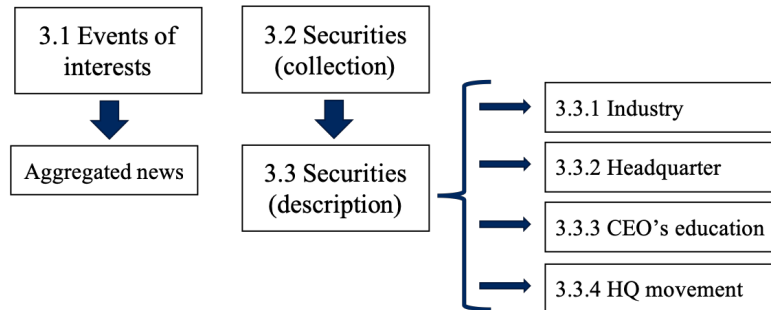

Figure 2: The different steps of the data collection process outlines the structure of chapter 3.

3.1 Events of interest

The sample period is restricted to the most recent events in the conflict and cover the time period from Jan. 1st, 2010 to Aug. 1st, 2018. Although the sample starts in 2010, the conflict's intensification is rooted back to events in 2006, when the new statute of autonomy of Catalonia is approved with absolute majority in the Spanish Parliament (Mascarell, 2017, p. 56). This event sparked the conflict in Catalonia, as the statute is put on trial and four years later, in 2010, practically disactivated by the Constitutional Court of Spain, letting the independence movement flare up (Calamur, 2017).

Accordingly, I start my analysis in 2010. The sample covers a 103-month period and the events are manually identified through analyzing existing literature and newspaper articles. In doing this, I identify a total of 24 events which are of considerable importance to hypothetically have a financial impact. Table 1 outlines the 24 events with a short description of their main characteristics.

ID	Date	Description
		Table 1 – events of interest
1	Jun. 28th 2010	Spanish Constitutional Court almost disactivates the new statute of autonomy of Catalonia, claiming there are no legal basis for Catalonia being recognized as a nation within Spain and that the Catalan language should not be favored over Spanish. This is heavily criticized by the Catalan government (Calamur, 2017; Mascarell, 2017, p. 58).
2	Nov. 28th 2010	The center-right political party, *Convergència i Unió (CiU),* returns to power in Catalonia. The party is led by Artur Mas, who in December becomes the regional president. CiU favors letting the Catalan population decide whether or not they should become independent (Belmonte, Mondelo, & Oms, 2010; Catalunya, 2018).
3	Sept. 11th 2012	Sept. 11th is Catalonia's national day and up to 1.5 million people take to the streets showing support for an independent Catalonia. Most are frustrated with the statute of

		autonomy of Catalonia, lack of dialogue and Catalonia's net fiscal deficit to Spain (Raventós & Buster, 2012; RTVE.es, 2012c).
4	Sept. 13th 2012	Spanish government, headed by Mariano Rajoy, rejects giving Catalonia more fiscal independence. As a response, Artur Mas, the Catalan president, says that Catalonia needs a proper state (Barber, 2012b; Mascarell, 2017, p. 68; RTVE.es, 2012a).
5	Dec. 19th 2012	In the Catalan elections, *CiU* and the social democratic party *Esquerra Republicana de Catalunya (ERC),* win the elections. Artur Mas remains regional president and both parties favor a referendum in 2014 (Barber, 2012a; Buck, 2012; RTVE.es, 2012b).
6	Jan. 23rd 2013	Catalan parliament approves "*la declaración soberanista"* (English: declaration of sovereignty) with 85 votes in favor, 41 against and 2 abstains. This gives green light for undertaking the referendum in 2014 (Buck, 2013; RTVE.es, 2013).
7	Apr. 8th 2013	The referendum is rejected by the Spanish Parliament which claims the region does not have legal authority for auto-determination (Generales, 2013; Mascarell, 2017, p. 68).
8	Sept. 11th 2013	On this year's national day of Catalonia, a human chain across Catalonia is formed, with more than 1.6 million Catalans holding hands across a 400 km long human chain, known as "*la via catalana*" (English: the Catalan way). The objective is to reclaim the right for independence (Mascarell, 2017, p. 69; TV3, 2013).
9	Mar. 25th 2014	Spain's Constitutional Court asserts the "declaration of sovereignty" and the planned referendum as unconstitutional. The passage stating that "the people of Catalonia have, for reasons of democratic legitimacy, the nature of a sovereign political and legal subject", violates Article 2 in the constitution (Buck, 2014b; Mascarell, 2017, p. 69; RTVE.es, 2014b).
10	Apr. 8th 2014	Spanish parliament denies that Catalonia convokes a referendum, where the Constitutional Court's sentence is a weighing argument (Mascarell, 2017, p. 69; Menédez & Plaza, 2014).
11	Sept. 19th 2014	Catalan President, Artur Mas, signs a mandate calling for a non-binding referendum considering the independence from Spain. The Constitutional Court pauses the plans, claiming that they need time to consider whether such a referendum is constitutional or not (BBC, 2018).
12	Nov. 9th 2014	Around 2.3 out of 5.4 million eligible voters take part in the symbolic, non-binding referendum. The outcome is 80.76% votes favoring a Catalan independence (Buck, 2014a; RTVE.es, 2014a).
13	Jan. 15th 2015	Catalan President, Artur Mas, request new regional elections Sep. 27th 2015, in order to measure the political support of a potential declaration of independence (Buck, 2015; Menédez, 2015).
14	Mar. 25th 2015	The earlier branch of CiU, *Convergencia Democrática de Cataluña* (CDC), and ERC agrees on making a coalition called "*Junts Pel Sí*" (English: together for yes) With the purpose of reaching the independence of Catalonia (Noguer, 2015; P. Rodríguez, 2015).
15	Sept. 27th 2015	The parties favoring a referendum win the regional election with 47.74% of the votes (CDC, ERC and CUP). While 39.17% for parties against a referendum and 11.45% for neutral parties. As a consequence, CiU and ERC argue that this provides them with a mandate to continue working for the independence (Mascarell, 2017, p. 70; Pais, 2015)
16	Nov. 12th 2015	Despite being suspended by the Constitutional Court, a resolution supporting the Catalan independence is adopted by the Catalan Parliament (Roger, 2015).
17	Dec. 1st 2015	Constitutional Court revokes the Catalan Parliament's motion to start the process of separating from the rest of Spain, claiming that the legislation is unconstitutional (Kassam, 2015).
18	Jan. 10th 2016	Carles Puigdemont, pro-Catalonia and mayor of Girona, is inducted as the President of Catalonia (Puente, 2016).
19	Mar. 13th 2017	Catalan political leaders Artur Mas, Joana Ortega and Irene Rigau are banned from public office for having disobeyed the Constitutional Courts in the 2014 referendum. Mas is also fined €36.500, Ortega €30.000 and Rigau €24.000 (Jones, 2017).
20	Oct. 1st 2017	Around 90% of the 2.26 million Catalans vote yes in the Oct.1st referendum, which Spain claims as unofficial and illegal (Stothard, 2017a). The Spanish national police use force against Catalans, who peacefully oppose them to stop the vote (Benito, 2017;

21	Oct. 27th 2017	M. Rodríguez & Congostrina, 2017). According to *Sistema d'Emergències Mèdiques* (Catalunya, 2017), 1.066 people are injured.
		Catalan Parliament declares independence from Spain, 70 to 10 votes favoring the decision (Menédez, 2017; Stothard, 2017b). As a response, the central government in Madrid takes direct control over Catalonia and Spain's public prosecutor calls for charges of Catalan leaders (Stothard, 2017c, 2017d).
22	Dec. 21st 2017	In the Catalan elections called by the Spanish government, the pro-independence parties once again win a majority. However, *Ciudadanos* who is a pro-Spain party becomes the single largest group in the regional parliament (Pais, 2017; Utrera, 2017).
23	May 5th 2018	*Junts pel Sí* change law to allow Puigdemont to be re-elected as the Catalan President, despite having fled abroad to avoid being arrested on rebellion charges (Carbajosa & Baquero, 2018).
24	May 14th 2018	Joaquim Torra, supporter of the independence process, is chosen as the president of the Catalan regional government (Stothard, 2018b)

Table 1: Compilation of the 24 most important events in the conflict of Catalonia over the sample period, Jan. 1st, 2010 to Aug. 1st, 2018. The financial impact of these events is analyzed over different dimensions in the empirical analysis.

In order to draw inference across the events, I classify them into two groups: Pro-independence (18 events) and pro-Spain (7 events). The Oct. 27th event is classified in both categories.[3] Table 2 illustrates how this classification is distributed.

Table 2 – Division of events		
	Events	Event ID
Pro-independence	18	2,3,4,5,6,8,11,12,13,14,15,16,18,20,21,22,23,24
Pro-Spain	7	1,7,9,10,17,19,21

Table 2: Classification of events into pro-independence and pro-Spain events. These two categories will be used to investigate each group's financial impact in the empirical analysis.

Next, I aggregate news data from the international newspaper *Financial Times (FT)* and the Spanish newspaper *La Vanguardia* to further investigate the importance of these events. The aggregation is manually performed, going month by month in the newspaper's archives and collecting the number of articles by searching for "Catalonia independence" in *FT* and "independencia catalana" in *La Vanguardia*. Figure 3 summarizes this aggregation, including vertical lines that illustrate the 24 events from Table 1.

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[3] Oct. 27th is classified as both pro-independence and pro-Spain because it covers events going in both directions. During this day Catalonia declared its independence (pro-independence event). However, as a response, Spain sacked the Catalan government and the public prosecutor called for charges against Catalan politicians (pro-Spain event).
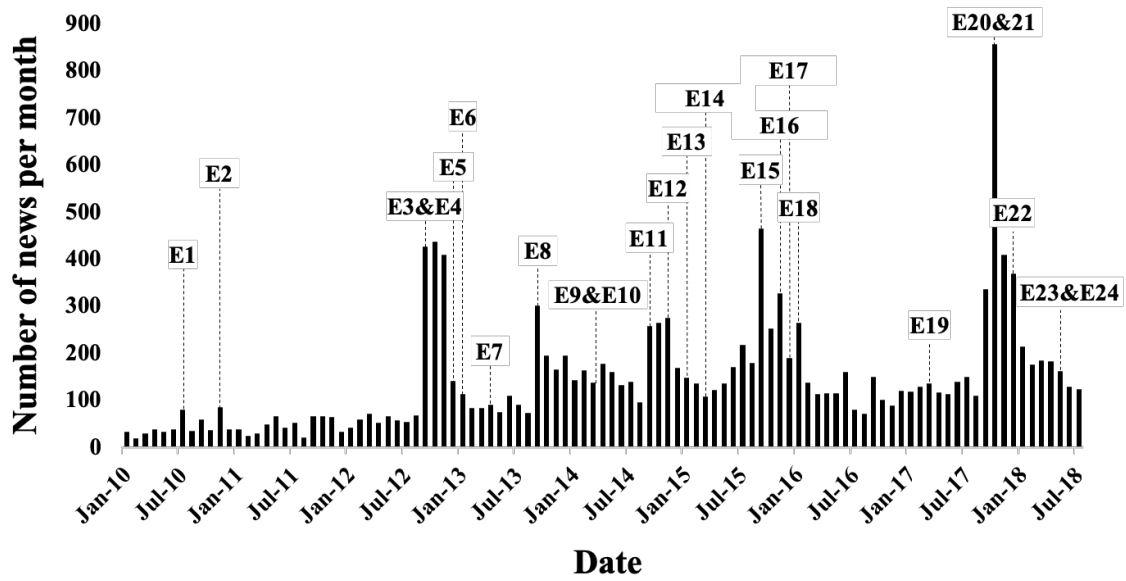
Figure 3: Aggregated news articles over the sample period from *FT* and *La Vanguardia* using the search term "Catalonia independence" and "independencia catalana". The 24 events from Table 1 is highlighted.

As newspapers are profit-seeking and rely on publishing relevant and current news, the aggregated number of published articles gives an indication of the importance of the conflict. The aggregation indicates that Oct. 2017 is an important month, with 226 articles in *FT* and 631 articles in *La Vanguardia*. This is approximately twice the number compared to other peaks. Although Table 1 reveals that there are two events during this month, most news happens in relation to Oct. 1st, which suggests that this event should get special attention in the empirical analysis.

Moreover, some events occur within a close time range, which could create problems isolating the effects of each one of them. Thus, the following events are clustered:[4]

- Events 3-4: Sept. 11th – Sept. 13th, 2012
- Events 9-10: Mar. 25th – Apr. 8th, 2014
- Events 23-24: May 5th – May 14th, 2018

Furthermore, I assume that the events in Table 1 happen with an element of surprise, as they are relatively unpredictable. This is supported by Figure 3, where most events are followed by a peak in news articles compared to the months before and after, indicating special occurrences. As mentioned, Oct. 1st is related to the highest number of news, which suggests that this event is more unusual than the rest.

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[4] Even though events 20 and 21 are in the same month, these are still 26 days from each other; being Oct.1st and Oct.27th. These events will therefore be considered individually.

3.2 Securities listed on Bolsas y Mercados Españoles (BME)

The selection criteria for the inclusion of firms is based on the natural restriction of having a relation to the political situation in Catalonia. Consequently, I assume that firms with operations in either Spain or Catalonia comply with this restriction. Although the conflict is happening in Catalonia, companies with operations only in Spain might also be affected by a Catalan separation as the region constitutes a fifth of the country's GDP.

Traditionally, there are four stock exchanges in Spain, spread across Madrid, Barcelona, Bilbao and Valencia (BME, 2018). However, these exchanges are now integrated in *Bolsas y Mercados Españoles* (BME) and its official index is the IBEX35, which includes the 35 most liquid stocks in the integrated market (BME, 2013). Since I first analyze the Spanish market's reaction to the events compared to the European market, the price index (PI) for IBEX35 is collected from Datastream. In addition, PI for three important European stock indices is collected: FTSE100,[5] STOXX50 and DAX30.

Furthermore, to enable a concise study, data containing PI for all stocks listed in Spain is gathered. In doing this, I assume that these companies have a relation to either the Spanish or the Catalan economy. After the data cleansing, where I remove incomplete and unfrequently traded stocks, I am left with 141 companies (Appendix Table 2). The price data for these securities is classified as time series data with unit root, with the sample being quite large and complete. However, 42 companies are being listed during the sample period and will be considered when the data is complete throughout each event's estimation period, using "the start date dummies" in Appendix Table 3.

3.3 Analyzing the securities listed on BME

To further investigate the financial impact of the conflict, stock characteristics are collected. This is done in four dimensions: By identifying the companies' economic industry sector, headquarter location, CEO study place location and headquarters fleeing from Catalonia.

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[5]As FTSE100 comes in British Pound, the UK £ to € data is collected to remove currency fluctuations from my analysis.

3.3.1 Economic industry sector

First, the economic industry sector classification for each stock is collected. The data will be used to investigate if there is a different effect of the events across this dimension. Figure 4 illustrates the firm's distribution across the economic industry sectors.
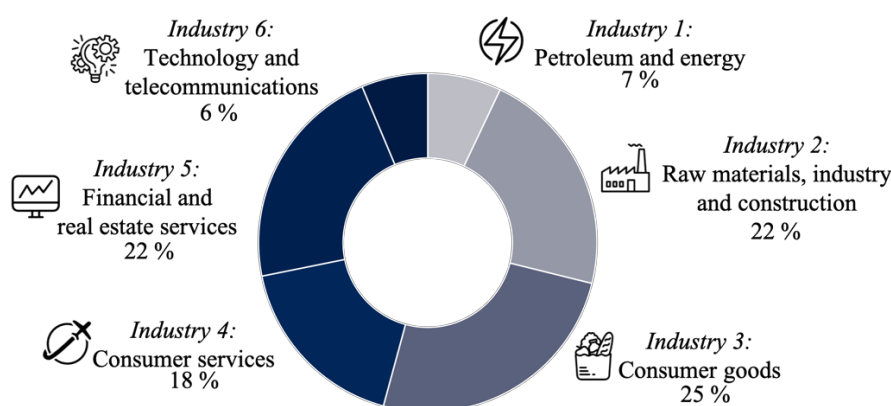

Figure 4: Classification of the 141 sample firms into economic industry sectors (Appendix Table 4)

The classification is based upon 3 sources; Datastream, Morningstar and BME's webpage. As BME is the stock exchange's official webpage, it is assumed to be the most appropriate source.[6]

3.3.2 Headquarter location

Then, headquarter location for each company is collected. The data will be used to investigate if the impact is different based on the headquarter location of the firms. Figure 5 illustrates the headquarter distribution over the sample.
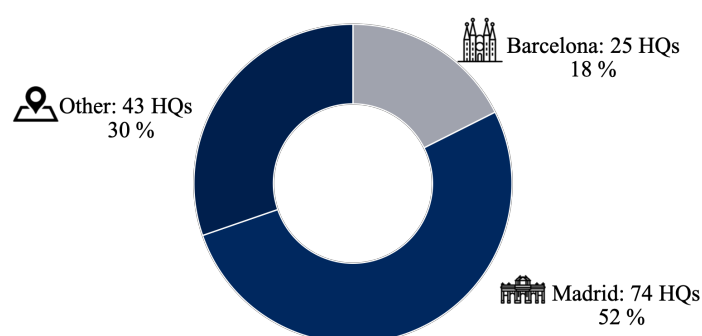
Figure 5: Distribution of the headquarter location for the sample firms (Appendix Table 5)

In collecting headquarter location data, I consider the location before fleeing from Catalonia, a topic which will be discussed in subsection 3.3.4. The headquarter location data is manually collected, and I strive to keep the collection process organized. Thus, I utilize mainly two

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[6] Although the BME classification is used as the main source, Datastream and Morningstar are utilized to categorize 21 stocks which are collected from the *Mercado Alternativo Bursátil (MaB),* as they are excluded from the BME industry classification. If interested, the classifications from Datastream and Morningstar are available on request.

sources: the company's LinkedIn profile and the BME's firm description. However, in 4 cases headquarter location is collected from the firm's own web page because the information is not available in the previous two sources.

3.3.3 CEO study place location

Next, data containing CEO study place location is collected. This data is gathered to investigate whether there exists a different financial impact based on this selection criterion. Figure 6 shows the distribution of the CEO study place location over the sample firms.
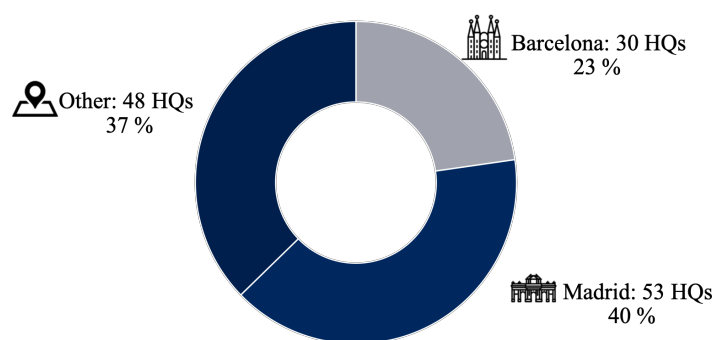
Figure 6: Distribution of the study place location of the CEO of the sample firms (Appendix Table 6)

If the education of a CEO contains various study places, e.g. Bachelor and Master, only the study place location of their bachelor's degrees is considered. This simplification is done because the bachelor's degrees in Spain last 4 years while the master's degrees only lasts 1 year. Thus, I assume that the four-year bachelor's degree will have the strongest impact on the CEO's potential political affiliation.

3.3.4 Headquarters fleeing from Catalonia

Finally, data containing the firms that have moved the headquarters out of Catalonia is collected. This information will be used to investigate whether the announcement of headquarter movement has impacted the stock prices for the securities in question. Figure 7 shows the distribution of companies moving out and staying in Catalonia.
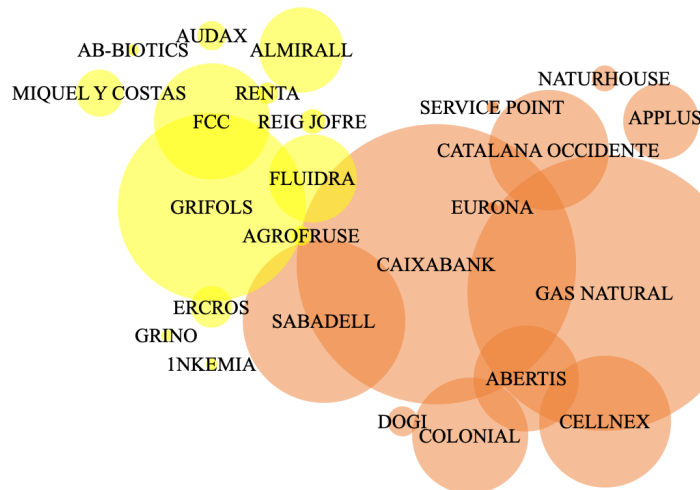
Figure 7: Companies with headquarter in Catalonia. Firms moving out are highlighted in red and those staying in yellow. The size of the bubble represents the relative market value of each company (Appendix Table 7).

During October 2017, 12 out of the 25 firms with headquarters in Catalonia moved out, to Alicante, Valencia, Madrid or other places (Pellicer, Ser, & Alameda, 2017). In Figure 7, the size of the bubbles represents the market value of each company and one observes that many large companies have chosen to leave Catalonia, including Caixabank and Gas Natural[7] with market values of €23.70bn and €22.97bn, respectively.

In contrast to the rest of the data, the returns for these firms will be analyzed based on the day each company officially announced that they were going to change the headquarter location, outlined in Appendix Table 7. For the other data, the companies will be analyzed over the event dates in Table 1.

Having gathered all relevant data for the event study analysis, step 2 is completed. Next, I conduct the empirical analysis of the thesis, starting with a brief introduction to the event study methodology.

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[7] Gas Natural changed its name to Naturgy, June 27th, 2018 (Martínez, 2018).

