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Determinants of risk in the banking sector during the European Financial Crisis

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ABSTRACT

Risk assessment in the banking sector has been a prominent topic in the banking literature and has gained attention especially since the recent financial crises. In particular, the European crisis, which was the first since the formation of the Eurozone, underlined a number of significant problems and increased concerns on the tail or crash risk of banks. In the present study, we seek to examine whether information asymmetry, the importance of banks in the financial system and systemic risk play significant roles in the evolution of stock crashes in the banking sector. Information asymmetry is proxied by opacity, the importance of a bank in a financial network is proxied by network centrality, and systemic risk is proxied by clustering. The research framework considers a number of regulatory, reporting and financial market factors that have also been determined to relate to stock crashes and shows that all of the above factors are related to (idiosyncratic) stock crash risk under specific conditions.

1. Introduction

Risk assessment in the banking sector has been a prominent topic in the banking literature. The Global Financial Crisis (henceforth GFC) and the European Financial Crisis (henceforth EFC) created a need for efficient risk measurement and the prediction of risk (Avramidis and Pasiouras, 2015) and renewed interest in the risk of financial networks (Billio et al., 2012; Minoiu and Reyes, 2013; Leon and Berndsen, 2014). The literature on the networks of financial institutions has advanced in recent years with the use of network analysis to infer the level of risk of the financial network through measures such as the connectedness of financial institutions. Connectedness is related to systemic risk; a high value of this measure in a financial system makes the transmission of negative shocks easier through the system likely because of illiquidity or insolvency (Bilio et al., 2012). In this respect, a number of studies have used the concept of connectedness to infer about the stability of a financial network (i.e., Nier et al., 2007; Minoiu and Reyes, 2013; Diebold and Yilmaz, 2014).

An important manifestation of risk during a crisis is idiosyncratic risk, which takes the form of firm-specific or idiosyncratic stock crashes. This kind of risk is estimated using idiosyncratic stock returns and thus it excludes market-wide movements.[1] In this respect, idiosyncratic stock crash risk (or tail risk) is related to firm-specific risk rather than systemic risk. The recent financial crises increased concerns on the tail risk of banks due to the likely signaling of decreased future performance (Cohen et al., 2014). Dewally and Shao (2013) and Cohen et al. (2014) provide supportive evidence on the relation between the likelihood of a future stock crash and the existence of earnings management by banks during the crisis period. The authors assert that banks that hide negative news at a higher frequency than other banks have increased probabilities of crashing in the future. In essence, an important factor in cases of high idiosyncratic risk is information asymmetry. As Hutton et al. (2009) argue, information asymmetry caused by a delay in the dissemination of bad news is related to higher future crash risk. The authors base their assertion on the fact that after a certain point firms can no longer withhold the bad news and their subsequent disclosure leads to a crash.

Moreover, idiosyncratic risk is deemed significant, especially in the case that a bank is considered important in the network during a

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[1] Throughout the paper the term crash risk refers to idiosyncratic stock crash risk.

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financial crisis because the crash may be diffused in the system and affect other banks (Balla et al., 2014). Therefore, there are reasons to believe that additional firm-specific characteristics of the topology of the financial network, which are related to information asymmetry, the importance of the bank in the network and the diffusion of shocks, may also provide information on future idiosyncratic risk. Characteristics of this kind include the importance of the role of certain financial firms in the financial system (centrality) as well as the degree of clustering of financial firms, which measures how closely the nodes in a network are tied. Stated otherwise, centrality provides a proxy of the importance of a node in the system, whereas clustering refers to the proximity of a node with other nodes in the network. These network characteristics are related to the characterization of "too big to fail" and "too interrelated to fail" for financial institutions. In other words, the importance of some nodes in the system, assessed through the degree of how central they are in the network (centrality),[2] as well as the degree of how tied the financial institutions are in the financial network (clustering),[3] may in turn affect their future idiosyncratic risk.

The rationale is that financial institutions that are more central in the system are also more prominent. Hence, they likely face higher pressure from regulators, auditors and other users of their financial information compared to other financial institutions that are less prominent in the financial system. This pressure potentially leads to less information asymmetry, which in turn lowers the risk of future crashes. Another reason for the lower idiosyncratic risk of some nodes in the system could be that they are more resilient to shocks. Allen and Gale (2000) argue that "complete" financial systems, where all nodes are connected (which indicates a high degree of clustering), are more stabilized compared to "incomplete" financial systems. Even if the network is not "complete" and exhibits a core-periphery structure, a bank that is central in the system and therefore has a higher clustering coefficient may face less risk because of the likely intervention of the government aimed at preventing systemic risk (domino effects) in the banking sector.

