WHY DO SPANISH FIRMS RARELY USE THE BANKRUPTCY SYSTEM? THE ROLE OF THE MORTGAGE INSTITUTION

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WHY DO SPANISH FIRMS RARELY USE THE BANKRUPTCY SYSTEM? THE ROLE OF THE MORTGAGE INSTITUTION [(*)]

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Abstract

Taking advantage of a rich database of more than 1 million companies in Spain, France and the U.K., we propose and test a hypothesis to explain why Spain has one of the world's lowest business bankruptcy rates, even during the current economic crisis and after controlling for market exit rates. This hypothesis is based on two premises, the low efficiency of the Spanish bankruptcy system relative to that of an alternative insolvency institution, the mortgage system, and the unattractiveness of the personal bankruptcy law.

Keywords: Bankruptcy, mortgage, insolvency.

JEL classification: G33, G21, K0.

Resumen

Utilizando una amplia base de datos de más de 1 millón de empresas españolas, francesas y británicas, este documento de trabajo propone y contrasta una hipótesis que explica por qué España tiene una de las tasas de bancarrota empresarial más bajas del mundo. Este hecho se produce incluso durante la crisis económica actual y controlando por las tasas de salida de empresas del mercado. La hipótesis se basa en dos premisas: por un lado, el sistema concursal español es poco eficiente en comparación con la principal alternativa para solucionar una situación de insolvencia, el sistema hipotecario, y, por otro, la bancarrota personal en España resulta muy poco atractiva para el deudor.

Palabras clave: Concursos de acreedores, hipotecas, insolvencia.

Códigos JEL: G33, G21, K0.

1   Introduction

Business bankruptcy rates[1] in Spain are among the lowest in the world. This means that Spanish firms rarely enter a formal bankruptcy procedure, which may imply that economic agents regard the system as inefficient and try to deal with financial distress in alternative ways.[2]

According to Euler Hermes (2007) Spain had the second lowest bankruptcy rate out of 30 countries, including both high-income and emerging economies. in 2006, as shown in Table 1. An even more striking observation is the difference in the orders of magnitude between Spain and other developed economies: for instance, while there were around 179 bankruptcies per 10,000 firms in France and 115 in U.K., there were less than 3 in Spain[3]. The deep economic crisis that Spain is currently experiencing has modestly increased the number of bankruptcies, but the Spanish bankruptcy rate is still one of the lowest of the world (Euler Hermes, 2011).

Table 1: Business bankruptcy rates around the world, 2006

Business bankruptcy rates are computed as the number of business bankruptcies per 10,000 firms. Source: authors' computations with data from Euler Hermes (2007).

Country	Bankruptcy rate	Country	Bankruptcy rate
Poland	1.79	Ireland	53.39
Spain	2.56	Sweden	67.13
Czech Republic	5.43	Denmark	67.61
Singapore	5.95	Netherlands	79.60
Brazil	5.95	Japan	86.59
Greece	6.81	Norway	95.51
South Korea	7.78	Germany	96.31
Hong Kong	8.10	Finland	96.64
Taiwan	10.02	Belgium	107.24
China	11.17	UK	114.69
Portugal	15.01	Hungary	134.96
Italy	25.48	Switzerland	151.58
Canada	29.83	France	178.59
Slovak Republic	32.66	Luxembourg	231.62
USA	33.46	Austria	239.81

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[1]The business bankruptcy rate is the number of business bankruptcies divided by the number of firms in the economy.

[2]Following Djankov *et al.* (2008), by "bankruptcy" we mean a legal procedure that imposes court supervision over the financial affairs of a firm or individual that has broken its promises to creditors or honours them with difficulty, and whose possible outcomes are reorganisation or liquidation. By "financial distress" we mean a situation in which a firm is close to default and it needs to take corrective action, such a selling major assets, merging with another firm or filing for bankruptcy (Ross *et al.*, 2005).

[3]A discussion on the comparability of bankruptcy rates across countries is provided in Appendix A.

The goal of this paper is to explain this empirical observation, which may indicate the absence of a well-designed bankruptcy system. This may have negative consequences on the performance of the economy (Hart, 2000, Succurro, 2012).[4]

The proposed hypothesis is that Spanish firms avoid filing for bankruptcy by making possible that their creditors foreclose on the company's assets. This is a more attractive way to deal with financial distress because the mortgage system is more efficient, in the sense of providing higher discounted recovery rates to creditors, which lowers the risk premium charged to borrowers. Furthermore, *personal* bankruptcy, which may be used by non-corporate businesses and by small corporate firms whose members pledge personal guarantees to obtain credit (Berkowitz and White, 2004), is a very unattractive option because it is extremely severe towards the individual debtor. Since the costs of filing for bankruptcy are high while the benefits are almost none, those firms have strong incentives to avoid filing for bankruptcy and use the mortgage system instead.

A direct implication of our hypothesis is that the use of mortgage debt relative to other types of debt should be higher in Spain than in countries with higher bankruptcy rates. This is what we observe in Figure 1, in which the proportion of mortgage debt relative to total bank debt of non-financial firms is much higher in Spain than in the two countries we will use in our comparative analyses, France and U.K.[5]

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[4]The macroeconomic impact of bankruptcy codes has also been analysed by Suárez and Sussman (2006) and Meh and Terajima (2008). The relationship between bankruptcy codes and entrepreneurship, innovation and venture capital has been studied by Armour and Cumming (2008), Acharya and Subramanian (2009) and Armour (2004), respectively.

[5]The increase in the Spanish series in the available period, 1999-2012, is likely to be explained by the housing boom in the Spanish economy. However, the level of the series at the beginning of the period, when the housing boom was just starting, was already substantially higher than the French one. The British economy also experienced a strong housing boom-bust cycle, but the UK series -only available from 2005q3- is flat. In other words, the increase and subsequent decrease in the price of real estate and, in turn, in the collateral value of mortgage loans has not changed the weight of these loans in the total value of the loans received by British firms, unlike the Spanish case, which corroborates our hypothesis that the mortgage system plays a much more important role in Spain than in UK.

Figure 1: Mortgage loans to total bank loans of non-financial firms (%), 1999-2012.

Source: author's elaboration based on data from Banque de France, Banco de España and Office for National Statistics. In the U.K. series mortgage loans do not include floating charges.
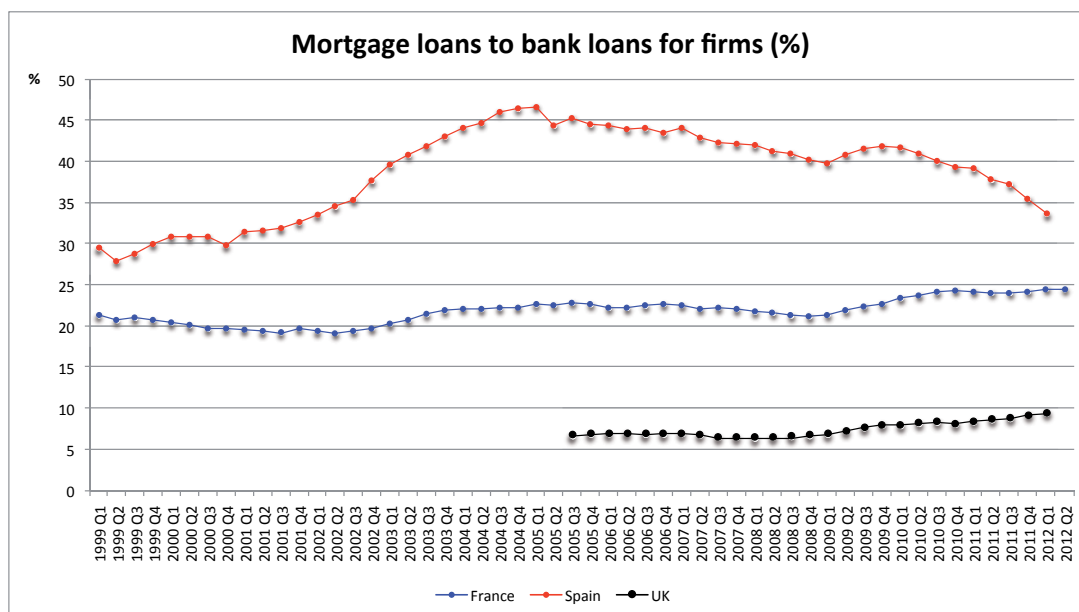
The econometric test of our hypothesis is carried out by using data on more than 1 million Spanish, French and British firms from the OECD-Orbis database. The main conclusion is that *holding mortgage debt* is a "bankruptcy-avoidance activity" with a much greater impact in Spain than in the other two countries. Specifically, in Spain such an activity reduces the probability of filing for bankruptcy, ceteris paribus, between a 29.1 and a 35.3%. We take these results as strong evidence supporting the proposed hypothesis.

Other findings lead us to reject several alternative hypotheses about the very low bankruptcy rates in Spain. One is that they are a consequence of a bankruptcy code with an unusually low "implied insolvency test", which only makes filing for bankruptcy a legal requirement when firms are in a situation of extreme financial distress. However, the Spanish firms that file for bankruptcy are not more financially distressed than their French and British counterparts.

Another alternative explanation is that the low bankruptcy rates are just a consequence of the low business exit rates in Spain (Núñez, 2004; López-García and Puente, 2006)[6]. Table 2 shows the "conditional business bankruptcy rates"

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[6]A firm exit is not necessarily the same as default. A firm can exit the market without having defaulted if, for instance, its owners decide to shut down the business because, say, they want to retire, seek other career opportunities, etc. A default does not necessarily lead to a firm's exit, since its debt can be restructured following negotiations with the creditors so that the firm is kept as a going concern.

(CBBR) -number of business bankruptcies divided by the total firms that exit the economy in a certain year- for a subset of countries for which data are available. Spain still has the lowest rate, 3 times less than the country with the second lowest (Czech Republic). A related factor that could explain the very low use of the bankruptcy system is the size of the Spanish informal economy, but there are several countries with larger informal economies such as Italy, Portugal, Greece, Hungary, South Korea and Brazil (Schneider and Buehn, 2009).

Table 2: Conditional business bankruptcy rates (CBBR) around the world, 2006.

Conditional business bankruptcy rates are expressed as the ratio of business bankruptcies over firms' exits, in %. To enhance comparability across countries we do not take into account exits from industries with high public sector presence (education, health, social and personal service activities). Source: authors' computations with data from Euler Hermes (2007), Eurostat and OECD.

Country	CBBR (%)	Country	CBBR (%)
Spain	0.4	UK	12.2
Czech Republic	1.2	Germany	12.2
Portugal	1.5	Netherlands	12.4
Brazil	2.7	Hungary	16.8
Ireland	3.2	Sweden	17.9
Italy	4.0	Norway	19.6
Slovak Republic	4.5	France	28.5
USA	4.8	Austria	28.8
Canada	9.2	Belgium	30.0
Denmark	9.5	Luxembourg	30.6
Finland	11.7	Switzerland	43.6

Finally, the low bankruptcy rates could also be attributed to the Spanish economy having a higher proportion of micro enterprises (Núñez, 2004, López-García and Sánchez, 2010) and that a high proportion of the bankruptcy costs are fixed, hence deterring the use of the bankruptcy system by those firms. We discard this hypothesis on two grounds. First, although it is true that in Spain micro firms (less than 10 employees) exhibit the lowest bankruptcy rates, it seems that the bankruptcy rates of larger firms are also lower than in the other countries. For example, in 2006 the bankruptcy rate for non-micro enterprises was 23.2 in Spain, while it was 204.5 in France.[7] Second, bankruptcy costs (compensation of the insolvency administrators, lawyers' fees, etc) are not fixed in Spain, since the Spanish legislation contemplates a cheaper and faster procedure for small firms.

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[7]Sources: *Instituto Nacional de Estadística*, Altares (2010), Eurostat.

To the best of our knowledge, this is the first paper that addresses the research question with firm-level data. Claessens and Klapper (2005) use country-level data to explain bankruptcy rates around the world. They find that a country's overall institutional quality and some features of bankruptcy systems (creditors' consent for reorganisation, automatic stay of creditors' claims) are associated with more bankruptcies. However, since Spain, according to the authors, has high institutional quality and its bankruptcy system requires creditors' consent for reorganisation and provides an automatic stay provision, Spain should exhibit high bankruptcy rates.