4 Empirical analysis (step 3 & 4)

In this section, I briefly explain the event study methodology before I delve into the empirical analysis. Figure 8 presents the structure of the analysis, which is organized as a funnel, investigating the conflict over different levels, split into pro-independence and pro-Spain events. In addition, I take a special look at the Oct. 1st, 2017 event in each sub-section. Throughout the empirical analysis the quantitative results will be discussed in light of the qualitative interviews, to further enhance the understanding of the financial impact.
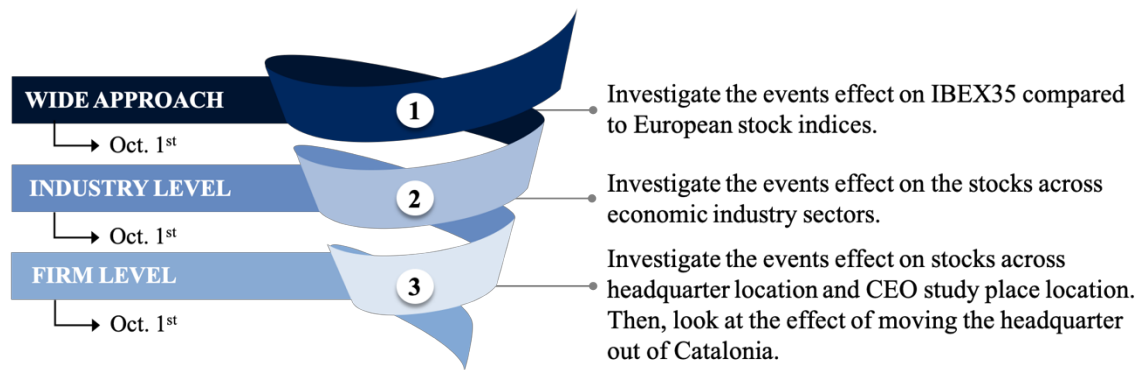
Figure 8: The empirical analysis follows a funnel structure, first applying a wide approach before narrowing down the investigation. In each dimension, there is devoted special attention to the Oct. 1st event.

4.1 Methodology of event studies

The method used to investigate the thesis question is the event study methodology, which is quite common in financial and econometric analysis. Put simply, this method calculates an event's effects on stock performance, considering the securities abnormal stock return behavior (MacKinlay, 1997). It is built on the following 3 assumptions:

1. **Stock markets are semi-efficient.** New information is absorbed by the trading prices, including news about political events such as the conflict in Catalonia. Thus, if an event has a considerable impact on the economy, then it should influence the stock prices in that market, as the prices reflect all new and available information.

2. **Events happen by surprise.** The events must take the market by surprise. If not, the investors could adjust their portfolio accordingly, positioning the market for the event's outcome. Then, it is difficult to isolate the event's impact and there will be no abnormal returns. As mentioned, I assume that the events in Table 1 happen by a certain degree of surprise, as the outcomes are relatively unexpected. Especially the Oct. 1st event.

3. **No cofounding events.** Also related to isolating the event's impact, there cannot be any cofounding occurrences at the same time. This would compress or exaggerate the impact of the event in question, as it would downplay or overstate its effect.

Furthermore, the general flow of event studies begins by defining the events of interest, which is done in chapter 3.1, divided into pro-independence and pro-Spain (MacKinlay, 1997). Next, the estimation period and the event window have to be defined. The estimation period is the period before the event and will be used to calculate the abnormal returns in the event window.

In the thesis, I employ an estimation period of 110 trading days and an event window of 31 trading days. The long event window is chosen to investigate the market adjustment before the event and potential post-event price reversals. Yet, the event window is also studied into smaller groups throughout the different sections in the empirical analysis. For the estimation period, I use unique data points as these are collected prior to the event window, without overlap. Figure 9 illustrates an event, the estimation period and the event window on a timeline.
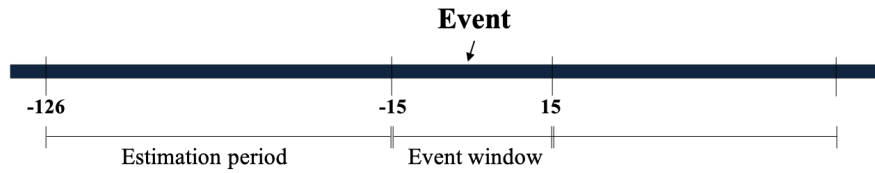

Figure 9: The horizontal axis represents time. The period (-15-(-126)) is the estimation period, used to estimate parameters. The period (15-(-15)) is the event window, where the event's impact is analyzed.

Next, the appraisal of the impact of these events needs a measure of abnormal return. This is calculated by subtracting the normal return of the firm from the actual ex post return over the event window. The normal return is the expected return without the existence of the event. In explaining the event study methodology, I borrow MacKinlay's notions used in his famous paper *Event Studies in Economics and Finance* (1997), presented in Table 3.

Table 3 – Methodology notions	
Company	i
Event time	τ
Event date	$\tau = 0$
Estimation period	$[\tau = T_0 + 1, \tau = T_1]$
Event window	$[\tau = T_1 + 1, \tau = T_2]$
Length of estimation period	$L_1 = T_1 - T_0$
Length of event window	$L_2 = T_2 - T_1$

Table 3: Notions defined by MacKinlay used in explaining the event study methodology, which is later employed throughout the empirical analysis.

Using the notations from Table 3, the abnormal return is calculated in equation 1.

$$AR_{i\tau} = R_{i\tau} - E[R_{i\tau}|X_\tau] \ (1)$$

There are several ways of estimating the abnormal returns (Binder, 1998; MacKinlay, 1997). Two common models are the *constant mean return model* (where X_τ is a constant) and the

market model (where X_τ is the market return). Both are statistical models, opposed to economical models such as the *capital asset pricing model* and the *arbitrage pricing theory*.

Campbell et al. (1997) reach the conclusion that "there seems to be no good reason to use an economic model rather than a statistical model in an event study". Thus, I apply the *market model* and ignore the *constant mean return model,* as it is quite unrefined, ignoring factors such as the firm's risk and the market performance. Even though Brown & Warner (1980, 1985), prove that this model often reaches the same conclusions as more sophisticated models, I prefer to consider these factors in the analysis.

4.1.1 Market model

The *market model* calculates the abnormal returns as residuals of ordinary least squares (OLS) of stock returns on market returns, assuming a linear relationship. This model removes the variation related to the market return and could consequently improve the identification of an event's impact. Equation 2 demonstrates how the normal return is calculated by a linear, one-regressor model.

$$R_{i\tau} = \alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau} \ (2)$$

Where $R_{i\tau}$ and $R_{m\tau}$ are the returns in period τ respectively on firm i and the market $m,$ and ε_{it} is the zero mean disturbance term. When parameters α and β are estimated, the model can predict the abnormal return in the event window, shown in equation 3.

$$\widehat{AR}_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau} \ (3)$$

Under $H_0: AR = 0$, the abnormal returns will have a normal distribution, zero conditional mean and a conditional variance as represented in equation 4.

$$\sigma^2(\widehat{AR}_{i\tau}) = \hat{\sigma}^2_{\varepsilon_i} + \frac{1}{L_1}[1 + \frac{(R_{m\tau} - \hat{\mu}_m)^2}{\hat{\sigma}^2_m}](4)$$

When the estimation period, $L_1,$ is large such as in this thesis, the additional variance due to sampling errors in α_i and β_i approaches 0 and the variance is: $\sigma^2(\widehat{AR}_{i\tau}) \to \hat{\sigma}^2_{\varepsilon_i}$

To draw overall inference of the events of interest, the abnormal returns need to be aggregated (MacKinlay, 1997). Given N events, the $\overline{AR}_\tau$ can be calculated by equation 5 and its variance is represented by equation 6 when the estimation period, L$_1$, is large.

$$\overline{AR}_\tau = \frac{1}{N} \sum_{i=1}^{N} \widehat{AR}_{i\tau} \ (5)$$

$$var(\overline{AR}_\tau) = \frac{1}{N^2}\sum_{i=1}^{N}\hat{\sigma}_{\varepsilon_i}^2 \ (6)$$

Then, $H_0: AR = 0$ can be tested, by calculating a test statistic using equation 7.

$$\theta_1 = \frac{\overline{AR}_\tau}{(var(\overline{AR}_\tau))^{.5}} \ (7)$$

To test the persistence of the event's impact during a period, the cumulative abnormal return (CAR) in equation 8 can be calculated, during the period $(\tau_2 - \tau_1)$.

$$\widehat{CAR}_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \widehat{AR}_{i\tau} \ (8)$$

In addition, the $\overline{AR}_\tau$ is aggregated over the event window, illustrated in equation 9. The variance of CAR is shown in equation 10 when the estimation period, L_1, is large.

$$\overline{CAR}(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} \overline{AR}_\tau \ (9)$$

$$var(\overline{CAR}(\tau_1, \tau_2)) \approx \sum_{\tau=\tau_1}^{\tau_2} var(\overline{AR}_\tau) \ (10)$$

Since $\sigma_{\varepsilon_i}^2$ is unknown, I approximate the calculation of the variance of abnormal returns in equation 6 by using the usual sample variance measure of $\hat{\sigma}_{\varepsilon_i}^2$ from the market model regression during the estimation period. Then $H_0: CAR = 0$ can be tested, calculating a test statistic using equation 11.

$$\theta_1 = \frac{\overline{CAR}(\tau_1, \tau_2)}{\left(var(\overline{CAR}(\tau_1, \tau_2))\right)^{.5}} \ (11)$$

Next, I will analyze the events widely, comparing the Spanish markets to the European. Then, I will analyze the events across the other dimensions before I investigate the firms moving out the headquarter of Catalonia.

Throughout the analysis, the results will be discussed in light of the qualitative interviews. This is purposefully done, in order to present the quantitative results and immediately afterwards draw qualitative insights in each subsection, allowing for a more comprehensive understanding of the financial impact.

4.2 Wide analysis: Spanish vs European markets

First, I analyze the Spanish financial market represented by IBEX35, compared to the European market represented by FTSE100 and DAX. Figure 10 shows the average cumulative abnormal returns for the pro-independence and pro-Spain events. The thick line represents the cumulative abnormal returns for IBEX35, and the two thinner lines represent FTSE100 and DAX. As mentioned in the methodology, I control for the economy-wide phenomena by computing the data using the *market model*.[8]
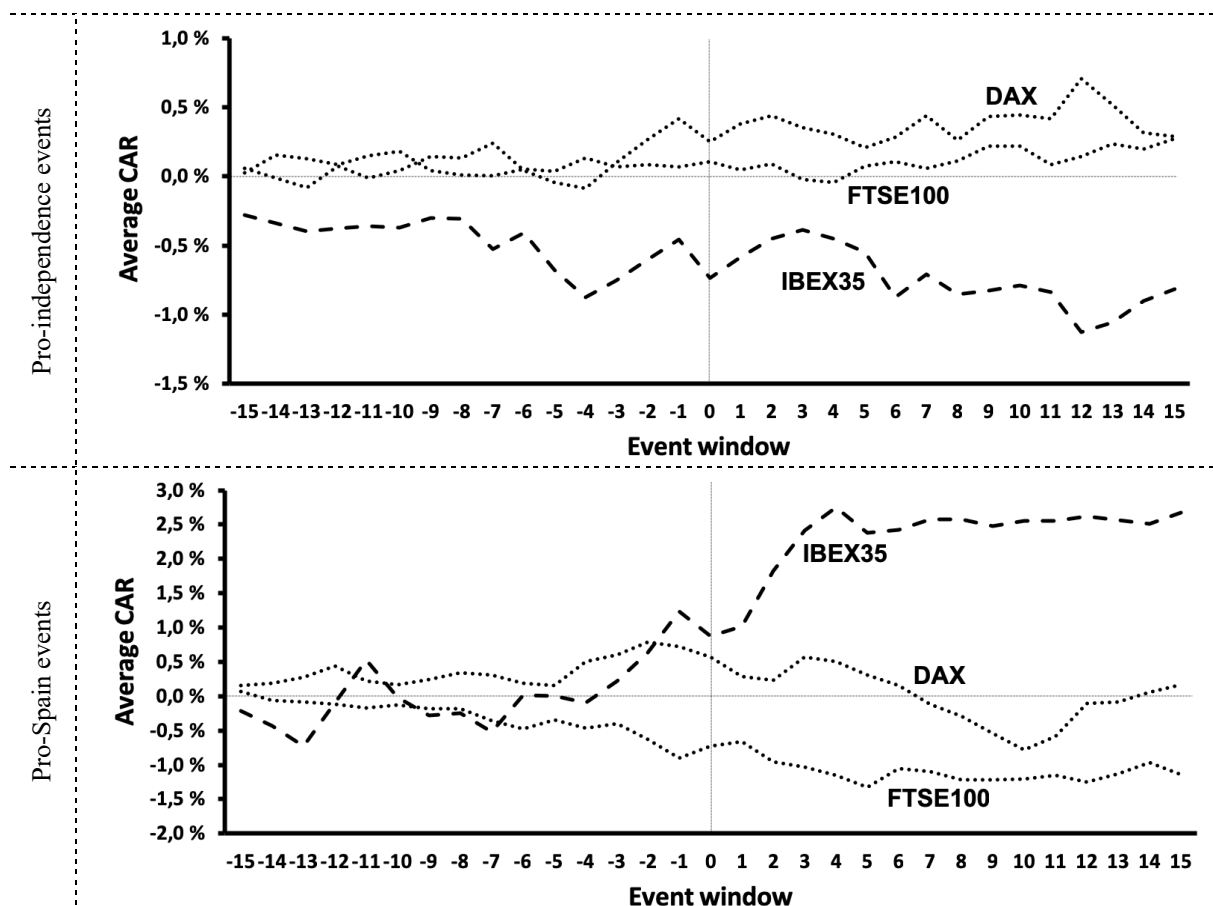

Figure 10: Average CARs for the pro-independence and pro-Spain events, calculated by the *market model* using STOXX50 as the benchmark. The seperation of events is lined out in chapter 3.1. Event day 0 is the event date, where the events presented in Table 1 take place. The event window is 31 trading days and the estimation period is 110 trading days. The ARs and CARs, with respective t-values, are availble in Appendix Table 8.

None of the abnormal returns in Figure 10 are statistically different from 0. This might be the case as the abnormal returns not necessarily reflect the whole financial impact of these events, as they could have been incorporated into the prices before the event itself, violating assumption 2 of unexpected events. In other words, the events might not have taken the market by complete

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[8] The CARs are also calculated by the *constant mean return model* and the results are consistent with Figure 10, with no ARs significantly different to 0. However, IBEX35 experience positive CARs during both pro-independence and pro-Spain events, probably because there is a positive market trend in the European markets which is ignored in the *constant mean return model*.

surprise, which would allow investors to consider the information long before the events, making it difficult to isolate the total financial impact. Another possibility is that these events indeed do not impact the Spanish financial market and consequently do not produce significant abnormal returns.

In the interview with the President of the Barcelona Stock Exchange, Mr. Hortalà says that the overall financial impact of the conflict in Catalonia on the Spanish stock index IBEX35 is limited and of little significance. He explains that most firms included in IBEX35 have large international geographical diversification, hedging local risk exposure to issues such as the conflict in Catalonia. He argues that IBEX35 is following the cyclical movements in the world economy and rather responds to events of global importance such as the Brexit negotiations or a financial downturn in the US economy.

Furthermore, during both pro-independence and pro-Spain events, the CARs lay on a level closer to 0 before the event compared to after. The IBEX35 stabilizes at a level around -0.8% during the pro-independence events and 2.5% during the pro-Spain events. This indicates a larger cumulative spread in the end of the event window compared to the beginning. However, by comparing IBEX35 to the other indices, I find no evidence to suggest that the ARs are statistically different from each other.[9]

In sum, IBEX35 experiences larger cumulative abnormal returns than DAX and FTSE100 during the events in question. This implies a stronger market reaction, although not of statistical significance.

Next, I will take a special look into the Oct. 1st referendum, to investigate if the situation is similar for this special event.

4.2.1 Wide analysis: Special look at Oct. 1st

The Oct. 1st referendum (event 20, Table 1) stands out from the rest with a larger financial impact. It is also the single event with the largest number of news hits (E20, Figure 3). Thus, it is further investigated to better understand its financial impact.[10] Table 4 illustrates the abnormal returns and the cumulative abnormal returns for IBEX35 during the event window.

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[9]Based on a two-sample t-test, assuming independent and unpaired variables.
[10] Results from other specific events can be provided on request.

Event day	AR (%)	t AR	CAR (%)	t CAR
-15	0.764*	1.69	0.764	
-14	-0.391	-0.86	0.373	0.82
-13	0.181	0.40	0.554	0.86
-12	-0.207	-0.46	0.346	0.44
-11	-0.073	-0.16	0.274	0.30
-10	-0.090	-0.20	0.184	0.18
-9	0.262	0.58	0.445	0.40
-8	-0.757*	-1.67	-0.312	-0.26
-7	-0.353	-0.78	-0.665	-0.52
-6	-0.046	-0.10	-0.711	-0.52
-5	-1.240***	-2.74	-1.951	-1.36
-4	-0.462	-1.02	-2.413	-1.61
-3	1.257***	2.77	-1.156	-0.74
-2	-0.425	-0.94	-1.581	-0.97
-1	-0.033	-0.07	-1.614	-0.95
0	-1.864***	-4.12	-3.478**	-1.98
1	-0.115	-0.25	-3.593**	-1.98
2	-2.771***	-6.12	-6.364***	-3.41
3	2.268***	5.01	-4.097**	-2.13
4	0.051	0.11	-4.046**	-2.05
5	0.275	0.61	-3.771*	-1.86
6	-0.836*	-1.85	-4.607**	-2.22
7	1.421***	3.14	-3.186	-1.50
8	0.071	0.16	-3.116	-1.43
9	-0.549	-1.21	-3.665*	-1.65
10	-0.940**	-2.08	-4.605**	-2.03
11	0.540	1.19	-4.065*	-1.76
12	0.288	0.64	-3.777	-1.60
13	-0.012	-0.03	-3.789	-1.58
14	0.286	0.63	-3.503	-1.44
15	-0.768*	-1.70	-4.271*	-1.72

Table 4 – IBEX35 on Oct. 1st, 2017

Table 4: ARs and CARs during the Oct. 1st event, calculated with the *market model* using STOXX50 as the benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively. The test statistics, t AR and t CAR are obtained by equation 7 and 11, respectively.

Table 4 shows that there are 7 days with significant abnormal returns in relation to the referendum on Oct. 1st, both negative and positive. On the event day[11], the $\overline{AR}_{[0]}$ is -1.864% (significant at 1%), which indicates a negative stock market reaction to the event.

With more than a thousand people injured by the national police during the referendum, this is arguably an escalation of the conflict, making it different to the previous events (Catalunya, 2017). Consequently, as seen in Table 4, the impact is also different, with large abnormal returns. Figure 11 illustrates the abnormal returns and cumulative abnormal returns graphically.

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[11] The referendum on Oct. 1st take place on a Sunday, making Oct. 2nd the first trading day after the event.
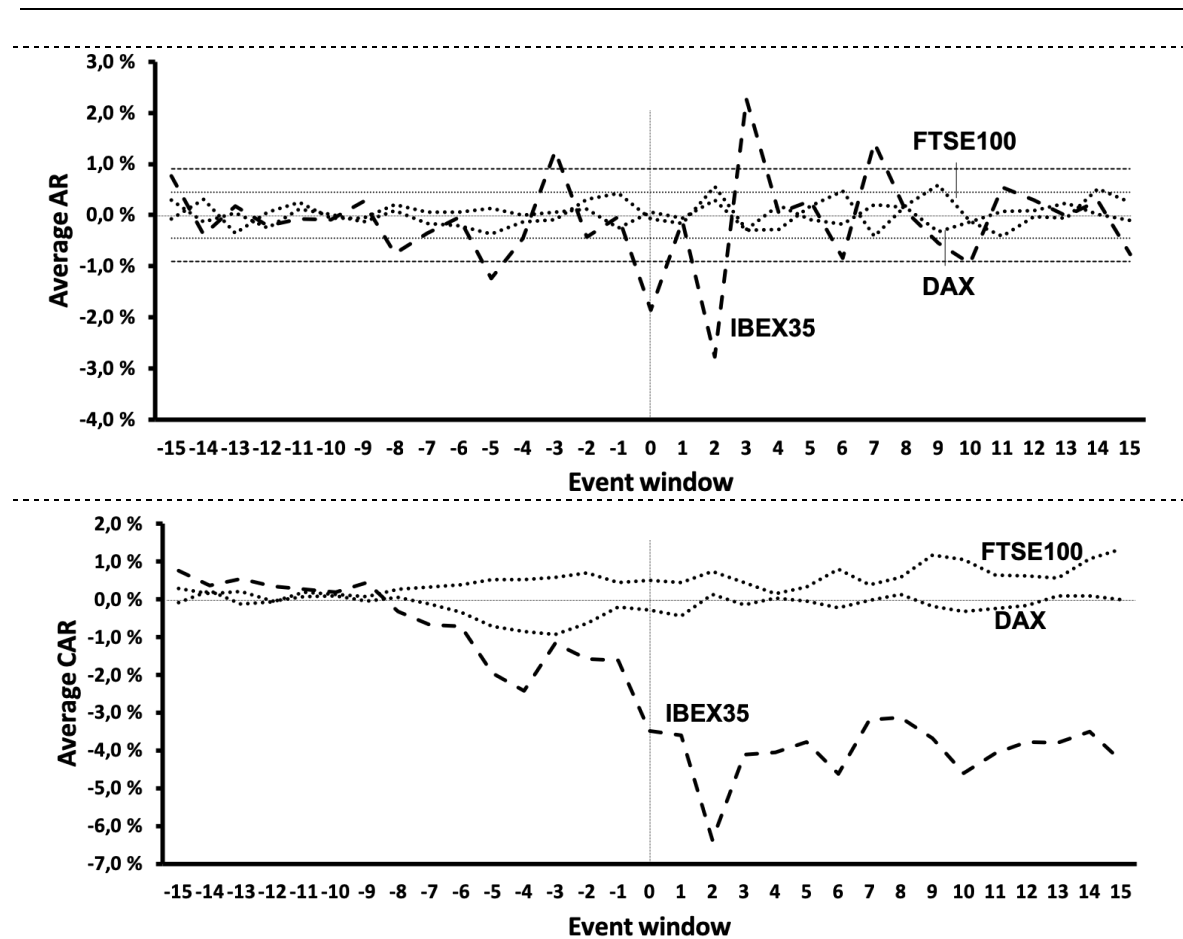
Figure 11: ARs and CARs for the Oct. 1st event, calculated with the *market model* using STOXX50 as the benchmark. The strippled lines in the first figure represent one and two standard deviations calculated over the estimation period. The event window is 31 trading days and the estimation period is 110 trading days. The ARs and CARs, with respective t-values, are availble in Table 4.

Figure 11 illustrates the abnormal returns around the referendum and one observes fluctuations outside the standard deviations calculated during the estimation period, indicating ARs of statistical significance. The cumulative effect is negative, despite some considerable price reversals, with the largest happening on pre-event day 3, with a noticeable abnormal return of 2.268% (significant at 1%).

