DECENTRALIZED MULTINATIONAL BANKS AND RISK TAKING: THE SPANISH EXPERIENCE IN THE CRISIS

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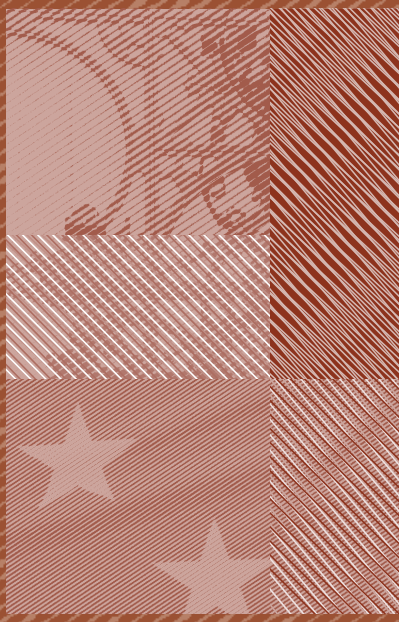

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DECENTRALIZED MULTINATIONAL BANKS AND RISK TAKING: THE SPANISH EXPERIENCE IN THE CRISIS [*]

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BANCO DE ESPAÑA

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Abstract

This paper analyses the effects of decentralized multinational banks, characterized by the large autonomy of the affiliates that the banking group has abroad, on bank's risk, using Spanish confidential supervisory data. Having activity abroad, in countries whose business and financial cycles may be less than perfectly correlated with those of the home country can generate more stability in the results of the consolidated banking group. Such isolation should be greater for multinational and decentralized banks. On the other hand, the international activity of banks may be associated to more risk taking as distance can hinder the ability of a bank's headquarters to monitor its subsidiaries or because of the more limited knowledge of the host country that the group has. Which effect dominates is an empirical matter which could be taken into account in capital requirements and when carrying out stress-tests. We provide empirical evidence of the relevance of the model of entry into foreign markets, international geographic diversification and business co-movements between the Spanish and the host economy on bank's ex-post risk. The results are consistent with the hypothesis that geographic diversification reduces risk.

Keywords: financial crises, geographic diversification, bank regulation, banking, risk.

JEL Classification: G21, G28, G01, F40.

Resumen

En este trabajo se analizan los efectos de los grupos bancarios multinacionales y descentralizados, caracterizados por la gran autonomía de sus afiliados en el exterior, sobre el riesgo del banco, utilizando información confidencial de la supervisión española. Tener actividad en el extranjero, en países cuyos negocios y ciclos financieros pueden estar menos que perfectamente correlacionados con los del país de origen, puede generar una mayor estabilidad en los resultados del grupo bancario consolidado. Tal aislamiento debería ser mayor para los bancos multinacionales y descentralizados. Por otro lado, la actividad internacional de los bancos puede estar asociada a una mayor asunción de riesgos, ya que la capacidad de la matriz para controlar sus filiales puede verse obstaculizada por la distancia o debido al conocimiento más limitado del país de acogida que tiene el grupo. Qué efecto domina es una cuestión empírica que podría tenerse en cuenta en los requisitos de capital y al realizar pruebas de estrés. Proporcionamos evidencia empírica de la relevancia del modelo de entrada en mercados extranjeros, la diversificación geográfica internacional y los movimientos conjuntos entre la economía española y la anfitriona sobre el riesgo *ex post* del banco. Los resultados son coherentes con la hipótesis de que la diversificación geográfica reduce el riesgo.

Palabras clave: crisis financiera, diversificación geográfica, regulación bancaria, bancos, riesgo.

Códigos JEL: G21, G28, G01, F40.

1 Introduction

International banking has increased with economic globalization. Before the 2007-09 crisis, there was a strong debate on the need to incorporate diversification effects in the risk metrics of banking regulation. The prevailing capital requirements framework did not properly account for the possibility of diversification benefits. Moreover, the use of bank stress tests since the crisis, both as a crisis management tool and as an early warning mechanism requires the formulation of adverse scenarios. Current stress-test frameworks face a wide scope to better take into account differences in the geographical structure of banking groups, and the fact that the scenario of simultaneous shocks in different economies has a low probability of occurrence. Finally, the business models that banks have adopted for the globalization of their activities and their impact on risk is still poorly incorporated into the regulatory framework. In this paper we use individual supervisory bank data to study the effects of geographic diversification and internationalization models on risk.

The literature has failed to provide clear evidence on the direction of the effect of geographic diversification on risk. In accordance with portfolio theory, banks see diversification, in general, as an opportunity for an upward shift in the risk-return trade-off, so that risk-adjusted returns should be higher at more diversified banks. The question of whether diversified financial institutions outperform their more concentrated peers has been widely researched with mixed results (Saunders and Walters (1994), DeYoung and Roland (2001), Stiroh (2004), Lepetit et al, (2007)).

While, in general, diversification benefits are expected from the reduction in the effect of idiosyncratic shocks on cash flow variance, the benefits of geographic diversification for internationally active banks and banking groups are expected to also arise from non-synchronized fluctuations in economic and financial activity across markets.

However, diversification may also lead banks to assume higher risk due to agency costs (while it may generate spillovers and contagion effects that may spread through direct exposures or asset prices)[1]. A lower variability of net income to assets may incentivize banks to adjust downwards their capital to assets ratio or their expected net income to assets. In fact, diversification can be carried out into higher risk activities, thus increasing the overall portfolio risk even if the returns are not highly correlated. In summary: global banks' functional and geographical diversification can have both costs and benefits in terms of financial stability.

During the crisis, risk seemed to spread across countries. Recent trends in banking show increased bank concentration in terms of business lines and geographic activity (CGFS, 2010a). In fact, there seems to be a return to traditional banking and a home bias as far as geographic destination of activity (CGFS, 2010b). In particular, direct cross-border lending as a share of total banking assets has declined, while the share of local lending by foreign bank affiliates has remained steady (IMF, 2015) (i.e. the activity developed with the residents in a given country by the operative units of the consolidated group that reside in such a jurisdiction).

1 This could be the case of the fast growing business of saving banks in Spain since 1989, when they were allowed to open branches nationwide, but had weak corporate governance and showed poor risk selection and monitoring (Fernández de Lis and García Mora (2008)).

Spanish banks stand out as the ones with the largest share of local activity among the major banking systems (McCauley et al (2010)). The evolution of Spanish banks since the crisis has been characterised by an increasing weight of foreign activity in the consolidated results of banking groups. This does not imply that Spanish banks have been alien to the generalised tendency of global banks since the crisis to retrench from some geographical regions and restructure their activity abroad.

Spanish banks follow the so-called multinational banking model (McCauley et al. 2010), which is characterized by the predominant role played by subsidiaries, in contrast to the relatively low weight of cross-border activity. Spanish international banks do not differ from more domestically oriented banks in that they have a business model focused on traditional commercial (mostly retail) banking, following the parent's business model. Moreover, local claims are mostly financed with local liabilities, so that subsidiaries have large funding autonomy. That is, each subsidiary must be funded independently, mainly through retail deposits, in their corresponding markets, and do not receive support from their parent, thus minimizing intra-group transactions. They are structured by incorporated local subsidiaries, which often have a significant market-share and which are directly regulated and supervised by local authorities. Finally, during the period of analysis commercial banks coexisted with a large number of saving banks, which have a different ownership structure and thus finance patterns while they were domestically-oriented with limited outward internationalization.

In this paper, we empirically test the effects of geographic diversification on banks' risk and return with data for all Spanish commercial and saving banks from 1999Q4 to 2014Q4. We analyse the relevance of the internationalization model of Spanish banks on distance-to-default and the role of diversification and business cycle synchronization. We then split the sample and analyse the response before and after the crisis and test whether the impact on risk during the crisis depends on the internationalization model. We analyse the relevance of geographic diversification and business synchronization with the distinction among different geographic areas and before and after the crisis. We then decompose the z-score index into its components to determine the role played by return, capital and volatility. Finally, we assess the relevance of ownership and funding structures within this framework.

We find that the combination of the decentralized and multinational approach of the international activity of Spanish banks has a positive effect on bank's resilience. We also find that the less synchronized the business cycles of Spain and those of the counterparty country are, the lower the bank's risk. Such effect is partially mitigated by multinational and decentralized banks. As for the crisis, we find that multinational and decentralized banks show higher resilience than banks following other internationalization patterns. We also gather evidence that the degree of diversification has a positive effect on resilience. In particular, we find that its relevance is statistically significant, mostly, after the beginning of the crisis. Finally, we find that the capital ratio is higher but the return is lower for multinational decentralized banks during the crisis in relation to their peers and in comparison, to the previous period.

The relevance of the paper can be justified on different grounds: most available empirical evidence on the costs and benefits of diversification date from pre-crisis years. In this paper, we make use of individual bank data that cover the period before the financial crisis and up to 2014. Such information allows us to assess whether internationalization compensates or exacerbates the results of banks during macroeconomic downturns in the home country. Moreover, most studies of geographic diversification have focused on local diversification (between regions in a given country). The international dimension has not been so extensively

explored (some exceptions are Buch et al 2013; García-Herrero and Vazquez 2013; Berger et al 2016; Argimon 2017). Moreover, we explore the role of the means of entry into the foreign market. The international dimension of most national banking systems is characterized either by large cross-border exposures, so that they are aligned with the so-called international banking model or by diversification in the business line (Gambacorta and van Rixtel 2013). Therefore, they do not follow the dominant Spanish approach of focusing their client base on local households and SMEs while retail deposits are the main source of financing. We take advantage of the heterogeneity in Spanish banks on their internationalization model to test for its relevance. Finally, the use of individual Spanish data allows us to explicitly control for bank characteristics and assess their relevance.