Celentani, García-Posada and Gómez (2010, 2012) have also addressed the low bankruptcy rates in Spain but from a very different perspective. They use the theoretical prediction of Ayotte & Yun (2007), according to which low creditor protection and low judicial ability imply low bankruptcy rates, to conjecture a wide set of activities (leverage reduction, lenders' screening and monitoring, choice of projects that trade off return for lower risk and/or lower liquidation costs, pledge of mortgage collateral) in which firms and their creditors could potentially engage to reduce the probability of bankruptcy. Then they provide some aggregate evidence that do not falsify their hypothesis. However, the lack of firm-level data prevents them from formally testing it. As the authors put it: "The main objective of the paper is to propose an explanation that is not immediately contradicted by a number of related aggregate stylized facts that we document. Because the data we use are aggregate, we cannot test our view. We can simply use the data as a guide to propose a coherent explanation and as an indication of how useful it may be to pursue this line of research." (Celentani, García-Posada and Gómez, 2010, 2012, pages 2 and 4, respectively).

Our contribution to the literature is twofold. First, we narrow the discussion of Celentani, García-Posada and Gómez (2010, 2012) by focusing on a few relevant factors and discarding the rest. We also concentrate on the efficiency of insolvency procedures instead on their debtor/creditor orientation. Second, we test our hypothesis by means of econometric analyses of firm-level data to establish causal links between the factors of interest, which has not been done before.

The rest of the paper is structured as follows. Section 2 discusses some key features of the bankruptcy and mortgage systems of Spain, France and UK. Section 3 is devoted to explain our hypothesis about the low bankruptcy rates in Spain. Section 4 focuses on data sources and sample selection criteria. Section 5 explains the empirical testing of the hypotheses. Section 6 concludes. Several robustness analyses and additional information are displayed in the appendices.

2 Institutional framework: the bankruptcy and the mortgage system.

In order to provide an adequate basis for the econometric exercise, it is necessary to analyse in-depth the institutional framework of the countries of interest.

Those are Spain, France and the UK. France and the UK are chosen because their bankruptcy rates are much higher than the Spanish ones and because they are representative examples of the two main world "legal families": Civil Law and Common Law, respectively (Djankov *et al.*, 2003; La Porta *et al.*, 2000) . We must exclude other interesting examples (e.g. Germany and the US) due to the database constraints.

2.1 Alternative insolvency procedures: informal workouts and foreclosures.

When a firm defaults on its debt, filing for bankruptcy is just one of the available alternatives. There are other procedures that may be cheaper and speedier for some types of businesses and creditors. Since there are many other options, depending on each country's legal system, we shall focus in the most universal ones: informal workouts and foreclosures.

An informal workout is a private reorganisation process in which the major financial creditors of the distressed company act in a coordinated manner to either restructure its debt, so that the company can be kept as a going concern, or to liquidate the company's assets in a orderly manner. Regardless of its potential advantages vis-à-vis formal bankruptcy -cost savings, avoidance of adverse publicity- it is often unfeasible due to coordination and asymmetric information problems (Gilson *et al.,* 1990, Morrison, 2008a, 2008b). These problems may be especially important in the case of Spain, where borrowing from multiple banks is much more common than in France and U.K.[8]

A foreclosure aims to recover the money owed to secured creditors by seizing the loan's collateral. It does not protect unsecured creditors, who must rely on separate insolvency proceedings to enforce their claims. Foreclosures differ across countries in several important dimensions. In Spain and France the insolvent company or the unsecured creditors can cause a stay of foreclosure proceedings by filing for bankruptcy, whereas in the U.K filing for bankruptcy does not stop foreclosure. In some countries a foreclosure can be an entirely out-of-court procedure, a private contractual solution in which a receiver liquidates the company (piecemeal or as a going concern) to maximise the recovery of the floating charge holder. This used to be case of administrative receivership in the U.K. prior to the Enterprise Act 2002. In other countries (e.g. Spain and France), a court oversees the foreclosure, although it is typically less involved than in bankruptcy. A related procedure is the "friendly foreclosure", in which the secured lender repossesses the property with the consent of the borrower in exchange for cancelling the outstanding debt. In Spain this mechanism (*dación en pago)* has been widely used during the housing burst by building and real estate companies.

Therefore the mortgage system could play a major role as an alternative in-solvency[9] institution if firms and their creditors agree on foreclosing on the assets

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[8] According to Hernández-Cánovas and Köeter-Kant (2008), Spanish firms had the highest average number of bank relationships in Europe.

[9] We use the term "insolvency" to mean "financial distress", i.e., the firm cannot pay its

that were pledged as mortgage collateral instead of filing for bankruptcy[10]. The choice of the mortgage system over the bankruptcy system will mainly depend on which institution is more efficient, in terms of the duration of its proceedings, costs for the contract parties (court fees, fees of insolvency administrators, auctioneers, lawyers) and credit recovery rates. This notion of efficiency is very close to that of Djankov *et al.* (2008).

2.2 Corporate bankruptcy laws in Spain, France and the U.K.

The current bankruptcy system in Spain (*Ley Concursal*), which entered into force in 2004[11], only has an insolvency procedure, the *concurso de acreedores,* both for firms and individual debtors, though it has a simplified version in the case of small firms (*concurso abreviado*). In France, the *redressement judiciaire* and the *liquidation judiciaire* are the main insolvency procedures for firms, although a new procedure, the *sauvegarde,* was introduced in the latest reform of the bankruptcy code (*Loi de sauvegarde des entreprises*), which came became effective in 2006[12]. In the U.K., although various insolvency procedures coexist since the entry into force of the Enterprise Act 2002, *administration* is the most important procedure for businesses[13]. For a description of the bankruptcy codes in these countries see Davydenko and Franks (2008) and Celentani, García-Posada and Gómez (2010, 2012).

2.3 Choice of insolvency institution in Spain, France and the U.K.

2.3.1 Spain

In Spain the mortgage system (*Ley Hipotecaria*) is an attractive alternative to bankruptcy because of its high efficiency relative to the latter. First, foreclosures are much speedier than bankruptcy procedures. The usual length of a foreclosure is 7 to 9 months (European Mortgage Federation, 2007), while the median duration of a bankruptcy process in 2007 ranged between 20 and 23 months (Van Hemmen, 2008). Furthermore, the modest increase in the number of bankruptcy filings due to the economic crisis has implied a congestion of the

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debts as they fall due. For a further discussion see Armour (2001) and Garoupa and Morgado (2006).

[10]From a pure legal perspective, one could think of an additional way to avoid the Spanish bankruptcy system: "migrating" the debt contract or even the society itself to other jurisdiction. This cannot happen in practice because of the specific configuration of the Spanish bankruptcy legislation, which would be used anyway.

[11]For a description of the Spanish bankruptcy laws before the entry into force of the current system see Cerdá and Sancho (2000).

[12]See Catritz *et al.* (2006).

[13]In the U.K. the term "bankruptcy" only applies to individuals, while insolvency law is the term that applies to companies.

courts and a dramatic increase in the median length of the procedures: between 27 and 36 months in the period 2008-2010 (Van Hemmen, 2009, 2010, 2011).[14]

Second, secured credit suffers from dilution inside the bankruptcy process, which decreases creditor recovery rates. Preferential credit (salaries for the last month of activity, compensation for the insolvency administrators, debtor-in-possession financing) enjoys priority over secured credits. There is also an automatic stay for secured credits over assets that are integrated in the debtor's production process. By contrast, mortgage creditors will not suffer any dilution if they avoid the bankruptcy process and foreclose on the collateral instead.

Finally, although estimates of the direct costs of bankruptcy are not available, there is a consensus among practitioners on foreclosures being much cheaper than bankruptcy filings.[15] A mortgage foreclosure (*ejecución hipotecaria*) is a well-defined and quite standardised process with a low degree of uncertainty about its final outcome, so that its implementation is subject to economies of scale (the bank files several foreclosure lawsuits at the same time, only changing the details of the debtor and the collateral). By contrast, bankruptcy procedures are much more complex and uncertain and they often involve high information asymmetries between the company and its creditors, requiring a great deal of invervention by the Court, insolvency administrators, lawyers, etc.

2.3.2 France

In France, unlike Spain, the mortgage system is not such an attractive alternative to bankruptcy, mainly because foreclosures are slower than bankruptcy procedures. The usual length of a foreclosure is between 15 and 25 months (European Mortgage Federation, 2007), while the average duration of bankruptcy proceedings in 2007 was 14.2 months (Ministère de la Justice, 2010). Real estate collateral is also less used than in Spain and the U.K. because sale proceeds are diluted by preferential credit (employee wages, bankruptcy fees, super-senior financing). Bankruptcy courts are not obliged to sell the assets to the highest bidder but they can sell the whole company to a lower bidder that commits to preserve the employment, hence selling the assets below their potential market prices. By contrast, accounts receivable and personal guarantees can be realised by banks directly and the proceeds are not subject to dilution by preferential credit even when the company is in formal bankruptcy. Hence these other types of collateral are used more often than real estate (Davydenko and Franks, 2008).

2.3.3 UK

In the U.K. the mortgage system is not expected to be an appealling alternative insolvency institution. Mortgage foreclosures are not significantly faster than bankruptcy procedures. The usual length of a foreclosure is between 8 and

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[14]Similar estimations are provided by the General Council of the Judicial Power (*Consejo General del Poder Judicial*, 2011).

[15]According to European Mortgage Federation (2007), the total costs of foreclosures are between the 5% and 15% of the price obtained in the auction of the collateral. The percentage decreases as the sale price increases, suggesting that an important part of the costs are fixed.

12 months (European Mortgage Federation, 2007), while the average length of bankruptcy proceedings (*administration*) is less than 1 year (Armour *et al.* 2006, Frisby, 2006).

More important, the high efficiency that a particular type of loan security, the floating charge -which does not exist in neither Spain nor France- brings to bankruptcy procedures makes the use of mortgage foreclosures less necessary. In the U.K. there are two types of security interests, the fixed charge and the floating charge. While a fixed charge is attached to a specific asset (e.g. real estate, machinery), a floating charge is a security over a fund of changing assets, which can be extended to cover all the company's assets, including intangibles and current assets. Floating charge holders -usually banks- are given ample control rights under bankruptcy (*administration*). Following default, they may appoint an administrator who takes over the management. The administrator, although also owes duties to other creditors, will try to maximise recovery for the floating charge holder, either via piecemeal liquidation or by selling the business as a going concern.

Since preferential credit (wage arrears and tax debts) is senior to floating charges but junior to fixed charges, Franks and Sussman (2005) show that British banks take both a fixed and a floating charge to enjoy both control rights over the bankruptcy process and seniority over most of the proceeds of the sale. This also eliminates coordination failures: there is little litigation and no evidence of creditors' runs. All these factors result in fast and cheap procedures with high credit recovery rates.[16]

2.3.4   Conclusion.

The mortgage system is more efficient than the bankruptcy system in Spain, which makes it an appealing alternative insolvency institution. This is not the case in France and the U.K. As an example, Table 3 shows a measure of efficiency, the duration of proceedings, for which we have collected data on both systems and the three countries.

Table 3: Duration of bankuptcy and mortgage proceedings (months)

Sources: European Mortgage Federation (2007), Van Hemmen (2008), Ministère de la Justice (2010), Armour *et al.* (2006), Frisby (2006).

	Spain	France	U.K.
Mortgage	(7,9)	(15,25)	(8,12)
Bankruptcy	(20,23)	14.2	<12

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[16]See Davydenko and Franks (2008) for evidence on credit recovery rates in the U.K, France and Germany, and Van Hemmen (2008, 2009, 2010, 2011) for Spain.

2.4 Choice of insolvency institution in Spain, France and the U.K.: small firms.

Personal bankruptcy laws may be used by non-corporate businesses and by small corporate firms (Berkowitz and White, 2004). When a business is non-corporate, its debts are personal liabilities of the firm's owner. When a firm is a small corporation, lenders often require personal guarantees that wipe out the owner's limited liability. This may be especially important in the case of Spain, since small firms account for a large proportion of the total stock of firms and their bankruptcy rates are the lowest (Celentani *et al.*, 2010, 2012).

Armour and Cumming (2008) measure the severity of personal bankruptcy laws across several dimensions, being one of them the number of years after bankruptcy until a debt discharge is available. In France, the discharge is immediate while in UK it is allowed after one year. By contrast, in Spain there is no discharge: all the present and future income of the debtor must be used to pay back her pre-bankruptcy debts.[17]

Since the costs of filing for bankruptcy are high (compensation of insolvency administrators, lawyers' fees, etc) while the benefits are almost none in the absence of a discharge, Spanish small firms may have strong incentives to avoid personal bankruptcy and use the mortage system instead. This might explain why in 2006 the bankruptcy rate for French micro enterprises (less than 10 employees) was 208 per 10,000 firms, while in Spain was 1.5, and the bankruptcy rate for French self-employed was 139, while in Spain was 0.1.[18]

3   The hypothesis

The proposed hypothesis about the extremely low bankruptcy rates in Spain is:

H0: *The extremely low bankruptcy rates in Spain are due to an institutional framework that discourages the use of the bankruptcy system and encourages the use of an alternative insolvency institution, the mortgage system. This framework makes Spanish firms hold a high proportion of mortgage debt, since this reduces the cost of credit and facilitates the use of the mortgage system in the event of default, hence avoiding filing for bankruptcy.*

H0 implies that *holding mortgage debt* is a "bankruptcy-avoidance" activity because it facilitates, following default, to avoid filing for bankruptcy by making possible that creditors foreclose on the company's assets. This is what will be tested in the empirical analyses.