Such a considerable positive abnormal return that close to an important escalation in the conflict could be caused by intelligent stock trading systems which almost automatically execute orders based on their technical analysis. The systems might not have incorporated the outcome of the referendum, making it believe that the timing is appropriate to execute buying orders.

Another explanation is that the market finds the referendum of little importance and consequently adjust itself thereafter. Or it could be caused by news on the third trading day, decreasing the uncertainty in the markets, leading to the positive abnormal returns.

Nevertheless, one observes in Figure 11 that IBEX35 underperforms compared to DAX and FTSE100 over the event window. As these indices normally follow suit, this is an indication of something special happening due to the referendum.

In the interview with the President at the Barcelona Stock Exchange, Mr. Hortalà confirms the existence of a financial effect during this event but argues that it is short-term and of small magnitude. That being said, Mr. Hortalà recognizes that Oct. 1st comes with a cost. He says that foreign investors now think twice before investing in Catalonia, which he explains, does not mean they will not finally do it, but that investing in Catalonia now is less attractive than before the event.

At the interview in the offices of Auren, Mr. Galipienso explains that there was a reduction in foreign investments in the region after Oct. 1st, but that it only lasted a few months. Furthermore, he believes that there is a financial impact of the conflict in Catalonia but argues that it is very difficult to quantify. He says that you would never have the complete scenario where you could compare the situation with and without Oct. 1st, seeing if the economy would have grown more or less. This being said, there is an increase in uncertainty, which no business or investor appreciates.

Furthermore, the returns might not reflect the whole financial impact of the Oct. 1st event, as it might not have happened completely by surprise, which means that it would already have been incorporated into the prices. However, considering the international attention due to the referendum, the outcome of the event is arguably unexpected. Especially considering that it is an escalation in the conflict where the national police uses force to stop the vote.

In sum, the referendum on Oct. 1st impacts the Spanish economy represented by IBEX35 at a significant level. The cumulative abnormal returns are statistically different to 0, which is not the case for the European indices, implying that the referendum has a short-term impact on the Spanish stock index.

Next, following the funnel structure, I will investigate the events impact across economic industry sectors. First, by looking at the pro-independence and pro-Spain events, before again taking a special look at the Oct. 1st event.

4.3 Industry level analysis

In this section, I investigate whether the various industries are differently impacted by the events in question. In doing this, the following industry classification is used:

- Industry 1: *petroleum and energy*
- Industry 2: *raw materials, industry and construction*
- Industry 3: *consumer goods*

- Industry 4: *consumer services*
- Industry 5: *financial and real estate services*
- Industry 6: *technology and telecommunication*

The full overview of the classification is available in Appendix Table 4. Figure 12 illustrates the average CARs across industries for the pro-independence and pro-Spain events.
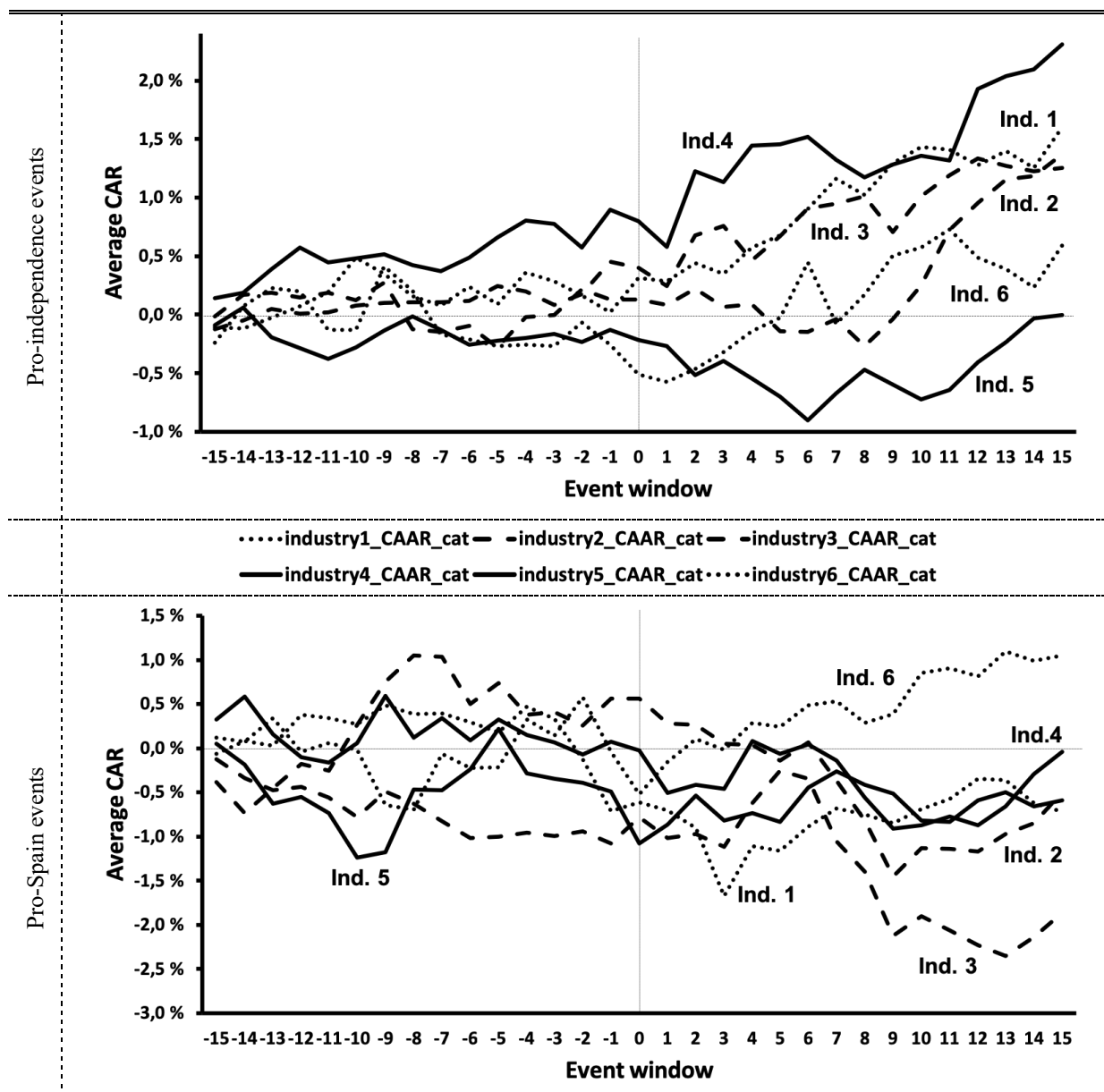

Figure 12: Average CARs for the pro-independence and pro-Spain events across the six different industries outlined in Figure 4, calculated with the *market model* using IBEX35 as the benchmark. The seperation of events is outlined in chapter 3.1. Event day 0 is the event date, where the events happened (presented in table 1). The event window is 31 trading days and the estimation period is 110 trading days. The industry labels are presented in Appendix Table 4. The ARs, with respective t-values, are available in Appendix Table 9 and Appendix Table 10.

In Figure 12 one observes differences across economic industry sectors, both for pro-independence and pro-Spain events. *Petroleum and energy* (ind. 1), *raw materials, industry and construction* (ind. 2), *consumer goods* (ind. 3) and *consumer services* (ind. 4) follow the same abnormal return pattern, while *financial and real estate services* (ind. 5) and *technology and telecommunication* (6) are diverging. Even though none of the abnormal returns are of statistically significant, Figure 12 reveals some interesting aspects discussed in the following.

During the pro-independence events, the four industries *petroleum and energy* (ind. 1), *raw materials, industry and construction* (ind. 2), *consumer goods* (ind. 3) and *consumer services* (ind. 4) are going from slightly positive abnormal returns prior to the event date to relatively large returns afterwards. The average $\overline{AR}_{[-15,-1]}$ is 0.025% and the average $\overline{AR}_{[1,15]}$ is 0.081%, which implies a positive overall reaction to events enforcing the independence movement, e.g. when around 1.6 million Catalans hold hands across a 400 km long human chain and the Catalan Parliament adopts a resolution supporting the Catalan independence (event 8 & 16, table 1).

During the qualitative interviews, I got the opportunity to gain valuable insight from active actors operating in different sectors in the Catalan and Spanish economy, allowing to elaborate on the financial impact across the economic industry sectors.

During the interview with Mr. Bricollé, CMO in AVASA Group, he explains that *consumer services* (ind. 4) remains mostly unaffected by the conflict in Catalonia. He says that there is a modest decrease in tourists coming to Catalonia from the rest of Spain but adds that the large international customer base coming from abroad compensates for the losses, making the overall impact negligible. Furthermore, Mr. Bricollé draws on his broad experience with business partners in the rest of Spain and explains that there is a strong tendency to separate business and politics to avoid unnecessary problems. This tendency, in combination with the international customer base, explains why this industry is not statistically affected by the crisis.

During my visit at Sàbat-Lligats Metal·lics in Alt Penedès, around an hour from Barcelona, the Sales Director, Mr. Gonzalez, supports Mr. Bricollé's claim of a strict separation of business and politics. He says that Sàbat-Lligats, which forms part of *raw materials, industry and construction* (ind. 2), has not encountered any obstacles in relation to suppliers and distributors in other regions of Spain, adding that business negotiations in Spain are kept professional. However, Mr. Gonzalez observes that the cava industry experiences larger problems, but adds that Sàbat-Lligats remains unaffected despite having cava as an important customer. He explains that they can easily substitute their customers to other sparkling wine producers in

regions abroad such as France, Italy, Tasmania, among others. If this is the general trend in industry 2, it might be an explanation for why the financial impact in the sector remains insignificant.

In addition, during my meeting with the General Director in Laboratorios SEID, Mr. Vilá also highlights the cava industry as more affected than others. He explains that cava is a product of symbolic value as it is mostly produced in Catalonia. Thus, people have large emotional ties to the product which makes it more exposed to potential boycotts from the rest of Spain.

Moreover, Mr. Vilá reflects upon the fact that SEID, which forms part of *consumer goods* (ind. 3), is somewhat more covered than the rest of pharmaceuticals. He argues that this is the case because their products are sold through a doctor's prescription, protecting them from potential boycotts, despite being of Catalan origin. This is different to Catalan products of more symbolic value such as cava, which is more exposed to this risk. As both cava and pharmaceuticals make up industry 3, one observes different risk exposures within the sector, which could explain why they overall do not have significant abnormal returns.

During the pro-Spain events, one observes that the tendency in Figure 12 is the opposite. The four industries, *petroleum and energy* (ind. 1), *raw materials, industry and construction* (ind. 2), *consumer goods* (ind. 3) and *consumer services* (ind. 4) all go from having average abnormal returns close to 0 prior to the event, to relatively low abnormal returns afterwards. The average $\overline{AR}_{[-15,-1]}$ is -0.019% and the average $\overline{AR}_{[1,15]}$ is -0.038%. In other words, there is a decrease in abnormal returns during the pro-Spain events such when the Spanish Constitutional Court almost disactivates the new statute of autonomy of Catalonia (event 2, table 1).

Furthermore, *financial and real estate services* (ind. 5) and *technology and telecommunication* (ind. 6) also experience an increase in average abnormal return during the event window. However, different to the previous industry sectors, where the cumulative abnormal returns go in same directions throughout the event window, industry 5 experiences a decrease for all events and industry 6 an increase. This means that *financial and real estate services* (ind. 5) responds negatively to both pro-independence and pro-Spain events, while *technology and telecommunication* (ind. 6) responds positively, although not of statistical significance.

During the interview at Auren, Managing Director and Partner Mr. Galipienso explains that the *financial services* (ind. 5) is sensitive to all tension in relation to the conflict in Catalonia, as it cannot risk a situation where they have operations in a region that does not have a clear legislation. On the other hand, *technology and telecommunication* (ind. 6) is arguably less

exposed to this risk, as the potential consequences do not affect their operations in the same way as it does for *financial services* (ind. 5).

In sum, industry 1, 2, 3, 4 experience a small positive reaction to the pro-independence events and a small negative reaction to the pro-Spain events. The impact on industry 5 is negative over all events and is positive for industry 6. However, there is not enough evidence to suggest that the ARs are of statistical significance and not caused by random stock return behavior.

Next, I will take a closer look at the Oct. 1st referendum across economic industry sectors.

4.3.1 Industry level: Special look at Oct. 1st

Again, I wish to take a closer look at the Oct. 1st referendum. Figure 13 illustrates the average cumulative abnormal returns across industries during the Oct.1st event.[12]
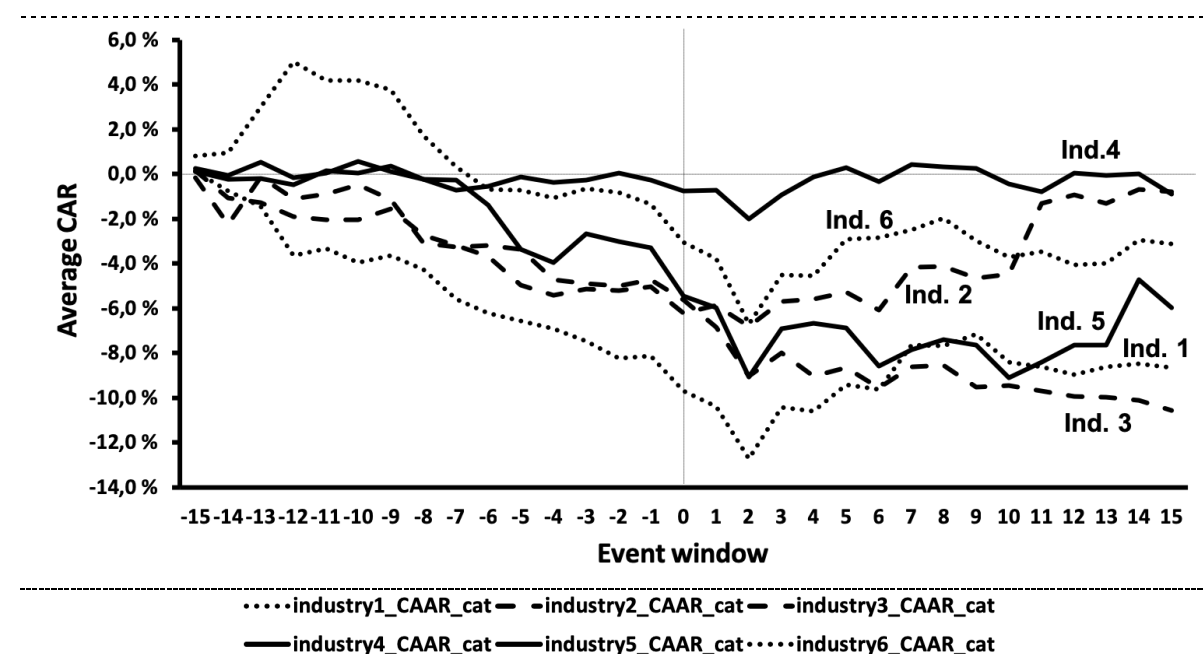
Figure 13: Average CARs for the different industries on Oct. 1st, calculated by the *market model* using STOXX50 as the benchmark. The strippled lines in the first figure represent one and two standard deviations calculated over the estimation period. The event window is 31 trading days and the estimation period is 110 trading days. The industry labels are presented in Appendix Table 4. The ARs, with respective t-values, are available in Appendix Table 11.

In Figure 13, one observes different abnormal return reactions to the referendum across industries. Although to different degrees, all industries experience negative abnormal returns.[13]

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[12] As the Oct. 1st event impacts the whole market (seen in section 4.2.1), STOXX50 is used as the benchmark instead of IBEX35 to avoid neglecting a potential impact by benchmarking the industries to a market significantly affected by the event.
[13] The relative impact across the industries is consistent with the analysis using IBEX35 as the benchmark.

During the first trading day after the referendum, Oct. 2nd, all industries experience a negative abnormal return. However, they are only of statistical significance for *petroleum and energy* (ind. 1), *raw materials, industry and construction* (ind. 2) and *financial and real estate services* (ind. 5). This means that these three industries experience a significant negative impact, reacting to the outcome of the Oct. 1st referendum.

During the interview with Auren, it is explained that a potential independent Catalonia creates a great deal of uncertainty for *financial services* (ind. 5), which could lead to large deposit withdrawals by their customers. It is a sector where confidence is important and is consequently relatively more penalized when the uncertainty rises (Hernández, 2017). Mr. Galipienso explains that for the two largest Catalan banks, Caixabank and Sabadell, the conflict imposes the unbearable threat of remaining without a legislation, forcing the banks to take action to minimize their risk. This might be an explanation of why this industry sector experiences negative CARs of statistical significance.

Once again in Sant Sadurní, the Sales Director at Sàbat-Lligats Metal·lics, Mr. Gonzalez explains that Sàbat-Lligats is not impacted by the conflict in Catalonia due to their international diversification. He explains that approximately 60% of their customer base is from abroad and they have the capacity to further shift their exposure towards international markets, making them robust even if the cava industry is impacted. Still, this might not be the case for the rest of the industry, as it is punished by the stock market around the Oct. 1st event, observed in Figure 13.

Furthermore, *consumer goods* (ind. 3) and *technology and telecommunication* (ind. 6) suffer from large negative cumulative abnormal returns during Oct. 2nd, but these are not of statistical significance as the industries have large standard errors during the estimation period. This means that the two industries experience larger price movements during the estimation period than the rest, which makes the abnormal returns relatively less important. This could be an indication of the event already being incorporated into the prices, as if the event did not take the market by surprise, leading to larger price movements prior to the event. If this is the case, it is more difficult isolate the entire financial impact of the event over these industries.

During the interview with Mr. Bricollé he elaborated on a case of Casa Tarradellas, a Catalan company producing Catalan gastronomical products, forming part of *consumer goods* (ind. 3). He explains that the firm has suffered boycotts simply due to its Catalan origin, even though their web page is in French, Spanish, English and Catalan and they use raw materials from the

rest of Spain, like tomatoes. This creates fear and uncertainty in the economy and could explain the negative abnormal returns in the sector.

Furthermore, all industries experience a drop in abnormal return on Oct. 4th. For *petroleum and energy* (ind. 1), *consumer services* (ind. 4) and *financial and real estate services* (ind. 5) at 1% and for *raw materials, industry and construction* (ind. 2) and *consumer goods* (ind. 3) at 10%. This is probably due to the continuing uncertainty caused by the referendum. On the following day, Oct. 5th, the industries experience a large price reversal, of statistical significance for industry 1, 2, 4 and 5 (industry 6 at 10%). Like the price reversal for IBEX35, this might have been provoked by intelligent stock trading systems, reduced perception of the uncertainty in markets, among other possibilities.

Different to the rest of the industries, *consumer services* (ind. 4) does not have cumulative abnormal returns significantly different from 0. The CMO at AVASA Group, Mr. Bricollé, explains that the large number of international tourists offer a protection to the conflict, which might explain its limited return movements observed in Figure 13. These small movements indicate that the investors of firms in *consumer services* (ind. 4) value the referendum and the escalation of the conflict as something insignificant.

This is unexpected considering that Perles-Ribes et al. (2018) find that the event led to a reduction in tourist spending in Catalonia, which one would believe have a negative impact. No large fall in CARs might imply that investors prices the reduction in tourist spending as insignificant when valuing these firms' intrinsic value, possibly due to their broad geographic diversification and international customer base.

In sum, industry 1, 2 and 5 are more punished by the Oct. 1st referendum than the rest. Industry 3 and 6 also experience large negative returns, but with less significant differences to 0. Last, industry 4 is the least impacted.

Next, following the funnel structure, I will investigate the financial impact at firm level across headquarter location. First by looking at the pro-independence and pro-Spain events, before again taking a special look at the Oct. 1st referendum.

4.4 Firm level: Headquarter location

In this section, I investigate whether the financial impact over headquarter location is different. This is an interesting exercise because one would expect that firms with headquarters in Barcelona are the most effected, as they presumably have the largest Catalan exposure making them more vulnerable to an increased uncertainty in the region than the rest. Figure 14 shows the average cumulative abnormal returns during the pro-independence and pro-Spain events. [14]
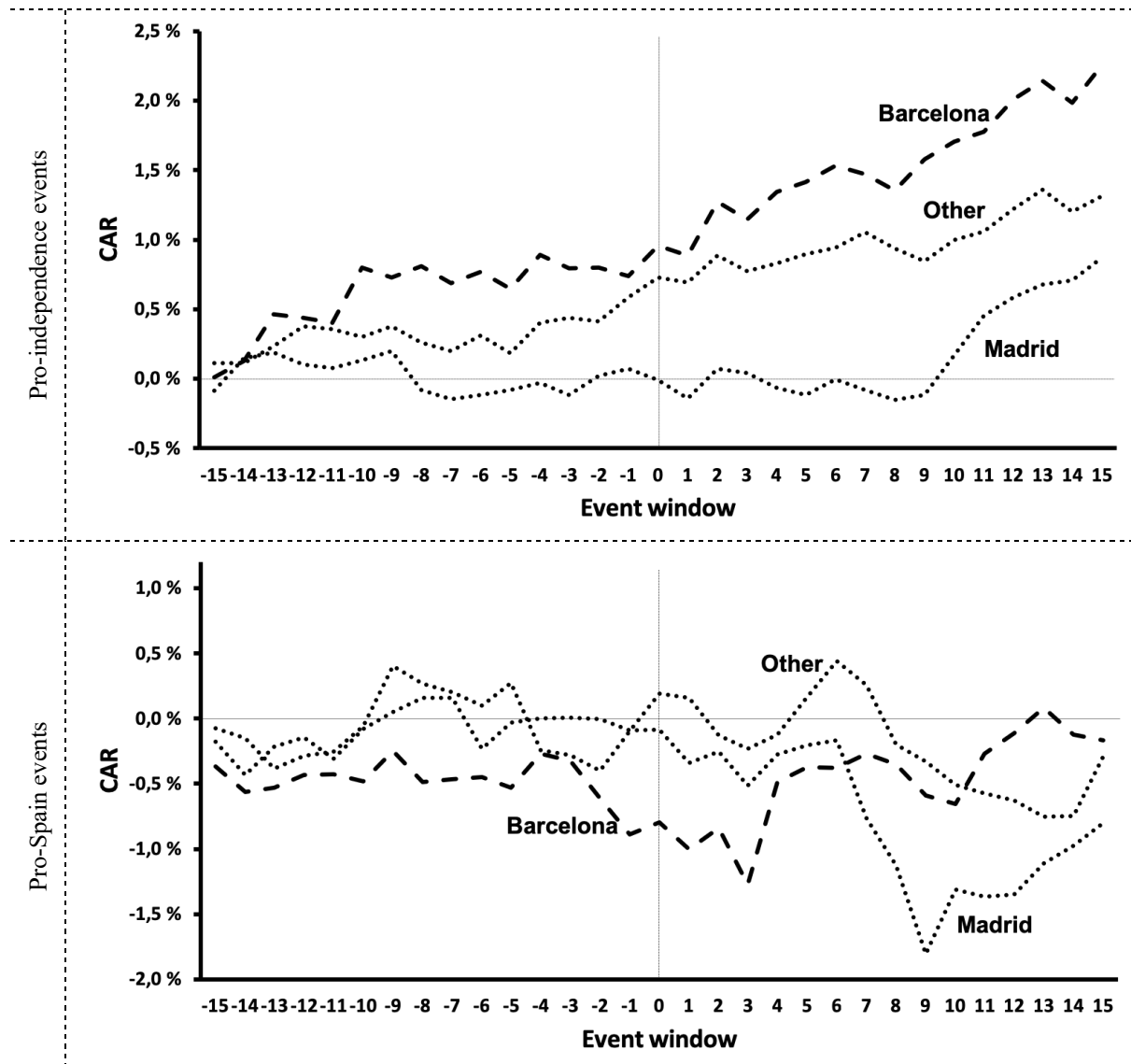

Figure 14: Average CARs for the pro-independence and pro-Spain events across the headquarter location of the firms, calculated with the *market model* using IBEX35 as the benchmark. The seperation of events is outlined in chapter 3.1, the distribution of headquarter location is presented in chapter 3.3.2 and the division is available in Appendix Table 5. The event day 0 is the event date, where the events happened (presented in Table 1). The event window is 31 trading days and the estimation period is 110 trading days. The ARs, with respective t-values, are available in Appendix Table 12.

