

**SYSTEMIC RISK: CAUSE OR EFFECT
OF THE FINANCIAL CRISIS IN THE EURO AREA?
THE CASE OF SPANISH BANKING SYSTEM BAILOUTS**

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Abstract

The aim of this paper is to determine to which extent systemic risk is a cause and an effect of the 2008 financial crisis. In the context of Spanish bailouts, we study the transmission of risk in the Spanish banking system. We make use of data from Google Trends on all Spanish financial institutions, which are selected as examples of one of the countries most affected in the last financial crisis. This analysis is one of the first attempts to use this kind of data for purposes of financial analysis. We compute the impact of each bailout in the banking system and we show how it affects the activity of the bailed-out bank and other institutions according to their status both before and after the announcement of the bailouts. We then show that it is possible to quantify the subjective systemic risk, an elusive concept that is difficult to measure with data from standard sources.

**RYZIKO SYSTEMOWE – PRZYCZYNA CZY KONSEKWENCJA KRYZYSU
FINANSOWEGO W STREFIE EURO?
PRZYKŁAD POMOCY PUBLICZNEJ DLA HISZPAŃSKIEGO SYSTEMU
FINANSOWEGO**

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Słowa kluczowe: ryzyko systemowe, stabilność systemu finansowego, Google Trends, programy pomocy dla sektora bankowego.

Abstrakt

Celem artykułu jest określenie, czy wzrost ryzyka systemowego jest przyczyną, czy konsekwencją ostatniego kryzysu finansowego. W kontekście problemów hiszpańskiego systemu finansowego przeanalizowano, czy występuje transmisja ryzyka w systemie finansowym tego kraju. W artykule wykorzystano dane uzyskane z platformy Google Trends dotyczące hiszpańskich instytucji finansowych, które w dużym stopniu ucierpiały podczas kryzysu finansowego w strefie euro. Badanie to jest jedną z pierwszych prób wykorzystania tego typu danych w analizach sektora finansowego oraz transmisji ryzyka systemowego. W artykule przeanalizowano wpływ programów pomocy publicznej (*bailouts*) na cały system bankowy oraz na poszczególne grupy instytucji w systemie według ich statusu przed uzyskaniem pomocy publicznej i po jej ogłoszeniu. W artykule wskazano, że dane Google Trends mogą być wykorzystywane do analiz stabilności systemu finansowego oraz do kwantyfikacji subiektywnego ryzyka systemowego.

Introduction

The European debt crisis started in the first stages of the Great Recession in late 2009. It was characterized by an environment of excessively high structural deficits and accelerating debt levels (DE GRAUWE 2011, GROSS 2012). Four Euro Area countries needed to be rescued by sovereign bailout programmes (WYPLOSZ 2014). When the weak banking sector suffered big capital losses, most states in Europe had to bailout several of their banks with recapitalization loans with this affecting their sovereign debt and vice versa in a spiral process (ACHARYA et al. 2014, ACHARYA, STEFFEN 2015). Since there is a direct relation between the survival of financial institutions and the financial stability, most Euro Area countries decided to provide funding through loans or injection of capital (BARTH et al. 2012). The publicly funded bailouts to the banking system were one of the main causes of the sharply worsened debt-to-GDP ratios in several European countries, nonetheless it was only one of the causes of the outbreak of the sovereign debt-crisis in the Eurozone (DEWATRIPONT 2014).

After the crisis, the new regulatory initiatives have made bailouts a more difficult solution to implement. Nonetheless, the cost of inaction could have been even higher than the bailout funds (LUDWIG, SOBAŃSKI 2014). Most analysts agree the worst stages of the financial stability have already taken place. However, the public support to failing banks has created a moral hazard problem and the risks that banks take tend to be higher after public assistance. Under this scenario, the current financial risk in the Euro Area could be even higher. This fact also explains the new regulations to prevent more bailouts. The desirable policy would urge the authorities to decrease more effectively the expected rents of banks after the financial assistance (GIOVANNI, RATNOVSKI 2013).

In the current situation, we consider it important to continue the research on financial risk and financial crisis in the Euro Area to understand its causes and consequences as well as the ways of mitigating the systemic risk. In this

paper, we use public available data from Google Trends to explore the subjective systemic risk in the Spanish banking system.

In the second section, we briefly describe previous studies that used Google Trends data and we show how it is possible to predict and make useful analysis with this kind of data. In the third part, we present the research questions and we describe why the Spanish case has been chosen. In the section four, the main results are presented. Finally, the conclusions and further research areas are discussed in the fifth section.