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[17]Cross-country comparisons of other features of personal insolvency laws that also determine their severity yield quite similar conclusions.

[18]The figures for France were computed using Altares (2010) and Eurostat's business demography.

4 Data

4.1 The OECD-Orbis database

The firm-level data come from the OECD-Orbis database, which is the result of the treatment of raw data from the commercial database Orbis by the OECD (Ribeiro, Menghinello and De Backer, 2010, and Ragoussis and Gonnard, 2011). Orbis, developed by Bureau van Dijk, contains financial information on 85 million companies around the world, both private and publicly held, and includes up to 10 years of information per company. The source for these data is generally the office of the Registrar of Companies of each country.

Orbis includes firm-level accounting data in a standardised format for 24 balance sheet items, 25 profit and loss account items and 26 financial ratios. The accounts are transformed into a common layout to enhance comparability across countries. Orbis also provides other firm-level information, such as year of incorporation, industry, legal form and status. Status is a variable that tells the legal and economic condition of the firm (e.g. if the company is active or it has ceased its operations, and if it is undergoing some bankruptcy procedure or not) *only* at the moment in which the data are extracted from the database, i.e., no historical records are kept. Since the data from Orbis were extracted in 2010 (December 31, 2010), we have the status of each company at that time.

4.2 Sample selection

The sample comprises data on firms from 3 countries, Spain, France and U.K.. The sample selection is conditioned by the main goal of our empirical analysis: to model the probability of filing for bankruptcy as a function of a company's financials. Moreover, those financials must be comparable among the firms in the selected sample.

1. All the selected data correspond to 2008, except the information on status, which corresponds to 2010. Although financial data are available for many other years, there are two reasons why we only use those for 2008. First, the main variable in all our analyses will be constructed using the information on status, which is only available for 2010. This makes panel data an unfeasible structure for the sample, since the variation in the main variable will happen across sections, but not across time. Second, ideally we would like to use the financial statements of the year closest to the one for which we have the information on status (2010) in order to establish meaningful relationships between the capital and asset structures of the companies and their status, which would suggest using the data of 2009 or even 2010, if available. However, because of the time lag in the submission of financial statements by firms, the Orbis database is characterised by a typical time lag of two years (Ribeiro, Menghinello and De Backer, 2010). This implies that the coverage (in number of companies and complete records) for 2009 and 2010 is very poor, leaving 2008 as the best choice.

2. Financial firms are excluded because their financial ratios are not comparable to those of non-financial companies (Klapper *et al.*, 2004)[19].

3. Listed firms are also removed because their financials are not strictly comparable to those of unlisted firms. For instance, the size of the former is normally assessed by their market capitalization, while the size of the latter is computed with the book value of their assets. A measure of financial distress that shall be used in this study, the Altman Z-Score, has two versions, one for listed firms and one for non-listed firms. However, since listed firms account for a very small proportion of the firms of any economy[20], any different propensity to file for bankruptcy[21] cannot explain the large variation in bankruptcy rates around the world, so excluding them from the sample does not threat the external validity of the results.

4. State-owned companies are also eliminated since their decision on filing for bankruptcy is much less related to their financial health than in the case of private firms. We also exclude non-profit organisations and membership organisations.

5. All legal forms with unlimited liability -e.g., sole proprietorships- are excluded because of their poor and uneven coverage in Orbis. Although we are aware of the importance of these firms in the economy, including them would jeopardize the internal validity of our results, without substantially improving their external validity due to their poor coverage[22].

6. We eliminate some firms according to their status in order to assure data comparability. Appendix B, which gives a detailed description of the different statuses and its meaning in the 3 countries of interest, also explains the criteria for elimination.

7. We eliminate redundant observations. The main cause of redundancies is the presence of both consolidated and unconsolidated accounts for the same company, i.e., a firm could be reporting unconsolidated figures for its headquarters, along with consolidated data for the business group it belongs, which inevitably include figures for the headquarters. Although the exclusion of one of the accounts is necessary to avoid double-counting

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[19] As also pointed by Klapper et al. (2004, page 10): "... financial institutions tend to be subject to specific entry restrictions, (e.g. initial capital requirements) that do not apply to nonfinancial firms."

[20] There are 167 listed companies in Spain's main stock market (*Bolsa de Madrid*), while there are 586 in France (Euronext Paris) and around 1,600 in the U.K. (London Stock Exchange's main market). Thus we do not exclude the bulk of publicly held companies.

[21] According to Dahiya and Klapper (2007), listed firms may have a lower propensity to file for bankruptcy because they are subject to the market for corporate control. This is an alternative discipline mechanism, since managers may lose control of their companies even in the absence of financial distress, if the market believes that the current management is not maximising the value of the firm, so that its shares are underpriced.

[22] Their poor coverage generates the "separation problem" in models for binary dependent variables such as logit (Zorn, 2005), which will be used in our econometric analysis. To avoid this problem all firms with unlimited liability must be eliminated.

of information, there are relative pros and cons associated with the exclusion of either the consolidated or the unconsolidated account (Ragoussis and Gonnard, 2011). In our case, we decide to eliminate all consolidated accounts for which unconsolidated information exists.

8. We eliminate non-yearly financial accounts -since flow variables such as profits can only be compared for firms with the same time length in their accounts- and observations with some data inconsistencies. Extreme values are also removed, as well as observations with mostly missing values.[23]

4.3   Sample characteristics.

After carrying out all the above filtering procedures, the resulting sample has around 1,200,000 observations, with around 400,000 Spanish, 700,000 French and 100,000 British firms. All the financial data correspond to the year 2008, while other firm characteristics (status, industry, size category) correspond to the moment of data extraction (2010).

The distribution of firms according to their industry is shown in Table 4 for each country. In the 3 countries most of the firms belong to the industries "Real estate, renting and business activities", "Wholesale and retail trade", "Construction" and "Manufacturing". The distribution of companies according to their size is shown in Table 5, where the size classification used is the one of the Orbis database, which is explained in Appendix C. We can see that, in the 3 countries, most companies are SMEs, although the proportion of large and very large firms is substantially higher in U.K. than in the other 2 countries. Finally, Table 6 shows the number of bankrupt firms in each country, as well as its percentage over the total number of firms.

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[23]We consider X_i, the value of the variable X corresponding to firm i, an extreme value if and only if $X_i < Q(25) - 3 \cdot IQR$ or $X_i > Q(75) + 3 \cdot IQR$, where Q(25) and Q(75) are the first and the third quartile, respectively, and IQR=Q(75)-Q(25) is the interquartile range. However, all the results presented in this paper are robust to the use of more sophisticated techniques of outlier detection, such as the Hadi algorithm for multivariate outliers (Hadi, 1992).

Table 4: industry classification of sample firms.

Industry classification according to NACE Rev. 1.1.

SECTOR	SPAIN	
	Number	%
A.Agriculture, hunting and forestry	10,146	2.41
B.Fishing	857	0.20
C.Mining and quarrying	1,349	0.32
D.Manufacturing	63,146	15.00
E.Electricity, gas and water supply	3,717	0.88
F.Construction	63,014	14.97
G.Wholesale and retail trade; others.	103,881	24.68
H.Hotels and restaurants	22,174	5.27
I.Transport, storage and communication	19,731	4.69
K.Real estate, renting and business activities	109,940	26.12
M.Education	3,571	0.85
N.Health and social work	6,893	1.64
O.Other community, social and personal service activities	12,432	2.95
Total	420,851	100

SECTOR	FRANCE	
	Number	%
A.Agriculture, hunting and forestry	12,702	1.71
B.Fishing	304	0.04
C.Mining and quarrying	1,070	0.14
D.Manufacturing	83,131	11.16
E.Electricity, gas and water supply	1,114	0.15
F.Construction	116,140	15.59
G.Wholesale and retail trade; others.	200,998	26.98
H.Hotels and restaurants	63,919	8.58
I.Transport, storage and communication	26,860	3.61
K.Real estate, renting and business activities	181,341	24.34
M.Education	8,711	1.17
N.Health and social work	12,873	1.73
O.Other community, social and personal service activities	35,734	4.80
Total	744,897	100

SECTOR	U.K.	
	Number	%
A.Agriculture, hunting and forestry	2,318	1.99
B.Fishing	196	0.17
C.Mining and quarrying	483	0.42
D.Manufacturing	15,813	13.60
E.Electricity, gas and water supply	266	0.23
F.Construction	13,924	11.97
G.Wholesale and retail trade; others.	18,969	16.31
H.Hotels and restaurants	4,714	4.05
I.Transport, storage and communication	5,214	4.48
K.Real estate, renting and business activities	43,461	37.37
M.Education	818	0.70
N.Health and social work	2,555	2.20
O.Other community, social and personal service activities	7,569	6.51
Total	116,300	100

Table 5: size classification of sample firms.

Size classification according to the Orbis database (see Appendix C).

SIZE	SPAIN		FRANCE		U.K.	
	Number	%	Number	%	Number	%
Small	273,575	65.01	553,532	74.31	72,670	62.48
Medium	126,182	29.98	164,190	22.04	25,139	21.62
Large	18,662	4.43	24,503	3.29	14,850	12.77
Very large	2,432	0.58	2,672	0.36	3,641	3.13
Total	420,851	100	744,897	100	116,300	100

Table 6: number of bankrupt firms and % over the total number of firms.

	SPAIN	FRANCE	U.K.
Number	2,718	7,938	1,229
%	0.65	1.07	1.06

5 Empirical analyses

5.1 Descriptive statistics.

For the empirical analyses of this paper we need to construct several variables: a variable that captures the event of bankruptcy, a proxy for the proposed "bankruptcy-avoidance" activity and controls.

BANKRUPTCY is a dummy variable that equals 1 if the firm was undergoing a bankruptcy procedure when the data were extracted (2010). The variable equals 0 if the firm was active (either operating normally or under a situation of financial distress) or if it had exited the market following financial distress but not through a bankruptcy process (e.g. via a foreclosure or a private workout).

Since the Orbis database does not contain specific information on mortgage loans, we need to construct a proxy for the proposed "bankruptcy-avoidance" activity, *holding mortgage debt.* The proposed proxy is TANGIBILITY, which is computed as the % of tangible fixed assets (land, buildings, plant and machinery) to total assets. Since tangible fixed assets are the only assets that can be used as *mortgage* collateral, we expect firms with a high % of those to hold a high proportion of mortgage debt as well.

We use several variables as controls, which capture either factors traditionally associated with financial distress or reflect important characteristics of the firm. BANK DEBT is calculated as % of long-term bank debt to total debt. BANK DEBT may capture several factors that reduce the probability of filing for bankruptcy. First, as found by Gilson *et al.* (1990), banks are more likely to

engage in private workouts with their debtors than other types of creditors.[24] Second, as argued by Djankov et al. (2007), banks may respond to poor creditor protection under bankruptcy by screening and monitoring borrowers more carefully at loan origination, which reduces the risk of default.[25] Finally, banks are also the main mortgage creditors, so that they have incentives to foreclose on the firm's assets and hence avoiding a bankruptcy filing. As it was shown in Figure 1, in Spain a high proportion of bank debt is mortgage debt. Such a proportion is expected to be much higher when we restrict it to *long-term* bank debt (i.e., maturity longer than 1 year) since mortgage loans are rarely short-term.