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[14]Each event takes into consideration new listings of firms by only including those with complete data throughout the whole estimation period, using the dummies in Appendix Table 3.

In Figure 14, none of the cumulative abnormal returns are significantly different to zero. Nevertheless, Figure 14 exposes some interesting characteristics which are discussed in this subsection.

Firms with headquarters in Barcelona have a $\overline{CAR}_{[0]}$ of 0.956% at the event day during the pro-independence events and -0.796% during the pro-Spain events. This means that they react positively to pro-independence events and negatively to pro-Spain events, favoring the independence process and punishing events against it. However, as mentioned, these results are not of statistical significance.

Prior to the event, the $\overline{CAR}_{[-15,-1]}$ is 0.606% during the pro-independence events and -0.471% during the pro-Spain events. In other words, closer to 0 than during the event day. After the event day the $\overline{CAR}$ continue to rise during the pro-independence events and the $\overline{CAR}_{[1,15]}$ is 1.591%. This means that firms with headquarter in Barcelona favor the independence events throughout the event window. Conversely, the $\overline{CAR}$ during the pro-Spain events, approaches a level closer to 0, implying that the positive abnormal returns after the event day offset the negative abnormal returns.

If financial markets are efficient, stock prices should reflect all available information and react to events of considerable importance. If this is correct, Figure 14 implies that the market perceives the pro-independence events as positive for the companies with headquarters in Catalonia, although not of statistical significance. However, a criticism to this analysis is the labeling of a Catalan firm based on solely headquarter location, without considering critical factors such as earnings per region, geographical operations, employees per region, among others.

Furthermore, **firms with headquarters in Madrid**, have a $\overline{CAR}_{[0]}$ of -0.009% during the pro-independence events and -0.083% during the pro-Spain events. In other words, the CARs lay around 0, implying no financial impact during the event day. However, the $\overline{CAR}$ rises during the pro-independence events after the event date, while it falls during the pro-Spain events. In other words, firms with headquarters in Madrid react similarly to companies with headquarters in Barcelona, although later, with positive CARs during the pro-independence events and negative CARs during the pro-Spain events.

Again, if one believes in this classification of stocks, these results are the exact opposite of what one should expect, as the pro-independence events create more uncertainty and the pro-Spain

events create more stability. However, since the results are not of statistical significance, these returns might be caused by random stock return behavior and not by headquarter location.

Moreover, **firms with headquarters in other places**, have a $\overline{CAR}_{[0]}$ of 0.729% at the event day during the pro-independence events and 0.191% during the pro-Spain events. This means that the stock market reacts positively at the event day for the firms with headquarters in other places. The $\overline{CAR}$ rises towards the end of the event window during the pro-independence events and stays around 0 during the pro-Spain events. This implies that there is also a positive reaction for these firms when independence events take place, while there is almost no reaction to the pro-Spain events. However, as mentioned, there is not enough statistical evidence to suggest that this is caused by the events.

In sum, regardless of these firms headquarter location, they have a small, insignificant increase in cumulative abnormal returns during the pro-independence events. On the other hand, during the pro-Spain events, the cumulative abnormal returns lay closer to 0, implying no large abnormal returns in neither direction.

Next, I will again take a closer look at the Oct. 1st event.

4.4.1 Firm level: Special look at Oct. 1st

The Oct.1st event is also further investigated also over this dimension. Figure 15 presents the cumulative abnormal returns for the firms across headquarter location.[15]
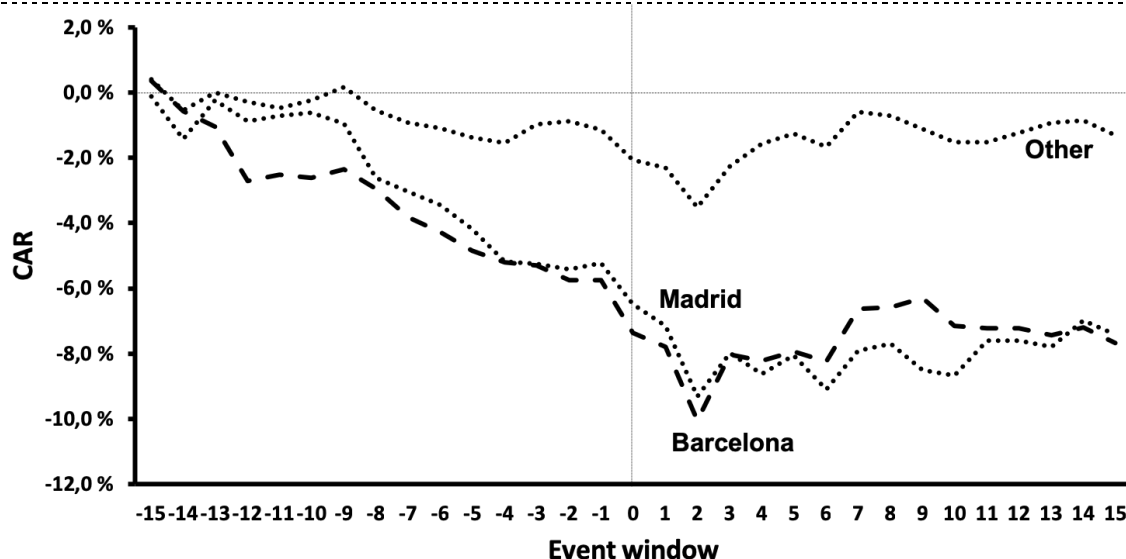

Figure 15: Average CARs for the different headquarter locations on Oct. 1st, calculated by the *market model* using STOXX50 as the benchmark. The distribution of headquarter location is presented in chapter 3.3.2 and the division is available in Appendix Table 5. The event window is 31 trading days and the estimation period is 110 trading days. The ARs and CARs, with respective t-values, are available in Appendix Table 13.

Once again, the Oct. 1st event comes through as more special than the rest. Figure 15 reveals that companies with headquarters in Barcelona and Madrid are largely affected, while firms with headquarters in other places are only impacted to a limited degree.

The $\overline{CAR}_{[15]}$ for firms with headquarters in Barcelona is -7.661% (significant at 1%) and -7.399% for companies with headquarters in Madrid (significant at 5%).[16] This implies an extensive cumulative negative impact due to the referendum for companies with headquarters in the two cities. On the contrary, this is not the case for firms with headquarters in other places, in which the CARs are closer to 0 and of no statistical significance.

If one believes that the financial markets reflect all available information, the firm's value should reflect the gravity of the situation. By following this argument, the fact that firms with

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[15] STOXX50 is used as the benchmark for the same reasons as in section 4.3.1
[16] By using IBEX35 as the benchmark, the CAR over the event window is statistically significant at 10% for the firms with headquarter in Barcelona and not significant for the firms with headquarter in Madrid.

headquarters in Madrid and Barcelona are largely punished by the referendum implies that the gravity of the situation could be quantified through their reduced value.

By looking at the days close to the referendum, one observes statistically significant abnormal returns for all firms. For firms with headquarters in Barcelona, the $\overline{AR}_{[0]}$ is -1.602% (significant at 1%), while it is -1.255% (significant at 10%) for companies with headquarter in Madrid and -0.904% (significant at 5%) for firms with headquarter in other places.

It is interesting to observe that firms in Madrid and companies with headquarters in Barcelona are equally affected negatively by the financial markets, even though one would assume that the strictly Catalan firms are more severely affected due to their relative proximity to the conflict. Thus, if one believes that headquarter location is a good measure of company's affiliation, it is noteworthy to observe that the impact is as large in Madrid as in Catalonia. However, one could discuss whether it is a good measure of where the companies really belong and whether they have a larger risk exposure towards the Catalan economy.

During the interview at the Barcelona Stock Exchange, Mr. Hortalà explains that most of the listed companies have both national and international operations, regardless of where the headquarter is located. This reduces their risk exposure and arguably makes headquarter location a poor restriction, as it might not adequately represent the company's exposure towards the Catalan economy and thereby the conflict in Catalonia.

Yet, as Catalonia makes up around 20% of the Spanish GDP, an impact on the regional economy is arguably an impact on the country's economy, which could be the explanation of the short-term fall in the Madrid stocks. However, if this is the case, the question of why the companies with headquarters in other places are not as affected arises.

During the interview at Auren, Mr. Santamaria explains that it is common sense that investors flee from stocks with larger exposure to minimize the risk. The perception of the conflict is arguably more intense between Madrid and Barcelona than with the rest of Spain, which might explain why these firms are less impacted, as investors might not find it necessary to flee from these.

Moreover, all firms experience large negative abnormal returns on the second trading day after the referendum. For firms with headquarters in Barcelona, Madrid and other places, the $\overline{AR}_{[2]}$ is -2.256%, -2.159% and -1.200%, respectively (all significant at 1%). In addition, there is a stock reversal the following day, where the $\overline{AR}_{[3]}$ for Barcelona, Madrid and other is 2.016%

(significant at 1%), 1.321% (significant at 5%) and 1.257% (significant at 1%). Despite the price reversal, the cumulative effect remains negative with an average $\overline{CAR}_{[1,15]}$ of -7.573% for the firms with headquarter in Barcelona and -8.024% for the companies with headquarter in Madrid. The firms with headquarters elsewhere have a $\overline{CAR}_{[1,15]}$ closer to 0.

In other words, all firms experience a significant drop shortly after the referendum. This does not come by a surprise considering that IBEX35, which is a good indicator of the Spanish stock market, underperforms compared to the European stock indices due to this event (seen in section 4.2.1). However, companies with headquarters in other places recover quite fast and the cumulative effect is not significant, something which is not the case for the companies with headquarters in Barcelona and Madrid.

Both during the interview at the Barcelona Stock Exchange and during the interview at Auren, they confirm that the long-term effect so far is insignificant, although there exists evidence for a limited short-term effect around the referendum. That being said, if the conflict prevails and escalates, the situation might prove to be different.

In sum, both firms with headquarters in Barcelona and in Madrid suffer due to the Oct. 1st referendum compared to firms with headquarters in other places.

Next, I investigate whether firms based on the CEO study place location are creating a different impact across the events in the conflict. First, by looking at the pro-independence and pro-Spain events, before again taking a special look at the Oct. 1st event.

4.5 Firm level: CEO education

Next, I investigate whether CEO study place location changes the firm's impact.[17] This is interesting as one would assume that a CEO who studied in Barcelona would have more sympathy for the pro-independence movement, which could lead to a different strategic direction for the firm and possibly a different stock return reaction. Figure 16 presents the cumulative abnormal return during the pro-independence and pro-Spain events.
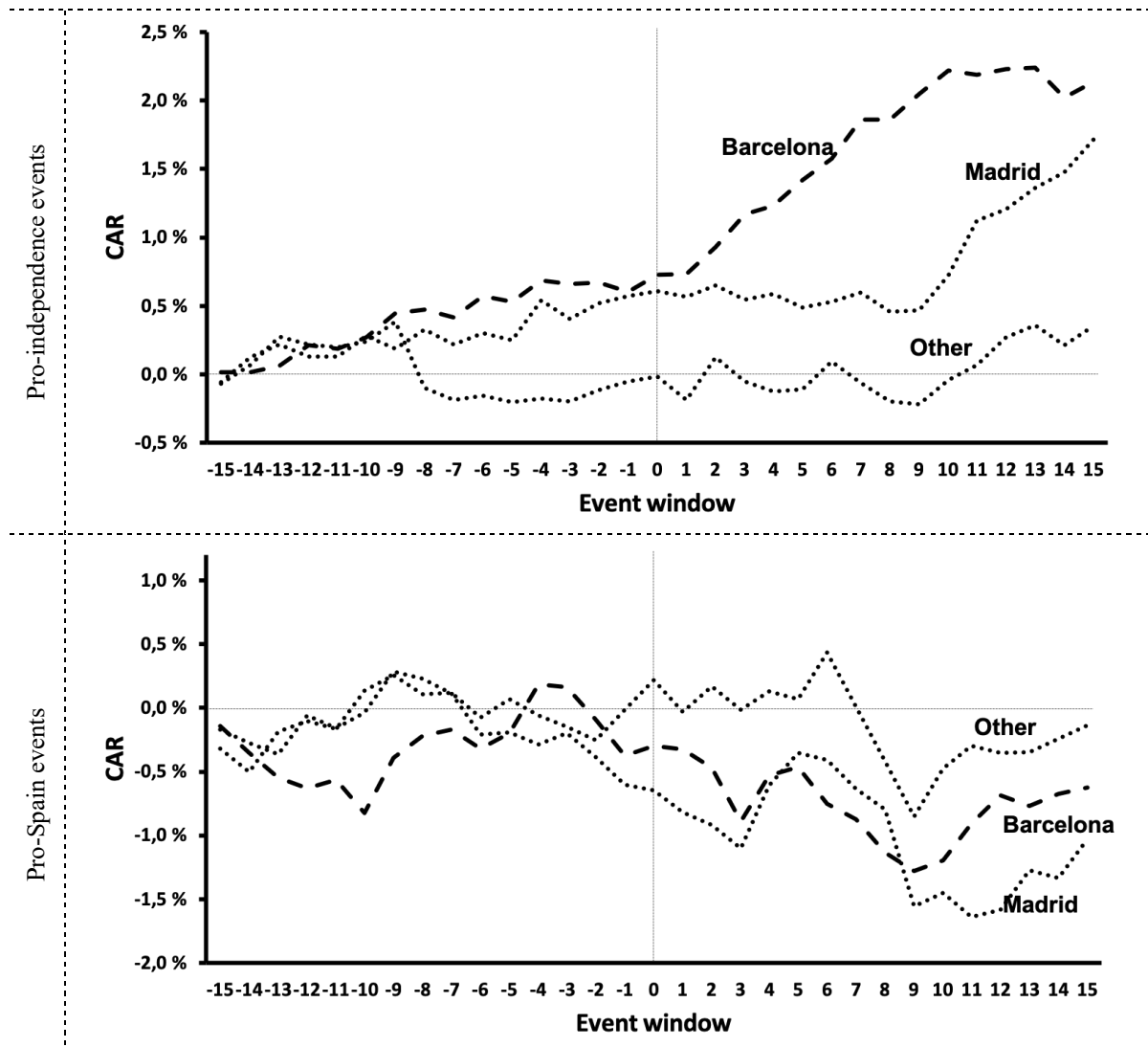

Figure 16: Average CARs for the pro-independence and pro-Spain events across CEO studyplace location, calculated with the *market model,* using IBEX35 as the benchmark. The seperation of events is lined out in chapter 3.1. The event day 0 is the event date, where the events happened (presented in Table 1). The distribution of CEO study place location is presented in chapter 3.3.3 and the division is available in Appendix Table 6. The event window is 31 trading days and the estimation period is 110 trading days. The ARs, with respective t-values, are available in Appendix Table 14.

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[17] Under two assumptions: (1) CEOs have large influence over their company and (2) study place location affects one's political affiliation, giving more sympathy for the location where one study.

In Figure 16, none of the cumulative abnormal returns are significantly different to zero. However, once again, it shows some interesting characteristics discussed in the following.

Firms where the CEOs have studied in Barcelona, have a $\overline{CAR}_{[0]}$ of 0.729% during the pro-independence events and -0.297% during the pro-Spain events. In other words, this coincides with the firms whose headquarter is in Barcelona and their positive reaction to the pro-independence events and negative reaction to the pro-Spain ones.

This is not a surprise if one assumes that the CEO study place location influences the CEOs political affiliations. If that is the case, studying in Barcelona would imply that the CEOs have a bond to the region and more sympathy for the independence movements. In turn, this could influence the company's strategic direction, considering the large influence of the CEOs. Therefore, one could be inclined to think that the results are not very surprising. This being said, there is probably an omitted variable bias, where other factors such as headquarter location likely have an influence and is not included in this calculation.

More surprisingly is the fact that **firms where the CEOs have studied in Madrid** follow the same pattern. During the pro-independence events the $\overline{CAR}_{[0]}$ is 0.607% while it is -0.646% during the pro-Spain events.

One is inclined to think that studying in Madrid creates sympathy against the independence movements, and if one believes in a relation between study place location and the stock's strategic direction, this result is unexpected. However, the relationship of study place location and firm's stock performance is quite weak, questioning the credibility of the result. In addition, as none of these abnormal returns are of statistical significance, they might be caused by random stock price movements.

For **firms where CEOs have studied in other places** the reaction is reversed, although relatively small. During the pro-independence events, the $\overline{CAR}_{[0]}$ is -0.016% while it is 0.217% during the pro-Spain events for this category.

In sum, this shows that the CEO study place location does not have a significant impact when looking at all the events together. However, companies where the CEOs have studied in Barcelona and Madrid follow the same abnormal returns pattern.

Next, I will look at the Oct. 1st event over this dimension.

4.5.1 Firm level: Special look at Oct. 1st

Again, I wish to take a closer look at Oct.1st. Figure 17 shows the cumulative abnormal return for the firms across the CEO study place location.[18]
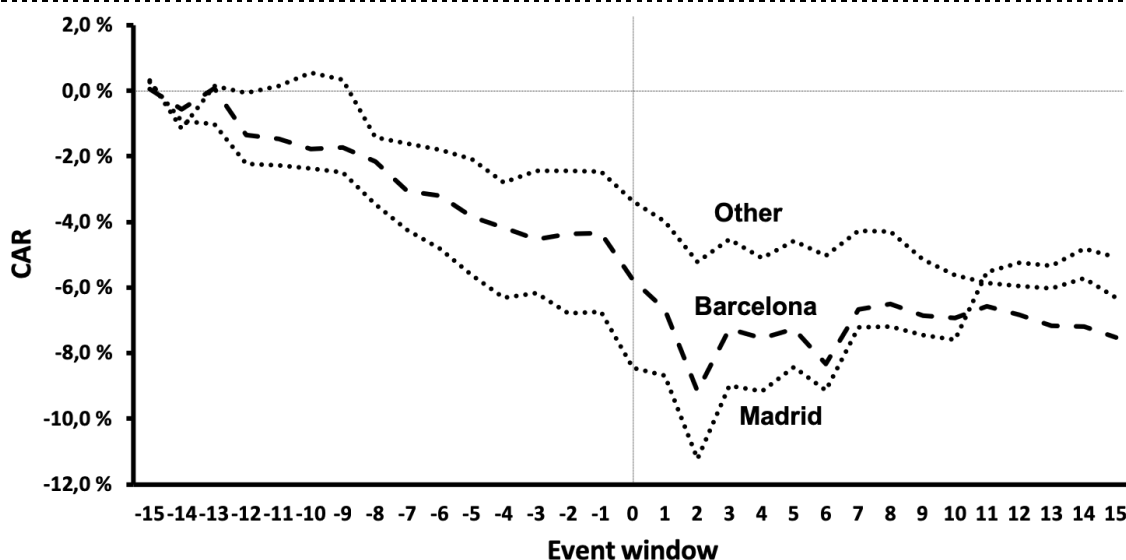

Figure 17: The CARs across CEO study place location on Oct. 1st, calculated by the *market model* using STOXX50 as the benchmark. The distribution of CEO study place location is presented in chapter 3.3.3 and the division is available in Appendix Table 6. The event window is 31 trading days and the estimation period is 110 trading days. The ARs and the CARs, with respective t-values, are available in Appendix Table 15.

Once again, the Oct. 1st event brings interesting aspects to the table. In Figure 17, one observes that firms where the CEOs have studied in Madrid are surprisingly the most affected. Both firms where the CEOs have studied in Barcelona and Madrid have significant abnormal returns, while the last group does not. The $\overline{CAR}_{[15]}$ for the firms where the CEOs have studied in Barcelona is -7.522% (significant at 1%) while it is -5.071% (significant at 10%) for firms where the CEOs have studied in Madrid. However, the $\overline{CAR}_{[10]}$ is -7.582% (significant at 1%), because the Madrid firms experience a large positive abnormal return on post-event day 11.

Again, if one believes that the relationship between CEO study place and a potential stock return effect, it is surprising that the CEOs having studied in Madrid are more punished than the ones having studied in Barcelona. Nevertheless, as in the previous sub-section, this analysis may suffer from an omitted variable bias, like headquarter location or economic industry sector.

Furthermore, the pattern is similar to the earlier analysis of the Oct. 1st referendum. There is a significant negative abnormal return during the event day, followed by an even larger drop two

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[18] STOXX50 is used as the benchmark for the same reasons as in section 4.3.1.

days later before a price reversal on post-event day 3. For firms where the CEO has studied in Barcelona and Madrid, all abnormal returns are statistically significant at 5%. This builds up under the assumption of an omitted variable bias, as the return behavior follows the pattern of earlier investigations of Oct. 1st and the assumption of the impact based on CEO study place location is weak.