The purpose of the present study is to examine the information asymmetry factors as well as the network characteristics that are important in the prediction of idiosyncratic risk for banks during the European Financial Crisis. The present study provides the first comprehensive evidence on the stock crash risk of the banking sector for European banks. As determinants of information asymmetry and network characteristics, we use opacity and measure the importance of the financial institutions in the network and the power of their relation with other financial institutions (local clustering). Our first research question is to what extent is the importance of a financial institution related to future stock crash risk. Moreover, given the discussion above on the likely resilience of institutions, which have high clustering coefficients, to shocks, one could assert that the more important a financial institution is or the higher the clustering coefficient is, the less probable a future stock crash will be. Our second research question is to examine if institutions that are more prominent in the financial system or have high clustering coefficients are more protected from future crashes, despite having high levels of opacity. Opacity has been found to be positively related to future stock crashes for banks during a crisis (Cohen et al., 2014). However, this relation is expected to be less significant and positive for more prominent financial institutions in the network or institutions that have a high clustering coefficient.

The study uses a sample of European banks and examines whether the opacity, the importance of a bank in the network as well as the power of its relation with other banks (clustering) play a role in the prediction of future stock crash risk. Centrality seems to also lead to a more positive relation between opacity and future risk for banks domiciled in crisis-affected countries. In contrast, centrality and clustering are found to relate to lower future stock crash risk in some of the model specificationss to also lead to a more positive relation between opacity and future risk for banks domiciled in crisis-affected countries. In contrast, centrality and clustering are found to relate to lower future stock crash risk in some of the model specifications. These results extend the literature on financial networks by showing that the information generated from a network analysis of the financial system may provide a number of useful predictors of future crash risk. Moreover, we extend the stock crash risk literature in the case of financial institutions and under a setting that includes numerous phases of a financial crisis. In this essence, the results point towards the adoption of risk measures for the banking sector that take into consideration the richer information set that may emerge when the environment in which a bank operates is also analyzed.

The remainder of the study is organized as follows: Section 2 provides a brief review of the relevant literature, Section 3 presents the research framework and develops the testable hypotheses, Section 4 describes the data, Section 5 analyzes the empirical results, and Section 6 presents the study's conclusions and offers implications for future research.

2. Literature review

Since the unfolding of the GFC and the EFC, the idiosyncratic risk of banks has gained ample academic attention as a result of the repercussions and collapses of important players in the financial markets. Even though both the GFC and the EFC originated in the financial sector they were soon transmitted into the real economy. In essence, the initial triggers of the toxic assets created liquidity problems as a result of the inability of banks to raise funds in the market. Longstaff (2010) identify liquidity as one of the key factors that lead to contagion in the financial markets. However, he also notes that contagion likely stems from increases in the risk premium of a market, which are fueled from negative events that occur in another market. These two factors (liquidity and risk premium) are shown to trigger financial contagion during the GFC (Longstaff, 2010). Kosmidou et al. (2015) report similar results and show that the European debt crisis soon transformed into a liquidity crisis, whereas the subsequent release of an increasing volume of negative news negatively affected stock prices in the EU markets.

The concerns about the crisis are also triggered by the large socio-economic problems that a banking crisis may generate (Wagner, 2007; Acharya, 2009). Jin and Myers (2006) argued that less transparent markets faced more frequent crashes. A large stream of the literature that followed (i.e., Hutton et al., 2009, for industrial firms and Cohen et al., 2014, for banks) provided support to this hypothesis by showing that higher opacity (less financial transparency) increased the possibility of a future stock crash.

However, managerial discretion in delaying the disclosure of bad news may be limited by higher pressure from regulators, auditors and other users of the financial information of a bank. This is the case of financial institutions that are more important in the financial network and are noted as "too big to fail" banks. It could be asserted that in this case, future crash risk is reduced by the ability

[2] Centrality is taken as a measure of the degree of importance of a node in a system and is measured based on a number of proxies, which are eigenvector centrality (how important are other nodes that are connected to the node of interest), out-degree centrality (the number of nodes that are affected by the node of interest) and in-degree centrality (the number of nodes that affect the node of interest).

[3] Clustering is taken as a measure of the degree of tying between the nodes of a network and is measured, following Fagiolo (2007), using a number of clustering coefficients, which are formed based on causality in the clique, the latter being a group of financial institutions that interact. In this respect, the causality in the relation between the stock returns of two nodes may be, for example, unidirectional or one-directional.