To measure leverage we compute 3 variables: total debt over total assets (LEVERAGE 1); total debt over capital (LEVERAGE 2), where capital is total debt plus equity; and the interest coverage ratio (INT.COV.RATIO), which is the ratio of ebitda to interest expense. To capture liquidity we use CURRENT RATIO, which is current assets to current liabilities. To measure profitability we compute two versions of return on assets (profit over total assets), one using net income (ROA 1) and the other one using ebitda (ROA 2). Firm's size (SIZE) is computed as the natural log of total assets. Small firms may file less for bankruptcy if a substantial proportion of the bankruptcy costs are fixed (Morrison, 2008a and 2008b) or if personal insolvency laws are very severe, although the relationship between size and bankruptcy need not be linear.[26] Another control is the natural log of age (LNAGE). According to Berger and Udell (1995) and Petersen and Rajan (1994), it captures the public reputation of the firm, since they find a negative relationship between firms' age and interest rate premium charged by banks. Davydenko and Franks (2008) interpret it as a proxy for information asymmetries between a firm and its lenders, since they find a negative impact of age on the probability of filing for bankruptcy (*vis-à-vis* using out-court procedures). We also take into account the average employment cost (AV. EMPL. COST), computed as the ratio between employment costs (including social security contributions and pensions) and number of employees, although it is difficult to determine the sign of the relationship with BANKRUPTCY a priori. Too high average employment costs -due to a very high level of employment protection or restrictiveness of collective aggreements-

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[24]According to Gilson *et al.* (1990), while trade credit is often dispersed among a large number of poorly informed small trade creditors, bank credit, in contrast, tends to be concentrated in a smaller number of better informed lenders. Hence private workouts are more likely to succeed when relatively less debt is owed to trade creditors and more is owed to bank lenders, since coordination and information asymmetry problems are less severe in such a case.

[25]We restrict our attention to *long-term* debt in order to capture "relationship lending": banks which provide short-term funding do not have high incentives to screen and/or monitor the borrower, since they can always "vote with their feet". Both Petersen and Rajan (1994) and Berger and Udell (1995) proxy relationship lending with the number of years that the firm has conducted business with its current lender.

[26]Traditionally in Spain medium-sized firms have experienced the highest bankruptcy rates, followed by those of large companies, with micro-firms and small firms having the lowest rates (Celentani *et al*, 2010).

can undermine profitability but may reflect high productivity of labour as well[27]. Finally, industry dummies have been constructed to control for sectoral downturns and other industry-level factors.

Table 7 shows descriptive statistics for all those variables for Spanish, French and British firms. We can observe that Spanish and British firms have much higher levels of TANGIBILITY than French firms. In the case of BANK DEBT, Spain has the highest levels by far, both in mean and median terms. Spain also has the most leveraged firms (LEVERAGE 1, LEVERAGE 2 and INT.COV.RATIO), while the levels of liquidity (CURRENT RATIO) are very similar across countries. Spanish firms seem to be the least profitable (ROA 1 and ROA 2). In terms of SIZE, Spanish companies are smaller than their British counterparts but larger than the French ones, and the same happens in terms of age (LNAGE). Finally, Spanish firms have the lowest average employment costs.

Table 8 shows descriptive statistics for the same variables for Spanish, French and British firms, respectively. Panels A display the descriptive statistics for the subsamples of firms with BANKRUPTCY=0 (henceforth, non-bankrupt firms) and panels B for the subsamples of firms with BANKRUPTCY=1 (henceforth, bankrupt firms), while panels C show the differences of the means and medians of each variable between non-bankrupt and bankrupt firms, as well as the p-values associated with the null hypothesis that the difference is zero.[28] Our main variable of interest, TANGIBILITY, shows a different behaviour depending on the country. In Spain, TANGIBILITY is higher for non-bankrupt than bankrupt firms, and the implied differences are statistically significant and sizeable (8.4% for means, 9.5% for medians). This finding, though very preliminary, would suggest that *holding mortgage debt* is a relevant "bankruptcy-avoidance activity" in the case of Spain: companies that have not filed for bankruptcy have a higher proportion of tangible assets than those that have filed for bankruptcy. By contrast, in France non-bankrupt or bankrupt firms have higher TANGIBILITY than the other group depending on whether the mean or the median is the reference statistic and, in any case, the differences are very small in comparison with the Spanish ones. Finally in UK, both in mean and median terms, the levels of bankrupt and non-bankrupt firms are not statistically different.

The case of BANK DEBT is quite similar. In Spain, BANK DEBT is much higher for non-bankrupt than bankrupt firms, both in mean and median terms. In France it is also higher for non-bankrupt than bankrupt, but the differences

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[27]Furthermore, higher average employment costs may be associated with a lower probability of filing for bankruptcy since they may increase the dilution of creditors' claims under bankruptcy as in some procedures –such as the French and, to a lower extent, the Spanish- the claims of workers and government are ranked first in the distribution of the liquidation proceeds.

[28]The statistical significance of differences in means is evaluated through one-sided p-values of two-sample t-tests. These tests can be implemented with and without the assumption of equal population variances. In order to ascertain whether this assumption is plausible, two tests for the equality of variances have been implemented in each case. The selected tests are those of Brown and Forsythe (1974), since they are robust to non-normality and the variables of this study have been found to be non-normal. The statistical significance of differences in medians is assessed through one-sided p-values of Fischer's exact tests.

(3% for means, -0.3% for medians) are very small relative to the Spanish ones (14.3% for means, 32% for medians) and non-significant for the medians. Finally the opposite occurs in UK: BANK DEBT is higher for bankrupt than for non-bankrupt. With regards to the rest of control variables, those associated with financial distress behave as expected. In the 3 countries, non-bankrupt firms have lower leverage, higher liquidity and higher profitability. Unsurprisingly, bankrupt firms are also larger. Bankrupt firms are also older in Spain and France, although the difference is negligible in the case of U.K. Finally, in Spain bankrupt firms have higher average employment costs than non-bankrupt, while in France and in U.K. the opposite occurs.

Table 7: descriptive statistics (all firms).

Spain					
	Scale/units	Mean	St.Dev.	Median	N
TANGIBILITY	%	34.2	29.5	26.9	420,851
BANK DEBT	%	69.3	37.8	90.4	420,851
LEVERAGE 1	%	37.7	29.4	32.3	420,851
LEVERAGE 2	%	61.0	43.3	59.0	393,628
CURRENT RATIO	fraction	1.5	1.3	1.1	420,851
ROA 1	%	0.7	7.5	0.9	387,305
ROA 2	%	6.4	11.4	6.1	401,598
SIZE	natural log	6.4	1.6	6.3	420,851
LNAGE	natural log	2.5	0.6	2.5	420,851
AV.EMPL.COST	thousands €	25.7	12.3	23.5	344,274
INT.COV.RATIO	fraction	3.4	6.3	2.4	329,462

France					
	Scale/units	Mean	St.Dev.	Median	N
TANGIBILITY	%	13.5	16.3	7.1	744,897
BANK DEBT	%	21.7	28.3	6.8	744,897
LEVERAGE 1	%	36.6	27.0	32.0	744,897
LEVERAGE 2	%	52.6	36.0	48.7	706,957
CURRENT RATIO	fraction	1.5	1.0	1.3	744,897
ROA 1	%	6.2	13.4	5.1	707,163
ROA 2	%	11.2	17.5	10.1	724,223
SIZE	natural log	5.5	1.6	5.4	744,897
LNAGE	natural log	2.4	0.7	2.4	744,897
AV.EMPL.COST	thousands €	39.6	21.5	35.5	335,979
INT.COV.RATIO	fraction	10.8	17.3	6.3	327,953

U.K.					
	Scale/units	Mean	St.Dev.	Median	N
TANGIBILITY	%	36.0	32.9	24.9	116,300
BANK DEBT	%	41.8	42.9	25.0	116,300
LEVERAGE 1	%	34.9	25.1	31.5	116,300
LEVERAGE 2	%	54.3	35.2	53.0	109,655
CURRENT RATIO	fraction	1.3	1.1	1.1	116,300
ROA 1	%	10.8	24.1	4.9	55,487
ROA 2	%	19.4	32.9	11.4	50,197
SIZE	natural log	6.8	2.2	6.7	116,300
LNAGE	natural log	2.6	0.7	2.5	116,300
AV.EMPL.COST	thousands €	37.6	20.0	34.0	26,609
INT.COV.RATIO	fraction	10.3	17.2	5.0	31,938

Table 8: descriptive statistics: bankrupt and non-bankrupt firms.

	SPAIN				FRANCE				U.K.			
	Panel A: firms **with BANKRUPTCY=0.**				**Panel A: firms** **with BANKRUPTCY=0.**				**Panel A: firms** **with BANKRUPTCY=0.**			
	Mean	St.Dev.	Median	N	Mean	St.Dev.	Median	N	Mean	St.Dev.	Median	N
TANGIBILITY	34.3	29.5	27.0	418,133	13.5	16.3	7.1	736,959	36.0	32.9	24.9	115,071
BANK DEBT	69.4	37.8	90.6	418,133	21.8	28.4	6.8	736,959	41.8	42.9	25.0	115,071
LEVERAGE 1	37.6	29.4	32.2	418,133	36.4	26.8	31.9	736,959	34.7	24.8	31.3	115,071
LEVERAGE 2	60.9	43.3	58.8	391,312	52.2	35.6	48.4	700,763	54.0	34.9	52.7	108,557
CURRENT RATIO	1.5	1.3	1.1	418,133	1.5	1.0	1.3	736,959	1.4	1.1	1.1	115,071
ROA 1	0.8	7.3	0.9	384,743	6.3	13.3	5.1	699,649	11.0	24.2	5.0	54,841
ROA 2	6.5	11.3	6.1	399,012	11.3	17.5	10.1	716,591	19.6	33.0	11.6	49,606
SIZE	6.4	1.6	6.3	418,133	5.5	1.6	5.4	736,959	6.8	2.2	6.7	115,071
LNAGE	2.5	0.6	2.5	418,133	2.4	0.7	2.4	736,959	2.6	0.7	2.5	115,071
AV.EMPL.COST	25.7	12.3	23.5	341,881	39.6	21.6	35.5	331,316	37.6	20.1	34.0	26,206
INT.COV.RATIO	3.4	6.3	2.4	327,013	10.9	17.3	6.3	323,345	10.4	17.3	5.1	31,432
	Panel B: firms **with BANKRUPTCY=1.**				**Panel B: firms** **with BANKRUPTCY=1.**				**Panel B: firms** **with BANKRUPTCY=1.**			
	Mean	St.Dev.	Median	N	Mean	St.Dev.	Median	N	Mean	St.Dev.	Median	N
TANGIBILITY	25.9	25.2	17.5	2,718	12.5	13.6	7.7	7,938	37.1	33.1	26.2	1,229
BANK DEBT	55.1	36.6	58.6	2,718	19.6	25.3	7.1	7,938	43.9	40.8	31.5	1,229
LEVERAGE 1	50.6	30.1	50.2	2,718	51.6	34.5	45.8	7,938	53.9	39.1	50.6	1,229
LEVERAGE 2	82.5	36.7	83.9	2,316	91.8	56.0	81.3	6,194	84.7	52.0	81.8	1,098
CURRENT RATIO	1.1	0.7	1.0	2,718	0.9	0.6	0.9	7,938	0.9	0.6	0.9	1,229
ROA 1	-12.2	19.6	-4.6	2,562	-1.5	17.5	1.3	7,514	-3.3	14.5	-0.4	646
ROA 2	-6.1	20.1	-0.1	2,586	3.5	17.4	5.4	7,632	2.4	16.1	4.4	591
SIZE	7.6	1.5	7.5	2,718	6.0	1.3	5.9	7,938	7.7	1.5	7.7	1,229
LNAGE	2.6	0.6	2.6	2,718	2.7	0.6	2.7	7,938	2.6	0.7	2.6	1,229
AV.EMPL.COST	31.7	12.5	29.9	2,393	37.4	16.7	34.9	4,663	35.2	16.1	33.4	403
INT.COV.RATIO	-1.4	5.5	0.0	2,449	3.3	13.6	2.4	4,608	1.4	7.3	1.5	506
	Panel C: Differences **in BANKRUPTCY=0,1.**				**Panel C: Differences** **in BANKRUPTCY=0,1.**				**Panel C: Differences** **in BANKRUPTCY=0,1.**			
	Mean	p-value	Median	p-value	Mean	p-value	Median	p-value	Mean	p-value	Median	p-value
TANGIBILITY	8.4	0.00	9.5	0.00	1.0	0.00	-0.5	0.00	-1.1	0.12	-1.3	0.21
BANK DEBT	14.3	0.00	32.0	0.00	2.2	0.00	-0.3	0.21	-2.2	0.03	-6.5	0.01
LEVERAGE 1	-13.0	0.00	-18.0	0.00	-15.2	0.00	-14.0	0.00	-19.1	0.00	-19.3	0.00
LEVERAGE 2	-21.6	0.00	-25.2	0.00	-39.5	0.00	-32.9	0.00	-30.8	0.00	-29.1	0.00
CURRENT RATIO	0.4	0.00	0.2	0.00	0.5	0.00	0.4	0.00	0.5	0.00	0.2	0.00
ROA 1	13.0	0.00	5.5	0.00	7.8	0.00	3.8	0.00	14.3	0.00	5.4	0.00
ROA 2	12.6	0.00	6.2	0.00	7.8	0.00	4.8	0.00	17.2	0.00	7.2	0.00
SIZE	-1.2	0.00	-1.2	0.00	-0.4	0.00	-0.5	0.00	-1.0	0.00	-1.1	0.00
LNAGE	-0.1	0.00	-0.2	0.00	-0.2	0.00	-0.3	0.00	0.0	0.47	-0.1	0.06
AV.EMPL.COST	-6.0	0.00	-6.4	0.00	2.3	0.00	0.6	0.01	2.5	0.00	0.6	0.18
INT.COV.RATIO	4.8	0.00	2.4	0.00	7.6	0.00	3.9	0.00	9.0	0.00	3.6	0.00

5.2 Explaining the probability of bankruptcy: multivariate analyses

5.2.1 Methodology: statistical and economic significance.

The multivariate analyses consist of two steps. In the first one (section 5.2.2) within-country regressions are run to ascertain whether the proposed proxy for the activity *holding mortgage debt*, TANGIBILITY, has a *statistically* significant and negative impact on the probability of bankruptcy in each country, once other determinants are controlled for. However, the estimated *marginal effects* say little about the *economic significance* of the effect, i.e., its *size*. Therefore a second step in the analysis (section 5.2.3) , consists of assessing whether such an impact is economically significant and comparing it across countries.