The rest of the paper is structured as follows. Section 2 succinctly reviews the literature on diversification. Section 3 presents the empirical approach and the data. Section 4 covers the results for the tests on banking models and Section 5 develops some robustness tests which provide insight into the role of geographic diversification, the role of the different component of our risk measure and the relevance of ownership and funding patterns. Lastly, Section 6 concludes.

2 Why diversify

There are three main arguments that from a theoretical point of view justify diversification in the banking sector: increase market power, improvement in resource management and reduction of agency problems (Gulamhussen et al. (2011)).

The improvement in resource management is linked to efficiency gains from scale and scope. It can be extended to arguments of cross-selling financial products or following their clients abroad (Focarelli and Pozzolo, 2005) and to the financial aspect of firm management linked to the isolation from idiosyncratic shocks and its positive impact in terms of the reduction of the cash flow variance. Risk diversification arising from operating in a larger number of geographic areas renders banks more resilient to shocks and reduces their costs[2].

However, diversification can lead to negative outcomes. On the one hand, it can be accompanied by increased complexity that can affect the organizational and operational level (Liang and Rhodes (1988), Laeven and Levine (2007) Van Lelyveld and Knot (2009)). It can lead to increased risk-taking as the lower costs of funding may be used to take additional risk (Demsetz and Strahan, 1997). Moreover, the quality of bank loan portfolios is endogenous (Acharya et al (2006)) in the sense that it is determined by the level of monitoring that can depend on the diversification degree[3]. In particular, less expertise in monitoring can be associated to lending in a new sector or location. It is also not close to relational banking, which characterizes the Spanish model and which requires a deeper knowledge of your clients. It can also contribute to increased systemic risk as, although diversification can benefit a bank individually, it can generate interlinkages that could increase spillover effects and generate contagion in international markets. In a way, widespread diversification makes banks more similar to one another, exposing them to similar risks and thus increasing the probability of a joint failure. Finally, foreign exchange risk may increase risk as part of the assets is denominated in foreign currency.

A part of the literature has focused on the analysis of the effects of geographic diversification on bank's market valuation addressing the issue of whether banks that diversify are valued at more or less than the sum of their constituting parts[4]. In particular, Gulamhussen et al (2010) in an international sample of more than 500 large banks across 56 countries between 2001 and 2007 find that internationally diversified banks trade at a premium, but with a threshold, suggesting that the benefits of geographic scale and scope economies more than offset the agency costs. A similar result is obtained in Elsas et al (2010) with data for nine countries, who find that diversification increases bank profitability and also market valuation. Baele et al (2007), De Nicolo and Kwast (2002) and De Nicolo et al (2004) find that diversification increases the systematic risk of banks.

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2 Portfolio diversification theory shows that when returns are not perfectly correlated, diversification reduces risk (Markowitz (1952)), so that diversifying investment portfolios internationally may facilitate a decline in risk (Levy and Sarnat (1970), Driessen and Laeven (2007))

3 Acharya et al (2006) point at three reasons why diversification can reduce monitoring or monitoring efficiency: less expertise in monitoring can be associated to lending in a new sector or location; entrance into a highly competitive market can lead to adverse selection and increase in size can lead to agency-based scale inefficiencies.

4 We will not deal with the large strand of literature that has been devoted to the analysis of financial stability issues linked to the effects on the home or host economies of the presence of foreign banks or cross border activity.

Another strand of the literature has assessed the effects of geographic expansion through mergers and acquisitions. In their study of the effect of geographic diversification on risk, Amihud et al. (2002) show that cross-border mergers and acquisitions have no net effect on the risk (and returns) of the acquiring banks.

As for the effects of geographic diversification on risk and on return performance, the evidence is somewhat mixed. Liang and Rhoades (1988) using a sample of US banking organizations operating during the period 1976-85 show that geographic diversification across metropolitan statistical areas or counties provides opportunities for banks to reduce risk. However, they also find that as diversification increases, the level of earnings declines, which can result from increased operating risk resulting from changes in strategy, management or facilities. Achyara et al (2002) also find that that increased diversification reduces return at very high levels of risk, but increases returns at moderate levels of risks. Deng and Elyasiani (2008), analysing Bank Holding Companies (BHC) in the US, find that geographic diversification is associated with risk reduction (and lower stock price variability), along with value enhancement. However, the magnitude of such reduction depends on the distance between the holding company and its branches, a result also found in Berger and DeYoung (2001) as diseconomies associated with distance are limiting gains from geographic diversification. The work of Deng et al (2007) gathers evidence that geographic diversification can provide a funding advantage as they show with data of over 60 US BHC from 1994 to 1998 that the diversification of deposits reduces the bond-yield spread. Goetz et al (2016) find that geographic expansion reduces risk when banks expand into areas with low macroeconomic correlation. In particular, they analyse the effect on risk of BHC expanding into U.S metropolitan statistical areas with asynchronous business cycles, taking advantage for the identification strategy of the different calendar in the removal of the prohibition to enter other states.

Acharya et al. (2006), with information from 105 Italian banks over the period 1993-99, disaggregated by industrial sector, asset decomposition and geographic region (Italy, other EU countries and Rest of the World), find that geographic diversification results in an improvement in the risk-return trade-off, but only for banks with low levels of risk. Positive diversification benefits are also found in Fang and van Lelyveld (2014). They use a correlation matrix approach to calculate international diversification effects and treat bank subsidiaries as individual assets of the banking group portfolio. The approach is applied to 49 large banking groups over the period 1992-2009 and concludes that banks' credit risk could be reduced by 1.1%, spanning from negligible to 8%.

Meslier et al. (2015) using an unbalanced panel of 10681 US BHC and banks from 1994 to 2006 analyse the effects of intrastate and interstate geographic diversification for bank risk and return. They assess the role of bank size and disparities in economic conditions within states or across states on these effects. They find that the effects of diversification depend on bank size and the size of economic disparities. For large banks both intrastate and interstate diversification is beneficial in terms of risk-adjusted returns while for small banks only the former is beneficial, but always with a threshold. Moreover, they also find that expanding activities towards markets with different economic conditions impacts the benefits of diversification. In particular, greater disparities in economic conditions amplify the effect of intrastate diversification on small banks' risk.

One of the main challenges in the empirical literature is the identification of an exogenous source of variation in geographic expansion and accounting for where the expansion takes place. If the banking group increases the riskiness of its asses when it

expands geographically, an OLS regression will yield upwardly biased estimates of the impact of geographic diversification on risk. Moreover, the specific economies where the expansion takes place and its degree of dissimilarity with the home economy will also contribute to affect the impact. Goetz et al., 2016 address these issues using a gravity-deregulation methodology, and with data for BHC in the U.S. find that geographic diversity reduces risk

As for the empirical evidence on negative effects of banks' geographic diversification, Morgan and Samolyk (2003) find for U.S. BHC for the 1994-2001 period that domestic geographical diversification is not associated with higher returns and lower risk. Berger et al. (2016) with a population of 15988 U.S. commercial banks estimate for different measures of risk the role played by internationalization for the period 1989:Q1 to 2010:Q4. They find that international banks have higher risk than purely domestic banks and that such risk is increasing with the degree of internationalization. Gulamhussen et al (2014) using a sample of 384 listed banks from 56 countries for the period 2001-2007 find that international diversification increases bank risk proxied either by the expected default frequency or by the z-score.

3 Empirical approach and data used

The framework for the empirical strategy follows the model presented in Berger et al (2016) of a bank's portfolio with two risky assets: a foreign asset with expected return μ_f and standard deviation δ_f and a domestic asset with expected return μ_d and standard deviation δ_d. The correlation between the two assets is ρ_{fd} and the bank invests an exogenous proportion *w* in the foreign asset.

Two hypotheses can emerge from this simple approach:

a) Benefits hypothesis (diversification hypothesis): banks will have lower risk when they diversify, as they are less exposed to domestic shocks. It implies ρ_{fd} is low and δ_f is not too large relative to δ_d and the return μ_f is not too low relative to μ_d.

b) Cost hypothesis (market risk hypothesis). Banks that diversify geographically have higher risk due to market-specific factors that make foreign assets relatively riskier (δ_f is high relative to δ_d and/or the return μ_f is low relative to μ_d) unless the higher risk is offset by a low correlation ρ_{fd}.

We propose determining empirically a) which hypothesis dominates in the case of Spanish banks; b) whether the multinational and decentralized model of internationalization affects risk; c) whether there are differences before the crisis and since then and d) the role of the internationalization model in the crisis.

3.1 Empirical specification of baseline model

The baseline specification differs from previous work in this area (Berger et a. 2016; Götz et al 2016) by the inclusion of a synchronization index, which allows us to test for the differential effect of the correlation between home and host economies and by the inclusion of a variable that captures the internationalization model that characterizes the bank. Formally, we estimate the following equation:

$$Y_{i,t-k+1,t} = \alpha_{1i} + \alpha_{2t} + \beta_1 DIV_{i,t-k} + \beta_2 BS_{i,t-k} + \lambda_2 multidiv_{i,t-k} + \gamma X_{i,t-k} + \varepsilon_{i,t-k+1,t} \quad (1)$$

where Y_{it} is a measure of resilience of bank i at time t, which is computed over the k periods from t-k+1 to t, while the right-hand-side variables are measured at period t-k to ensure that they are predetermined in relation to the dependent variable. In particular, DIV_{it} is an indicator of international geographic diversification, BS_{it} is the weighted index of synchronization or correlation between the business cycle of Spain and the country where the affiliate has been set[5], $multidiv_{i,t-k}$ are variables that capture the multinational and decentralized structure of the bank and X_{it} are control variables, both at the bank and the time dimension (bank's efficiency, size,..).