Google Trends as a data source for complex analysis

The use of Google Trends data to predict events in the near future and to discover the popularity of a topic in the past is still infrequent but increasingly employed. Google Trends data can be useful as a key source to explore the interest on a subject. This kind of data has been used in a growing number of fields.

One of the areas in which Google Trends has shown a great predictive power is in the field of epidemiology. For example, US data on influenza at regional and national level have been published with a delay of two weeks. Instead, Google Trends forward these results for up to ten days, and may offer advanced predictions about the level of influenza regionally, depending on the number of searches about related symptoms (CARNEIRO, MYLONAKIS 2009).

In addition to the research on the flu contagion, Google Trends data provide valuable information at regional level for other diseases such as Lyme disease (SEIFTER et al. 2010), which is more prevalent in the warm season. Tuberculosis has ten million new cases each year and produces more than a million deaths. It can also be predicted with data from Google Trends (ZHOU et al. 2011).

Google Trends information has not only been used to predict levels of diseases, even though that is its best-known application. There are many examples that show how one can use Google Trends to predict values of economic indicators and spreading of financial risk within the system. CHOI and VARIAN (2012) emphasize the ability to predict the near future, which has been called *nowcasting* as opposed to traditional forecasting. Using data from Google Trends it is possible to predict the number of unemployed individuals through searches of terms related to job portals or information on administrative procedures to receive unemployment benefits.

Google Trends has also shown its validity for predicting consumption levels. VOSEN and SCHMIDT (2011) show that US search results improve survey indicators of consumption. The authors discussed whether the surveys on consumer expectations really reflect the current and future real purchases. Instead, Google Trends provides search data on each type of product. It is feasible to establish with a high degree of certainty what will be the current level of consumption

of each product, especially as a greater portion of consumption is now happening on the internet with consumers tending to look for information prior to the purchase at the very least.

The predictive power of the research with this source of information is such that it is possible to predict variables such as the box-office of movies at the weekend premiere, video game sales the first month after their launch and even the position of them in the lists of popularity weeks in advance (GOEL et al. 2010). Its use for specific markets, such as in the case of car sales (CARRIÈRE-SWALLOW, LABBÉ 2013), also exceeds traditional prediction models. Google trends data-models emerge as one of the most promising alternative tools. Thus, whenever a large part of consumers use the Internet to search for products, Google Trends database contains valuable information about future consumption patterns.

In economics, Google Trends has not been used only in studies on consumption patterns. Its application in financial economics is also promising. PREIS et al. (2010) found key terms that allow designing strategies to over-perform the main indexes of the stock market. Strategies created with searches volumes of words such as debt, stocks and portfolio results were 2.31σ , 2.21σ and 1.69σ higher than a random investment. In fact, an investment strategy based on search levels of debt would have made a 326% profit in the period, compared to 16% obtained with a buy and hold strategy.

The key variable for asset pricing is an investor attention. However, there is no direct measure of this variable. In the past, only indirect measures of investment attention were used in the financial models such as news headings and adverts. With the extensive use of web searchers, the data from Google Trends can be considered as a faithful representation of investor attention (DA et al. 2011). The stocks that experience an atypical increase in attention are usually associated with a better performance than the average of the market during the subsequent two weeks.

Google Trends data can also be useful to supervise portfolio diversification and active risk management, because popularity of a stock calculated by search queries is highly correlated with the volatility of that stock (KRISTOUFEK 2013). In addition, NERI and ROVIEL (2017) described and predicted the dynamics of Norwegian stock market using Google data, while the goal of BROCK (2018) was to quantify macroeconomic expectations in stock markets using this kind of data. The great number of applications of Google Trends data have been analyzed by JUN et al. (2018).

This source of data has a wide range of applications and it is relevant for any study in which the searches are important, as it happens with disease symptoms, purchases and stocks. Individuals also use web searchers to compare products of different banks, access to their balances and perform activities with web services of their banks. Therefore, it is possible to make use of Google Trends data to analyze both news coverage and demand of financial institutions.

Systemic risk during financial crisis in Spain

There is no consensus on a unique definition of systemic risk (SZPUNAR 2012, SMAGA 2014, JAJUGA et al. 2017). On the one hand, some authors consider it an *external shock* that generates systemic effects. On the other, some authors assume it *emerges endogenously* (DANIELSSON 2002, DANIELSSON et al. 2013). The effects of systemic risk can be modeled as *sequential* or *simultaneous* (DE BRANDT, HARTMANN 2000). These effects can also be classified as horizontal if the systemic risk only affects the financial sector or vertical if we analyze also its effects on the real economy. Finally, it can be classified as objective when the data of financial networks is studied and subjective if the focus is on the effects on the reputation and investors' attention or attitude towards banks.