During all interviews it is said that the independence movement creates social problems rather than economical ones. Mr. Vilá says that in SEID they decided to send and invoice telling the employees that one should not discuss politics during working hours to avoid internal conflicts. Meanwhile, Mr. Bricollé from the AVASA Group has experienced that flags, pins and other symbols, both in favor and against, have been banned in his working place, also to avoid unnecessary quarrels.

Equally, during the interview at Sàbat-Lligats Metal·lics in the village Sant Sadurní d'Anoia, the tendency of separating business and politics is noted. The Sales Director, Mr. Gonzalez explains that Sàbat-Lligats is clear on the fact that you come to the factory to work, saving political discussions for later.

This tendency of separating the two topics discredits the separation of firms based on the criterion of CEO study place location, as the interviews reveal that personal political opinions generally are separated from the daily business. Despite the topic being of high personal importance, even at an emotional level, the business people interviewed explain that it is separated and that the focus is rather on delivery and meeting customer expectations.

In sum, this means that there is a negative reaction to all the firms, with the largest impact on the ones where the CEOs have studied in Madrid.

Next, I will conduct a cross-sectional regression, investigating the relationship between the cumulative abnormal returns during the Oct. 1st event on the different characteristics in the analysis.

4.6 Cross-sectional regression Oct. 1st

In the previous subsections, one observes that there is a significant short-term impact on the stock returns during the Oct. 1st event. Thus, I wish to further investigate how the cumulative abnormal returns are affected by the following data variables: economic industry sector, headquarter location and CEO study place.

In order to do this, I run a cross-sectional regression on the cumulative abnormal returns.[19] The estimated regression is the following:

$$CAR_t = \alpha + \beta_1(IND) + \beta_2 * (HQ\_LOC) + \beta_3 * (CEO\_LOC) + \varepsilon_i$$

Where:

- CAR_i = Cumulative abnormal return for firm i
- IND = Economic industry sector (industry 1-6)
  - Industry 1: *petroleum and energy*
  - Industry 2: *raw materials, industry and construction*
  - Industry 3: *consumer goods*
  - Industry 4: *consumer services*
  - Industry 5: *financial and real estate services*
  - Industry 6: *technology and telecommunication*
- HQ_LOC = Headquarter location dummy (Barcelona=0, Madrid=1, Other=2)
- CEO_LOC = CEO study place location dummy (Barcelona=0, Madrid=1, Other=2)
- ε_i = error term

Table 5 shows the results of this regression for the following three event windows [-15, 15], [-5,5] and [-1,1][20].

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[19] Only the Oct. 1st event is considered in this part, as the remaining events did not produce any abnormal returns of significant character when looking at them individually.

[20] IND, HQ_LOC and CEO_LOC are indicator variables and consequently need one variable to be omitted and used as a reference. For IND, ind. 4 is used as the reference, as this sector has the least impact in Figure 11. For HQ_LOC and CEO_LOC, "Other" is used as the reference variable, as the two other variables, "Barcelona" and "Madrid", are the most interesting.

Table 5 – Cross-sectional regression Oct. 1st			
Event window	[-15, 15]	[-5, 5]	[-1,1]
IND1	0.02	-0.004	-0.003
	(0.667)	(0.875)	(0.858)
IND2	-0.008	-0.056***	-0.015
	(0.826)	(0.005)	(0.147)
IND3	0.070**	-0.012	-0.009
	(0.050)	(0.523)	(0.365)
IND5	-0.009	-0.037*	-0.018*
	(0.814)	(0.066)	(0.100)
IND6	-0.031	-0.064**	-0.032**
	(0.530)	(0.022)	(0.029)
HQ_LOC1	-0.078**	-0.044**	-0.023**
	(0.029)	(0.025)	(0.029)
HQ_LOC2	0.000	-0.010	-0.001
	(0.985)	(0.519)	(0.854)
CEO_LOC1	-0.002	0.002	0.002
	(0.947)	(0.914)	(0.854)
CEO_LOC2	0.034	-0.001	-0.008
	(0.179)	(0.955)	(0.261)
Constant	-0.063*	-0.003	-0.002
	0.067	(0.890)	(0.833)
Observations	129	129	129
R-squared	0.143	0.143	0.104

Table 5: Cross-sectional regression on the sample firms during the Oct. 1st event. The CAR is the dependent variable and is regressed on three indicator variables: economic industry sector, headquarter location and CEO study place location. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The p-values are shown in the parenthesis underneath each coefficient.

The results in Table 5 show that *IND* is negative for all industries in the three event windows, expect IND1 and IND3 in event window [-15,15]. A negative coefficient implies an adverse relationship between industries and cumulative abnormal return which is in line with the findings in Figure 13, where all industries experience negative cumulative abnormal returns during around the Oct. 1st event.

Most of the coefficients of statistical significance are in event windows [-5,5] and [-1,1]. Both *technology and telecommunication* (ind. 6) and *financial and real estate services* (ind.5) have negative coefficients in event windows [-5,5] and [-1,1], at 5% and 10%, respectively. In addition, *raw materials, industry and construction* (ind. 2) has a negative coefficient significant at 1% in the event window [-5,5]. This indicates a negative relationship between cumulative abnormal returns and firms operating in these three sectors, also in line with the results from Figure 13, where these sectors experience large fall in cumulative abnormal returns around the Oct. 1st event.

The *consumer goods* (ind. 3) has a positive coefficient significant at 5% in event window [-15,15], which indicates a positive relationship between firms in this sector and the cumulative abnormal returns. The remaining coefficients are insignificant.

The fact that the rest of the industries do not have significant results could be explained by the possibility of the Oct. 1st event not happening by surprise, allowing the market to adjust beforehand making it difficult to isolate the event.

Furthermore, the results indicate that firms with headquarters in Barcelona have an adverse effect on the cumulative abnormal return between -2.3% and -7.8%, statistically significant at 5% in all event windows, while the firms with headquarters in Madrid do not have coefficients statistically significant from 0. This is also the case for the CEO study place location, where none of the coefficients are significantly different to 0.

In sum, the results indicate that there is an adverse relationship between industries, headquarters in Barcelona and cumulative abnormal returns in the event windows [-5,5] and [-1,1]. However, there is only statistical evidence to suggest that headquarters in Barcelona are significant over all event windows. Some industries, depending on the event window also have coefficients of statistical significance.

Next, I will investigate the firms that move their headquarters out of Catalonia. This is the last section of the empirical analysis and is followed by the conclusion of this master thesis.

4.7 Firm level: Moving headquarter out of Catalonia
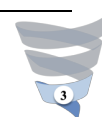
Finally, I investigate the financial impact of the companies that have moved their headquarters out of Catalonia, investigating the stock return reaction of this decision. Different to the earlier analysis, I now aggregate the stocks over the announcement date of moving out the headquarters, available in Appendix Table 7. Figure 18 represents the average cumulative abnormal returns for these companies.[21]
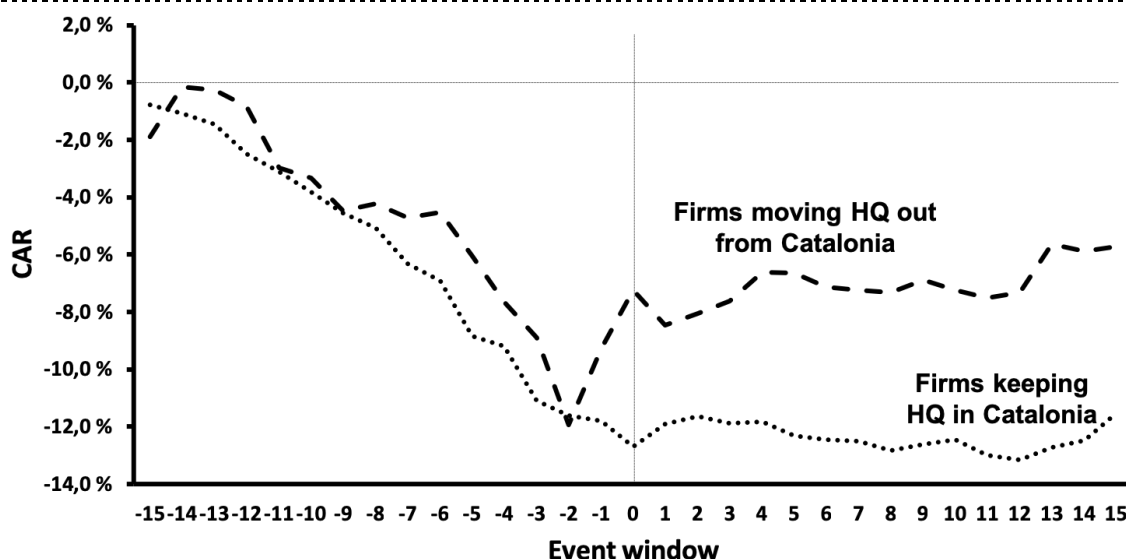
Figure 18: Average CARs for the 12 companies that have moved their headquarters out of Catalonia and the 13 firms that have stayed, calculated by the *market model* using STOXX50 as the benchmark. Event day 0 is when the companies announced to move the headquarter, listed in Appendix Table 7. The event window is 31 trading days and the estimation period is 110 trading days. The ARs and CARs, with respective t-values, are available in Appendix Table 16.

In Figure 18, one observes that the overall effect for the 12 companies is negative. There are large negative abnormal returns 6 to 2 trading days before the event. Two trading days before the event, the average abnormal return is -3.042% (significant at 5%) and the following day it is 2.655% (significant at 10%)[22]. After the announcement there is a smaller negative abnormal return before the cumulative abnormal returns stabilize at a level around -6%.

Simply by looking at the CARs of moving the headquarter out of Catalonia, one could be inclined to believe that there is a short-term negative impact for these firms. However, by comparing them to the firms choosing to keep the headquarters in Catalonia, one realizes that this is not necessarily the case. As the date of the announcements mostly happen closely to the

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[21] For the same reason as in section 4.3.1, STOXX50 is used as the benchmark.
[22] Service Point Solutions (GPP) is ignored since it is a clear outlier with a very large standard error.

Oct. 1st referendum, there is a problem of confounding events, which makes it difficult to isolate the effects of the headquarter movement and separate it from the financial impact of the Oct. 1st referendum. This might imply that firms who announce their movement after the referendum in reality experience a negative effect due to the Oct. 1st event and not by the announcement itself. Especially considering that the overall abnormal returns are falling before announcing the headquarter movements.

During the announcement day and the day before, there is an increase in abnormal returns for the firms moving out. According to *El Nacional* (Serra, 2018), the companies that moved out, especially the banks, did it because "money is coward", and that the movement enforced confidence for clients and investors. During the interview with the consultants in Auren they argue that the decision of moving out the headquarter might have been precipitated and argue that their advice as consultants would have been "to wait" and see how the situation develops.

During the interview at the Barcelona Stock Exchange, Mr. Hortalà says that despite a short-term negative impact, the stocks recuperate and remain mostly unaffected, which he adds will be the case as long as the conflict does not escalate. Mr. Hortalà argues that although the headquarter is moved, it does not imply a cost increase, as most employees keep working in Catalonia. However, if the situation intensifies and firms start moving employees, this would create considerable collateral damage related to their families, houses, partner's work, etc.

During the interview at Auren, Mr. Galipienso explains that the decision of moving out the headquarter is mainly based on two reasons. First, the fear of a sales reduction due to the personal and emotional impact of the conflict, e.g. in industries such as the cava sector. Second, the fright of remaining in an economy without a clear legislation, especially for *financial services* (ind. 5). Mr. Santamaria adds that the headquarter movement does not have a large short-term impact, except a reduction in tax income for Catalonia, which in the medium and long term would have a negative impact on the Catalan economy.

In sum, there is a negative overall short-term effect for the companies moving their headquarters out of Catalonia. However, it might be caused by the Oct. 1st referendum rather than by the announcement itself, as firms with headquarters in Catalonia experience even lower cumulative abnormal returns than those who level.

Next, I will conclude the paper, starting with a quick summary of the main findings in the empirical analysis.

5   Conclusion

The purpose of this study is to investigate the financial impact of the non-violent conflict in Catalonia. Table 6 summarizes the main findings from the empirical analysis, divided into pro-independence/pro-Spain and the Oct. 1st event. As discussed throughout the analysis, there is not sufficient evidence to suggest that there is an overall financial impact for neither pro-independence nor pro-Spain events. On the other side, the Oct. 1st referendum and the decision of moving out the headquarter provoke abnormal returns of statistical significance.

Table 6 – Main findings in the empirical analysis

		Pro-independence & pro-Spain events	Oct. 1st event
Wide analysis		Compared to DAX and FTSE100, IBEX35 underperforms during pro-independence and overperforms during pro-Spain events. However, without significant abnormal returns.	IBEX35 underperforms compared to DAX and FTSE100 and have statistically significant abnormal returns.
Industry level		Differences between industries, but without abnormal returns of statistical significance.	Industry 1, 2 and 5 are the most punished and industry 4 the least. Industry 3 and 6 also experience large negative abnormal returns, but these are not significant due to large return movements during the estimation period.
Firm level	Headquarter location	Only small differences based on headquarter location and no significant abnormal returns.	Large differences between firms with headquarters in Madrid/Barcelona compared to firms with headquarters in other places.
	CEO study place location	Only small differences based on CEO study place location and no significant abnormal returns.	Similar to the headquarter location analysis, but firms where CEOs have studied in Madrid are relatively more effected compared to Barcelona.
		Announcement date	
	Headquarter movement	Negative short-term effect for firms moving their headquarters out of Catalonia. However, there are cofounding events with the Oct. 1st event, creating problems of isolating the financial impact.	

Table 6: Summary of the main findings in the empirical analysis. The compilation of events is studied over different dimensions, shining light on the characteristics of the impact. The referendum on Oct. 1st and the headquarter movements are the only events with an impact of statistical significance.

The quantitative analysis reveals that the Oct. 1st event has a significant short-term financial impact, where IBEX35 underperforms compared to the European indices. In addition, the effect is different across economic industry sectors, with the largest impact for *petroleum and energy* (ind. 1), *raw materials, industry and construction* (ind. 2) and *financial and real estate services* (ind. 5).

Moreover, companies with headquarters in Madrid and Barcelona underperform compared to the rest. However, these stocks recover quickly, despite the previsions prior to the event, claiming catastrophic economic consequences (Serra, 2018). Regardless of the risen uncertainty in Catalonia, these previsions turned out to be wrong and the financial impact is prompt and limited during the period.

In addition, there is no significant impact of the overall events classified into pro-independence and pro-Spain. The qualitative interviews reveal that there are two main explanations of this limited impact: international geographic diversification and a tendency to strictly separate business and politics.

The first explanation is that most stock listed companies have a large geographical diversification, making them relatively unaffected by regional quarrels such as the conflict in Catalonia, as they can further diversify their risk exposure towards international markets. The interviews reveal that the financial markets in Spain are more affected by global events such as Brexit negotiations, news on Wall Street and changes in global international trade relations. Additionally, it is logical to believe that the EU and the European Central Bank will be there regardless of the conflict's outcome, reducing the risk in the market.

The second explanation is that there is a tendency to strictly separate business and politics, allowing companies to move forward despite the intensified social tensions. The interview objects explain that they have experienced very few problems rooted to the conflict in Catalonia and say that there is a tendency to act very professionally while doing business, leaving political discussions for other occasions.

This implies that investors with exposure to the Spanish Stock Exchange have experienced a limited financial impact due to the conflict, except the short-term fall around the Oct. 1st event. The impact varies depending on the firm's economic industry sector and headquarter location but they recover relatively quickly without prolonged stock return effects. However, the conflict is ongoing and the uncertainty in the markets remains.

By looking towards the future, the financial impact on Oct. 1st should arguably not be neglected as it could be an indication of how the markets respond to an escalation of the conflict. As the referendum was followed by a negative short-term financial impact, it is logical to assume that another escalation could provoke a similar response, which is something to bear in mind for investors operating in Catalonia and Spain.

With a minority government in Spain and Catalan politicians in prison and exile, the conflict is unstable and likely to continue. If it intensifies, the uncertainty will arguably rise, and the short-term economic consequences could be more serious.

During the interview with Mr. Vilá, it comes through that he believes the conflict will intensify again, even though it is quieter now. He says that it could be sparked when the politicians in prison receive their sentences, which could provoke anger in either direction. He further adds that if people continue breaking the law, there will be repercussions and people will go to jail. This being said, concluding our conversation he stated that predicting the future is an intricate task, saying that if someone would have told him in 2012 what was going to happen in 2017, he would have said it was madness.

The representative from AVASA, Mr. Bricollé also believes that the conflict will continue but adds that he does not think it will necessarily escalate. This argument is also supported by the president at the Barcelona Stock Exchange, Mr. Hortalà, which during the interview explained that he is positive to the Catalan and Spanish economy but warns about a medium-term negative impact if the conflict remains unsolved.

In the village of Sant Sadurní d'Anoia, Mr. Gonzalez explains that he does not want conflicts, as they come with harmful social consequences and makes it more difficult to do business. In addition, he says that people are starting to get exhausted by the situation in Catalonia, as it has claimed a lot of attention over a long time. However, Mr. Gonzalez does not see any clear way out of the conflict. He adds that the Catalan people are more split than ever, as half of the regional population support the independence while the rest prefer to remain part of Spain, creating division and social problems in the region.

During the interview with Auren, Mr. Santamaria also says that the conflict might calm down because people are getting exhausted. He believes families that have split due to conflicting opinions, will probably come together during the upcoming Christmas and agree on leaving politics out of the dinner table.

In sum, the short-term financial impact of the non-violent conflict in Catalonia has so far proven to be abrupt and followed by a quick market recovery. However, a potential escalation might be followed by larger economic consequences, something to bear in mind as the conflict remains unsolved and without any clear solution in the near future.

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Appendix

Appendix Table 1 - Background statistics

EU-28	Population (2017)	Area (2015)	Gross GDP (M)	GDP per capita
Germany	82,521,653	358,327 km^2	€ 2,954,696	€ 35,805
France	66,989,083	549,060 km^2	€ 2,042,082	€ 30,484
UK	65,808,573	247,763 km^2	€ 2,080,119	€ 31,609
Italy	60,589,445	301,291 km^2	€ 1,546,694	€ 25,527
Spain	46,527,039	498,504 km^2	€ 1,057,467	€ 22,728
Poland	37,972,964	313,851 km^2	€ 4,102,56	€ 10,804
Romania	19,644,350	239,068 km^2	€ 170,281	€ 8,668
Netherlands	17,081,507	37,824 km^2	€ 660,393	€ 38,661
Belgium	11,351,727	30,668 km^2	€ 391,877	€ 34,521
Greece	10,768,193	131,912 km^2	€ 157,526	€ 14,629
Czechia	10,578,820	78,874 km^2	€ 171,981	€ 16,257
Portugal	10,309,573	88,847 km^2	€ 168,677	€ 16,361
Sweden	9,995,153	449,896 km^2	€ 420,244	€ 42,045
Hungary	9,797,561	93,013 km^2	€ 104,979	€ 10,715
Austria	8,772,865	83,944 km^2	€ 329,941	€ 37,609
Catalonia	**7,555,830**	**32,113 km^2**	**€ 223,139**	**€ 29,532**
Bulgaria	7,101,859	110,995 km^2	€ 44,807	€ 6,309
Denmark	5,748,769	43,162 km^2	€ 250,852	€ 43,636
Finland	5,503,297	337,547 km^2	€ 193,268	€ 35,119
Slovakia	5,435,343	49,026 km^2	€ 76,431	€ 14,062
Ireland	4,784,383	70,601 km^2	€ 275,947	€ 57,677
Croatia	4,154,213	56,539 km^2	€ 40,403	€ 9,726
Lithuania	2,847,904	65,412 km^2	€ 37,917	€ 13,314
Slovenia	2,065,895	20,277 km^2	€ 37,366	€ 18,087
Latvia	1,950,116	65,519 km^2	€ 23,626	€ 12,115
Estonia	1,315,635	45,347 km^2	€ 20,479	€ 15,565
Cyprus	854,802	9,249 km^2	€ 16,996	€ 19,883
Luxembourg	590,667	2,595 km^2	€ 50,155	€ 84,912
Malta	460,297	315 km^2	€ 9,832	€ 21,360

Appendix Table 1: Statistics comparing a potential independent Catalonia to the EU-28 countries, graphically illustrated in Figure 1.