We are interested in the sign and statistical significance of β_1, β_2 and λ_2. Under the diversification hypothesis, we will find that β_1 is negative and β_2 is positive. If the market risk hypothesis dominates, we will find that β_1 is positive and β_2 is negative. The statistical significance of λ_2 provides a test for the differential impact of the multinational and decentralized model on bank's resilience. A positive sign implies that banks that follow a more multinational and decentralized approach to international expansion will have a lower probability of bank insolvency.

5 We also carry out the analysis using synchronization of financial cycles as captured through the credit to GPD gap, with rather the same qualitative results.

The previous specification provides a test for the overall relationship between risk and geographic diversification, business cycle synchronization and internationalization models. As we are interested in assessing the role that these models have on resilience, we estimate equation (2) that allows for a test of whether the internationalization model reinforces or mitigates the effects of diversification (λ_3) and business cycle synchronicity (λ_4):

$$Y_{i,t-k+1,t} = \alpha_{1i} + \alpha_{2t} + \beta_1 \ DIV_{i,t-k} + \beta_2 \ BS_{i,t-k} + \lambda_3 \ DIV_{i,t-k} * multidiv_{i,t-k} + \lambda_4 \ BS_{i,t-k} * multidiv_{i,t-k} + \gamma \ X_{i,t-k} + \varepsilon_{i,t-k+1,t} \quad (2)$$

The additional estimated coefficients λ_3 and λ_4 will provide a test for the differential impact that these types of banks have on the determinants of bank risk in an international environment. If λ_3 is positive it implies that the more multinational or decentralized a bank is the larger the positive impact of geographic diversification on bank's resilience. Such result would reinforce the diversification risk hypothesis. If λ_4 is negative it implies that the more multinational or decentralized a bank is the larger the negative impact of synchronization on bank's resilience. Such result will also reinforce the risk diversification hypothesis.

Finally, as we are interested in assessing the role of the different variables during the cycle, we either estimate these specifications before and after the crisis or formulate specifications such as:

$$Y_{i,t-k+1,t} = \alpha_{1i} + \alpha_{2t} + \beta_1 \ DIV_{i,t-k} + \beta_2 \ BS_{i,t-k} + \lambda_3 \ DIV_{i,t-k} * multidiv_{i,t-k} + \lambda_4 \ BS_{i,t-k} * multidiv_{i,t-k} + \delta \ crisis * multidiv_{i,t-k} + \gamma \ X_{i,t-k} + \varepsilon_{i,t-k+1,t} \quad (3)$$

where *crisis* is a dummy variable that takes value 1 since the 4th term of 2008 and zero otherwise. The statistical significance of δ in eq 3 provides a test for the different impact of the multinational and decentralized model during the crisis in comparison to other periods. We can expect that multinational banks are less exposed to idiosyncratic shocks than international banks as they hold a larger proportion of assets and liabilities in foreign markets, which tend to be imperfectly correlated with the home market. We would then observe that, in a crisis, more multinational banks show lower risk. Moreover, decentralized banks have more stable sources of financing which are less volatile during crises as they have lower dependence on capital and inter-bank markets than purely domestic or more centralized banks. We can expect that decentralized banks, which rely on local sources of funding, will be less exposed to risks in a crisis than other types of banks[6]. We can then expect that δ will have a positive sign if the diversification benefits hypothesis holds.

3.2 Multinational and decentralization index

To capture the different modes of entry into foreign markets, we follow McCauley et al. (2010) and Gambacorta and van Rixtel (2013) and characterize banking business models in two dimensions. We simplify the approach and centre the difference in either the claims or the liabilities side of the bank's balance[7]. On the claims side, we distinguish between multinational

6 Levine et al, 2016 find that the geographic expansion of banks across U.S. states lowered their funding costs, especially if the headquarter of the bank is located in a state with low correlation with the overall U.S. economy. On the other hand, Anginer et al. 2016 find evidence of a positive correlation between parent bank' and foreign subsidiaries' default risk, which is lower for subsidiaries that have a higher share of retail deposit funding and that are more independently managed from their parents

7 McCauley et al (2010) do not center the distinction in the two sides of the balance sheet. They also use the share of foreign liabilities booked outside the home country to distinguish between international and multinational banks.

and international banks. Multinational banks are characterized by the predominance of local business (either through branches or subsidiaries) in contrast to international banks which operate out of the home country and conduct mostly cross-border business. We proxy this dimension by the ratio of local claims over total claims abroad (*multinational*). The higher the value of the variable *multinational*, the closer the bank is to following a multinational model with less emphasis on cross-border business than if it would follow an international approach. Although the Spanish banking system as a whole responds to the multinational model, Spanish banks present a certain degree of heterogeneity (see Tables in Annex).

On the liabilities side, we distinguish between centralized and decentralized banks. A centralized bank raises funds at home offices or headquarter and redistributes them around the group. The decentralized bank operates in a way such that affiliates raise funds locally to finance local activity. Decentralization is linked to where the bank raises funds, so we proxy it by the ratio of total local liabilities over total claims abroad (*decentralized*). The larger the value of the ratio, the more decentralized the bank is. This definition of degree of decentralization is not limited to banks that have affiliates abroad that carry out local activity[8].

3.3 Risk measure

We propose using the Z-score as our basic measure of risk and fragility, following previous literature (see e.g. Boyd et al. 2006, Laeven and Levine, 2009, Demiguç-Kunt and Huizinga, 2010; Berger et al., 2016). The Z-score should be interpreted as a distance-to-default measure, i.e. as the number of standard deviations the Return on Assets (ROA), defined as net income divided by total assets, can diverge from its mean before the bank defaults. It is calculated as the sum of the bank's mean ROA and mean capitalization ratio, $\underline{E/A}$ (the average equity to assets ratio over the same period as the average ROA) divided by the standard deviation of ROA (δ_{ROA}), which proxies its volatility. A higher Z-score indicates a safer bank. Although this indicator has limitations as a risk measure, it has the advantage that it can be defined for non-listed institutions, which constitute the majority of our sample. It is thus calculated as:

$$\text{Z-score} = (\underline{ROA} + \underline{E/A}) / \delta_{ROA}$$

We compute it over a 12-quarter period following Demiguç-Kunt and Huizinga, 2010 and Berger et al., 2016.

Since the z-score is highly skewed, we use the natural logarithm of the z-score, which is normally distributed (Laeven and Levine, 2009). As we use data from consolidated statements, these series reflect the ex-post risk generated by all the operations of the bank in both their home countries plus those of their subsidiaries and branches abroad, both local and cross-border.

3.4 International diversification

We measure geographic diversification using the financial statements that bank groups provide in relation to their foreign activity by counterparty country, including both cross-border and local activity. We focus our measure of diversification on the intensive margin, that is, the share of foreign relative to total assets.

We follow the empirical literature (Stiroh and Rumble (2006), Gulamhussen et al (2014), García-Herrero and Vázquez (2013), Meslier et (2015)) and we construct a Hirsch-

8 McCauley et al (2010) distinguish centralized banks from decentralized multinational banks by the extent to which local assets are locally funded.

Herfindhal index to capture *international concentration.* We define it so that the lower bound corresponds to a non-diversified (purely domestic) bank and the upper bound corresponds to the most internationally diversified bank:

$$\text{Herfindhal}_{j,t} = 1 - \sum_{j=1}^{Rj} (\text{Assets in affiliates abroad or at home}_j / \text{total assets}_j)^2$$

where R_j is the total number of jurisdictions where bank j operates, including the home country. A value close to 0 indicates very low geographic diversification while as it grows close to 1 it reflects higher diverse international presence. If the benefits hypothesis dominates, we can expect a positive relation with resilience.

3.5 Business cycle synchronization

We propose making use of the concept of business cycle synchronization to establish the role that the less than perfect correlation of risks among different economies may play in bank's resilience. Such measure was developed in the literature that studies conditions on the optimality of currency areas (Busl and Kappler (2013)) and has been used also in other areas (eg. Kalemli-Ozcan et al (2013)) to proxy the correlation between the fluctuations in economic activity across markets. In particular, the bilateral synchronization between country k and country j at time t, η_{kjt} is measured as the negative absolute difference between the two countries' real GDP growth rates (or any other measure of economic performance).

$$\eta_{kjt} = - |\Delta Y_{kt} - \Delta Y_{jt}|$$

It is defined so that higher values of η_{kjt} (the closer to zero) indicate a higher degree of bilateral synchronization between country k and j in year t.

As Busl and Kappler (2013) point out this approach has several advantages over a traditional time-invariant correlation measure of business cycle synchronization. On the one hand, it allows synchronization to vary over time. On the other hand, η_{kjt} is independent of the underlying sample period for each t. Finally, it can be based on observed growth rates instead of filtered rates, which can be subject to measurement errors.

We use the quarterly interannual real GDP growth provided by the IMF International Financial Statistics. We first calculate the bilateral synchronization indices between Spain and the host country. We then construct the index as a weighted average of these bilateral synchronization indices, where the weights are the former quarter share of the counterparty's country assets on total assets.

3.6 Control variables

We include also a set of control variables, which are time-varying at the bank level, and which affect bank's risk outcomes.