In previous works (KASZOWSKA, SANTOS 2014, 2017) we attempted to model the role of risk perception on systemic risk generation and amplification. In this paper, however, we focus on *how subjective systemic risks appears due to bailouts*. We make use of weekly data from Google Trends of all the Spanish financial institutions for the period 2004–2014. This data includes all the web searches: those intended to access bank web servers to perform operations, searches intended to compare bank services and products and others related to news.

In our study, the database was created using data from the Bank of Spain about financial institutions and information extracted from Google Trends. The link to database is provided at the end of article. We introduced names of Spanish financial institutions in Google Trends webpage: the names of banks as well as savings banks (*cajas de ahorro* in the local language). In the case of multiple names, all the possibilities were computed and added (e.g. Caja de Burgos, cajaburgos and Caja Burgos). We searched for 5 names each time (that is the maximum quantity allowed to be retrieved at once). Then, we need to rank banks from the less searched to the most searched. Google Trends offer an index from 0 to 100 where 100 is the maximum level of searches in the period for the most popular search. Empty records were used in the case the level of searches was too low and Google Trends did not report the value. The methodology that allows us to build the database uses groups of five banks with one common search term in the sample to be able to compare volumes of all of them altogether. At the end of the procedure, it is possible to compare the volume of all searches and arrive to the same index for all Spanish private banks and savings banks. Then, we can compare how index for each bank or group of banks is changing in time. The analysis could be carried out graphically, but we can also carry out any statistical analysis using these indexes. Below we provide the example how the index that we constructed can be used to analyze the consequences of bailouts in Spain.

Spain is the fourth biggest economy in the Euro Area and the biggest among those most affected by the financial crisis that started in 2008 (UXO 2017). It has a clearly segmented banking system between private banks and savings

banks (*Informe sobre la crisis...* 2014). The second type of banks were managed in a way that did not intend to maximize profits but rather to increase their size as it was perceived as a proof of adequate management prior to the crisis. This strategy provoked a high growth in their presence at national level with respect to their previous status as regional banks.

In 1998, the number of offices of saving banks and private banks were practically the same and in 2008 the number of offices of saving banks exceeded the number of offices of private banks by 60%. In the last decade of the real estate bubble saving banks increased their market participation by 5% and represented 45% of web searches (excluding the six savings banks that did not need public assistance). However, the total financial assets of savings banks were lower than those of private banks as savings banks were created in the nineteenth century to provide financial services to the poorest families while private banks offered their services to wealthy families and industries. Nowadays, this difference can still be observed.

Since 2009, a series of bailouts have taken place. The most significant ones are indicated with white points (see: Fig. 1). The portion of searches for banks with bailouts in the period 2010–12 is tooth-shaped as the searches increased during bailouts but then a part of consumers changed institutions to more stable private banks. In 2013, the portion of searches for banks that received bailout money increased and then sharply declined as private banks acquired several entities previously nationalized.

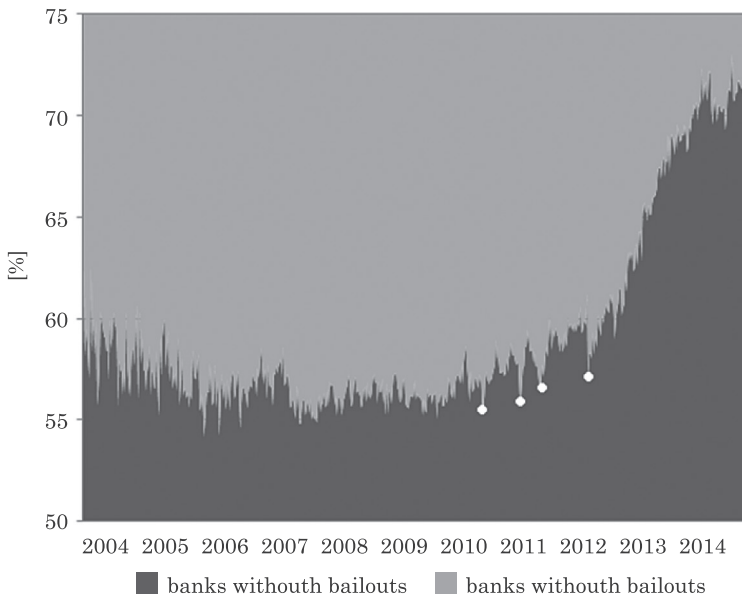


Fig. 1. The decreasing market share of banks that needed bailouts

Source: own elaboration.