Appendix Table 2 – List of stocks

Ticker	Stock	Ticker	Stock	Ticker	Stock	Ticker	Stock
IKM	1nkemia Uict	CNB	Clinica Baviera	IBG	Iberpapel Gestion	PHAR	Pharma Mar
ABBO	Ab-Biotics	CODR	Codere Sa	IMGI	Imaginarium	PRIM	Prim
ABG	Abengoa	CMM	Commcenter	IND	Inditex	YPMR	Promorent Socimi
ACE	Abertis	CAF	CAF	IDR	Indra Sistemas	PRIS	Grupo Prisa
ANA	Acciona	EMP	Corp Empresarial	COL	Inmobiliaria Colonial	PROS	Prosegur Cash
ACX	Acerinox 'R'	ALB	Corp Alba	DSUR	Inmobiliaria Del Sur	PSG	Prosegur
ACS	Grupo ACS	OLE	Deoleo	IAG	IAG	QBT	Quabit
BNT	Bionatur Solutions	DIA	Dia	INPR	Inypsa	REA	Realia Business
ADZ	Ad. Dominguez	DGI	Dogi	RUF	Laboratorio Reig Jofre	REE	Red Electrica
ADV	Adveo Group	MDF	Duro Felguera	LRES	Lar España Real Estate	R4SI	Renta 4 Banco
ADSH	Aedas Homes	EBI	Ebioss Energy	ROVI	Lab.Farmac. Rovi	RNCP	Renta Corp
AENA	Aena	EVA	Ebro Foods	LBK	Liberbank	REP	Repsol Ypf
DIN	Alantra Partners	ELEC	Elecnor	LGT	Lingotes Especiales	SCYR	Sacyr
LAB	Almirall	ENAG	Enagas	LOGI	Logista Holdings	CARM	Santander Cartera
ALC	Altia Consultores	ENC	Ence	MAP	Mapfre	SECU	Secuoya Grupo
AMS	Amadeus It Group	ELE	Endesa	MAS	Masmovil Ibercom	GPP	Service Point
AMP	Amper	YENT	Entrecampos	MEDC	Medcomtech Sa	GAM	Siemens Gamesa
ASTO	Applus Services	ECR	Ercros	TL5	Mediaset Com.	SNC	Sniace
A3M	Atresmedia Corp	EESP	Euroespes	MEL	Melia Hotels Intl.	SEM	Solaria Energia
FGN	Audax Ren.	EUWT	Eurona	MRLN	Merlin Properties	TLGO	Talgo
AZK	Azkoyen	EKTL	Euskaltel	METR	Metrovacesa	TECN	Tecnicas
BSAB	Banco de Sabadell	FAE	Faes Farma	MCM	Miquel Y Costas	TEF	Telefonica
SAN	Banco Santander	FERC	Ferrovial	MONT	Montebalito	TPZZ	Telepizza Group
BKIA	Bankia	FDR	Fluidra	NOVE	Morgan Stanley Inv.	TUB	Tubacex
BKT	Bankinter	FCC	Fomento	NAT	Natra	TUBO	Tubos Reunidos
BDL	Baron De Ley	FUN	Funespana	NTH	Naturhouse Health	UNI	Unicaja Banco
BBVA	Bbv.Argentaria	CTG	Gas Natural	HOME	Neinor Homes	UBS	Urbas
PULB	Biosearch	GEAM	GAM	NEUB	Neuron Bio	VER	Vertice
RIO	Bodegas Riojanas	GESP	Gestamp Auto.	NHH	Nh Hotel Gr	VID	Vidrala
BOLS	BME	DOM	Global Dominion	NEA	Nicolas Correa	VIS	Viscofan
BAIN	Borges	GSJ	Grupo San Jose	NYE	Nyesa Valores	VOC	Vocento
CABK	Caixabank	PROB	Grifols Ord	OHL	Obrascon Huarte Lain	ZOT	Zardoya Otis
CRBE	Carbures Europe	GRIE	Grino Ecologic	ORY	Oryzon Genomics	ZNK	Zinkia
COM	Catenon Sa	GCO	Cat. Occidente	PAC	PAC		
CLNX	Cellnex Telecom	EZE	Grupo Ezentis	PAR	Parques Reunidos		
AFR	Cie Automotive	IBE	Iberdrola	PVA	Pescanova		

Appendix Table 2: Complete list of the 141 securities in the sample, with each respective stock's ticker. Price data is gathered from Datastream.

Ticker	Start date	Dummy
MEDC	25.03.2010	1
AMS	29.04.2010	1
NEUB	02.07.2010	1
ABBO	20.07.2010	1
ALC	01.12.2010	2
EUWT	15.12.2010	2
CMM	30.12.2010	2
IAG	24.01.2011	2
EESP	16.02.2011	2
DIA	07.05.2011	2
COM	06.06.2011	2
BKIA	20.07.2011	2
SECU	28.07.2011	2
GRIE	29.07.2011	2
TUBO	23.11.2011	2
BNT	26.01.2012	2
CRBE	23.03.2012	2
MAS	30.03.2012	2
IKM	21.12.2012	6
EBI	07.05.2013	6
LBK	16.05.2013	6
YENT	28.11.2013	7
LRES	05.03.2014	8
ASTO	09.05.2014	8
MRLN	30.06.2014	9
LOGI	14.07.2014	9
YPMR	04.12.2014	11
AENA	11.02.2015	12
NTH	24.04.2015	12
CLNX	07.05.2015	12
TLGO	07.05.2015	12
EKTL	01.07.2015	13
ORY	14.12.2015	16
DOM	27.04.2016	16
TPZZ	27.04.2016	16
PAR	29.04.2016	16
PROS	17.03.2017	17
HOME	29.03.2017	17
GESP	07.04.2017	17
UNI	30.06.2017	18
ADSH	20.10.2017	20
METR	06.02.2018	20

Appendix Table 3: Overview of firm's listings during the sample period. These firms are included in the abnormal return calculation from the event number relative to its dummy. The dummy takes into consideration the grouped events explained in section 3.1.

Appendix Table 4 – BME industry classification

Sector BME	Sector code	# firms	Sub-sector BME	Subsector Code	# firms in subsector
Petroleum and energy	1	10	Petroleum	1,1	1
			Electricity y gas	1,2	6
			Renewables	1,3	0
Raw materials, industry and construction	2	31	Mineral, metals y transformation	2,1	3
			Manufacturing and equipment	2,2	6
			Construction	2,3	9
			Construction material	2,4	0
			Chemical industry	2,5	1
			Engineering and others	2,6	6
			Aerospace	2,7	0
Consumer goods	3	36	Alimentation and drinks	3,1	8
			Textile, clothing and footwear	3,2	4
			Paper and graphic arts	3,3	4
			Pharmaceuticals and biotechnology	3,4	14
			Other consumer goods	3,5	1
Consumer services	4	25	Leisure, tourism and hospitality	4,1	4
			Commerce	4,2	1
			Media and advertising	4,3	6
			Transportation and distribution	4,4	4
			Other services	4,5	4
Financial and real estate services	5	31	Banks and saving boxes	5,1	7
			Insurance	5,2	2
			Portfolio and holding	5,3	4
			Real estate and other	5,4	11
			Investment services	5,5	2
			Socimi	5,6	3
Technology and telecommunications	6	9	Telecommunication	6,1	5
			Electronic y software	6,2	3

Appendix Table 4: Distribution over economic industry sectors based on BME's classification. To complete this table, the Morningstar and Datastream classifications are used. This is presented in Figure 4 and analyzed in section 4.3 and 4.3.1.

Appendix Table 5 – Headquarter location

Ticker	Headquarter	HQ	LinkedIn	BME	Homepage	Ticker	Headquarter	HQ	LinkedIn	BME	Homepage
IKM	Barcelona	1			x	IND	Arteixo	3	x	x	
ABBO	Barcelona	1			x	IDR	Madrid	2	x	x	
ABG	Sevilla	3	x	x		COL	Barcelona	1	x	x	
ACE	Barcelona	1		x		DSUR	Sevilla	3		x	
ANA	Madrid	2	x	x		IAG	Madrid	2	x	x	
ACX	Madrid	2		x	x	INPR	Madrid	2	x	x	
ACS	Madrid	2		x		RUF	Barcelona	1	x	x	
BNT	León	3			x	LRES	Madrid	2		x	
ADZ	Ourense	3	x	x		ROVI	Madrid	2	x	x	
ADV	Madrid	2	x	x		LBK	Madrid	2	x	x	
ADSH	Madrid	2		x		LGT	Valladolid	3	x	x	
AENA	Madrid	2		x		LOGI	Madrid	2		x	
DIN	Madrid	2	x	x		MAP	Madrid	2	x	x	
LAB	Barcelona	1	x	x		MAS	San Sebastian	3	x	x	
ALC	Alger	3	x			MEDC	Madrid	2	x		
AMS	Madrid	2	x	x		TL5	Madrid	2	x	x	
AMP	Madrid	2	x	x		MEL	Palma de Mallorca	3	x	x	
ASTO	Barcelona	1		x		MRLN	Madrid	2		x	
A3M	Madrid	2	x	x		METR	Madrid	2	x	x	
FGN	Barcelona	1	x	x		MCM	Barcelona	1		x	
AZK	Peralta	3	x	x		MONT	Madrid	2			x
BSAB	Barcelona	1	x	x		NOVE	Madrid	2		x	
SAN	Madrid	2	x			NAT	Valencia	3	x	x	
BKIA	Madrid	2	x	x		NTH	Barcelona	1		x	
BKT	Madrid	2	x	x		HOME	Bilbao	3		x	
BDL	Mendavia	3		x		NEUB	Granada	3	x		
BBVA	Bilbao	3	x	x		NHH	Madrid	2	x	x	
PULB	Granada	3		x		NEA	Burgos	3	x	x	
RIO	Cenicero	3	x	x		NYE	Madrid	2	x	x	
BOLS	Madrid	2	x	x		OHL	Madrid	2	x	x	
BAIN	Reus	1	x	x		ORY	Madrid	2		x	
CABK	Barcelona	1		x		PAC	Madrid	2	x		
CRBE	Santa María	3	x			PAR	Madrid	2		x	
COM	Madrid	2	x			PVA	Pontevedra	3	x	x	
CLNX	Barcelona	1		x		PHAR	Madrid	2	x	x	
AFR	Bilbao	3	x	x		PRIM	Madrid	2	x	x	
CNB	Madrid	2	x	x		YPMR	Madrid	2	x		

E

Left panel:

Ticker	Location	Group	C1	C2	C3
CODR	Madrid	2	x	x	
CMM	La Coruña	3		x	
CAF	Beasain	3	x		
EMP	Madrid	2		x	
ALB	Madrid	2		x	
OLE	Madrid	2		x	x
DIA	Madrid	2	x	x	
DGI	Barcelona	1	x	x	
MDF	Gijón	3	x	x	
EBI	Sofía	3	x		
EVA	Madrid	2		x	
ELEC	Madrid	2	x	x	
ENAG	Madrid	2		x	
ENC	Madrid	2	x	x	
ELE	Madrid	2	x	x	
YENT	Madrid	2		x	
ECR	Barcelona	1	x	x	
EESP	La Coruña	3	x		
EUWT	Barcelona	1	x		
EKTL	Bilbao	3		x	
FAE	Madrid	2	x		
FERC	Madrid	2	x	x	
FDR	Barcelona	1	x	x	
FCC	Barcelona	1		x	
FUN	Almería	3		x	
CTG	Barcelona	1	x	x	
GEAM	Granda - Siero	3	x	x	
GESP	Bilbao	3		x	
DOM	Bilbao	3		x	
GSJ	Pontevedra	3		x	
PROB	Barcelona	1	x	x	
GRIE	Lleida	1		x	
GCO	Barcelona	1		x	
EZE	Sevilla	3		x	
IBE	Bilbao	3	x	x	
IBG	San Sebastian	3		x	x
IMGI	Zaragoza	3	x		

Right panel:

Ticker	Location	Group	C1	C2	C3
PRIS	Madrid	2	x	x	
PROS	Madrid	2		x	
PSG	Madrid	2	x	x	
QBT	Madrid	2	x	x	
REA	Madrid	2	x	x	
REE	Madrid	2		x	x
R4SI	Madrid	2		x	
RNCP	Barcelona	1	x	x	
REP	Madrid	2	x	x	
SCYR	Madrid	2	x	x	
CARM	Madrid	2		x	
SECU	Madrid	2	x		
GPP	Barcelona	1	x	x	
GAM	Zamudio	3	x	x	
SNC	Madrid	2		x	
SEM	Madrid	2	x	x	
TLGO	Madrid	2		x	
TECN	Madrid	2	x	x	
TEF	Madrid	2	x	x	
TPZZ	Madrid	2		x	
TUB	Llodio	3	x	x	
TUBO	Amurrio	3	x	x	
UNI	Malaga	3		x	
UBS	Madrid	2	x	x	
VER	Madrid	2	x	x	
VID	Llodio	3	x	x	
VIS	Aranguren	3	x	x	
VOC	Madrid	2	x	x	
ZOT	Madrid	2	x	x	
ZNK	Madrid	2	x		

Appendix Table 5: Stock's headquarter distribution divided in Barcelona (1), Madrid (2) and other (3). LinkedIn and BME's webpage are used as the main source. The company's web page is used as a source in the cases where there are no headquarter information in the previous two. This data is shown in Figure 5 and analyzed in section 4.4 and 4.4.1.

Appendix Table 6 – CEO studyplace location

Ticker	CEO	Studyplace of CEO	Place	Source	Ticker	CEO	Studyplace of CEO	Place	Source
IKM	Josep Castells i Boliart	Universitat de Barcelona	1	x	IBE	Ignacio S. Galán	Uni. Pontificia Comillas	2	x
ABBO	Sergi Audivert	ESADE in Barcelona	1	x	IBG	Iñigo Echevarria Canales	Universidad Complutense	2	x
ABG	Joaquín F. de Piérola Marín	Universidad de Zaragoza	3	x	IMGI	Felix Tena	ESADE in Barcelona	1	x
ACE	Francisco Reynés Massanet	Universitat de Barcelona	1	x	IND	Pablo Isla	Universidad Complutense	1	x
ANA	José Manuel Domecq	Universidad Complutense	2	x	IDR	Fernando M. Hernández	Instituto Católico	2	x
ACX	Bernardo V. Herreros	ICAI	2	x	COL	Pere Viñolas Serra	ESADE	1	x
ACS	Florentino Pérez	Technical Uni. de Madrid	2	x	DSUR	Ricardo Pumar	Instituto Católico	2	x
BNT	Pilar de la Huerta	Universidad Complutense	2	x	IAG	Willie Walsh	University of Dublin	3	x
ADZ	Elena A. D. Gonzalez	ICADE Madrid	2	x	INPR	Valentin Estefanell Jara	ESADE in Barcelona	1	x
ADV	Jaime Carbó Fernández	IE Business School Madrid	2	x	RUF	Ignasi Biosca	IESE business school Madrid	2	x
ADSH	David Martínez Montero	Uni. Politécnica de Madrid	2	x	LRES	Jon Armentia	Universidad de Navarra	3	x
AENA	Jaime García-Legaz	Colegio Uni.	2	x	ROVI	Juan L.Belmonte Encina	Universidad CEU San Pablo	3	x
DIN	Jacobo Llanza	Université de Paris	3	x	LBK	Manuel M.-Menendez	Universidad de Oviedo	3	x
LAB	Eduardo J. Sanchiz Yrazu	Universidad de Deusto	3	x	LGT	Felix Cano de la Fuente			
ALC	Constantino Fernández	Uni. Santiago de Comp.	3	x	LOGI	Bertrán de Lis	Universidad Complutense	2	x
AMS	Luis Maroto	IESE Business School	2	x	MAP	Antonio Huertas	Universidad de Salamanca	3	x
AMP	Juan Carlos Carmona	Uni. Autónoma de Madrid	2	x	MAS	Meinrad Spenger	Bocconi Milan	3	x
ASTO	Fernando Basabe	Universidad de Madrid	2	x	MEDC	Juan Sagalés	UAB	1	x
A3M	Silvio Gonzalez Moreno	Uni. Autónoma de Madrid	2	x	TL5	Massimo Musolino	Universidad de Siena	3	x
FGN	Francisco José Elías	Uni. Politécnica de Cat.	1	x	MEL	Gabriel Escarrer Jaume	ESADE	1	x
AZK	Eduardo Unzu Martinez	Universidad País Vasco	3	x	MRLN	Ismael Clemente	ICADE	2	x
BSAB	Jaime Guardiola Romojaro	ESADE	1	x	METR	Jorge Perez de Leza	Uni. Pontificia Comillas	2	x
SAN	José Antonio Alvarez	Uni. de Santiago de Comp.	3	x	MCM	Jorge Mercader Miró	IESE Business School	1	x
BKIA	José Sevilla Álvarez	CUNEF	2	x	MONT	José Luis Rodríguez			
BKT	María Dolores Dancausa	Uni. San Pablo CEU	3	x	NOVE	Gonzalo Gortázar Rotaeche	Uni. Pontificia Comillas	3	x
BDL	Eduardo Santos-Ruiz Diaz	Universidad Complutense	2	x	NAT	Dominique Luna Tuleda	Université libre de Bruxelles	3	x
BBVA	Carlos Torres Vila	MIT	3	x	NTH	Jesús Ripoll	IESE	1	x
PULB	José M. Roset	Uni. Autónoma de Madrid	2	x	HOME	Juan Velayos Lluis	Universidad de Abat Oliba	1	x
RIO	Eladio B. M. Eladio Bezares	IESE	1	x	NEUB	Javier S. Burgos Muñoz	Uni. Autónoma de Madrid	2	x
BOLS	Antonio J. Zoido Martínez	Universidad Complutense	2	x	NHH	Ramon Aragonés Marín	Uni. Palma de Mallorca	3	x
BAIN	José Pont Amenós	Universidad de Georgia	3	x	NEA	José N.-Correa Barragán	IESE	2	x
CABK	Gonzalo Gortázar Rotaeche	Uni. Pontificia Comillas	3	x	NYE	Alberto Gimeno			
CRBE	Rafael Contreras	Universidad de Cádiz	3	x	OHL	Juan Luis Osuna Gómez	Uni. Politécnica de Madrid	2	x
COM	Javier R. de Azcárate Varela	Uni. Autónoma de Madrid	2	x	ORY	Carlos Buesa Arjol	IESE	1	x
CLNX	Tobías Martínez Gimeno	IESE	1	x	PAC	Oliver B Hasler	Universidad Iberoamericana	3	x
AFR	Jesus M. H. Barandiaran	University DO Pais Basco	3	x	PAR	Isidoro Díez	Universidad San Pablo	2	x
CNB	Eduardo Baviera Sabater	University of Valencia	3	x	PVA	Ignacio G. Hernández	Uni. Pontificia Comillas	2	x

Code	Name	Study Place	Loc		Code	Name	Study Place	Loc	
CODR	Jose A. Martínez Sampedro	Uni. Politécnica de Madrid	2	x	PHAR	José M. Fernández S.-Faro	IESE	2	x
CMM	José Luis Otero Barros	Uni. Santiago de Comp.	3	x	PRIM	Victoriano Prim Gonzalez			
CAF	Andrés Arizkorreta García	Andrés Arizkorreta García	3	x	YPMR	Jose Jose pavon			
EMP	Álvaro Bordas	Uni.Complutense de Madrid	2	x	PRIS	Manuel Mirat	IESE Business School	1	x
ALB	José Carlos March Delgado	Uni.Complutense de Madrid	2	x	PROS	Jose Antonio Lasanta Luri	Uni. Pontificia Comillas	2	x
OLE	Pierluigi Tosato	SDA Bocconi (Italy)	3	x	PSG	Christian Gut Revoredo	Uni. De Estudios Financieros	3	x
DIA	Ricardo Currás de Pablos	Universidad Complutense	2	x	QBT	Jacinto V. Rey González	Uni. de Alcala, Madrid	2	x
DGI	Eduardo Navarro Zamora	ESADE	1	x	REA	Gerardo Kuri Kaufmann	Universidad Anáhuac	3	x
MDF	Acacio F. Rodriguez Garcia	Universidad de León	3	x	REE	Jose Folgado Blanco	Uni. Autónoma de Madrid	2	x
EBI	Luis Sánchez Angrill	Uni. Politécnica de Cat.	1	x	R4SI	Juan Luis Lopez Garcia	Universidad Complutense	2	x
EVA	Antonio Hernández Callejas	Universidad de Sevilla	3	x	RNCP	César Bardají Vivancos	Universitat de Barcelona	1	x
ELEC	Rafael de Bustamante Vega	Universidad de Navarra	3	x	REP	Josu Jon Imaz	University of Barcelona	1	x
ENAG	Marcelino Oreja Arburua	Uni. Pontificia Comillas	2	x	SCYR	Manuel Manrique Cecilia	Escuela Técnica de Ing.	2	x
ENC	Ignacio de C. y Brunet	IESE	1	x	CARM	Ignnacio C. F. Miranda	Universidad de Navarra	3	x
ELE	José Damián Bogas Gálvez	ICAI	2	x	SECU	Raúl Berdonés	Universidad de Navarra	3	x
YENT	Julián I. Segura Rodríguez				GPP	Laurent Salmon	Université Paris Dauphine	3	x
ECR	Antonio Zabalza Martí	Universidad de Barcelona	1	x	GAM	Markus Tacke	Cornell University	3	x
EESP	Ramón Cacabelos	Universidad de Santiago	3	x	SNC	Blas Mezquita Sáez	Instituto de Empresa SL	2	x
EUWT	Fernando Ojeda	ESADE	1	x	SEM	Miguel A. Velasco Garcia	University of Valladolid	3	x
EKTL	Alberto García Erauzkin	Universidad de Deusto	3	x	TLGO	Carlos de Palacio Oriol	Universidad Complutense	2	x
FAE	Francisco Quintanilla	Universidad Complutense	2	x	TECN	Juan Llado Arburua	Universidad de Georgetown	3	x
FERC	Inigo Meiras Amusco	Universidad Complutense	2	x	TEF	José M. A.-Pallete López	Universidad Complutense	2	x
FDR	Eloi Planes Corts	Uni. Politécnica de Cataluña	1	x	TPZZ	Pablo Juantegui	CUNEF	2	x
FCC	Pablo Colio Abril	Uni. Politécnica de Madrid	2	x	TUB	Jesus Esmoris			
FUN	Francisco J. Marco Orenes	Universidad de Murcia	3	x	TUBO	Guillermo Ulacia	Universidad de Deusto	3	x
CTG	Francisco M. R. Massanet	Universitat de Barcelona	1	x	UNI	Sergio Corral	Uni. Autónoma de Madrid	2	x
GEAM	Jorge Alarcón	Uni. Pontificia Comillas	3	x	UBS	José Luis Sevilla Ferrández			
GESP	Francisco José Riberas Mera	Uni. Pontificia Comillas	2	x	VER	José María Irisarri Núñez	IESE Business School	1	x
DOM	Mikel Barandiarán Landín	Escuela Ing. de Bilbao	3	x	VID	Gorka Schmitt Zalbide	Universidad de Deusto	3	x
GSJ	Jacinto Rey González	Universidad Complutense	2	x	VIS	José Domingo de Ampuero	Bilbao's Industrial Engineers	3	x
PROB	Víctor Grífols Roura	Universitat de Barcelona	1	x	VOC	Luis Enriquez Nistal	Uni. Pontificia de Comillas	2	x
GRIE	Joan Griñó	Universidad de Navarra	3	x	ZOT	Javier Barquín	Universidad Salamanca	3	x
GCO	Jose Maria Serra Farre	ICADE	2	x	ZNK	Miguel Valladares García			
EZE	Fernando González Sánchez	ESADE	1	x					

Appendix Table 6: Stock's CEO study place distribution divided in Barcelona (1), Madrid (2) and other (3). Those without study place location are excluded from the analysis. In these cases, this information is not publicly available online. This data is shown in Figure 6 and analyzed in section 4.5 and 4.5.1.