The distinction between economic and statistical significance (Miller and Van Der Meulen, 2008, Wooldridge, 2003) is crucial in our case because in very large samples like ours it is common to find high levels of statistical significance for even very small regression coefficients (Wooldridge, 2003).

5.2.2 Multivariate analysis: marginal effects and statistical significance.

Formally the proposed within-country regressions can be expressed as follows:

$$BANKRUPTCY_{ij} = \beta_o^j + \beta_1^j \cdot TANGIBILITY_{ij} + \sum_{k=2}^{K} \beta_k^j \cdot CONTROL_{ij}^k + \epsilon_{ij}$$
$$\forall i = 1, ..., N_j; j = Spain, France, U.K.$$

where $BANKRUPTCY_{ij}$ is a dummy variable that equals 1 if the firm was undergoing a bankruptcy procedure when the data were extracted (2010) and 0 otherwise, $TANGIBILITY_{ij}$ is the % of tangible fixed assets to total assets and $CONTROL_{ij}^k$ expresses a set of k control variables that changes depending on the specification.

The within-country regressions are displayed in tables 11, 12 and 13, corresponding to the estimation of 4 different specifications for Spain, France and UK, respectively, by a logistic model. We report the average marginal effects.[29] These effects are expected to be very small since the baseline probability -the proportion of bankrupt firms in the sample- is very low, namely 0.65%, 1.07% and 1.06% for Spain, France and U.K., respectively.

Specification (1) is the baseline regression, and includes as controls BANK DEBT, LEVERAGE 1, ROA 1, CURRENT RATIO, SIZE and its square -to capture highly non-linear relationships- and LNAGE, as well as sector dummies and a constant. Specifications (2), (3) and (4) use the same regressors but

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[29]For a continuous variable x_i the average marginal effect (AME) is:
$AME_i = \beta_i \cdot \frac{1}{n} \sum_{k=1}^{n} f\left(\beta x^k\right)$ where βx^k denotes the value of the linear combination of parameters and variables for the kth observation, $f(.) \equiv F'(.)$ and $F(.)$ is a cumulative distribution function so that $F : \beta x \longrightarrow [0, 1]$. For a further discussion see Bartus (2005).

adding AV.EMPL.COST and/or INT.COV.RATIO at the expense of a substantial reduction in the number of available observations.

In Spain (Table 9) TANGIBILITY has a negative impact on the probability of bankruptcy. This effect is robust across all the specifications, since the marginal effects are always significant at a 1% confidence level. In France (Table 10), TANGIBILITY also has a negative effect on the probability of bankruptcy. By contrast, in UK (Table 11), TANGIBILITY is not robust to changes in the specification, since it is not significant in (1). The size of the marginal effects across countries cannot compared as the underlying theory does not tell us whether they should be higher or lower for Spain. A theoretical discussion on this issue is provided in Appendix D. Most of the controls are significant and with the expected sign.

Table 9: average marginal effects (%) for the probability of bankruptcy for Spain

Dep. var.: BANKRUPTCY. Baseline probability=0.65%. All regressions include sector dummies and a constant. Estimator: Logit. Robust standard errors in parentheses. *, **, and ***, significant at 10, 5, and 1 % level.

	(1)	(2)	(3)	(4)
TANGIBILITY	**-0.0072*****	**-0.0084*****	**-0.0086*****	**-0.0100*****
	(0.0005)	**(0.0006)**	**(0.0006)**	**(0.0007)**
BANK DEBT	-0.0013***	-0.0010**	-0.0016***	-0.0011**
	(0.0003)	(0.0004)	(0.0004)	(0.0005)
LEVERAGE 1	0.0050***	0.0059***	0.0049***	0.0060***
	(0.0004)	(0.0005)	(0.0005)	(0.0006)
ROA 1	-0.0777***	-0.0819***	-0.0844***	-0.0886***
	(0.0017)	(0.0019)	(0.0022)	(0.0025)
CURRENT RATIO	-0.2136***	-0.2690***	-0.2357***	-0.3043***
	(0.0120)	(0.0162)	(0.0144)	(0.0196)
SIZE	1.7683***	1.9434***	2.0123***	2.2157***
	(0.0838)	(0.0998)	(0.1014)	(0.1201)
SIZE^2	-0.0922***	-0.1028***	-0.1047***	-0.1173***
	(0.0052)	(0.0063)	(0.0062)	(0.0075)
LNAGE	-0.0420**	-0.0792***	-0.0456*	-0.0874***
	(0.0214)	(0.0250)	(0.0256)	(0.0297)
AV.EMPL.COST		0.0058***		0.0072***
		(0.0011)		(0.0013)
INT.COV.RATIO			-0.0158***	-0.0164***
			(0.0030)	(0.0034)
N	387,305	317,983	313,100	259,063
Pseudo R2	27.13%	28.04%	25.88%	26.65%

Table 10: average marginal effects (%) for the probability of bankruptcy for France

Dep. var.: BANKRUPTCY. Baseline probability=1.07%. Average marginal effects. All regressions include sector dummies and a constant. Estimator: Logit. Robust standard errors in parentheses. *, **, and ***, significant at 10, 5, and 1 % level.

	(1)	(2)	(3)	(4)
TANGIBILITY	**-0.0203*****	**-0.0297*****	**-0.0240*****	**-0.0356*****
	(0.0008)	**(0.0015)**	**(0.0015)**	**(0.0029)**
BANK DEBT	-0.0021***	-0.0022**	-0.0073***	-0.0076***
	(0.0005)	(0.0009)	(0.0009)	(0.0019)
LEVERAGE 1	0.0121***	0.0164***	0.0122***	0.0153***
	(0.0005)	(0.0009)	(0.0009)	(0.0018)
ROA 1	-0.0353***	-0.0430***	-0.0517***	-0.0559***
	(0.0014)	(0.0023)	(0.0027)	(0.0053)
CURRENT RATIO	-0.9416***	-1.1871***	-0.9919***	-1.3353***
	(0.0275)	(0.0502)	(0.0461)	(0.0939)
SIZE	1.8957***	2.6362***	2.6990***	3.8822***
	(0.0709)	(0.1258)	(0.1434)	(0.2812)
SIZE^2	-0.1397***	-0.1907***	-0.1943***	-0.2787***
	(0.0055)	(0.0096)	(0.0106)	(0.0204)
LNAGE	0.5590***	0.6262***	0.4742***	0.4643***
	(0.0195)	(0.0328)	(0.0331)	(0.0597)
AV.EMPL.COST		-0.0105***		-0.0148***
		(0.0011)		(0.0022)
INT.COV.RATIO			-0.0136***	-0.0236***
			(0.0016)	(0.0030)
N	707,163	322,139	319,316	128,830
Pseudo R2	11.58%	10.99%	10.95%	10.20%

Table 11: average marginal effects (%) for the probability of bankruptcy for UK.

Dep. var.: BANKRUPTCY. Baseline probability=1.06%. All regressions include sector dummies and a constant. Estimator: Logit. Robust standard errors in parentheses. *, **, and ***, significant at 10, 5, and 1 % level.

	(1)	(2)	(3)	(4)
TANGIBILITY	**-0.0017**	**-0.0095*****	**-0.0076*****	**-0.0140*****
	(0.0015)	**(0.0034)**	**(0.0027)**	**(0.0045)**
BANK DEBT	-0.0041***	-0.0010	-0.0056**	-0.0023
	(0.0014)	(0.0028)	(0.0023)	(0.0037)
LEVERAGE 1	0.0467***	0.0529***	0.0570***	0.0643***
	(0.0032)	(0.0050)	(0.0050)	(0.0068)
ROA 1	-0.0284***	-0.0350***	-0.0319***	-0.0316***
	(0.0023)	(0.0039)	(0.0038)	(0.0055)
CURRENT RATIO	-0.3525***	-0.8281***	-0.6565***	-1.1020***
	(0.0654)	(0.1591)	(0.1275)	(0.2169)
SIZE	2.4316***	3.1350***	2.8520***	3.3968***
	(0.2277)	(0.5920)	(0.3603)	(0.8043)
SIZE^2	-0.1413***	-0.1803***	-0.1678***	-0.1987***
	(0.0140)	(0.0334)	(0.0222)	(0.0451)
LNAGE	-0.1678**	-0.0805	-0.1320	0.0106
	(0.0659)	(0.1017)	(0.0981)	(0.1290)
AV.EMPL.COST		-0.0107**		-0.0161***
		(0.0042)		(0.0058)
INT.COV.RATIO			-0.0267***	-0.0341***
			(0.0035)	(0.0051)
N	55,487	26,323	31,678	18,823
Pseudo R2	17.63%	15.20%	15.50%	15.74%

A word of caution must be added when drawing conclusions from the above estimations. The reason is the potential endogeneity of some of the regressors due to the existence of omitted variables and/or simultaneity. The omitted-variable bias could arise due to the correlation of some regressors with some unobservable factors (e.g., managerial skills, incentives and reputational concerns, risk-taking of the company's business model)[30].

The simultaneity bias could arise if the bankruptcy process affects the financials of the company. For instance, once a firm files for bankruptcy, one could expect it to lose customers due to the reputational loss (which would reduce profits and in turn ROA), to see its available credit reduced due to the increased risk perceived by potential lenders (which would reduce LEVERAGE)

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[30]We attempted to control for unobserved heterogeneity via a conditional (fixed effects) logit for Spain, the only dataset for which we have the date of bankruptcy filing, so that a panel can be constructed. However, the estimations -available upon request- yielded unstable coefficients which changed sign and significance depending on the specification. The reason is that any fixed effects estimator is not a good approach when dealing with rare events data (Beck & Katz, 2001; Greenland et al., 2000). Since those estimators drop all the observations without temporal variation in the dependent variable (i.e. $BANKRUPTCY_{it} = 0$ or $BANKRUPTCY_{it} = 1 \ \forall \ t$) and only 0.65% of the firms are bankrupt, we lose more than 99% of the observations.

or to experience a loss of some physical assets in countries/circumstances where there is no an automatic stay on them (which would reduce TANGIBILITY). Ideally, in order to avoid this source of endogeneity, we would like to only use the last financials of each company right before the bankruptcy filing. However, since the information about the year in which the firm filed for bankruptcy is not available, we minimise this problem by only using data on firms that are *currently* undergoing a bankruptcy procedure, and not data on firms that ceased their activities following one. The reason is that the financials of the latter are expected to be much more influenced by the bankruptcy process, since we would likely pick up the last or one of the last financial statements of the companies before being liquidated, and hence the statements of companies that had been operating under bankruptcy for a long time. Furthermore, the fact that all our regressors are lagged -since we construct them from financial statements of 2008, while the dependent variable is computed using information of 2010- should signficantly reduce the simultaneity bias.

5.2.3 Multivariate analysis: size of the effects and economic significance.

The previous regressions estimate the *marginal* effects of the proposed factor on the probability of filing for bankruptcy and the sign of those effects. Most of them are significant for any confidence level, but this does not come as surprise due the large size of our sample. In this section we want to assess the *size* (i.e., the economic significance) of those effects and to ascertain whether they are greater in Spain than in the other two countries.