The biggest banks only show three significant changes in the last decade. Caja Madrid and Bancaja, along with other five savings banks, merged into Bankia, receiving public funding in the process. Banco Sabadell acquired with public assistance CAM, a savings bank with financial problems that previously doubled the size of the acquiring bank. At the end of 2013, Santander bank acquired its partner bank – Banesto, that was maintained as a separated brand to improve the investment abilities of the current CEO of Santander bank until the former CEO passed away. Since 2012, the share of web searches for small and medium size banks has progressively declined. Prior to the bailout there were 45 savings banks and currently only two- small local savings banks maintained their status. The remaining ones have merged and/or been acquired by private banks. However, many of them maintain their brand in their region of origin and therefore clients continue searching these names.

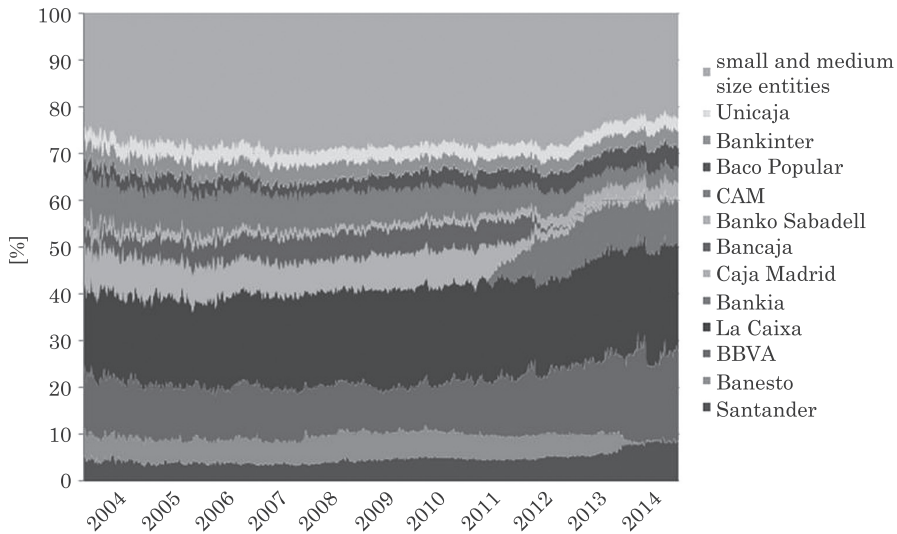


Fig. 2. Web searches – share of big banks

Source: own elaboration.

Google Trends data show that among the small and medium banks there has been a higher amount of change in the market than in the case of banks. Some institutions appeared and subsequently ceased their activities in the period under consideration (e.g. Cajasol and Unnim). Others were merged and the level of searches for them has been decreasing asymptotically to zero (as in the case of Caixanova, Caixa Galicia, Caja Canarias or Caixa Penedés). New private banks have been created after merging several savings banks (as in the case of Kutxabank and BMN). This pattern occurred in case of most of the financial institutions of small and medium size (only a selection is presented in Figure 3 for visualization purposes).

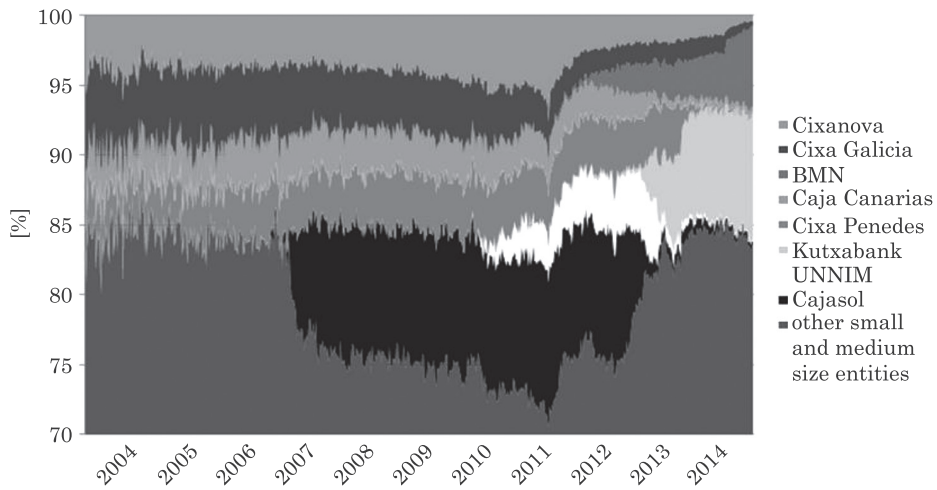


Fig. 3. Web searches – share of small and medium banks (selection)

Source: own elaboration.