We include a measure of diversity of financial activities, to complement the geographic diversification measure. In particular, following Berger et al. 2016, we use an index of income diversity which measures the degree to which the income of the bank is dependent on interest income. In particular we define *interest_income* as the ratio of net interest income over the sum of net interest and net fees and commissions income. The index takes values between zero and 100. Non-interest income is linked to less traditional activities, higher volatility in returns, and thus higher risk. Therefore, as larger values of the index imply a greater reliance on interest income, we can expect a positive coefficient under the benefits hypothesis.

Another factor influencing risk is bank's cost structure. Demirgüc-Kunt and Huizinga, 2010 found that banks with higher costs were less stable. To capture this effect, we construct the variable *overhead_cost* as the ratio of bank's operating expenses over total assets. The lower this ratio, the higher the cost efficiency. We can expect that the coefficient will have a negative sign under the benefits hypothesis.

We also condition on bank's size as it is an important determinant of the capacity to internationalize. On the one hand, banks may have economies of scale in foreign exchange management. On the other hand, size may affect risk taking, as larger banks have a greater capacity to absorb risk (Berger et al 2014) and may be affected by moral hazard associated to the "too big to fail" hypothesis. We proxy the variable *size* with the log of total assets.

Finally, we also include time and bank fixed effects in all specifications.

3.7 Banks and summary statistics

We use quarterly balance sheet and income statements reports submitted by Spanish banks to the Banco de España. We initially use the whole population of Spanish banks, whether or not they carry economic activity abroad. We consider as international activity both cross-border and all the activity developed by the foreign affiliates that are classified as credit institutions or financial credit institutions[9] operating abroad.

The sample is an unbalanced panel of banks spanning from 1999Q4 to 2014Q4, although the lag structure of the definition of our risk variable limits the starting period to 2002Q4. The total number of banks is 112, initially. The maximum number of banks in a given quarter in the initial database is 83 and the minimum is 26. We measure all variables at the group level and not at the individual bank level, as we want to capture the diversification provided via affiliation with banks in other locations. If the bank does not belong to a group, we use its individual bank data. We deal with the restructuring of the Spanish banking sector that took place during the period of analysis, in such a way that the acquiring bank's code is maintained and the target bank drops from the sample. We think that the calculation of the dependent variable over a three year period mitigates the possible extreme accounting values associated to the M&A.

Table A.1 in the Appendix reports the main statistics of the different variables included in the analysis, distinguishing between those banks that have foreign subsidiaries and those that either do not have foreign activity or carry it out through branches or only have cross-border activity[10]. It can be the case that some banks appear in both parts as during our sample period they can change how they operate abroad. In the last column (col 11) we provide the t-ratio of the contrast of mean differences in the characteristics of the two groups for the whole period. The figures show that there are no statistically significant differences between the two groups of banks in our measures of risk (*lnzscore*), return (*roa*) nor efficiency (*overhead_costs*). On the other hand, banks with foreign subsidiaries are larger (*size*), show lower volatility in returns (*sdroa*), lower capital ratios (*capital ratio*) and lower weight of traditional sources of income (*interest_income*). As expected, these banks also show, on average, higher geographic diversification (*herfindhal*) and lower average synchronization (*syncro_gdp*) with the business cycle of the host countries in which they operate.

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9 The so-called «Filiales entidades de crédito y filiales establecimientos financieros de crédito".

10 We associate banks with subsidiaries to banks that follow a multinational and decentralized model of geographic expansion

Table A.2 in the Appendix presents the same sample split, but adding the distinction between the period before the crisis and the period since 2008Q3. Col (11) presents the t-ratio of the contrast of mean differences between the period before the crisis and the period after the beginning of the crisis for banks with subsidiaries. The same contrast for banks without subsidiaries is in col (22). The asterisk in col (13) reflect the statistical significance of the contrast of difference in means between the two groups of banks before the crisis. Col (18) reflects the results of the same contrast after the beginning of the crisis. We find that there are differences between the period before and after the beginning of the crisis when we distinguish between the two types of banks. Before the crisis, risk is higher for banks with subsidiaries but lower afterwards, thus giving an indication that multinational banks have been more resilient during the crisis, than their more domestic competitors and those more centred on cross-border activity[11]. Neither before nor after the crisis there were differences between the two groups of banks in the mean of their returns and their efficiency indicator. On the other hand, after the crisis, the volatility of returns is lower for banks with subsidiaries while the weight of traditional business, which was higher for more domestic banks before the crisis, does not differ between the two groups. Therefore, there is a process of divergence between the two groups as regards risk, with lower risk being associated to banks with subsidiaries, and of convergence as regards the weight of traditional business in income flows after the crisis. Size, geographic diversification and synchronization keep showing statistically significant larger values in both periods for multinational banks.

We also find that, for most variables, the differences between the two periods are statistically significant when the comparison is within each group of banks. The only exception is the efficiency measure whose mean does not change between the two periods. However, the direction of the change is not the same for both groups of banks. Both show an increase in risk (with lower *lnzscore*) after the crisis, with lower returns, but higher capital ratios. On the other hand, while banks without subsidiaries show higher mean volatility of their returns, banks with subsidiaries experience a decline in volatility, thus contributing to mitigate the increase in ex-post risk. The other differences in the evolution of the two groups, refer to the increase in the weight of traditional business and international diversification for banks with subsidiaries, in contrast to the decline in banks without. Both groups experience a decline in synchronization, reflecting the increase in dispersion in growth rates after the crisis.

As already stated, to compute the different measures of diversification, we use balance sheet and income statements data from consolidated financial statements that includes the activity corresponding to subsidiaries and other affiliates abroad and we merge it with the statements provided for each country where the group has affiliates. The initial dataset has information on 953 affiliates of banks operating in 85 different jurisdictions[12]. We keep detailed information on those country affiliates whose weight on any of the main balance sheet items (total assets, total liabilities, deposits or loans) is above 1% of total foreign activity. We add together all remaining foreign activity with the one carried out in affiliates in small jurisdictions such as Andorra or Panama, for which we do not have data on their economies. We remove any bank-quarter observations with missing or incomplete financial data on accounting variables such as total assets, equity, loans and deposits and, finally, omit observations for those banks for which we have information for less than three consecutive years (12 quarters). Our final database consists of 66 banks. Five of them have been engaged

11 We have calculated the differences in mean between the two periods for the z-score and presented the results in Table A.2 also excluding the observations that are built using data for the expansion years, with the same qualitative results.

12 The gross database contains 1129 affiliates. However, there is no data for 176 of them which can be directly compared to consolidated information.

in international activity through subsidiaries in any given time during the period of analysis. Twelve banks have not had any international activity. We distinguish among 34 different jurisdictions for which we have information on macrovariables.

Table A.3 in the Appendix records the main statistics for the destination of diversification abroad of Spanish banks, distinguishing between before and after the crisis (Panel A) and between commercial and saving banks (Panel B). The last column reflects the t-ratio of the contrast of mean differences in the characteristics of the two periods (Panel A) and between the two groups of credit institutions for the whole period (Panel B). The results show that there are no differences in the weight of foreign claims on total claims (*foreignhweight*) before and after the crisis. However, there was a geographic recomposition of the foreign portfolio as the share of claims on euro countries (*euroshare*) declined to be covered by claims in other advanced countries (*advancedshare*). The contrast of differences between commercial and saving banks show lower foreign activity in saving banks with higher weight of both euro and emerging markets.

4 Empirical results

4.1 Baseline results and role of international decentralization

Table 1 provides regression results on the relationship between bank's risk, its overall international geographic diversification, its internationalization model and the role that macroeconomic synchronization between the home and the host country can play, while controlling for time-varying bank characteristics and time and bank fixed effects. Column 1 presents the results obtained including banks which are purely domestic, so that we cannot test for the role of the internationalization model. Columns 2 to 7 report the results when we test for the relevance of the degree of decentralization and of multinational banks, following the specifications of eq (1). We report robust p-values.

The findings in Table 1 provide support to the hypothesis that internationalization contributes to reducing risk. Under all the specifications, either the HH index has a positive coefficient, as under the baseline specification in col. 1, and/ or the synchronization index has a negative coefficient, as in the remaining columns. Such results indicate that more geographically diversified banks and lower business cycle synchronization reduce bank's risk.

We do not find evidence that more decentralized or more multinational banks show lower risk on average, as the coefficients for *multinational* and *decentralized* are not statistically significant (col 2 and 3). However, we find that the conjunction of both variables (the multiplicative variable *multinational * decentralized*) has a positive effect on resilience (col 4), so that being more centralized and multinational at the same time reduces risk.

Moreover, the results also show that the higher the multinational (col 5) or the decentralised the bank is (col 6), the higher the positive impact of geographic diversification on risk reduction, as captured by the statistically significant coefficients for the multiplicative variables of bank internationalization model and the HH index. The results in cols 5 and 6 show that if it were not for these types of banks, the effect of geographic diversification would be nil. We also find that the negative effect of business synchronization on resilience is reduced the more the bank is decentralized or multinational. The same qualitative results hold for the joint multinational and decentralized banks variable (col 7).Therefore, we find that decentralized multinational banks have lower risk through their intensifying effects on geographic diversification and its mitigating effects on synchronization.

Turning to bank controls, we find that firm size has a negative statistically significant coefficient, which is not consistent with larger banks having better risk management skills or greater capacity to absorb losses through risk diversification. This finding is, in fact, more aligned with the too-big-to-fail hypothesis. We also find that overhead costs have a negative impact on risk, which is consistent with the findings of Demirgüç-Kunt and Huizinga, 2011 and Berger et al, 2016 that banks with higher costs are less stable. Finally, the positive sign of the variable interest income is only statistically significant when we exclude domestic-only banks, so that the weight of traditional business positively affects bank's ex-post risk for banks with international activity.