We will measure the size of the proposed "bankruptcy-avoidance" activity X (i.e., *holding mortgage debt*) by the *percentage change in relative risk (pcrr)*. The relative risk rr (or risk ratio) measures how likely is an event to ocurr in the reference group relative to its probability in the control group.[31] In formal terms it is defined as:

$$rr = \frac{\Pr(event/ReferenceGroup)}{\Pr(event/ControlGroup)}$$

The *pcrr* is $-100 \cdot (rr - 1)$. In our particular application, we will measure it as the percentual reduction in the probability of filing for bankruptcy that is caused by increasing the intensity of the activity from $X = X_0$ to $X = X_1$, where $X_1 > X_0$. Formally, our quantity of interest will be

$$pcrr = -100 \cdot \left(\frac{\Pr(BANKRUPTCY=1/X=X_1)}{\Pr(BANKRUPTCY=1/X=X_0)} - 1 \right)$$

Given our proxy for the activity *holding mortgage debt,* TANGIBILITY, we decide to take as X_0 the value 0 -which effectively implies eliminating the effect of that variable on the probability of bankruptcy- and take its mean as

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[31] We have decided not to use the odds ratio following the criticisms of King & Zeng (2002) and Miller & Van Der Meulen (2008).

X_1. Therefore, what we compute as the *pcrr* is the relative difference in the probability of filing for bankruptcy between a firm that engages in the activity with mean intensity and another one that does not engage in such an activity at all.

For each country the *pcrr* is derived in two steps. In the first step the within-country regressions that were shown in tables (9), (10) and (11) are estimated by a Rare Events Logistic Regression or relogit (King and Zeng, 2001a and 2001b). The relogit addresses the fact that the ordinary logit yields downwardly biased coefficients when the dependent variable is a rare event, i.e., a binary variable whose number of 1's -"events"- is much lower than the number of 0's -"non-events", as it is our case.[32] However, given the large size of our sample and the fact the ordinary logit is still consistent in the case of rare events, we expect the correction to be quite small.[33] In the second step the *pcrr* is computed for each country and specification, evaluating the estimated probability functions $\Pr(BANKRUPTCY = 1/X = X_1)$ and $\Pr(BANKRUPTCY = 1/X = X_0)$ at the country-mean of TANGIBILITY and at the value zero of that variable, respectively.

Table 12 shows the point estimates of the *pcrr* of TANGIBILITY for each country, as well as their respective confidence intervals at 95%, derived from the regression of specification (1) for each country (see tables 9, 10 and 11).[34] The table shows that, in Spain, engaging in the activity *holding mortgage debt* with mean intensity reduces, ceteris paribus, the probability of filing for bankruptcy by 35.3%. In France and in U.K. the corresponding reductions are substantially smaller, 23.4% and 4.7%, respectively. Furthermore, these differences are statistically significant for (at least) a 95% confidence level.

Table 12: percentage change in relative risk (pcrr) of TANGIBILITY using specification (1) (evaluated at its means)

Spain	France	UK
35.3	23.4	4.7
(31.8,38.9)	(21.8,25.0)	(-3.9,13.0)

The pcrr is $-100 \cdot \left(\frac{\Pr(BANKRUPTCY=1/X=X_1)}{\Pr(BANKRUPTCY=1/X=X_0)} - 1 \right)$, *where X_0 and X_1 are, respectively, 0 and the mean of TANGIBILITY for each country. 95% confidence intervals in parenthesis. Estimator: Rare Events Logit*

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[32] As shown in Table 6, the proportion of bankrupt firms is 0.65% for Spain, 1.07% for France and 1.06% for U.K.

[33] In fact we have run the regressions of tables (9), (10) and (11) both by a relogit and a conventional logit. The results -available upon request- show very similar regression coefficients.

[34] Following King and Zeng (2001a, 2002), both the point estimates and the confidence intervals are obtained via stochastic simulation. Specifically, the point estimates are the medians of the simulated posterior densities.

Alternatively, we can compute the *pcrr* as the relative difference in the probability of filing for bankruptcy between a firm that engages in the proposed activity with *median* intensity and another one that does not engage in such an activity at all, i.e., we proxy X_1 with the median of TANGIBILITY. This is shown in Table 13, using again specification (1). Like in the previous table, the total effect of TANGIBILITY in Spain is substantially greater than in the other two countries, and the implied differences are statistically significant for (at least) a 95% confidence level.

Table 13: percentage change in relative risk (pcrr) of TANGIBILITY using specification (1) (evaluated at its medians)

Spain	France	UK
29.1	13.3	2.9
(26.1,32.2)	(12.3,14.3)	(-3.0,8.5)

The pcrr is $-100 \cdot \left(\frac{\Pr(BANKRUPTCY=1/X=X_1)}{\Pr(BANKRUPTCY=1/X=X_0)} - 1 \right)$, where X_0 and X_1 are, respectively, 0 and the median of TANGIBILITY for each country. 95% confidence intervals in parenthesis. Estimator: Rare Events Logit

In order to assess the robustness of our results, the total effects of TANGIBILITY have been computed using other specifications, as it is shown in Appendix E. The main finding is that the *pcrr* of TANGIBILITY is always greater for Spain than for France and U.K., and the implied differences are statistically significant and, more important, sizeable. Therefore, we can conclude that *holding mortgage debt* is a "bankruptcy-avoidance activity" with a much higher impact in Spain: making use of our favourite specification (1), in Spain such an activity reduces the probability of filing for bankruptcy, ceteris paribus, between a 29.1 and a 35.3% (tables 12 and 13).

5.3   Testing differences in "implied insolvency tests".

There are two competing hypotheses on the extremely low bankruptcy rates in Spain. The one supported in this paper is that Spanish firms reduce the risk of bankruptcy because of the unattractiveness of the bankruptcy procedure, i.e., the distribution of Spanish firms in terms of their bankruptcy risk differs from that of other countries with higher bankruptcy rates. The alternative hypothesis is that the distribution of Spanish firms in terms of their bankruptcy risk is not different from that of other countries, but what differs is the legal threshold that separates insolvent from non-insolvent firms.

In other words, the Spanish bankruptcy legislation would be "softer", in the sense that it would make filing for bankruptcy a legal requirement only when firms are in a situation of extreme financial distress, leaving more room for private workouts. A firm would enter a bankruptcy procedure only in rare events,

when private workouts fail, or when its financial condition is so desperate that a private workout is not even attempted. This view would imply that the low bankruptcy rates are nothing but a statistical reflection of a legislation with an unusually low "implied insolvency test" that assigns more firms in financial distress to informal workouts (difficult to document) and fewer to formal bankruptcies (recorded in official statistics). Let us summarise this hypothesis as:

H1: *The extremely low bankruptcy rates in Spain are a consequence of a bankruptcy code with an unusually low implied insolvency test, in the sense that makes filing for bankruptcy a legal requirement only when firms are in a situation of extreme financial distress, leaving more room for private workouts.*

In this section we will reject this hypothesis both theoretically and empirically. First of all, the Spanish bankruptcy law, like the ones of France and UK, gives incentives for early filing through several mechanisms, so that the firm enters the bankruptcy procedure as soon as possible to avoid further deterioration of its financials (Celentani *et al.* 2010, 2012). Furthermore, private workouts are often unfeasible due to high bargaining costs, as previously explained.

Regardless of the strength of these theoretical objections, the hypothesis can also be tested empirically by studying whether the Spanish firms that have filed for bankruptcy are in worse financial conditions than their foreign counterparts or not. This is done by constructing several indicators of financial distress, liquidity, profitability, leverage and solvency for the bankrupt firms in the sample, and comparing their differences in means and medians across countries. Ideally, in order to construct those variables, we would use the last financial statement prior to the bankruptcy filing of each firm, so we can measure the financial soundness of the firms at the moment they enter the insolvency procedure and hence the softness or toughness of the insolvency tests implied by each bankruptcy system. But, since we only have the status of the firm at the moment in which the data were extracted from the Orbis database (2010), we minimise the effect that the different bankruptcy procedures could have on the firms' once they have entered the procedure by keeping firms that are operating under bankruptcy while eliminating firms that ceased their operations after being involved in a bankruptcy procedure. The reason is that the financials of the latter are expected to be much more influenced by the bankruptcy process, since we would likely pick up the last or one of the last financial statements of the companies before being liquidated, and hence the statements of companies that had been operating under bankruptcy for a long time.

The indicators that we use to assess the financial soundness of the firms are some variables already explained (CURRENT RATIO, ROA 2, LEVERAGE 1, LEVERAGE 2) plus the Altman's Z-Score (Altman, 2000) and the proportion of negative-equity firms in each country.[35] The Altman's Z-Score is a weighted sum of four variables that represent liquidity, solvency, profitability and leverage.

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[35] We prefer to use ROA 2, instead of ROA 1, because it is computed using EBITDA while ROA 1 uses net income. Since the purpose of this analysis is to compare financials

Both the weights and the variables are chosen by using discriminant analysis to find the linear combination that best predicts bankruptcy.[36] The higher the Z, the lower the probability of financial distress.[37] With respect to the proportion of negative-equity firms in each country, a firm is said to have negative equity when the book value of its assets is lower than the book value of its liabilities. There is a positive correlation between negative equity and financial distress.[38]

The means and standard deviations (in parentheses) of those indicators for each country are shown in Table 14. Each panel of Table 14 is organised so that the country with the highest mean appears in the second column, the country with the second highest mean in the third column and so on. The presence of an asterisk (*), two asterisks (**) or three asterisks (***) next to a particular figure indicates that the difference between the mean of that particular variable for that particular country and the mean of the same variable for the country that has the closest but lower mean is statistically different from zero at a 10% (*), 5% (**) or 1% (***) confidence level. This is found through one-sided p-values of two-sample t-tests.[39]

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across different countries, which differ in things such as taxation and accounting rules for depreciation and amortization, EBITDA seems more appropriate than net income to enhance comparability. We do not analyse INT.COV.RATIO because of its very high correlation (≥ 0.7) with ROA 2 among bankrupt firms in the 3 countries.

[36]The Z-Score has several versions depending on the type of firms to be analysed. The one used in this paper is for non-listed firms that do not necessarily belong to the manufacturing sector. The exact formula is: $Z = 6.56 \cdot X_1 + 3.26 \cdot X_2 + 6.72 \cdot X_3 + 1.05 \cdot X_4$ where $X_1 =$ (Current Assets-Current Liabilities) / Total Assets; $X_2 =$ Retained Earnings / Total Assets; $X_3 =$ Earnings Before Interest and Taxes / Total Assets; $X_4 =$ Book Value of Equity / Total Liabilities.

[37]Altman (2000) distinguishes 3 discrimination zones: a) "Safe" Zone: $Z > 2.6$; b) "Grey" Zone: $1.1 \leq Z \leq 2.6$; c) "Distress" Zone : $Z < 1.1$.

[38]Although there are firms that can have negative equity without being in financial distress because the book value of their assets is much lower than their market value (for instance, some companies have very valuable brands, but these resources only show up in the balance sheet as intangible assets when the company is purchased by another one, in the form of goodwill).

[39]Two-sample t-tests for the equality of means can be implemented with and without the assumption of equal population variances. See footnote 33.

Table 14: Financial Distress Indicators: means and standard deviations (s.d.)

Each panel is organised so that the country with the highest mean appears in the second column, the country with the second highest mean in the third column and so on. The presence of an asterisk (*), two asterisks (**) or three asterisks (***) next to a particular figure indicates that the difference between the mean of that particular variable for that particular country and the mean of the same variable for the country that has the closest but lower mean is statistically different from zero at a 10% (*), 5% (**) or 1% (***) confidence level. This is found through one-sided p-values of two-sample t-tests.

Panel A: Altman's Z-Score

country	U.K.	Spain	France
mean (s.d.)	-0.21*** (3.36)	-0.82***(3.93)	-1.90 (5.30)
N	590	2,255	7,295

Panel B: ROA 2

country	France	U.K.	Spain
mean (s.d.)	3.50* (17.42)	2.39*** (16.07)	-6.11 (20.10)
N	7,632	591	2,586

Panel C: CURRENT RATIO

country	Spain	France	U.K.
mean (s.d.)	1.10*** (0.71)	0.95*** (0.58)	0.88 (0.56)
N	2,718	7,938	1,229

Panel D: LEVERAGE 1

country	U.K.	France	Spain
mean (s.d.)	53.87** (39.12)	51.59* (34.51)	50.61 (30.12)
N	1,229	7,938	2,718

Panel E: LEVERAGE 2

country	France	U.K.	Spain
mean (s.d.)	91.77*** (56.04)	84.73 (52.01)	82.53 (36.66)
N	6,194	1,098	2,316

Panel G: % negative-equity firms

country	France	U.K.	Spain
mean (s.d.)	45.24*** (49.78)	33.61 (47.25)	32.89 (46.99)
N	7,938	1,229	2,718

Table 15 is structured in the same way, but showing medians instead.[40] The statistical differences are found through one-sided p-values of Fischer exact tests.