The first bailout after the crisis emergence took place in March 2009. CCM, a savings bank that represented less than 1% of the Spanish financial system, was nationalized and later sold to another savings bank for a small part of the money spent in the bailout. In the next five years ten banks were nationalized, eight of them savings banks with only two small private bank needing public assistance. Another three mergers of savings banks needed support in form of public funding but comparatively the amount of public money devoted to those bailouts was much lower. A total amount of 95.3 billion euro was spent in bank

Table 1

Bank nationalizations after 2005

Nationalization stage	Date	Bank affected	Amount (million €)	% of total bailouts	Type
1	29.03.2009	CCM	6,974	7.32	savings bank
2	22.05.2010	Cajasur	358	0.38	savings bank
3	22.07.2011	CAM	13,222	13.87	savings bank
4	30.09.2011	Novacaixagalicia	11,081	11.63	savings bank
4	30.09.2011	CatalunyaCaixa	13,652	14.33	savings bank
4	30.09.2011	Unnim	1,992	2.09	savings bank
5	21.11.2011	Banco de Valencia	7,223	7.58	private bank
6	09.05.2012	Bankia	36,183	37.97	savings bank
7	12.03.2013	BMN	3,745	3.93	savings bank
7	15.03.2013	Banco Gallego	867	0.91	private bank

Source: own elaboration.

nationalizations and 4.3 billion euro in bailouts to mergers. This amount equals to 2,175 euro per inhabitant. As shown in Table 1, these ten nationalizations happened in seven stages.

Results: Subjective systemic risk

In this section, we study the subjective systemic risk six months before the bailout and after the most important bank nationalizations. The first intervention changed the paradigm of the stability of Spanish financial institutions. The third and four nationalizations during 2011 happened within two months and they represented 41.9% of the total funds spent on this purpose. Finally, Bankia's nationalization was the biggest and had important political and social consequences as the government of Spain asked a bailout to the European Union to rescue this mismanaged bank. These three stages of nationalizations represent 85.1% of the financial assistance provided during the crisis.

We divide the banking system into the following categories:

- entity(ies) nationalized;
- other entities that received public aid during the crisis¹;
- stable savings banks²;
- stable private banks³.

If there were a transmission of systemic risk between groups, it would be possible to observe how the level of searches of groups 2 to 4 would increase. This increase should be higher in groups 2, and 3 in a lesser degree. We establish level equal to 100 for each group during the week when the bailout took place.

The following results show the series of searches after the application of the Hodrick-Prescott filter (cf. HODRICK, PRESCOTT 1997, MCELROY 2008) because all the series add seasonality as the level of searches tend to be higher during the last and especially the first week of each month. This takes place because in Spain workers and retired people receive their monthly wage or retirement pay respectively during those weeks.

CCM: The first nationalization (6.9 billion euro)

CCM was the first nationalized bank in Spain after the burst of the real estate bubble in 2008. It was nationalized on Sunday, March 29, 2009, after two savings banks rejected a planned merger. Nine days after the bailout, Pedro Solbes, Minister of Economics and Finance resigned after he urged the Prime

¹ Rest of Spanish financial institutions not included in other categories.

² La Caixa, Ibercaja, Unicaja, BBK, KutxaBank, Kutxa and Caja Vital.

³ BBVA, Banco Santander, Banesto, Banco Popular, Bankinter and Banco Sabadell.

Minister to undertake the reforms in the financial sector with no delays. After two years of changes in regulations, mergers and acquisitions, and successive minor bailouts, the rest of financial institutions with severe problems were nationalized.

In Figure 4 we can observe that the level of searches of CCM was higher several weeks before the nationalization. The peak corresponds to the intense rounds of negotiations to merge with two potential partners.