4.2 International banks before and after the crisis

We next examine how internationalization affects risk during financial crisis. To do so, we compare the effect of diversification, synchronization, the degree of centralization and the

multinational structure of the banking group on bank risk, before and after the crisis. The results are reported in Table 2.

We first split the sample in two, with observations up to the third quarter of 2008 and observations from then onwards and run separate regressions of equation (1) for the two periods. We then define the dummy variable *crisis* that takes value 0 up to the third term of 2008 and 1 since then and include the interaction terms *decentralized* x *crisis* and *multinational x crisis* using the whole sample to test whether these types of banks were more resilient in the crisis than their peers.

The estimates reported in columns 1 to 3 of Table 2 for the period before the crisis show a statistically significant positive effect on resilience of banks which are decentralized, multinational or a combination of both. So, these types of banks had lower risk than their competitors before the crisis. The results for the period of the crisis (columns 4 to 6) only show a positive statistically significant coefficient for the multiplicative variable *multinational * decentralized*, but not for any of them separately. Therefore, during the crisis only banks that were both more multinational and more diversified showed lower risk than the rest of banks. However, the direct comparison of the two periods using the whole sample show that during the crisis, both multinational and decentralized banks (and the combination of both) had higher resilience (cols 7 to 9), as captured by the statistically significant positive coefficient of the multiplicative variables *crisis* decentralized* and *crisis* multinational*. Therefore, the level of resilience that centralised and multinational banks recorded during the crisis was higher than for the rest of banks and before the crisis.

The negative impact of synchronization on risk is statistically significant both before and after the beginning of the crisis, so that higher internationalization to jurisdictions with low economic synchrony seem to contribute to isolate banks' risk, in general, and since the crisis, in particular. Diversification, as captured by the Herfhindal index, is positive and statistically significant in both periods, when taken in isolation. However, the results for the whole period do not find that it is statistically significant, so that only synchronization is relevant for risk.

Therefore, the evidence gathered shows that during the crisis, banks that were more decentralized and more multinational had lower probability of bank insolvency. We also find (not shown) that, although decentralization and multinationality do not seem to play a direct separate role in relation to the crisis, they reinforce the positive effect of diversification on resilience and mitigate the negative effect of higher synchronization. Finally, we also find that the multinational and decentralized business models are more resilient than its peers.

These findings suggest that it is not only internationalization per se and especially the level of geographic diversification that affects banks' ex-post risk, but the more or less synchrony of economic cycles and the internationalization model which is followed.

5 Robustness checks

5.1 Differences in economic areas

Up to here, we have analysed the role of diversification with a concentration index at the highest level of disaggregation, treating each country where Spanish banks have foreign affiliates on equal terms. So, for instance, the calculated Herfindhal index is the same whether a bank is diversifying into advanced economies or into emerging economies, as far as the weight in total assets were the same. As economic cycles are more synchronized in industrial countries (Griffith-Jones et al, 2002) and as host economies closer to the home country will tend to be more synchronized with the home economy (Buch, 2005), we can expect that benefits will differ depending on the economic area in which banks carry out their foreign activity. However, as synchronization can be expected to be stronger within a given region, we can also expect that the greater the diversification among regions, the greater the benefits. We next explore alternative approaches to capture the role of geographic diversification on risk which may overcome these limitations.

We analyse the role of the relative allocation of banks assets in three regions: euro countries (*euro*), advanced non-euro countries (*adv)* and emerging countries (*eme)*, which gathers Latin American countries, Mexico and emerging market economies. As shown in Table A.3 of the Appendix, on average, banks that have foreign activity maintain 92% of their assets at home (67% if they operate through subsidiaries). The weight into euro countries, which is about 24% of total foreign assets declined with the crisis, compensated with an increase in the weight of assets to other advanced economies.

We first calculate a herfindhal index from the weights that these areas have on total bank's claims (*herfidhalarea*). It reflects concentration in relation to these geographical areas so that it can provide an overview of the relevance of diversifying into different economic regions. We also test the differential role that such diversification has played on risk during the crisis with the inclusion of a multiplicative variable (*crisis* herfidhalarea).*

The results recorded in col (1) of Table 3 replicate what we had obtained when we disaggregated by country: diversification into different economic areas reduces the probability of bank insolvency. Moreover, we find that the positive effect that diversification has on resilience is concentrated in the crisis years (col (2)).

In order to disaggregate a little bit more among regions, we calculate the weight that each of the regions has exclusively on foreign claims (*euroshare*, *emeshare* and *advshare*), thus excluding domestic activity. These indices should allow us to capture the contribution of each of these geographic areas to risk, conditioning on synchronization of business cycles. As the sum of the three share indices is one, we only include two of them in the estimation (*euroshare*, *emeshare*). We can interpret the estimated coefficients as the contribution of the region to the overall effect of diversification, in relation to the contribution of diversifying into "advanced economies". We also include the weight that foreign activity has on total claims (*foreignweight*) in order to capture the overall effect of having more activity abroad in comparison to being more domestically oriented. We also compute the differential effect of the weight of claims in these regions during the crisis through multiplicative variables (*crisis*euroshare* and *crisis*emeshare*).

We, again, find evidence that diversifying abroad has a positive effect on risk reduction, as captured by the positive and statistically significant coefficient for *foreignweight* (columns 3 to 6). We find that both the share of claims in emerging countries and in the euro region have a positive impact on bank's resilience in relation to the share of claims into the rest of advanced economies (col 3). However, we find that such positive effects on risk reduction were mitigated after the crisis years (col 4).

Finally, we decompose the synchronization index into three synchronization indexes for each one of the regions, including only those countries that are located in the specific region. We find evidence that it is the synchronization with non-euro advanced countries which drives the negative effect of synchronization on risk. The higher average synchronization with the business cycle of countries within this group (See Table A.3) could explain this result.

Therefore, economic areas in terms of diversification matter for risk. When we decompose the international activity of multinational banks by regions we find evidence that the more synchronized are the economies where multinational banks have affiliates, and the higher the volume of assets to these economies, the higher the ex-post risk.

5.2 Decomposition of z-score

We next analyse the contribution of each one of the components of the z-score (ROA, capital ratio and standard deviation of ROA) to the results that we have obtained. It provides an assessment of the channels through which bank internationalization affects risk. We present the results in Table 4, distinguishing before and after the crisis and specifying the dependent variables in logs. We first run the central regressions with data up to the crisis (cols 1 to 3) and then for the sample since the beginning of the crisis (col 4 to 6). Such approach allows us to analyse the role that geographic diversification and the synchronization with the business cycle of different jurisdictions has played before and after the crisis as determinants of return, capital and return dispersion. We then run a regression to contrast whether there are differences before and after the crisis as to these impacts (cols 7 to 9), by including multiplicative terms for our measures of synchronization and diversification.

We find that ROA (*lnroa*) and its standard deviation (*lnsdroa*) are negatively affected by diversification in both periods (cols 1 and 3 and 4 and 6). It is therefore the case that the volatility of banks' returns decline with diversification, but also its average value. When we compare both periods (cols 7 and 9), we find that during the crisis the more the banks diversified geographically the higher their returns and the lower their volatility. As for the solvency ratio (*lnlev*), we find that more diversified banks showed lower leverage ratios before the crisis, but not afterwards. When we compare both periods (col 8), we find that during the crisis the higher the banks diversified geographically, the higher their capital ratio. Therefore the estimated effects in relation to the crisis period are pointing in the same direction: more geographic diversification has positive effects on resilience.

We also find that higher economic synchronization results in lower capital ratios, both before and after the crisis, but we do not find that the effect differs between the two periods. We also find that synchronization during the crisis reinforces the negative effect on returns, but it also mitigates the reduction in volatility.

It therefore seems that the impact of diversification and synchronization of business cycles on the different components of the z-score index goes, in general, in the same direction. It seems that the positive impact of diversification on the z-score arises because of its

mitigating effect on volatility, although it is not aligned with its negative impact on return and capital. However, during the crisis, the effects of diversification on all the three components point at a positive effect on z-score. Synchronization mostly impacts capital, although the crisis period also sees return contributing to its negative impact on z-score. Return volatility is increasing with synchronization, but not during the crisis.

5.3 Ownership and funding structures

Finally, we test whether the structure of banks' ownership and funding affects the results we have presented so far. On the one hand, we assess whether there are differences between commercial and saving banks, as saving banks are not listed and thus have less access to funding markets. Contrary to banks, which are owned by shareholders, their stakeholders are represented by the board of directors, made up of municipal and autonomous representatives, thus giving rise to weaker corporate governance. Their traditional objective was to promote family savings and provide loans to small and medium size enterprises, and were not allowed to expand beyond the region in which their headquarters were established until 1989. The financial liberalization which started at the end of the seventies in Spain gave rise to geographical expansion and to a reduction in specialization, so that at the end of the nineties there was convergence in activity between the two types of banks. As with small and medium size banks they were primarily domestically oriented with limited international activity.

On the other hand, we also analyse the role of wholesale funding, whose weight has reduced since the crisis. Spanish banks have traditionally had a large proportion of stable funding from retail deposits as compared to other jurisdictions, in consonance with the traditional activity in the asset side, with very low proportion of investment banking. Higher weight of wholesale funding may reflect a higher appetite for risk (Huang and Ravnoski, 2010). Moreover, the exposure to the shutdown of international financial markets that took place during the crisis was proportional to the dependence on wholesale funding which generated problems to refinance debt instruments reaching maturity.