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Appendix Table 7 – Firm's with headquarter in Catalonia

Name	Ticker	Not moved	Moved	News published
1nkemia uict group	IKM	x		
Ab-biotics	ABBO	x		
Abertis infraestructuras	ACE		x	09.10.2017
Almirall	LAB	x		
Applus services	ASTO		x	11.10.2017
Audax renovables	FGN	x		
Banco de sabadell	BSAB		x	05.10.2017
Borges agriculture (agrofruse)	BAIN	x		
Caixabank	CABK		x	06.10.2017
Cellnex telecom	CLNX		x	09.10.2017
Dogi intl.fabrics	DGI		x	06.10.2017
Ercros	ECR	x		
Eurona wireless telecom	EUWT		x	05.10.2017
Fluidra	FDR	x		
Fomento constr.y cntr.	FCC	x		
Gas natural sdg (naturgy)	CTG		x	06.10.2017
Grifols ord cl a	PROB	x		
Grino ecologic	GRIE	x		
Grupo catalana occidente	GCO		x	10.10.2017
Inmobiliaria colonial	COL		x	09.10.2017
Laboratorio reig jofre	RUF	x		
Miquel y costas	MCM	x		
Naturhouse health	NTH		x	01.08.2017
Renta corpn.real estate	RNCP	x		
Service point solutions	GPP		x	06.10.2017

Appendix Table 7: Companies with headquarters in Catalonia the announcement date of moving out the headquarter out from the region. This data is presented in Figure 7 and analyzed in section 4.7.

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Interview guide[23]

Lead in

Para empezar, voy a explicar el propósito de la entrevista. El objetivo de mi trabajo final del máster es investigar y entender el impacto financiero del *procés*. En primer lugar, hago una investigación de las empresas cotizadas en la bolsa española, mirando sus ganancias comparadas con las de bolsas europeas. También analizo el impacto financiero a través de sectores económicos, empresas con sede en Cataluña, el efecto de la ubicación de la educación de los directores, y al final, el impacto de mover la sede principal. En segundo lugar, estos resultados son discutidos en comparación con entrevistas cualitativas para poder capturar el impacto tenido en las empresas que no están en la bolsa y poder mejorar la comprensión del conflicto.

Before beginning the interview:

- Preguntar permiso de utilizar el nombre de la compañía en el proyecto. ¿Puedo usar citas directas en el informe y se permite grabar la entrevista?

Opening question:

- Por favor, cuéntame brevemente de usted. ¿Quién es, que posición en la empresa tiene, y cuánto tiempo lleva en la empresa? ¿Qué tipo de empresa es?

Case point

- ¿Cree usted que la independencia de Cataluña es económicamente viable?
- ¿Opina usted que unos eventos en particular han sido importantes, con un impacto notable, a su empresa?
- ¿Estos eventos han afectado toda su industria? ¿O han afectado otras industrias más?
- ¿Qué tipos de problemas internas han surgido este conflicto?
- ¿Qué tipos de problemas con proveedores/distribuidores han surgidos de este conflicto?
- ¿Cree que los inversores han cambiado su percepción del riesgo en Cataluña?

Closing question:

- ¿Tiene algo más que quiere añadir?

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[23] The interview guide for Mr. Hortalà is personalized as he represents the Barcelona Stock Exchange and not a particular firm. In that guide, the questions focus more on the general financial impact in the markets and the Catalan and Spanish economy as a whole

Interview guide translated to English

Lead in

To start, I will explain the purpose of the interview. The objective of my master thesis is to investigate and understand the financial impact of *el procés* (the conflict in Catalonia). First, I investigate the firms listed on the Spanish stock exchange, looking at its performance compared to European exchanges. In addition, I analyze the financial impact across economic industry sectors, firms with headquarters in Catalonia, the effect of the study place location of the CEOs, and finally, the impact of moving the headquarter out of Catalonia. Second, these results will be discussed in comparison with qualitative interviews to better capture the impact of the firms which are not listed on the stock exchange and to better understand the conflict.

Before beginning the interview:

- Ask permission to use the name of the company in the project. May I use direct quotes in the thesis, and could I record the interview?

Opening question:

- Please, tell me shortly about yourself. Who are you, which position in the firm do you have and how much time have you been in the Company? What type of Company is it?

Case point

- Do you think that an independent Catalonia is economically viable?
- Do you think that there are some events that have been of large importance, with a notable impact, on your company?
- Have these events affected the whole industry? Or have other industries been more affected?
- What type of internal problems have arisen from this conflict?
- What type of problems with suppliers/distributors have arisen from the conflict?
- Do you think that international investors have changed their perception of the uncertainty in Catalonia?

Closing question:

- Do you have anything else to add?

Appendix Table 8 – Wide analysis: Spanish vs European markets

Event day	PRO-INDEPENDENCE EVENTS				PRO-SPAIN EVENTS			
	AR (%)	t AR	CAR (%)	t CAR	AR (%)	t AR	CAR (%)	t CAR
-15	-0.280	-0.37	-0.280		-0.218	-0.32	-0.218	
-14	-0.056	-0.07	-0.336	-0.45	-0.219	-0.32	-0.436	-0.64
-13	-0.062	-0.08	-0.398	-0.37	-0.294	-0.43	-0.730	-0.75
-12	0.020	0.03	-0.378	-0.29	0.633	0.92	-0.097	-0.08
-11	0.016	0.02	-0.362	-0.24	0.621	0.90	0.524	0.38
-10	-0.006	-0.01	-0.368	-0.22	-0.543	-0.79	-0.019	-0.01
-9	0.066	0.09	-0.302	-0.16	-0.259	-0.38	-0.278	-0.17
-8	-0.006	-0.01	-0.308	-0.15	0.030	0.04	-0.249	-0.14
-7	-0.216	-0.29	-0.525	-0.25	-0.274	-0.40	-0.523	-0.27
-6	0.115	0.15	-0.410	-0.18	0.532	0.77	0.009	0.00
-5	-0.265	-0.35	-0.675	-0.28	-0.007	-0.01	0.002	0.00
-4	-0.201	-0.27	-0.876	-0.35	-0.100	-0.15	-0.098	-0.04
-3	0.125	0.17	-0.750	-0.29	0.319	0.46	0.221	0.09
-2	0.150	0.20	-0.601	-0.22	0.414	0.60	0.635	0.26
-1	0.142	0.19	-0.459	-0.16	0.602	0.88	1.238	0.48
0	-0.275	-0.36	-0.734	-0.25	-0.367	-0.53	0.871	0.33
1	0.149	0.20	-0.585	-0.19	0.147	0.21	1.018	0.37
2	0.135	0.18	-0.450	-0.14	0.806	1.17	1.824	0.64
3	0.064	0.08	-0.386	-0.12	0.592	0.86	2.416	0.83
4	-0.066	-0.09	-0.452	-0.14	0.335	0.49	2.750	0.92
5	-0.097	-0.13	-0.549	-0.16	-0.373	-0.54	2.377	0.77
6	-0.325	-0.43	-0.874	-0.25	0.045	0.07	2.423	0.77
7	0.167	0.22	-0.707	-0.20	0.151	0.22	2.574	0.80
8	-0.145	-0.19	-0.852	-0.24	0.000	0.00	2.574	0.78
9	0.023	0.03	-0.828	-0.22	-0.098	-0.14	2.476	0.74
10	0.040	0.05	-0.788	-0.21	0.082	0.12	2.558	0.74
11	-0.048	-0.06	-0.837	-0.22	-0.001	0.00	2.556	0.73
12	-0.291	-0.39	-1.128	-0.29	0.067	0.10	2.623	0.73
13	0.073	0.10	-1.055	-0.26	-0.055	-0.08	2.568	0.71
14	0.153	0.20	-0.902	-0.22	-0.062	-0.09	2.507	0.68
15	0.087	0.12	-0.814	-0.20	0.163	0.24	2.669	0.71

Appendix Table 8: ARs and CARs for IBEX35 during the Oct. 1st event, calculated with the *market model* using STOXX50 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR and t CAR are obtained by equation 7 and 11, respectively. The ARs and CARs for DAX and FTSE100 are available on request, but none of the abnormal returns are statistically significant from 0. This data is used in Figure 10.

	Industry 1		Industry 2		Industry 3		Industry 4		Industry 5		Industry 6	
Event day	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR
-15	-0.108	-0.17	-0.015	-0.02	-0.126	-0.20	0.142	0.21	-0.088	-0.17	-0.237	-0.28
-14	-0.013	-0.02	0.188	0.24	0.074	0.12	0.047	0.07	0.148	0.28	0.311	0.36
-13	0.093	0.15	0.015	0.02	0.099	0.15	0.200	0.29	-0.250	-0.47	0.152	0.18
-12	0.100	0.16	-0.039	-0.05	-0.040	-0.06	0.183	0.27	-0.094	-0.18	-0.028	-0.03
-11	0.124	0.20	0.037	0.05	0.015	0.02	-0.123	-0.18	-0.094	-0.18	-0.327	-0.38
-10	0.289	0.46	-0.061	-0.08	0.056	0.09	0.035	0.05	0.099	0.19	-0.001	0.00
-9	-0.134	-0.21	0.148	0.19	0.023	0.04	0.035	0.05	0.145	0.27	0.541	0.63
-8	-0.191	-0.30	-0.396	-0.52	0.008	0.01	-0.094	-0.14	0.120	0.23	-0.209	-0.24
-7	-0.082	-0.13	-0.026	-0.03	-0.001	0.00	-0.052	-0.08	-0.116	-0.22	-0.370	-0.43
-6	0.161	0.25	0.056	0.07	0.011	0.02	0.114	0.17	-0.122	-0.23	-0.042	-0.05
-5	-0.149	-0.24	-0.183	-0.24	0.126	0.19	0.176	0.26	0.032	0.06	-0.060	-0.07
-4	0.272	0.43	0.258	0.34	-0.047	-0.07	0.143	0.21	0.025	0.05	0.014	0.02
-3	-0.074	-0.12	0.016	0.02	-0.116	-0.18	-0.027	-0.04	0.031	0.06	-0.011	-0.01
-2	-0.123	-0.19	0.220	0.29	0.092	0.14	-0.204	-0.30	-0.066	-0.13	0.198	0.23
-1	-0.146	-0.23	-0.087	-0.11	0.277	0.43	0.323	0.48	0.102	0.19	-0.190	-0.22
0	0.299	0.47	0.002	0.00	-0.051	-0.08	-0.096	-0.14	-0.086	-0.16	-0.252	-0.29
1	-0.029	-0.05	-0.047	-0.06	-0.156	-0.24	-0.221	-0.32	-0.052	-0.10	-0.065	-0.08
2	0.153	0.24	0.136	0.18	0.432	0.67	0.643	0.95	-0.246	-0.47	0.111	0.13
3	-0.090	-0.14	-0.154	-0.20	0.080	0.12	-0.087	-0.13	0.120	0.23	0.145	0.17
4	0.225	0.36	0.021	0.03	-0.291	-0.45	0.309	0.45	-0.150	-0.28	0.176	0.20
5	0.100	0.16	-0.232	-0.30	0.202	0.31	0.013	0.02	-0.155	-0.29	0.117	0.14
6	0.227	0.36	0.000	0.00	0.238	0.37	0.063	0.09	-0.203	-0.39	0.471	0.55
7	0.258	0.41	0.106	0.14	0.040	0.06	-0.198	-0.29	0.234	0.44	-0.526	-0.61
8	-0.135	-0.21	-0.231	-0.30	0.065	0.10	-0.150	-0.22	0.199	0.38	0.253	0.29
9	0.267	0.42	0.234	0.30	-0.304	-0.47	0.110	0.16	-0.127	-0.24	0.334	0.39
10	0.138	0.22	0.285	0.37	0.304	0.47	0.077	0.11	-0.128	-0.24	0.066	0.08
11	-0.023	-0.04	0.473	0.62	0.178	0.28	-0.043	-0.06	0.086	0.16	0.154	0.18
12	-0.132	-0.21	0.231	0.30	0.145	0.22	0.614	0.90	0.232	0.44	-0.240	-0.28
13	0.122	0.19	0.203	0.26	-0.065	-0.10	0.108	0.16	0.177	0.33	-0.095	-0.11
14	-0.142	-0.22	0.027	0.04	-0.048	-0.07	0.061	0.09	0.202	0.38	-0.157	-0.18
15	0.342	0.54	0.187	0.24	0.029	0.05	0.211	0.31	0.027	0.05	0.354	0.41

Appendix Table 9: ARs during the pro-independence events, calculated with the *market model* using IBEX35 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR, is obtained by equation 7. The CARs with their t statistics are available on request, but these are of statistical significance. This data is used in Figure 12.

Appendix Table 10 – Industry level analysis (pro-Spain events)

	Industry 1		Industry 2		Industry 3		Industry 4		Industry 5		Industry 6	
Event day	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR
-15	-0.067	-0.11	-0.385	-0.60	-0.123	-0.20	0.329	0.51	0.050	0.08	0.123	0.16
-14	0.148	0.25	-0.350	-0.55	-0.214	-0.34	0.253	0.39	-0.236	-0.38	-0.049	-0.07
-13	-0.051	-0.09	0.280	0.44	-0.136	-0.22	-0.423	-0.65	-0.446	-0.72	0.264	0.35
-12	0.346	0.57	0.279	0.44	0.037	0.06	-0.259	-0.40	0.082	0.13	-0.379	-0.51
-11	-0.039	-0.07	-0.081	-0.13	-0.122	-0.19	-0.061	-0.09	-0.187	-0.30	0.101	0.14
-10	-0.068	-0.11	0.523	0.82	-0.221	-0.35	0.219	0.34	-0.504	-0.81	-0.077	-0.10
-9	0.215	0.36	0.486	0.76	0.286	0.45	0.537	0.83	0.062	0.10	-0.627	-0.84
-8	-0.100	-0.17	0.299	0.47	-0.136	-0.22	-0.471	-0.73	0.708	1.14	-0.056	-0.08
-7	0.009	0.01	-0.014	-0.02	-0.200	-0.32	0.221	0.34	-0.008	-0.01	0.635	0.85
-6	-0.098	-0.16	-0.540	-0.85	-0.190	-0.30	-0.255	-0.39	0.243	0.39	-0.156	-0.21
-5	-0.116	-0.19	0.240	0.38	0.019	0.03	0.233	0.36	0.459	0.74	0.004	0.01
-4	0.295	0.49	-0.359	-0.56	0.043	0.07	-0.171	-0.26	-0.508	-0.82	0.540	0.72
-3	-0.137	-0.23	0.030	0.05	-0.039	-0.06	-0.083	-0.13	-0.059	-0.09	-0.182	-0.24
-2	-0.460	-0.76	-0.149	-0.23	0.054	0.09	-0.142	-0.22	-0.051	-0.08	0.440	0.59
-1	-0.590	-0.98	0.306	0.48	-0.137	-0.22	0.149	0.23	-0.096	-0.15	-0.620	-0.83
0	0.097	0.16	-0.005	-0.01	0.295	0.47	-0.100	-0.15	-0.585	-0.94	-0.479	-0.64
1	-0.091	-0.15	-0.277	-0.43	-0.236	-0.37	-0.483	-0.75	0.210	0.34	0.361	0.48
2	-0.199	-0.33	-0.019	-0.03	0.046	0.07	0.093	0.14	0.327	0.52	0.261	0.35
3	-0.770	-1.27	-0.213	-0.33	-0.142	-0.22	-0.043	-0.07	-0.280	-0.45	-0.119	-0.16
4	0.565	0.93	-0.020	-0.03	0.495	0.78	0.536	0.83	0.080	0.13	0.301	0.40
5	-0.053	-0.09	-0.174	-0.27	0.365	0.58	-0.146	-0.23	-0.096	-0.15	-0.041	-0.05
6	0.272	0.45	0.205	0.32	-0.089	-0.14	0.113	0.18	0.391	0.63	0.242	0.32
7	0.213	0.35	-0.435	-0.68	-0.710	-1.12	-0.187	-0.29	0.183	0.29	0.042	0.06
8	-0.072	-0.12	-0.451	-0.71	-0.344	-0.54	-0.417	-0.64	-0.155	-0.25	-0.243	-0.33
9	-0.102	-0.17	-0.632	-0.99	-0.723	-1.14	-0.350	-0.54	-0.101	-0.16	0.099	0.13
10	0.163	0.27	0.325	0.51	0.218	0.35	0.035	0.05	-0.304	-0.49	0.471	0.63
11	0.113	0.19	-0.010	-0.02	-0.159	-0.25	0.103	0.16	-0.014	-0.02	0.049	0.07
12	0.228	0.38	-0.033	-0.05	-0.170	-0.27	-0.103	-0.16	0.245	0.39	-0.090	-0.12
13	-0.013	-0.02	0.202	0.32	-0.123	-0.19	0.216	0.33	0.094	0.15	0.283	0.38
14	-0.261	-0.43	0.120	0.19	0.215	0.34	0.361	0.56	-0.166	-0.27	-0.111	-0.15
15	-0.098	-0.16	0.349	0.55	0.276	0.44	0.256	0.40	0.074	0.12	0.060	0.08

Appendix Table 10: ARs during the pro-Spain events, calculated with the *market model* using IBEX35 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR, is obtained by equation 7. The CARs with their t statistics are available on request, but these are of statistical significance. This data is used in Figure 12.

Appendix Table 11 – Industry level: Special look at Oct. 1ˢᵗ

Event day	Industry 1 AR (%)	Industry 1 t AR	Industry 2 AR (%)	Industry 2 t AR	Industry 3 AR (%)	Industry 3 t AR	Industry 4 AR (%)	Industry 4 t AR	Industry 5 AR (%)	Industry 5 t AR	Industry 6 AR (%)	Industry 6 t AR
-15	-0.388	-0.62	-0.081	-0.14	-0.410	-0.36	-0.128	-0.27	-0.204	-0.40	0.374	0.34
-14	-0.519	-0.83	-0.889	-1.51	-1.783	-1.55	-0.145	-0.30	-0.009	-0.02	0.442	0.40
-13	-0.818	-1.31	-0.272	-0.46	2.035*	1.76	-0.006	-0.01	0.479	0.94	1.944*	1.76
-12	-2.041***	-3.27	-0.464	-0.79	-0.836	-0.72	-0.193	-0.40	-0.530	-1.04	2.158*	1.95
-11	0.357	0.57	-0.165	-0.28	0.219	0.19	0.633	1.32	0.216	0.43	-0.822	-0.74
-10	-0.546	-0.87	0.110	0.19	0.525	0.46	-0.034	-0.07	0.622	1.22	0.105	0.09
-9	0.148	0.24	0.350	0.59	-0.796	-0.69	0.219	0.46	-0.642	-1.26	-0.603	-0.54
-8	-0.069	-0.11	-0.735	-1.25	-1.532	-1.33	-0.281	-0.59	0.168	0.33	-1.507	-1.36
-7	-1.027	-1.64	-0.176	-0.30	0.123	0.11	-0.267	-0.56	0.244	0.48	-1.121	-1.01
-6	-0.568	-0.91	-0.424	-0.72	0.095	0.08	0.206	0.43	-1.089**	-2.14	-0.994	-0.90
-5	0.606	0.97	-0.464	-0.79	0.609	0.53	0.967**	2.02	-1.085**	-2.14	0.867	0.78
-4	0.038	0.06	-0.160	-0.27	-1.040	-0.90	-0.001	0.00	-0.268	-0.53	-0.009	-0.01
-3	-1.486***	-2.38	-0.354	-0.60	-0.811	-0.70	-0.415	-0.87	0.444	0.87	-0.423	-0.38
-2	-0.431	-0.69	0.218	0.37	0.139	0.12	0.504	1.05	-0.037	-0.07	0.142	0.13
-1	0.171	0.27	0.302	0.51	0.388	0.34	-0.226	-0.47	-0.239	-0.47	-0.492	-0.44
0	-0.094	-0.15	0.011	0.02	0.270	0.23	0.378	0.79	-0.829	-1.63	-0.353	-0.32
1	-0.615	-0.98	0.444	0.75	-1.112	-0.96	0.095	0.20	-0.456	-0.90	-0.634	-0.57
2	-0.255	-0.41	0.682	1.16	-0.614	-0.53	-0.065	-0.14	-1.196***	-2.35	-0.997	-0.90
3	0.610	0.98	-0.162	-0.27	-0.218	-0.19	0.108	0.23	0.635	1.25	0.631	0.57
4	-0.240	-0.38	0.036	0.06	-1.116	-0.97	0.730	1.53	0.173	0.34	-0.097	-0.09
5	1.017	1.63	0.190	0.32	0.278	0.24	0.311	0.65	-0.363	-0.71	1.451	1.31
6	0.396	0.63	-0.318	-0.54	-0.461	-0.40	-0.255	-0.53	-1.164**	-2.29	0.637	0.58
7	0.925	1.48	1.070*	1.81	0.127	0.11	0.160	0.34	-0.230	-0.45	-0.621	-0.56
8	-0.085	-0.14	-0.028	-0.05	0.032	0.03	-0.164	-0.34	0.400	0.79	0.479	0.43
9	0.965	1.55	-0.127	-0.22	-0.612	-0.53	0.230	0.48	0.165	0.32	-0.614	-0.55
10	-0.547	-0.88	0.765	1.30	0.667	0.58	-0.264	-0.55	-0.803	-1.58	-0.056	-0.05
11	-0.605	-0.97	2.847***	4.83	-0.581	-0.50	-0.616	-1.29	0.324	0.64	-0.140	-0.13
12	-0.566	-0.91	0.268	0.45	-0.382	-0.33	0.746	1.56	0.567	1.12	-0.779	-0.70
13	0.317	0.51	-0.513	-0.87	-0.123	-0.11	-0.185	-0.39	-0.040	-0.08	0.029	0.03
14	-0.070	-0.11	0.462	0.78	-0.307	-0.27	-0.026	-0.05	2.754***	5.42	0.842	0.76
15	0.394	0.63	0.361	0.61	0.019	0.02	-0.575	-1.20	-0.746	-1.47	0.388	0.35

Appendix Table 11: ARs during the Oct. 1ˢᵗ event, calculated with the *market model* using STOXX50 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR is obtained by equation 7. The CARs with their t statistics are available on request. This data is used in Figure 13.