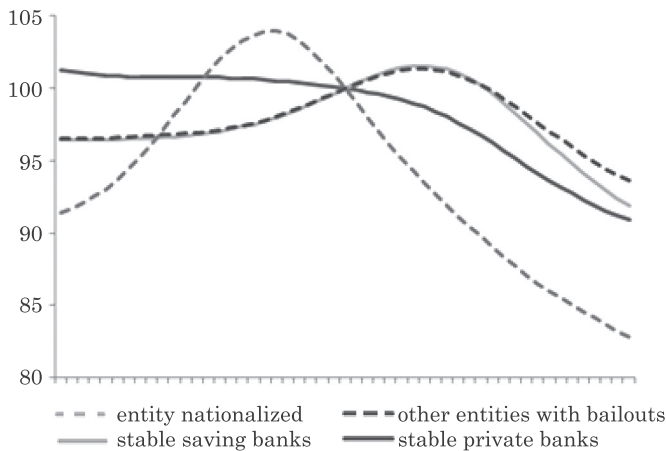


Fig. 4. Searches six months prior and after the bailout (searches during the bailout = 100)
Source: own elaboration.

The weeks immediately before the bailout the rest of savings banks started to increase their search level. There is no distinction between those that later needed to participate in a bailout and those that could change their status to private banks without public assistance. In this way, the subjective financial risk started before the nationalization of CCM.

After the nationalization, the searches level of CCM as well as the searches of stable banks declined. However, searches of the remaining savings banks increased for five weeks. The subsequent decrease of searches of those banks that needed assistance later was lower. This behavior shows a clear systemic risk transmission.

Table 2 presents quantitative information about the behavior observed in Figure 4. In the six months prior to the bailout, the searches of the entity nationalized (a saving bank) had a high correlation with both stable saving banks and other entities with bailouts (mostly saving banks). Saving banks and private banks had negative correlation showing the dual banking system of the country before the first bailout. In the following six months, correlation increase between all the four kinds of entities because of the risk transmission.

Table 2

Correlation of searches prior and after the bailout

Entities		6 months prior and after the bailout	6 months prior the bailout	6 months after the bailout
Stable private banks	stable saving banks	0.4418	-0.9379	0.9512
Stable private banks	entity nationalized	0.8411	-0.6977	0.9675
Stable private banks	other entities with bailouts	0.3197	-0.9421	0.9494
Stable saving banks	entity nationalized	0.4057	0.6382	0.8437
Stable saving banks	other entities with bailouts	0.9908	0.9998	1.000
Entity nationalized	other entities with bailouts	0.3147	0.6373	0.8405

Source: own elaboration.

The entity nationalized presents high correlation with stable saving banks, that did not need public aid in the following years (0.8437) and the value is like the one with the entities that need subsequent bailouts (0.8405). The correlation is even higher with private banks, that did not need bailouts in these years, (0.9675) due to the decrease in the searches in both. The public interest in the entity that needed the bailout decrease sharply after the aid program was implemented, and private banks were not perceived as risky, so the level of searches decreased as well. However, both stable saving banks and other entities with subsequent bailouts (mostly other saving banks) had a correlation close to the unit both prior and after the bailout of 2009. Then, it is possible to conclude that, at this point, the public did not discern the risk level between different saving banks.

Third nationalization and triple nationalization (13.2 + 26.7 billion euro)

Fourteen months after the intervention in CCM, a small savings bank property of the diocese of Cordoba had to be nationalized and subsequently acquired by BBVA private bank for a compensation of 358 million euro.

After another period of fourteen months, the government continued denying the financial crisis, but the situation was highly unsustainable. In summer 2011, CAM savings bank still could not find any partner to merge with and had to be nationalized. In 2011, most of the merges of savings banks took place. The financial sector supervisor recommended the creation of new private banks created thanks to merges of saving banks of different regions in order to reduce duplicities. However, regional public authorities did not want to lose the control of their savings banks and forced inter-regional merges. Three out

of the four oversized regional banks had to be nationalized in September 2011 (two from Catalonia and the other ones from Galicia). The remaining regional banks that merged could only survive under private management with a bailout of 525 million euros.

In this case, the systemic risk transmission is not as clear as in the previous case. The searches level increased for private banks because in the period before the bailouts many mergers occurred, and many clients changed their bank to a more stable one.

After these bailouts, savings banks had to reduce their branch networks as stated in the memorandums of public assistance. For this reason, the level of searches declined and the searches of private banks, with the same number of branches, incorporated new customers.