We report in Table 5 the results obtained for all credit institutions (not only for those with foreign activity), distinguishing when only commercial banks are included in the estimation (col 1) from when only saving banks are included (col 2). We obtain the same qualitative results for both types of banks as those reflected in Column 1 of Table 1: international geographic diversification positively affects banks' resilience, independently of type of ownership[13].

When to test for the relevance of type of funding we include the ratio of non-deposits over total liabilities (*whole*) in the specification of equation 1 (col 3) we still find the same result as regards the positive role of international diversification on banks' resilience. Moreover, the estimated coefficient for *whole* is negative and statistically significant, thus indicating that the lower the weight of deposits on banks' liabilities, the higher the risk.

The results are also robust when we focus on banks with international activity. When we distinguish between before and after the beginning of the crisis, we find that diversification is relevant for risk and the multinational decentralized model of international expansion has a positive impact on resilience (cols 4 to 6). We do not find evidence that during the crisis, the weight of traditional funding had an impact on risk (col 5).

13 Here we do not deal with nationwide expansion, and only focus on internationalization.

6 Concluding remarks

There has been a long debate both theoretical and empirical on the beneficial effects of banks' geographic diversification, while international global banking has been expanding. Internationally active banking groups have been increasing in size and complexity and since the crisis, they have been subject to tighter regulatory requirements, aiming at better aligning regulatory capital to actual risk.

This paper provides empirical evidence on the effect on ex-post risk of the different characteristics of the internationalization of Spanish banks and gives support to the diversification benefits hypothesis. In particular, our results show that, in general terms, international geographic diversification has a positive effect on banks' resilience. An increase in both the intensive and the extensive margin reduces ex-post risk. We also find robust evidence that business cycle synchronization between the home and the host country in which a bank operates has a negative impact on risk. The more synchronized the two economies are, the lower the benefits of diversification. We also find that the more decentralized and multinational a bank group is the higher its resilience. The mode of entry into foreign markets affects risk in such a way that the higher the local claims in comparison to cross-border activity and the higher the reliance on local funding in comparison to funding from headquarters, the lower the probability of bank insolvency. The results also show that multinational and decentralized banks mitigate the negative affect of synchronization and reinforce the positive effect of diversification on bank's resilience. Finally, the results show that these positive effects are reinforced during the crisis years, which was specially felt in advanced economies. The more banks' claims were diversified abroad, the less synchronized the foreign geographic areas were with the Spanish economic cycle and the higher the weight of local foreign claims and local foreign liabilities on banks' balance, the better their performance after the crisis in terms of ex-post risk.

The findings in this paper, which are aligned with those in Gotz et al. (2016) and Griffith-Jones et al (2002) support the proposal to consider the possibility of incorporating the benefits of international diversification into the regulatory framework. The alignment of capital requirements with risk would suggest rewarding geographic diversification with lower capital. They would also support the proposal of taking into account the different model of internationalization in regulating banks. The evidence gathered on the higher resilience of multinational-decentralized banks, especially during the crisis, could give support to consider such characteristics when assessing G-SIFs and their capital requirements, and when treating the Multiple Point of Entry models for resolution. They would also call for a reconsideration of the level of detail used in stress tests. Since the 2008 financial crisis, stress tests have become a key tool of supervisory policy. They aim at testing whether banks would have adequate capital in the event of a severe recession. The use of granular detailed scenarios for different geographical regions taking into account their cyclical synchronization degree could allow for the consideration of the joint probabilities of different local stressed scenarios.

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Table 1: Multinational and centralized banks and risk. (1999Q4-2014Q4) (1)

	ALL BANKS	ONLY BANKS WITH FOREIGN CLAIMS					
VARIABLES	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
herfindhal $_{jt-k-1}$	0.852***	0.441	0.474*	0.499*	-0.0590	0.101	0.136
	(0.00244)	(0.114)	(0.0907)	(0.0758)	(0.839)	(0.732)	(0.643)
syncro_gdp $_{esjt-k-1}$	-0.132	-0.271***	-0.241**	-0.200**	-0.574***	-0.620***	-0.572***
	(0.126)	(0.00412)	(0.0120)	(0.0369)	(0.00670)	(0.00452)	(0.00597)
multinational $_{jt-k-1}$		-0.00369					
		(0.207)					
decentralizedi $_{jt-k-1}$			0.00216				
			(0.226)				
*multinationaljt-1*decentralizedi* $_{jt--k1}$				0.000132**			
				(0.0161)			
*multinationaljt--k-1*herfindhal* $_{jt-k-1}$					0.0756***		
					(0)		
*multinationaljt-k-1*syncro_gdp* $_{esjt-k-1}$					0.00958***		
					(0.000518)		
*decentralizedijt-k-1*herfindhal* $_{jt-k-1}$						0.0289***	
						(1.02e-05)	
*decentralizedijt-k-1*syncro_gdp* $_{esjt-k-1}$						0.00712**	
						(0.0169)	
*multinationaljt-k-1*decentralizedijt-k-1*herfindhal* $_{jt-k-1}$							0.000579***
							(1.03e-09)
*multinationaljt-k-1*decentralizedijt-k-1*syncro_gdp* $_{esjt-k-1}$							0.000109***
							(0.00350)
size $_{jt-k-1}$	-0.477***	-0.479***	-0.404***	-0.425***	-0.573***	-0.399***	-0.456***
	(0.000520)	(0.000779)	(0.00863)	(0.00588)	(8.61e-05)	(0.00889)	(0.00303)
overhead_costs $_{jt-k-1}$	-0.221***	-0.201***	-0.160**	-0.165**	-0.241***	-0.155**	-0.164**
	(0)	(2.51e-09)	(0.0354)	(0.0305)	(0)	(0.0310)	(0.0232)
interest_income $_{jt-k-1}$	0.00699	0.00956*	0.00973*	0.00930*	0.00869*	0.0104**	0.00917*
	(0.137)	(0.0544)	(0.0521)	(0.0625)	(0.0771)	(0.0393)	(0.0674)
constant	3.530***	4.669***	3.631**	3.851**	5.575***	3.529**	4.058**
	(0.000864)	(7.24e-05)	(0.0275)	(0.0203)	(2.37e-06)	(0.0272)	(0.0121)
bank_dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
time_dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,155	1,941	1,928	1,928	1,941	1,928	1,928
Adj_R-sqr	0.656	0.602	0.600	0.600	0.610	0.603	0.604

(1) *z-score* $_{jt-kt}$ is computed as the sum of mean *roa* (net income over total assets) and mean capitalization ratio (equity over total assets) divided by stdv of *roa* (the volatility of *roa*) over a 12 quarter period. Robust p-values in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 2: Multinational and centralized banks before and after 2008Q3. (1999Q4-2014Q4) (1)

	BEFORE CRISIS			CRISIS			OVERALL		
VARIABLES	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
herfindhal $_{jt-k-1}$	0.861**	0.710**	0.760**	0.821*	0.853**	0.814*	0.248	0.281	0.191
	(0.0108)	(0.0370)	(0.0260)	(0.0526)	(0.0477)	(0.0586)	(0.374)	(0.321)	(0.492)
syncro_gdp $_{esjt-k-1}$	-0.205	-0.285**	-0.214*	-0.191*	-0.172*	-0.117	-0.298***	-0.281***	-0.255***
	(0.113)	(0.0295)	(0.0834)	(0.0569)	(0.0771)	(0.214)	(0.00102)	(0.00170)	(0.00442)
size $_{jt-k-1}$	-0.626***	-0.509**	-0.577**	-0.0301	-0.0397	-0.0806	-0.486***	-0.528***	-0.519***
	(0.00263)	(0.0286)	(0.0143)	(0.951)	(0.936)	(0.869)	(0.000515)	(0.000291)	(0.000358)
overhead_costs $_{jt-k-1}$	-0.252***	-0.181***	-0.199***	-0.0222	-0.0332	-0.0408	-0.184***	-0.240***	-0.234***
	(5.17e-09)	(0.00383)	(0.00156)	(0.814)	(0.716)	(0.656)	(1.30e-07)	(0)	(2.33e-08)
interest_income $_{jt-k-1}$	0.000355	-0.000930	-0.00158	0.00587	0.00528	0.00458	0.00720	0.00603	0.00514
	(0.965)	(0.910)	(0.849)	(0.360)	(0.409)	(0.471)	(0.153)	(0.217)	(0.292)
multinational $_{jt-k-1}$	0.0161***			-0.00487			-0.00805**		
	(0.000340)			(0.430)			(0.0137)		
decentralizedi $_{jt-k-1}$		0.00549***			0.00734			0.00153	
		(0.00778)			(0.196)			(0.403)	
*multinationaljt-k-1*decentralizedi* $_{jt-k-1}$			0.000226***			0.000249***			1.60e-06
			(0.00836)			(0.000200)			(0.976)
crisis multinational* $_{jt-k-1}$							0.00533***		
							(0.000703)		
*crisis*decentralizedi* $_{jt-k-1}$								0.00810***	
								(2.93e-08)	
*crisis*multinationaljt-k-1*decentralized* $_{jt-k-1}$									0.000143***
									(0)
constant	5.361***	4.395**	5.022**	-0.612	-0.543	-0.117	4.630***	5.480***	5.396***
	(0.00206)	(0.0223)	(0.0106)	(0.886)	(0.900)	(0.978)	(6.64e-05)	(3.87e-06)	(2.35e-05)
bank_dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
time_dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,212	1,199	1,199	729	729	729	1,941	1,931	1,931
Adj_R-sqr	0.614	0.601	0.602	0.731	0.731	0.733	0.604	0.608	0.610