Table 15: Financial Distress Indicators: medians

Each panel is organised so that the country with the highest median appears in the second column, the country with the second highest median in the third column and so on. The presence of an asterisk (*), two asterisks (**) or three asterisks (***) next to a particular figure indicates that the difference between the median of that particular variable for that particular country and the median of the same variable for the country that has the closest but lower median is statistically different from zero at a 10% (*), 5% (**) or 1% (***) confidence level. This is found through one-sided p-values of Fischer exact tests.

Panel A: Altman's Z-Score

country	U.K.	Spain	France
median	0.23	0.04***	-0.55
N	590	2,255	7,295

Panel B: ROA 2

country	France	U.K.	Spain
median	5.38**	4.36***	-0.12
N	7,632	591	2,586

Panel C: CURRENT RATIO

country	Spain	France	UK
median	0.97***	0.89	0.88
N	2,718	7,938	1,229

Panel D: LEVERAGE 1

country	U.K.	Spain	France
median	50.58	50.16***	45.80
N	1,229	2,718	7,938

Panel E: LEVERAGE 2

country	France	Spain	U.K.
median	90.20**	88.01**	85.39
N	7,481	2,585	1,203

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[40] For the computation of the medians of LEVERAGE 2, the firms with negative values for its denominator have been assigned the maximum value of LEVERAGE 2 of the distribution. LEVERAGE 2 is computed as Debt*100/(Debt + Equity). The numerator is always positive, but the denominator -and consequently the variable- may be negative for very negative values of Equity. Firms with very negative equity are heavily leveraged but, since they have a negative value for LEVERAGE 2, its inclusion would cause a downward bias of the mean and the median of the variable. For the computation of the means, those observations have been removed.

From the analysis of tables 14 and 15 the following findings on the bankrupt firms of the sample can be summarised: a) In terms of the Altman's Z-score, Spanish and British firms have better financials than the French ones; b) Spanish companies have the lowest levels of profitability (ROA 2); c) Spanish firms have the highest levels of liquidity (CURRENT RATIO); d) Spanish firms have the lowest levels of *mean* leverage and intermediate levels of *median* leverage (LEVERAGE 1 and LEVERAGE 2); e) Spain and U.K. have a lower proportion of negative-equity firms than France.

These findings lead to the conclusion that the Spanish firms that file for bankruptcy are not in worse financial conditions than their European counterparts. The only criterion in which the Spanish bankrupt firms score much lower than the French and British ones is profitability (ROA 2). However, this is also the case for non-bankrupt firms. As shown in the panels A of Table 8, the mean (median) ROA 2 for Spanish non-bankrupt firms is 6.5 (6.1), while for the French ones is 11.3 (10.1) and for the British ones is 19.6 (11.6). Therefore, the fact that the Spanish bankrupt companies are less profitable than their European counterparts can be explained by the mere observation that in general Spanish companies, regardless of their status, are less profitable. Therefore the empirical evidence rejects the hypothesis that the Spanish bankruptcy code implies a lower "insolvency test", which assigns more firms in financial distress to informal workouts and fewer to formal bankruptcies.[41]

6 Conclusions

Spain has one of the world's lowest business bankruptcy rates, i.e., number of business bankruptcies divided by the total number of firms in the economy. This paper presents and tests a hypothesis that attempts to explain this empirical finding. According to this hypothesis, the low efficiency of the Spanish bankruptcy system relative to that of an alternative insolvency institution, the mortgage system, would make Spanish firms hold a high proportion of mortgage debt, since this reduces the cost of credit and facilitates the use of the mortgage system in the event of default, hence avoiding filing for bankruptcy. In other words, *holding mortgage debt* is a very effective "bankruptcy-avoidance" activity in Spain. Furthermore, the fact that the Spanish *personal* insolvency law, which applies to unincorporated companies and many small firms, is very severe towards the individual debtor, makes filing for bankruptcy very unattractive to those firms, giving them strong incentives to use the mortgage system instead.

We test this hypothesis empirically with financial and economic data on more than 1 million Spanish, French and British firms from the OECD-Orbis database. The main conclusion from the analysis is that *holding mortgage debt* is a "bankruptcy-avoidance activity" with a much greater impact in Spain than in the other two countries. Making use of our favourite econometric specification,

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[41] As a robustness analysis, we have removed very large firms and firms with consolidated accounts because the distribution of bankrupt firms across countries differs greatly in these two aspects. The results -available upon request- lead to the same general conclusion.

in Spain such an activity reduces the probability of filing for bankruptcy, ceteris paribus, between a 29.1 and a 35.3%. We take these results as strong evidence supporting the proposed hypothesis.

Other findings lead us to reject an alternative hypothesis about the extremely low bankruptcy rates in Spain, namely that they are a consequence of a bankruptcy code with an unusually low "implied insolvency test", in the sense that makes filing for bankruptcy a legal requirement only when firms are in a situation of extreme financial distress, leaving more room for private workouts. This should be reflected in the data in the Spanish firms that file for bankruptcy having worse financials than their French and British counterparts, but this is not the case.

The very low bankruptcy rates in Spain are not a statistical anecdote with no implications on the real economy but they may be associated with low levels of welfare.[42] The reason is that bankruptcy procedures and mortgage foreclosures are not perfect substitutes for each other. The mortgage system is not well suited for some industries, which incur in several deadweight losses when using it. First, in order to use the mortgage system, many firms must overinvest in tangible fixed assets since those are the assets that can be pledged as mortgage collateral.[43] This overinvestment leads to productive inefficiencies, which may be very costly for industries that require a high level of intangible assets (e.g., R&D) or current assets (e.g., retail trade). Second, mortgage foreclosures always entail piecemeal liquidation of the firm's assets -while in bankruptcy the firm is sometimes kept as a going concern- which leads to some inefficient liquidations. This deadweight loss will be greater for firms with low liquidation values but high going-concern ones, such as those from technologically innovative industries, which are normally characterised by high levels of human capital and firm-specific assets.

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[42]The following arguments are formally analysed by García-Posada (2012).

[43]For instance, by substituting labour for capital or by purchasing machinery instead of renting it, since in the first way it can be included in the mortgage contract.

7 Appendix A: comparability of bankruptcy rates across countries.

The business bankruptcy rate is the number of commercial bankruptcies divided by the number of businesses in the country. It measures the use of *formal* bankruptcy -defined as a legal procedure that imposes court supervision over the financial affairs of an insolvent firm or individual- by the firms and entrepreneurs in an economy. However, as explained in section 2.1, there are alternative out-of-court procedures, such as informal workouts and foreclosures, which can be used instead. Hence the bankruptcy rate does not necessarily reflect the level of effective insolvencies, since it does not take into account all the legal remedies used by insolvent firms in each country. This is one of the key points of our paper: Spanish firms may go insolvent as much as in other countries, but they rarely use the bankruptcy system for dealing with financial distress.

Nevertheless, it is necessary to make sure that the statistics on bankruptcy rates that motivate this paper, obtained from Euler Hermes (2007), compare similar concepts across countries. Euler Hermes (2007) provides a summary of the different legal procedures regarded as "bankruptcy" in each country, as well as a brief description of each national bankruptcy legislation. This allows the reader to know exactly which insolvency procedures are reflected in the reported bankruptcy rate of each country.

Euler Hermes (2007) also classifies all bankruptcy procedures into four theoretical types, according to several criteria such as the degree of financial distress of the company or the main goal of the procedure: amicable preventative procedures, preventative court procedures, court insolvency procedures and court liquidation procedures. Table 16 shows this classification for some developed economies.[44]

Amicable preventative procedures (e.g. *mandat ad hoc* and *conciliation* in France) apply to companies that are experiencing financial difficulties but have not defaulted yet. The procedure aims to facilitate workouts by providing an independent court-appointed mediator with expertise in resolving such disputes. Preventative court procedures (e.g. *sauvegarde* in Frace) are formal workout negotiations for companies that have not ceased payments yet but are close to do it. The goal of the procedure is to present a safeguard plan drawn up by the debtor, approved by the creditors and confirmed by the court.Court insolvency procedures (e.g. *redressement judiciaire* in France) are rescue-oriented procedures for insolvent companies, which also seek the satisfaction of creditors via a repayment plan. Court liquidation procedures (e.g. *liquidation judiciaire* in France) consist of the sale of the firm's assets, supervised by the court, to pay back creditors.

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[44]The Spanish case has been updated because there exists a preventative court procedure (*convenio anticipado*) in Spain since the reform of the bankruptcy law in 2009.

Table 16: The different types of bankruptcy procedures.

Source: Euler Hermes (2007) and authors' elaboration.

	Germany	Belgium	Denmark	Spain	Norway	Netherlands	Poland
Amicable preventative procedures	Vergleich	n.a.	Akkord	n.a.	Frivillig akkord	Minneljik Incassotraject	n.a.
Preventative court procedures	n.a.	n.a.	Betalings standsning	Convenio anticipado	Tvungen akkord	n.a.	Postepowanie Naprawcze
Court insolvency procedures	Insolvenzplanverfahren	Gerechtelijk Akkoord Le Concordat	Akkord	Concurso de acreedores	n.a.	Surseance van Betaling	Postepowanie Upadlosciowez mozliwosciazawarcia Ukladu
Court liquidation procedures	Insolvenz mangels Masse Insolvenz eröffnet	Het Faillissement La Faillite	Konkurs	Concurso de acreedores	Konkur Sloven	Faillissements procedur	Postepowanie Upadlosciowe w celu likwidacji Majatku

	Finland	France	Greece	Italy	UK	Sweden	USA
Amicable preventative procedures	n.a.	Mandataire ad hoc Conciliation	Sindialagi	Accordo di ristrutturazione dei debiti	n.a.	Underhands ackord	n.a.
Preventative court procedures	n.a.	Sauvegarde	n.a.	Concordato preventivo	Company voluntary arrangement	Företags rekonstruktion	Prepackaged bankruptcy
Court insolvency procedures	Yrityssan eeraus	Redressement judiciaire	Anadior ganosi	Concordato fallimentare	Administration	n.a.	Chapter 11
Court liquidation procedures	Konkurssi	Liquidation judiciaire	Ptochefsi	Procedura fallimentare	Creditors voluntary & compulsory liquidation	Konkurs	Chapter 7

8 Appendix B: the variable status in Orbis and elimination of companies according to their status.

The variable status attempts to standardise the large variety of legal statuses that a firm can have in every country covered by Orbis. Status distinguishes between active companies and inactive companies (i.e., companies that have exited the market) and, within these two broad categories, it has 12 sub-categories, which are shown in Table 17.

Table 17: categories and subcategories of status in Orbis.

ACTIVE	INACTIVE
Active	Bankruptcy
Active (default of payments)	Dissolved
Active (receivership)	Dissolved (merger)
Active (dormant)	Dissolved (demerger)
Active (branch)	In liquidation
	Inactive (branch)
	Inactive (no precision)

Despite the efforts of Bureau Van Dijk to enhance comparability of statuses across countries through these 12 labels, in practice some categories have a different meaning depending on the country. For the construction of the variable BANKRUPTCY we are especially interested in differentiating between companies that are operating under bankruptcy arrangements and those that ceased their operations after being involved in a bankruptcy procedure. In the former case, all companies still operating under bankruptcy have the status "Active (receivership)". The latter case is a bit more complicated. In France it corresponds to firms with status "Bankruptcy", while in U.K. it corresponds to the status "In liquidation". In Spain, the status "Dissolved" comprises firms that ceased their operations after bankruptcy, voluntary dissolutions and dissolutions caused by other reasons.

We eliminate some firms according to their status when selecting our sample. Within the active category we remove dormant firms and branches. Within the inactive category we eliminate firms that ceased their operations after being involved in a bankruptcy procedure. The main reason is that those firms can be unmistakenly identified in the case of France and U.K., but in Spain they are included within a sub-category that also comprises non-bankruptcy exits, which would lead to erroneous inferences. Furthermore, as it was explained in the relevant sections, the inclusion of firms that ceased their operations after a bankruptcy procedure would increase endogeneity problems in our regressions (section 5.2.2) and could lead to incorrect conclusions about the "implied insolvency test" of each national bankruptcy code (section 5.3). Finally, we eliminate

"healthy exits", i.e., firms that shut down their operations without being in financial distress. Although identifying a "healthy exit" is easy in some cases (dissolved following a merger or a demerger), it is not in others. For these other cases, in order to make sure that we only keep firms that exited the market following a situation of financial distress, we eliminate the firms whose Altman Z-score is greater or equal to 1.1.[45]

9 Appendix C: size classification of the Orbis database.

The criteria for the size classification of Orbis combines four elements: value of operating revenue, value of total assets, number of employees and whether the company is listed or not.