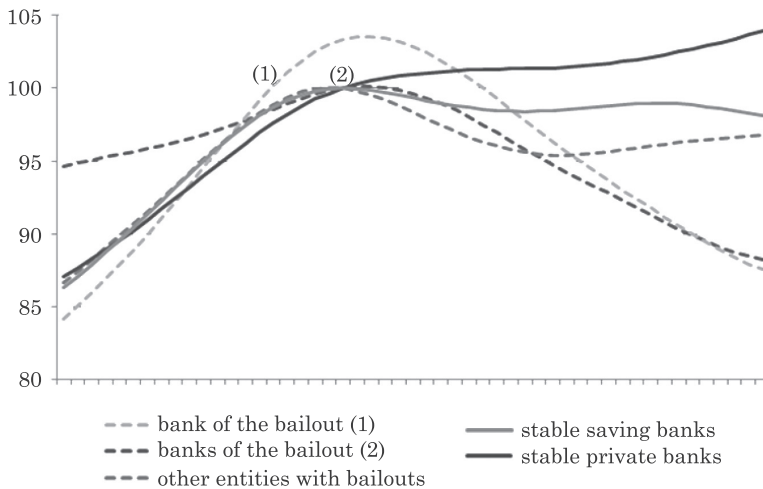


Fig. 5. Searches prior and after the bailout (searches during the bailout = 100)

Source: own elaboration.

Nationalized banks at this stage and other entities that needed bailouts decreased their activity at a higher rate than the rest of the savings banks that did not require public funding. In conclusion, the high level of changes in the sector at that time makes it hardly possible to identify the mechanisms of systemic risk transmission in this case.

Table 3 expands these results and presents the results of correlation among searches prior and after the triple bailout (26.7 billion euro). We can see how the results change dramatically after this event. The correlation between the five kinds of entities was close to the unit in all the cases before the bailout and the differences are broad in the six months after the event.

Banks affected by the bailouts of July and September of 2011 increased the correlation in searches up to 0.9999. However, their correlation with other

entities that needed bailouts afterwards decreased to 0.6163 and 0.6181. At this point the public still did not distinguish between entities that were about to be affected by subsequent bailouts and those that had higher solvency ratios (stable saving banks), that had similar correlation after the bailout (0.6164 and 0.6195).

However, the public at this point made a clear difference between saving banks and private banks, something that did not happened two years before as seen in Table 2. The correlation between banks with bailouts in July and September of 2011 and stable private banks became negative (-0.9350 and -0.9355 respectively). Other entities that needed subsequent bailouts also had a different search behavior after the summer of 2011 (correlation -0.4945) and stable private banks and stable savings banks perceived risk was also different after these bailouts (correlation -0.6597).

Table 3
Correlation of searches prior and after the bailout (2)

Entities		6 months prior and after the bailout	6 months prior the bailout	6 months after the bailout
Bank of the bailout (1)	banks of the bailout (2)	0.9826	0.9873	0.9999
Bank of the bailout (1)	other entities with bailouts	0.7038	0.9695	0.6163
Bank of the bailout (1)	stable private banks	-0.2450	0.9882	-0.9350
Bank of the bailout (1)	stable saving banks	0.7705	0.9684	0.6164
Banks of the bailout (2)	other entities with bailouts	0.7888	0.9959	0.6181
Banks of the bailout (2)	stable private banks	0.2053	0.9999	-0.9355
Banks of the bailout (2)	stable saving banks	0.6723	0.9956	0.6195
Other entities with bailouts	stable private banks	0.3499	0.9951	-0.4945
Other entities with bailouts	stable saving banks	0.9330	0.9999	0.8562
Stable private banks	stable saving banks	0.6230	0.9949	-0.6597

Source: own elaboration.

Bankia: the biggest nationalization (36.1 billion euro)

Bankia was created with a planned merge of Caja Madrid and other small savings banks. Finally, the financial authorities encourage middle-sized Bancaja to be part of this new bank, wrongly assuming its big size could be enough to make it sustainable. In May 2012, the viability of the rescue plan of R. Rato was questioned and the bank was nationalized in the biggest bailout in Spanish history. This bailout along with the second recession in the Euro Area made it advisable to ask for a bailout for the Spanish economy and financial system to the European Union authorities.

As it happened in case of the first nationalization, the pattern of subjective systemic risk transmission is observed. Searches for Bankia peaked several weeks before the bailout when the negotiations were taking place. It produced a temporary increase in searches for other entities that received bailout money previously and other stable saving banks with less intensity. Solvent private banks increased their searches share during this period and they maintained the new quota because of the increase in the number of clients. Again, subjective systemic risk was transmitted to savings banks even before the bailout took place.