(1) *z-score* $_{jt-kt}$ is computed as the sum of mean *roa* (net income over total assets) and mean capitalization ratio (equity over total assets) divided by stdv of *roa* (the volatility of *roa*) over a 12 quarter period. Robust p-values in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 3: Risk of multinational and centralized banks by geographic areas. (1999Q4-2014Q4) (1)

VARIABLES	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$
	(1)	(2)	(3)	(4)	(5)	(6)
herfindhalarea $_{jt-k-1}$	0.498*	-0.0595				
	(0.0818)	(0.839)				
*crisis * herfindhalarea* $_{jt-k-1}$		1.005***				
		(0)				
emesharejt-k-1			0.504***	0.765***	0.581***	0.782***
			(0.000697)	(9.66e-07)	(0.000110)	(5.72e-07)
eurosharejt-k-1			0.281*	0.703***	0.376**	0.711***
			(0.0654)	(2.17e-05)	(0.0158)	(1.99e-05)
foreignweightjt-k-1			0.0177***	0.0164***	0.0135***	0.0134***
			(0.000169)	(0.000328)	(0.00428)	(0.00371)
syncro_gdp $_{esjt-k-1}$	-0.206**	-0.210**	-0.135	-0.128		
	(0.0296)	(0.0179)	(0.172)	(0.171)		
*crisis*emesharejtk--1*				-0.689***		-0.592***
				(3.49e-05)		(0.000698)
*crisis*eurosharejt-k-1*				-0.981***		-0.857***
				(0.000161)		(0.00150)
*multinationaljt-k-1*decentralizedi* $_{jt-k}$	0.000133**	0.000148***	0.000113**	0.000127**	0.000107*	0.000121**
	(0.0155)	(0.00514)	(0.0408)	(0.0199)	(0.0520)	(0.0257)
emesyncro_gdp $_{esjt-k-1}$					0.0615	0.0214
					(0.596)	(0.849)
eurosyncro_gdp $_{esjt-k-1}$					-0.231	-0.239
					(0.408)	(0.387)
advsyncro_gdp $_{esjt-k-1}$					-0.938***	-0.716***
					(2.69e-05)	(0.00167)
size $_{jt-k-1}$	-0.423***	-0.396***	-0.412***	-0.445***	-0.401***	-0.426***
	(0.00606)	(0.00875)	(0.00816)	(0.00404)	(0.00967)	(0.00573)
overhead_costs $_{jt-k-1}$	-0.164**	-0.161**	-0.187**	-0.199***	-0.184**	-0.194***
	(0.0314)	(0.0288)	(0.0146)	(0.00734)	(0.0132)	(0.00773)
interest_income $_{jt-k-1}$	0.00926*	0.00700	0.00999**	0.00953*	0.00928*	0.00907*
	(0.0634)	(0.152)	(0.0479)	(0.0581)	(0.0651)	(0.0713)
constant	3.831**	3.765**	3.379**	3.545**	3.293*	3.406**
	(0.0210)	(0.0190)	(0.0494)	(0.0362)	(0.0526)	(0.0427)
bank_dummies	Yes	Yes	Yes	Yes	Yes	Yes
time_dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,928	1,928	1,928	1,928	1,928	1,928
Adj_R-sqr	0.625	0.632	0.628	0.632	0.631	0.633

(1) *z-score* $_{jt-kt}$ is computed as the sum of mean *roa* (net income over total assets) and mean capitalization ratio (equity over total assets) divided by stdv of *roa* (the volatility of *roa*) over a 12 quarter period. Robust p-values in brackets.***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 4: Decomposing the Z-Score. Before and after 2008Q3. (1999Q4-2014Q4) (1)

	BEFORE CRISIS			CRISIS			OVERALL		
VARIABLES	*lnroa* $_{jt-k-1}$	*lnlev* $_{jt-k-1}$	*lnsdroa* $_{jt-k-1}$	*lnroa* $_{jt-k-1}$	*lnlev* $_{jt-k-1}$	*lnsdroa* $_{jt-k-1}$	*lnroa* $_{jt-k-1}$	*lnlev* $_{jt-k-1}$	*lnsdroa* $_{jt-k-1}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
herfindhal $_{jt-k-1}$	-0.312**	-0.203***	-1.097***	-0.998***	0.101	-0.776**	-1.188***	-0.175**	-0.244
	(0.0287)	(0.00266)	(0.00145)	(0.000452)	(0.250)	(0.0357)	(7.25e-10)	(0.0250)	(0.389)
syncro_gdp $_{esjt-k-1}$	0.0344	-0.0850***	0.167	-0.553***	-0.120***	-0.0730	0.0958	-0.0471**	0.369***
	(0.380)	(1.28e-06)	(0.182)	(1.59e-10)	(0.000192)	(0.385)	(0.115)	(0.0138)	(0.00904)
*crisis*herfindhal* $_{jt-k-1}$							0.452***	0.143**	-0.541**
							(0.00237)	(0.0234)	(0.0425)
*crisis*syncro_gdp* $_{esjt-k-1}$							-0.679***	-0.0293	-0.386**
							(0)	(0.442)	(0.0206)
size $_{jt-k-1}$	-0.712***	-0.438***	0.122	-0.432*	0.183**	0.347	-0.873***	-0.264***	0.180
	(4.06e-10)	(0)	(0.550)	(0.0776)	(0.0141)	(0.399)	(0)	(0)	(0.171)
overhead_costs $_{jt-k-1}$	-0.219***	-0.0721***	0.155***	-0.106*	0.0309**	0.0730	-0.249***	-0.0429***	0.168***
	(0)	(7.10e-05)	(0.00393)	(0.0518)	(0.0371)	(0.359)	(3.47e-07)	(0)	(0)
interest_income $_{jt-k-1}$	-0.00168	0.00127	0.00279	0.00362	-0.00994***	-0.0117**	-0.00348	-0.00129	-0.00609
	(0.736)	(0.267)	(0.748)	(0.477)	(4.72e-07)	(0.0245)	(0.344)	(0.392)	(0.147)
*multinationaljt-k-1*decentralizedi* $_{jt-k-1}$	2.96e-05	-4.96e-06	-0.000185***	-0.000357***	0.000153***	-9.10e-05			
	(0.164)	(0.752)	(0.00710)	(5.88e-05)	(0)	(0.128)			
*crisis*multinationaljt-k-1*decentralizedi* $_{jt-k-1}$							-9.56e-05***	5.08e-05***	-6.09e-05
							(0.000123)	(3.87e-06)	(0.102)
constant	6.304***	5.418***	-3.983**	7.365***	2.036***	-2.681	11.89***	6.133***	-2.705***
	(6.39e-11)	(0)	(0.0276)	(0.000510)	(0.00216)	(0.460)	(0)	(0)	(0.00929)
bank_dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
time_dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,184	1,202	1,202	677	729	729	1,861	1,931	1,931
Adj_R-sqr	0.904	0.971	0.730	0.872	0.969	0.824	0.850	0.941	0.721

(1) *lnroajt-kt* is the log of the mean *roa* (net income over total assets), lnlevjt-kt is the log of the mean capitalization ratio (equity over total assets); lnsdroajt-kt is the log of the stdv of *roa* (the volatility of *roa*) over a 12 quarter period. Robust p-values in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 5: Funding patterns and risk of Spanish banks. (1999Q4-2014Q4) (1)

	ALL BANKS			ONLY BANKS WITH FOREIGN CLAIMS		
	COMMERCIAL BANKS	SAVINGS BANKS	ALL	BEFORE CRISIS	CRISIS	OVERALL
VARIABLES	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$	*lnz-score* $_{jt-k}$
	(1)	(2)	(3)	(4)	(5)	(6)
herfindhal $_{jt-k-1}$	0.648**	2.122***	0.824***	0.768**	0.781*	0.166
	(0.0147)	(0.000466)	(0.00248)	(0.0222)	(0.0751)	(0.541)
syncro_gdp $_{esjt-k-1}$	0.0340	-0.197	-0.0880	-0.203	-0.114	-0.182**
	(0.698)	(0.622)	(0.314)	(0.106)	(0.233)	(0.0462)
*multinationaljt-k-1*decentralizedi* $_{jt-k-1}$				0.000162**	0.000242***	-2.66e-05
				(0.0117)	(0.000532)	(0.588)
*crisis*multinationaljt-k-1*decentralizedijt-k-1*						0.000147***
						(0)
whole $_{jt-k-1}$			-0.0131***	-0.0105**	-0.00249	-0.0175***
			(3.31e-05)	(0.0189)	(0.599)	(0)
size $_{jt-k-1}$	-0.362**	-1.183***	-0.221	-0.401*	-0.0223	-0.0284
	(0.0242)	(4.84e-07)	(0.154)	(0.0868)	(0.966)	(0.858)
overhead_costs $_{jt-k-1}$	-0.208***	-0.343**	-0.192***	-0.219***	-0.0378	-0.145***
	(0)	(0.0169)	(0)	(2.38e-05)	(0.678)	(0.000248)
interest_income $_{jt-k-1}$	0.00255	-0.00938	0.00563	-0.000472	0.00477	0.00433
	(0.598)	(0.307)	(0.250)	(0.953)	(0.447)	(0.376)
constant	3.073**	13.15***	1.814	3.782*	-0.350	2.735**
	(0.0144)	(4.77e-05)	(0.109)	(0.0504)	(0.936)	(0.0409)
bank_dummies	Yes	Yes	Yes	Yes	Yes	Yes
time_dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	710	1,445	2,155	1,202	729	1,931
Adj_R-sqr	0.782	0.605	0.663	0.615	0.733	0.622