Appendix Table 12 – Firm level: Headquarter location

	PRO-INDEPENDENCE EVENTS						PRO-SPAIN EVENTS					
	Barcelona		Madrid		Other		Barcelona		Madrid		Other	
Event day	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR
-15	0.009	0.02	-0.086	-0.16	0.113	0.23	-0.367	-0.73	-0.179	-0.40	-0.072	-0.14
-14	0.120	0.22	0.233	0.43	0.001	0.00	-0.197	-0.39	-0.251	-0.56	-0.076	-0.15
-13	0.333	0.62	0.041	0.08	0.123	0.25	0.036	0.07	0.216	0.48	-0.237	-0.48
-12	-0.026	-0.05	-0.087	-0.16	0.142	0.29	0.098	0.19	0.069	0.15	0.100	0.20
-11	-0.035	-0.07	-0.025	-0.05	-0.024	-0.05	0.003	0.01	-0.160	-0.35	0.033	0.07
-10	0.397	0.75	0.057	0.11	-0.056	-0.11	-0.053	-0.11	0.226	0.50	0.197	0.40
-9	-0.070	-0.13	0.066	0.12	0.078	0.16	0.232	0.46	0.132	0.29	0.458	0.92
-8	0.080	0.15	-0.281	-0.52	-0.115	-0.24	-0.238	-0.47	0.106	0.23	-0.137	-0.27
-7	-0.122	-0.23	-0.066	-0.12	-0.061	-0.13	0.020	0.04	0.001	0.00	-0.062	-0.13
-6	0.084	0.16	0.030	0.06	0.109	0.22	0.017	0.03	-0.392	-0.86	-0.104	-0.21
-5	-0.123	-0.23	0.034	0.06	-0.127	-0.26	-0.079	-0.16	0.204	0.45	0.173	0.35
-4	0.244	0.46	0.052	0.09	0.221	0.45	0.256	0.51	0.031	0.07	-0.517	-1.04
-3	-0.098	-0.18	-0.083	-0.15	0.035	0.07	-0.052	-0.10	0.006	0.01	-0.035	-0.07
-2	0.007	0.01	0.138	0.25	-0.028	-0.06	-0.288	-0.57	-0.012	-0.03	-0.120	-0.24
-1	-0.063	-0.12	0.050	0.09	0.173	0.35	-0.279	-0.55	-0.085	-0.19	0.301	0.61
0	0.220	0.41	-0.082	-0.15	0.145	0.30	0.093	0.18	0.005	0.01	0.289	0.58
1	-0.069	-0.13	-0.133	-0.24	-0.034	-0.07	-0.207	-0.41	-0.256	-0.56	-0.031	-0.06
2	0.383	0.72	0.213	0.39	0.190	0.39	0.163	0.32	0.083	0.18	-0.289	-0.58
3	-0.125	-0.23	-0.031	-0.06	-0.109	-0.22	-0.434	-0.86	-0.260	-0.57	-0.103	-0.21
4	0.196	0.37	-0.105	-0.19	0.052	0.11	0.790	1.56	0.243	0.54	0.112	0.22
5	0.072	0.14	-0.053	-0.10	0.066	0.14	0.112	0.22	0.069	0.15	0.287	0.58
6	0.118	0.22	0.113	0.21	0.047	0.10	-0.005	-0.01	0.039	0.09	0.277	0.56
7	-0.060	-0.11	-0.078	-0.14	0.113	0.23	0.110	0.22	-0.601	-1.33	-0.188	-0.38
8	-0.118	-0.22	-0.069	-0.13	-0.119	-0.24	-0.083	-0.16	-0.365	-0.81	-0.457	-0.92
9	0.226	0.42	0.033	0.06	-0.092	-0.19	-0.239	-0.47	-0.674	-1.49	-0.129	-0.26
10	0.125	0.23	0.285	0.52	0.155	0.32	-0.061	-0.12	0.491	1.08	-0.177	-0.36
11	0.073	0.14	0.289	0.53	0.061	0.13	0.385	0.76	-0.053	-0.12	-0.068	-0.14
12	0.235	0.44	0.132	0.24	0.163	0.33	0.155	0.31	0.017	0.04	-0.051	-0.10
13	0.130	0.24	0.089	0.16	0.134	0.28	0.195	0.39	0.236	0.52	-0.126	-0.25
14	-0.158	-0.30	0.033	0.06	-0.156	-0.32	-0.204	-0.40	0.139	0.31	0.007	0.01
15	0.270	0.51	0.159	0.29	0.111	0.23	-0.042	-0.08	0.169	0.37	0.455	0.92

Appendix Table 12: ARs during the pro-independence and pro-Spain events, calculated with the *market model* using IBEX35 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR, is obtained by equation 7. The CARs with their t statistics are available on request, but these are not significant. This data is used in Figure 14.

	Barcelona				Madrid				Other			
Event day	AR (%)	t AR	CAR (%)	t CAR	AR (%)	t AR	CAR (%)	t CAR	AR (%)	t AR	CAR (%)	t CAR
-15	0.346	0.69	0.346		-0.117	-0.18	-0.117		0.400	0.96	0.400	
-14	-0.922*	-1.85	-0.576	-1.16	-1.311**	-2.01	-1.427**	-2.18	-0.954**	-2.28	-0.554	-1.32
-13	-0.467	-0.94	-1.043	-1.48	1.186*	1.82	-0.241	-0.26	0.554	1.33	0.001	0.00
-12	-1.675***	-3.36	-2.718***	-3.15	-0.647	-0.99	-0.888	-0.78	-0.283	-0.68	-0.282	-0.39
-11	0.200	0.40	-2.518***	-2.53	0.172	0.26	-0.716	-0.55	-0.199	-0.48	-0.482	-0.58
-10	-0.100	-0.20	-2.618***	-2.35	0.101	0.16	-0.615	-0.42	0.246	0.59	-0.236	-0.25
-9	0.265	0.53	-2.353*	-1.93	-0.340	-0.52	-0.954	-0.60	0.410	0.98	0.174	0.17
-8	-0.586	-1.18	-2.939**	-2.23	-1.649***	-2.52	-2.603	-1.51	-0.721*	-1.73	-0.547	-0.49
-7	-0.874*	-1.76	-3.814***	-2.71	-0.437	-0.67	-3.041	-1.64	-0.388	-0.93	-0.935	-0.79
-6	-0.460	-0.92	-4.274***	-2.86	-0.411	-0.63	-3.451*	-1.76	-0.156	-0.37	-1.090	-0.87
-5	-0.559	-1.12	-4.832***	-3.07	-0.730	-1.12	-4.181**	-2.02	-0.298	-0.71	-1.389	-1.05
-4	-0.368	-0.74	-5.201***	-3.15	-0.995	-1.52	-5.175**	-2.39	-0.157	-0.38	-1.546	-1.12
-3	-0.089	-0.18	-5.289***	-3.07	-0.069	-0.11	-5.244**	-2.32	0.576	1.38	-0.970	-0.67
-2	-0.462	-0.93	-5.751***	-3.20	-0.178	-0.27	-5.422**	-2.30	0.081	0.19	-0.889	-0.59
-1	-0.006	-0.01	-5.758***	-3.09	0.197	0.30	-5.226**	-2.14	-0.261	-0.63	-1.150	-0.74
0	-1.602***	-3.22	-7.360***	-3.82	-1.255*	-1.92	-6.480***	-2.56	-0.904**	-2.16	-2.054	-1.27
1	-0.422	-0.85	-7.782***	-3.91	-0.671	-1.03	-7.152***	-2.74	-0.249	-0.60	-2.303	-1.38
2	-2.256***	-4.53	-10.037***	-4.89	-2.159***	-3.30	-9.310***	-3.46	-1.200***	-2.87	-3.503**	-2.03
3	2.016***	4.05	-8.021***	-3.80	1.321**	2.02	-7.989***	-2.88	1.257***	3.01	-2.246	-1.27
4	-0.199	-0.40	-8.220***	-3.79	-0.640	-0.98	-8.630***	-3.03	0.680	1.63	-1.566	-0.86
5	0.292	0.59	-7.928***	-3.56	0.569	0.87	-8.061***	-2.76	0.308	0.74	-1.257	-0.67
6	-0.306	-0.61	-8.234***	-3.61	-1.040	-1.59	-9.101***	-3.04	-0.394	-0.94	-1.652	-0.86
7	1.613***	3.24	-6.621***	-2.83	1.192*	1.82	-7.909***	-2.58	1.067***	2.55	-0.585	-0.30
8	0.037	0.07	-6.585***	-2.76	0.217	0.33	-7.692***	-2.45	-0.123	-0.29	-0.707	-0.35
9	0.297	0.60	-6.288***	-2.58	-0.805	-1.23	-8.496***	-2.65	-0.413	-0.99	-1.121	-0.55
10	-0.863*	-1.73	-7.151***	-2.87	-0.180	-0.28	-8.677***	-2.66	-0.407	-0.97	-1.528	-0.73
11	-0.061	-0.12	-7.212***	-2.84	1.088*	1.67	-7.588**	-2.28	0.016	0.04	-1.512	-0.71
12	-0.016	-0.03	-7.228***	-2.79	-0.003	0.00	-7.591**	-2.24	0.277	0.66	-1.236	-0.57
13	-0.194	-0.39	-7.422***	-2.82	-0.205	-0.31	-7.797**	-2.25	0.314	0.75	-0.921	-0.42
14	0.224	0.45	-7.198***	-2.68	0.823	1.26	-6.974**	-1.98	0.076	0.18	-0.845	-0.38
15	-0.463	-0.93	-7.661***	-2.81	-0.424	-0.65	-7.399**	-2.07	-0.466	-1.11	-1.310	-0.57

Appendix Table 13: ARs and CARs during the Oct. 1ˢᵗ event, calculated with the *market model* using STOXX50 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR and t CAR, are calculated using equation 7 and 11, respectively. This data is used in Figure 15.

Appendix Table 14 – Firm level: CEO study place location

	PRO-INDEPENDENCE EVENTS						PRO-SPAIN EVENTS					
	Barcelona		Madrid		Other		Barcelona		Madrid		Other	
Event day	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR	AR (%)	t AR
-15	0.015	0.03	-0.059	-0.12	-0.068	-0.11	-0.141	-0.27	-0.171	-0.37	-0.320	-0.62
-14	-0.002	0.00	0.186	0.37	0.136	0.23	-0.214	-0.42	-0.105	-0.23	-0.183	-0.35
-13	0.051	0.10	0.092	0.19	0.209	0.35	-0.190	-0.37	-0.085	-0.18	0.316	0.61
-12	0.149	0.28	-0.091	-0.18	-0.058	-0.10	-0.086	-0.17	0.300	0.65	0.084	0.16
-11	-0.025	-0.05	0.000	0.00	-0.023	-0.04	0.067	0.13	-0.098	-0.21	-0.061	-0.12
-10	0.084	0.16	0.151	0.30	0.044	0.07	-0.261	-0.51	0.124	0.27	0.299	0.58
-9	0.174	0.33	-0.093	-0.19	0.147	0.24	0.431	0.84	0.319	0.69	0.123	0.24
-8	0.025	0.05	0.139	0.28	-0.485	-0.81	0.173	0.34	-0.055	-0.12	-0.147	-0.28
-7	-0.053	-0.10	-0.107	-0.22	-0.091	-0.15	0.054	0.10	-0.116	-0.25	0.007	0.01
-6	0.152	0.29	0.080	0.16	0.034	0.06	-0.150	-0.29	-0.323	-0.70	-0.194	-0.37
-5	-0.039	-0.07	-0.050	-0.10	-0.047	-0.08	0.121	0.24	0.020	0.04	0.145	0.28
-4	0.158	0.30	0.292	0.59	0.024	0.04	0.380	0.74	-0.096	-0.21	-0.126	-0.24
-3	-0.031	-0.06	-0.134	-0.27	-0.020	-0.03	-0.019	-0.04	0.089	0.19	-0.090	-0.17
-2	0.013	0.02	0.114	0.23	0.081	0.13	-0.256	-0.50	-0.187	-0.40	-0.104	-0.20
-1	-0.069	-0.13	0.050	0.10	0.065	0.11	-0.281	-0.55	-0.218	-0.47	0.235	0.45
0	0.127	0.24	0.038	0.08	0.037	0.06	0.075	0.15	-0.043	-0.09	0.233	0.45
1	0.006	0.01	-0.041	-0.08	-0.173	-0.29	-0.029	-0.06	-0.172	-0.37	-0.248	-0.48
2	0.197	0.37	0.084	0.17	0.313	0.52	-0.141	-0.27	-0.103	-0.22	0.203	0.39
3	0.238	0.45	-0.106	-0.21	-0.179	-0.30	-0.423	-0.82	-0.181	-0.39	-0.183	-0.35
4	0.060	0.11	0.045	0.09	-0.070	-0.12	0.360	0.70	0.495	1.07	0.143	0.28
5	0.190	0.36	-0.101	-0.20	0.014	0.02	0.063	0.12	0.254	0.55	-0.065	-0.12
6	0.155	0.29	0.039	0.08	0.202	0.34	-0.286	-0.56	-0.057	-0.12	0.369	0.71
7	0.286	0.54	0.070	0.14	-0.156	-0.26	-0.120	-0.23	-0.229	-0.49	-0.425	-0.82
8	-0.002	0.00	-0.139	-0.28	-0.135	-0.22	-0.263	-0.51	-0.158	-0.34	-0.429	-0.83
9	0.188	0.36	0.008	0.02	-0.022	-0.04	-0.142	-0.28	-0.761	-1.64	-0.433	-0.83
10	0.171	0.32	0.255	0.51	0.177	0.29	0.083	0.16	0.108	0.23	0.379	0.73
11	-0.030	-0.06	0.402	0.81	0.111	0.18	0.287	0.56	-0.189	-0.41	0.175	0.34
12	0.043	0.08	0.083	0.17	0.202	0.34	0.222	0.43	0.052	0.11	-0.057	-0.11
13	0.010	0.02	0.152	0.31	0.089	0.15	-0.083	-0.16	0.313	0.67	0.007	0.01
14	-0.217	-0.41	0.118	0.24	-0.145	-0.24	0.091	0.18	-0.058	-0.13	0.103	0.20
15	0.114	0.22	0.239	0.48	0.138	0.23	0.051	0.10	0.303	0.65	0.109	0.21

Appendix Table 14: ARs during the pro-independence and pro-Spain events, calculated with the *market model* using IBEX35 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR is obtained by equation 7. The CARs with their t statistics are available on request, but these are not significant. This data is used in Figure 16.

Appendix Table 15 – Firm level: CEO study place location Oct. 1st

Event day	Barcelona AR (%)	t AR	CAR (%)	t CAR	Madrid AR (%)	t AR	CAR (%)	t CAR	Other AR (%)	t AR	CAR (%)	t CAR
-15	0.064	0.13	0.064		0.266	0.54	0.266		0.324	0.40	0.324	
-14	-0.635	-1.32	-0.571	-1.19	-1.195***	-2.42	-0.930*	-1.89	-1.490*	-1.83	-1.166	-1.43
-13	0.643	1.34	0.072	0.11	-0.098	-0.20	-1.028	-1.47	1.317	1.61	0.151	0.13
-12	-1.429***	-2.97	-1.356	-1.63	-1.189***	-2.41	-2.217***	-2.60	-0.224	-0.27	-0.073	-0.05
-11	-0.119	-0.25	-1.476	-1.53	-0.070	-0.14	-2.287**	-2.32	0.219	0.27	0.146	0.09
-10	-0.312	-0.65	-1.787*	-1.66	-0.091	-0.19	-2.378**	-2.16	0.408	0.50	0.554	0.30
-9	0.053	0.11	-1.734	-1.47	-0.110	-0.22	-2.488**	-2.06	-0.223	-0.27	0.332	0.17
-8	-0.423	-0.88	-2.157*	-1.69	-0.976**	-1.98	-3.464***	-2.65	-1.755**	-2.15	-1.423	-0.66
-7	-0.908*	-1.88	-3.065**	-2.25	-0.771	-1.56	-4.235***	-3.04	-0.193	-0.24	-1.617	-0.70
-6	-0.141	-0.29	-3.206**	-2.22	-0.590	-1.20	-4.825***	-3.26	-0.181	-0.22	-1.798	-0.73
-5	-0.636	-1.32	-3.842***	-2.52	-0.788	-1.60	-5.613***	-3.60	-0.297	-0.36	-2.096	-0.81
-4	-0.325	-0.68	-4.168***	-2.61	-0.697	-1.41	-6.310***	-3.86	-0.712	-0.87	-2.807	-1.04
-3	-0.353	-0.73	-4.521***	-2.71	0.145	0.29	-6.165***	-3.61	0.367	0.45	-2.441	-0.86
-2	0.163	0.34	-4.357***	-2.51	-0.615	-1.25	-6.780***	-3.81	-0.010	-0.01	-2.450	-0.83
-1	0.017	0.04	-4.340***	-2.41	0.029	0.06	-6.751***	-3.66	-0.009	-0.01	-2.459	-0.81
0	-1.416***	-2.94	-5.757***	-3.09	-1.701***	-3.45	-8.452***	-4.43	-0.919	-1.13	-3.378	-1.07
1	-0.912*	-1.89	-6.669***	-3.46	-0.245	-0.50	-8.697***	-4.41	-0.605	-0.74	-3.983	-1.22
2	-2.493***	-5.18	-9.162***	-4.61	-2.537***	-5.14	-11.234***	-5.52	-1.230	-1.51	-5.213	-1.55
3	1.911***	3.97	-7.251***	-3.55	2.231***	4.52	-9.003***	-4.30	0.679	0.83	-4.534	-1.31
4	-0.301	-0.62	-7.552***	-3.60	-0.147	-0.30	-9.150***	-4.26	-0.558	-0.68	-5.092	-1.43
5	0.296	0.61	-7.256***	-3.37	0.718	1.46	-8.433***	-3.82	0.507	0.62	-4.585	-1.26
6	-1.085**	-2.25	-8.341***	-3.78	-0.717	-1.45	-9.149***	-4.05	-0.442	-0.54	-5.028	-1.35
7	1.667***	3.46	-6.674***	-2.95	1.931***	3.92	-7.218***	-3.12	0.751	0.92	-4.277	-1.12
8	0.175	0.36	-6.500***	-2.81	0.027	0.06	-7.191***	-3.04	-0.019	-0.02	-4.296	-1.10
9	-0.352	-0.73	-6.851***	-2.90	-0.262	-0.53	-7.453***	-3.08	-0.853	-1.05	-5.149	-1.29
10	-0.090	-0.19	-6.941***	-2.88	-0.129	-0.26	-7.582***	-3.07	-0.466	-0.57	-5.615	-1.38
11	0.363	0.75	-6.578***	-2.68	2.043***	4.14	-5.540**	-2.20	-0.234	-0.29	-5.849	-1.41
12	-0.245	-0.51	-6.823***	-2.73	0.292	0.59	-5.248**	-2.05	-0.107	-0.13	-5.956	-1.41
13	-0.341	-0.71	-7.164***	-2.81	-0.092	-0.19	-5.340**	-2.05	-0.063	-0.08	-6.019	-1.39
14	-0.026	-0.05	-7.190***	-2.77	0.532	1.08	-4.807*	-1.81	0.306	0.38	-5.713	-1.30
15	-0.332	-0.69	-7.522***	-2.85	-0.264	-0.53	-5.071*	-1.88	-0.600	-0.74	-6.313	-1.41

Appendix Table 15: ARs during the Oct. 1st event, calculated with the *market model* using STOXX50 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR and t CAR, are calculated using equation 7 and 11, respectively. This data is used Figure 17.

Appendix Table 16 – Firm level: Moving headquarter out of Catalonia

Event day	Firms moving headquarter out of Catalonia				Firms keeping headquarter in Catalonia			
	AR (%)	t AR	CAR (%)	t CAR	AR (%)	t AR	CAR (%)	t CAR
-15	-1.897	-1.39	-1.897		-0.788	-0.40	-0.788	
-14	1.747	1.28	-0.150	-0.11	-0.279	-0.14	-1.068	-0.55
-13	-0.103	-0.08	-0.254	-0.13	-0.403	-0.21	-1.470	-0.53
-12	-0.592	-0.43	-0.846	-0.36	-1.032	-0.53	-2.502	-0.74
-11	-2.124	-1.56	-2.970	-1.09	-0.601	-0.31	-3.103	-0.79
-10	-0.373	-0.27	-3.343	-1.10	-0.715	-0.37	-3.819	-0.87
-9	-1.141	-0.84	-4.484	-1.34	-0.743	-0.38	-4.562	-0.95
-8	0.271	0.20	-4.213	-1.17	-0.518	-0.27	-5.080	-0.98
-7	-0.495	-0.36	-4.708	-1.22	-1.242	-0.64	-6.321	-1.14
-6	0.170	0.12	-4.538	-1.11	-0.580	-0.30	-6.902	-1.18
-5	-1.498	-1.10	-6.036	-1.40	-1.932	-0.99	-8.834	-1.43
-4	-1.613	-1.18	-7.648*	-1.69	-0.354	-0.18	-9.188	-1.42
-3	-1.233	-0.90	-8.882*	-1.88	-1.900	-0.97	-11.088	-1.64
-2	-3.042**	-2.23	-11.923***	-2.43	-0.517	-0.26	-11.605*	-1.65
-1	2.655*	1.95	-9.268*	-1.82	-0.180	-0.09	-11.785	-1.61
0	2.031	1.49	-7.237	-1.37	-0.907	-0.46	-12.692*	-1.68
1	-1.211	-0.89	-8.448	-1.55	0.793	0.41	-11.899	-1.52
2	0.386	0.28	-8.062	-1.43	0.269	0.14	-11.630	-1.44
3	0.437	0.32	-7.625	-1.32	-0.249	-0.13	-11.879	-1.43
4	1.003	0.74	-6.622	-1.11	0.052	0.03	-11.828	-1.39
5	-0.017	-0.01	-6.639	-1.09	-0.498	-0.25	-12.326	-1.41
6	-0.487	-0.36	-7.126	-1.14	-0.133	-0.07	-12.459	-1.39
7	-0.111	-0.08	-7.237	-1.13	-0.038	-0.02	-12.497	-1.36
8	-0.083	-0.06	-7.320	-1.12	-0.336	-0.17	-12.833	-1.37
9	0.436	0.32	-6.884	-1.03	0.222	0.11	-12.611	-1.32
10	-0.341	-0.25	-7.225	-1.06	0.162	0.08	-12.448	-1.27
11	-0.291	-0.21	-7.516	-1.08	-0.547	-0.28	-12.995	-1.30
12	0.196	0.14	-7.320	-1.03	-0.164	-0.08	-13.160	-1.30
13	1.680	1.23	-5.640	-0.78	0.443	0.23	-12.716	-1.23
14	-0.250	-0.18	-5.890	-0.80	0.240	0.12	-12.477	-1.19
15	0.166	0.12	-5.724	-0.77	0.947	0.48	-11.530	-1.08

Appendix Table 16: ARs during the Oct. 1st event, calculated with the *market model* using STOXX50 as benchmark. The event window is 31 trading days and the estimation period is 110 trading days. ***, **, and * denote the significance level at 1 %, 5 %, and 10 %, respectively. The test statistics, t AR is obtained by equation 7. The CARs with their t statistics are available on request. This data is used in Figure 18.