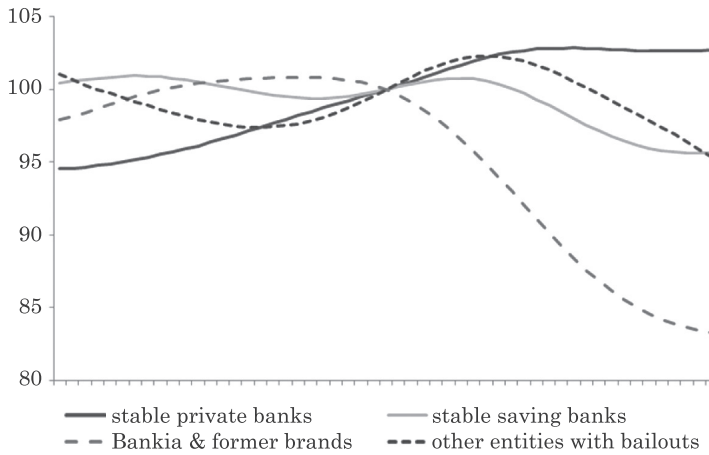


Fig. 6. Searches prior and after the bailout (searches during the bailout = 100)

Source: own elaboration.

In the first part of 2012 the search patterns of different kind of entities showed a different behavior with respect to one year before, as seen in Table 3. We can see in the second column of Table 4 how only stable private banks and

Table 4

Correlation of searches prior and after the bailout

Entities		6 months prior and after the bailout	6 months prior the bailout	6 months after the bailout
Stable private banks	stable saving banks	-0.6444	-0.8618	-0.6191
Stable private banks	Bankia & former brands	-0.7520	0.7205	-0.8364
Stable private banks	other entities with bailouts	0.2041	-0.3609	-0.3142
Stable saving banks	Bankia & former brands	0.6813	-0.6783	0.9472
Stable saving banks	other entities with bailouts	0.6853	0.4742	0.9116
Bankia & former brands	other entities with bailouts	0.1060	-0.8919	0.7707

Source: own elaboration.

Bankia (entity that received the bailout) and stable saving banks and other entities with bailouts had positive correlation. In this way, it could be inferred that the public did not anticipate the bailout of Bankia and other bailouts that happened the following year.

The behavior of the public after the bailout changed especially in Bankia and stable private banks (−0.8364 from 0.7205), stable saving banks and Bankia (0.9472 from −0.6783) and other entities with bailouts and Bankia (−0.8919 and 0.7707). The opinion about Bankia was similar to the ones of stable private banks before the bailout and this entity was perceived like stable and insolvent saving banks after the bailout took place.

Discussion and further research

In this paper, we have made use of data from Google Trends to show how subjective systemic risk was transmitted during the nationalization of six Spanish banks. We found that during two of the three stages studied in the article, the subjective systemic risk was transmitted to saving banks no matter if they needed public assistance or whether they were part of the few politically-managed banks that did not required public funding to survive.

The use of data from Google Trends allows discovering patterns of consumers activity given that internet is one of the main methods to search for products. This is also in the case of the banking sector as clients use web searchers to compare between different banks as well as to access their financial products.

We selected the Spanish case, as it is the biggest economy of the Euro Area among the most affected by the financial crisis of the Eurozone. Ten banks were nationalized since 2009 and approximately 100 billion euro was the total amount of public money spent to stabilize the national financial system. Spain had a segmented financial market in the beginning of the crisis with a low number of private banks and more than forty publicly-managed savings banks. The later were more affected by the crisis and monopolized most of the public assistance.

In the three nationalization stages that we studied, 85.1% of the total amount of public funding was spent. In the first and the third, we found a subjective systemic risk transmission to the savings banks. We found the transmission of subjective systemic risk to those banks that needed public funding to survive and to the low number of savings banks that were not experiencing viability problems.

In the second stage analyzed in the article, no systemic risk transmission processes were found as during this period plenty of changes in the financial system occurred and it was not feasible to isolate the potential systemic risk underlying processes. This suggests Google Trends data might not be enough to determine systemic risk, but it could be added to complex analysis such as in KASZOWSKA and SANTOS (2017), BATTISTON and CALDARELLI (2013), KASZOWSKA

et al. (2018). In this way, it is possible to develop a tool than quantifies and even predicts the objective and subjective systemic risk and the chances of bailouts.

Future research includes extending this approach to all the countries of the Euro Area and study the changes in searches level for each bank, their inter-relations and the correlation with financial variables.

Data disclosure

The data used in this article can be downloaded at “Weekly searches of Spanish banks in 2004–2014” dataset available in ResearchGate. DOI:10.13140/2.1.4038.4800.

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