(1) *z-score* $_{jt-kt}$ is computed as the sum of mean *roa* (net income over total assets) and mean capitalization ratio (equity over total assets) divided by stdv of *roa* (the volatility of *roa*) over a 12 quarter period. Robust p-values in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table A.1: Differences in return, risk and its determinants between banks operating in Spain with and without foreign subsidiaries. (1999Q4-2014Q4)

	BANKS WITH FOREIGN SUBSIDIARIES					REST OF BANKS[1]					
Variable	# of obs.	Mean	Std. Dev.	Min	Max	# of obs.	Mean	Std. Dev.	Min	Max	t-ratio[2]
	(1)	(2)	(3)	(4)	(15)	(6)	(7)	(8)	(19)	(10)	(11)
lnz_score_{jt}	199	-1.17	0.45	-1.95	-0.07	1732	-1.10	0.86	-6.36	0.63	-1.06
roa_{jt}	199	0.99	0.45	-0.28	2.48	1732	0.94	1.53	-15.01	23.06	0.51
$sdroa_{jt}$	199	0.33	0.09	0.13	0.51	1732	0.42	0.53	0.04	4.68	-2.46**
$capital\ ratio_{jt}$	199	5.65	1.01	3.38	8.07	1732	7.10	4.10	0.29	39.67	-4.96***
$size_{jt}$	199	14.70	1.12	12.52	16.38	1732	11.39	1.40	7.79	14.51	32.12***
$overhead\_costs_{}$	199	1.44	0.29	0.85	2.13	1732	1.53	0.93	0.08	9.02	-1.23
$interest\_income$	199	72.23	6.99	61.48	90.89	1732	75.75	13.40	3.05	93.35	-3.66***
$decentralized\_w$	197	42.85	28.90	0.00	100.00	1721	2.42	8.60	0.00	94.22	43.61***
$multinational\_w$	199	42.58	30.33	0.00	85.17	1724	4.82	12.75	0.00	68.85	32.53***
$herfindhal_{jt-1}$	199	0.45	0.28	0.09	0.84	1732	0.09	0.08	0.00	0.63	40.05***
$syncro\_gdp_{esjt-1}$	199	-0.71	0.82	-3.71	-0.06	1732	-0.09	0.10	-0.91	0.00	-29.93***

Source: own calculations from banks returns to Banco de España. (1) It includes bank without foreign activity (2) t-ratio of the contrast of mean difference between banks with and banks without foreign subsidiaries. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table A.2: Differences in return, risk and its determinant between Spanish banks with foreign activity with and without subsidiaries, before and after the beginning of the crisis (1999Q4-2014Q4)

	BANKS WITH FOREIGN SUBSIDIARIES							BANKS WITH FOREIGN ACTIVITY AND NO SUBSIDIARIES									
	UP TO 2007		FROM 2008					UP TO 2007					FROM 2008				
Variable	# of obs.	Mean	Mean	Std. Dev.	Min	Max	t-ratio [1]	# of obs.	Mean[2]	Std. Dev.	Min	Max	# of obs.	Mean[2]	Std. Dev.	Min	Max	t-ratio [1]
	(1)	(2)	(7)	(8)	(19)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
lnz_score_{jt}	106	**-1.05**	**-1.30**	0.38	-1.85	-0.07	-3.99***	1094	**-0.85*****	0.63	-3.59	0.57	630	**-1.54****	1.02	-6.36	0.63	-17.40***
$lnz\_score(*)_{jt}$	106	**-1.05**	**-1.34**	0.22	-1.63	-0.64	-2.73***	1094	**-0.85*****	0.63	-3.59	0.57	170	**-1.92****	1.46	-6.36	-0.13	-13.75***
roa_{jt}	106	**1.23**	**0.72**	0.39	-0.28	1.51	-9.58***	1094	**1.14**	1.11	-2.03	23.06	630	**0.59**	2.02	-15.01	12.15	-7.33***
$sdroa_{jt}$	106	**0.35**	**0.30**	0.10	0.13	0.51	-4.67***	1094	**0.34**	0.27	0.04	4.04	630	**0.55*****	0.79	0.04	4.68	8.00***
$capital\ ratio_{jt}$	106	**5.23**	**6.14**	0.76	4.55	7.71	7.10***	1094	**6.84*****	2.93	2.18	19.78	630	**7.54****	5.57	0.29	39.67	3.40***
$size_{jt}$	106	**14.38**	**15.07**	1.03	13.48	16.38	4.55***	1094	**11.36*****	1.20	7.79	14.37	630	**11.49*****	1.66	8.03	14.51	1.83*
$overhead\_costs_{jt}$	106	**1.47**	**1.42**	0.29	0.85	2.13	-1.15	1094	**1.52**	0.63	0.20	6.14	630	**1.53**	1.30	0.08	9.02	0.34
$interest\_income_{jt}$	106	**70.07**	**74.68**	4.68	61.91	90.89	4.91***	1094	**76.64*****	11.36	5.32	92.32	630	**74.11**	16.28	3.05	93.35	-3.78***
$decentralized\_w_{jt}$	104	**40.27**	**45.74**	26.88	0.01	80.77	1.33	1092	**1.82*****	7.94	0.00	94.22	629	**3.46*****	9.56	0.00	62.22	3.82***
$multinational\_w_{jt}$	106	**34.88**	**51.37**	28.90	2.46	85.17	3.97***	1094	**3.31*****	9.80	0.00	65.81	630	**7.44*****	16.35	0.00	68.85	6.56***
$herfindhal_{jt-1}$	106	**0.41**	**0.50**	0.30	0.09	0.84	2.19**	1094	**0.10*****	0.10	0.00	0.63	630	**0.07*****	0.06	0.00	0.29	-6.71***
$syncro\_gdp_{esjt-1}$	106	**-0.39**	**-1.08**	1.02	-3.71	-0.08	-6.53***	1094	**-0.07*****	0.08	-0.91	0.00	630	**-0.12*****	0.12	-0.79	0.00	-11.58***

Source: own calculations from banks returns to Banco de España. lnz_score(*)jt is calcualted for the year crisis without using information on pre-crisis period (1) t-ratio of the contrast of mean difference between up to 2008Q2 and since. (2) the asteriks reflect the t-ratio of the contrast of mean difference between banks with and without foreign activity for each period; ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table A.3: Destination of diversification

PANEL A. DIVERSIFIED BANKS

	OVERALL					UP TO 2007					AFTER 2007					
Variable	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max	t-ratio (1)
foreignweightjt	1923	7.73	12.73	0.09	78.90	1200	7.45	10.75	0.09	70.54	723	8.19	15.46	0.22	78.90	1.23
emesharejt-1	1931	62.44	35.70	0.00	100.00	1202	63.12	35.24	0.00	100.00	729	61.32	36.45	0.00	100.00	-1.08
eurosharejt-1	1931	23.78	25.02	0.00	85.55	1202	24.83	25.28	0.00	85.55	729	22.04	24.50	0.00	79.10	-2.38***
advancedsharejt-1	1931	13.03	18.18	0.00	81.10	1202	11.66	17.45	0.00	81.10	729	15.28	19.12	0.00	69.62	4.26***
$emesyncro\_gdp_{esjt-1}$	1931	-0.08	0.19	-1.64	0.00	1202	-0.04	0.07	-0.73	0.00	729	-0.15	0.28	-1.64	0.00	-13.49***
$eurosyncro\_gdp_{esjt-1}$	1931	-0.04	0.07	-0.73	0.00	1202	-0.04	0.08	-0.73	0.00	729	-0.03	0.05	-0.31	0.00	3.52***
$advsyncro\_gdp_{esjt-1}$	1931	-0.03	0.14	-1.94	0.00	1202	-0.02	0.07	-0.93	0.00	729	-0.06	0.20	-1.94	0.00	-6.98***

PANEL B. COMERCIAL VS. SAVING BANKS

	COMMERCIAL BANKS					SAVING BANKS					t-ratio (2)
foreignweightjt	607	14.90	20.10	0.27	78.90	1,364	4.39	3.97	0.09	32.73	-18.51***
emesharejt-1	710	49.39	40.06	0.00	100.00	1,445	62.02	36.78	0.00	100.00	7.28***
eurosharejt-1	710	18.66	23.19	0.00	82.20	1,445	22.81	25.38	0.00	85.55	3.67***
advancedsharejt-1	710	16.60	19.63	0.00	73.77	1,445	9.53	16.32	0.00	81.10	-8.83***
$emesyncro\_gdp_{esjt-1}$	710	-0.15	0.29	-1.64	0.00	1,445	-0.04	0.05	-0.50	0.00	14.28***
$eurosyncro\_gdp_{esjt-1}$	710	-0.05	0.09	-0.73	0.00	1,445	-0.02	0.05	-0.39	0.00	9.41***
$advsyncro\_gdp_{esjt-1}$	710	-0.08	0.22	-1.94	0.00	1,445	-0.01	0.02	-0.19	0.00	11.64***

Source: own calculations from banks returns to Banco de España. (1) t-ratio of the contrast of mean difference between up to 2008Q2 and since. ; (2) t-ratio of the contrast of mean difference between commercial and saving banks. ; ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively .

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