1. Very large companies: Operating revenue >= 100 million € OR Total assets>=200 million € OR Employees>=1,000 OR Listed.

2. Large companies: Operating revenue >= 10 million € OR Total assets>=20 million € OR Employees>=150 AND NOT Very Large.

3. Medium sized companies: Operating revenue >= 1 million € OR Total assets>=2 million € OR Employees>=15 AND NOT Very Large OR Large.

4. Small companies: not included in any of the previous categories.

10 Appendix D: the size of the marginal effects of TANGIBILITY.

We do not compare the size of the marginal effects of TANGIBILITY across countries because the underlying theory does not tell us whether they should be higher or lower for Spain. TANGIBILITY is the proxy for the "bankruptcy-avoidance" activity *holding mortgage debt,* which we will call X. The (expected) benefit from such an activity is the probability of avoiding bankruptcy times the cost of bankruptcy (C):

$B(X) = C \cdot (1 - P(X))$ where $P(X)$ is the probability of bankruptcy.

Differentiating with respect to X we find its marginal benefit (MB):

$MB(X) = -C \cdot P'(X)$ where $P'(X) \equiv \frac{\partial P(X)}{\partial X} < 0$

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[45]The Altman Z-Score, originally developed for bankruptcy prediction, is now considered a good proxy for other types of financial distress (Grice and Ingram, 2001). Altman (2000) distinguishes 3 discrimination zones: a) "Safe" Zone: $Z > 2.6$; b) "Grey" Zone: $1.1 \le Z \le 2.6$; c) "Distress" Zone: $Z < 1.1$.

But the activity *holding mortgage debt* is also costly because it makes firms deviate from their optimal asset structures by over-investing in tangible fixed assets, since those are the assets that can be pledged as mortgage collateral. This generates productive inefficiencies, since the amount of each type of input is not chosen to minimise production costs, but to relax credit constraints (e.g. purchasing machinery instead of renting it, since in the first way it can be included in the mortgage contract, at the expense of hiring less workers). We shall assume that the marginal cost of *holding mortgage debt* is increasing and its marginal benefit is decreasing, i.e., $\frac{\partial MC(X)}{\partial X} > 0; \frac{\partial MB(X)}{\partial X} < 0$. In equilibrium, marginal benefit must equal marginal cost:

$$MC(X^*) = MB(X^*) = -C \cdot P'(X^*)$$

The average marginal effects of TANGIBILITY are the estimation of $P'(X^*)$. Depending on the functional forms of MB, MC for each country and the value of some parameters, the marginal effects for Spain may be higher or lower than those for the other countries. Let us illustrate this with a couple of examples.

- Example 1: $0 > AME_{es} > AME_i$ where i=fr, uk and AME is the average marginal effect of TANGIBILITY on the probability of bankruptcy.
  This is equivalent to:

  $$P'_{es}(X^*_{es}) > P'_i(X^*_i).$$

  This implies that the equilibrium marginal benefit in Spain is lower than in the other countries as long as the cost of bankruptcy is also lower or equal, i.e.:

  $$MB_{es}(X^*) < MB_i(X^*) \Longleftrightarrow P'_{es}(X^*_{es}) > P'_i(X^*_i) \text{ if } C_{es} \leq C_i$$

  In this paper we have proposed that *holding mortgage debt* is a bankruptcy-avoidance activity that Spanish firms undertake more than their French and British counterparts, i.e., $X^*_{es} > X^*_i$, which is supported by the aggregate evidence of Figure 1 (page 6) and by the descriptive statistics of TANGIBILITY (page 22). An equilibrium compatible with all the above results is shown in Figure 2. The MC curve for Spain is below the one for the other countries (i.e., lower productive inefficiencies for the same level of over-investment in tangible fixed assets).

Figure 2: Marginal benefit and marginal cost curves of *holding mortgage debt* (example 1)
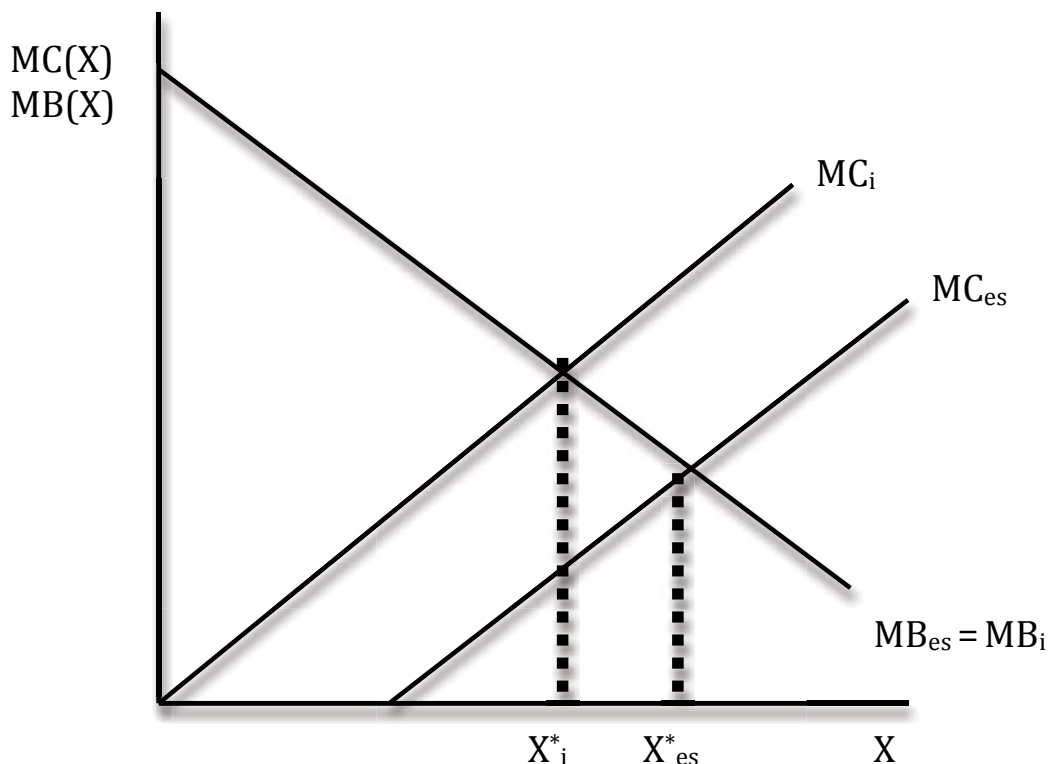
- Example 2: $0 > AME_i > AME_{es}$ where i=fr, uk and AME is the average marginal effect of TANGIBILITY on the probability of bankruptcy. This is equivalent to:

$$P'_{es}(X^*_{es}) < P'_i(X^*_i).$$

This implies that the equilibrium marginal benefit in Spain is higher than in the other countries as long as the cost of bankruptcy is also greater or equal in Spain.

$$MB_{es}(X^*) > MB_i(X^*) \Longleftrightarrow P'_{es}(X^*_{es}) < P'_i(X^*_i) \text{ if } C_{es} \geq C_i .$$

As before: $X^*_{es} > X^*_i$. An equilibrium compatible with all the above results is shown in Figure 3. In Spain either the cost of bankruptcy C and/or the marginal effectiveness in reducing the probability of bankruptcy $P'(X)$ are higher, so its MB curve is above the MB of the other countries.

Figure 3: Marginal benefit and marginal cost curves of *holding mortgage debt* (example 2)
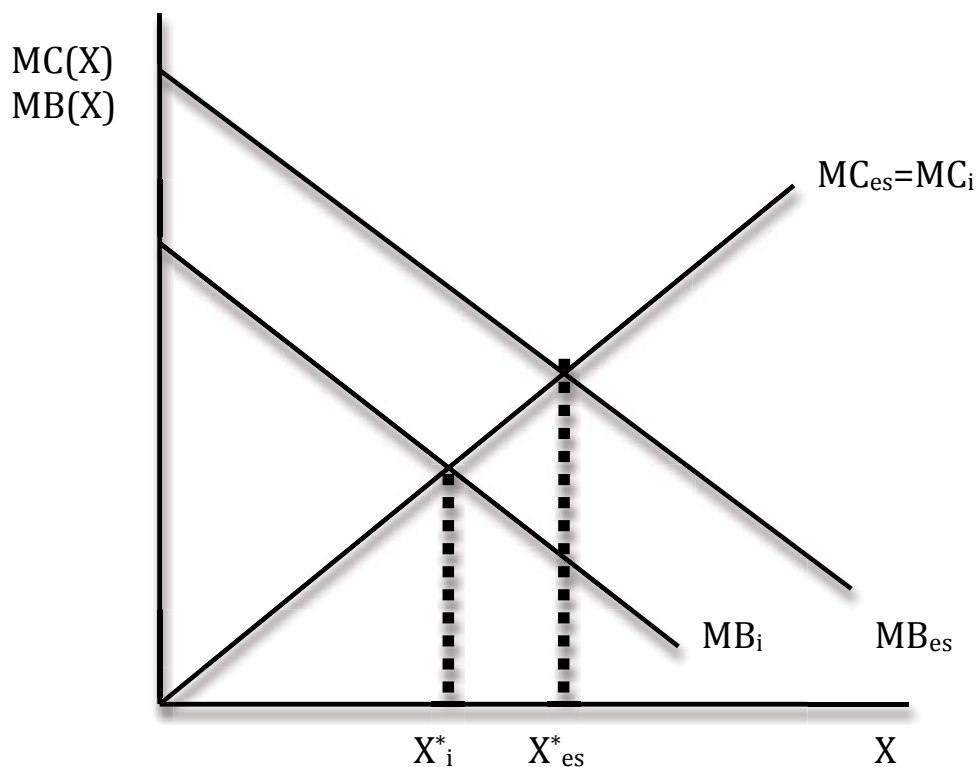
11 Appendix E: alternative estimations of total effects.

11.1 Evaluated at the means of TANGIBILITY.

As a robustness analysis, the total effects have been computed after regressing specifications (2), (3) and (4) for each country (see tables 9, 10 and 11). The total effect of X, the activity *holding mortgage debt*, is the percentual reduction in the probability of filing for bankruptcy that is caused by increasing the intensity of that activity from $X = X_0$ to $X = X_1$, where we evaluate X_0 at 0 and X_1 at the country-mean of its proxy, TANGIBILITY. The results are shown in Table 18. In the 3 cases the total effect of TANGIBILITY is statistically higher for Spain than for the other 2 countries for (at least) a 95% confidence level.

Table 18: percentage change in relative risk (pcrr) of TANGIBILITY using specifications (2), (3) and (4) (evaluated at its means)

Specification	Spain	France	UK
(2)	37.3 (33.5,41.0)	27.4 (25.1,29.5)	17.2 (6.4,26.6)
(3)	37.5 (33.8,41.2)	23.6 (21.2,26.1)	16.7 (5.8,26.6)
(4)	39.6 (35.2,44.0)	25.5 (21.8,28.7)	23.5 (8.6,34.7)

The pcrr is $-100 \cdot \left(\frac{\Pr(BANKRUPTCY=1/X=X_1)}{\Pr(BANKRUPTCY=1/X=X_0)} - 1 \right)$, *where* X_0 *and* X_1 *are, respectively, 0 and the mean of TANGIBILITY for each country. 95% confidence intervals in parenthesis. Estimator: Rare Events Logit*

11.2   Evaluated at the medians of TANGIBILITY.

As a further robustness analysis, the total effects have been computed using the same specifications of the previous section but evaluating X_1 at the country-*median* of TANGIBILITY. The results are shown in Table 19. In the 3 cases the total effect of TANGIBILITY is statistically higher for Spain than for the other 2 countries for (at least) a 95% confidence level.

Table 19: percentage change in relative risk (pcrr) of TANGIBILITY using specifications (2), (3) and (4) (evaluated at its medians)

Specification	Spain	France	UK
(2)	31.6 (28.0,34.9)	17.4 (15.7,18.8)	12.3 (3.9,19.6)
(3)	32.1 (28.7,35.7)	15.1 (13.4,16.7)	13.3 (4.4,21.1)
(4)	34.6 (31.1,38.3)	16.6 (14.4,18.8)	18.4 (7.8,27.6)

The pcrr is $-100 \cdot \left(\frac{\Pr(BANKRUPTCY=1/X=X_1)}{\Pr(BANKRUPTCY=1/X=X_0)} - 1 \right)$, *where* X_0 *and* X_1 *are, respectively, 0 and the median of TANGIBILITY for each country. 95% confidence intervals in parenthesis. Estimator: Rare Events Logit*

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