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Assessing the contribution of banks, insurance and other financial services to systemic risk ☆

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ABSTRACT

The aim of this paper is to contribute to the debate on systemic risk by assessing the extent to which distress within the main different financial sectors, namely, the banking, insurance and other financial services industries contribute to systemic risk. To this end, we rely on the $\Delta CoVaR$ systemic risk measure introduced by Adrian and Brunnermeier (2011). In order to provide a formal ranking of the financial sectors with respect to their contribution to systemic risk, the original $\Delta CoVaR$ approach is extended here to include the Kolmogorov–Smirnov test developed by Abadie (2002), based on bootstrapping. Our empirical results reveal that in the Eurozone, for the period ranging from 2004 to 2012, the other financial services sector contributes relatively the most to systemic risk at times of distress affecting this sector. In turn, the banking sector appears to contribute more to systemic risk than the insurance sector. By contrast, the insurance industry is the systemically riskiest financial sector in the United States for the same period, while the banking sector contributes the least to systemic risk in this area. Beyond this ranking, the three financial sectors of interest are found to contribute significantly to systemic risk, both in the Eurozone and in the United States.

1. Introduction

The financial system plays a central role in the proper functioning of modern economies. To the same extent that it can contribute to the fostering of economic growth (Levine, 1997), failures within the financial system, as has been crystalized by the recent financial crisis, can be devastating for the global economy, especially within a framework of highly interconnected economic agents. The need for the implementation of effective regulation is therefore obvious. Such a regulatory framework is, however, hard to design and to implement in practice. Indeed, historical evidence suggests that the response of the authorities to financial crises may engender perverse behaviors, insofar as safety measures can, in fact, encourage individual risk-taking (Barth et al., 2006; Demirgüc-Kunt et al., 2009). Furthermore, as suggested by Reinhart and Rogoff (2009), financial crises have been recurrent in economic history, implying that the fundamental roots of the current turmoil lie in the propensity of the financial system to be subject to episodes of extreme fragility rather than in the accumulation of exotic and risky financial products.

Risk within the financial system appears, in fact, to be more than the sole aggregation of risks related to individual institutions and includes a non-negligible component consisting of the endogenous risk that results from the collective behavior of financial institutions, i.e. the "systemic risk". In this respect, in the case of the banking industry, it is misleading that the historical focus of the regulators has been on imposing minimum levels of capital for banks as a cushion against unexpected losses (the so-called "Pillar I" in the Basel I and II agreements). This has meant that until only very recently, the systemic importance of individual institutions resulting from factors such as size, the degree of leverage, and the interconnectedness with the rest of the system has been ignored. In this respect, addressing Stein's concern regarding "the overarching goal of financial reform [which] must be not just to fortify a set of large institutions, but rather to reduce the fragility of our entire system of credit creation" (Stein, 2010), undoubtedly calls for a systemic approach to the problem that would contrast with most regulation attempts made so far.

Against this background, understanding the main causes of the system's fragility is essential in the quest for a proper regulatory

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framework and this remains one of the main challenges posed to policymakers, practitioners and the academic community. Regarding systemic risk, in a statement at the Economic and Monetary Affairs Committee of the European Parliament in 2009, Jean-Claude Trichet claimed that at least three major issues needed to be addressed: (i) the measurement of the degree of procyclicality in the financial system, (ii) the analysis of the inter-linkages between the financial sector itself, taken as a whole, and the real economy, and (iii) more generally, the assessment of systemic risk determinants. This paper aims to address the second and third issues by examining the contribution to overall risk arising from the different sectors that compose the financial system, i.e. the banking, insurance and other financial services sectors, in both the Eurozone and the United States. The other financial services sector contains financial companies other than banks and insurance companies, such as broker-dealers, hedge funds and holding companies for example. The main motivation behind this paper is the fact that in a globalized and financialized economy, economic agents are becoming increasingly more interconnected. This favors the spread of adverse shocks occurring in one or several financial sectors not only to the entire financial system but also to the real economy, as was illustrated by the Dotcom and subprime crises.

Addressing these issues requires not only the examination of the way shocks propagate within a given sector (i.e. how the distress of a given bank or insurance company spreads to other banks or insurance companies) but also the way shocks within a given financial sector affect other financial sectors or the real economy as a whole (i.e. how the distress of a given bank spreads to insurance companies or to other financial companies). As discussed extensively in the literature, a collapse of the banking system can lead to a worsening of credit conditions either through a "credit crunch" (Claessens and Kose, 2013), i.e. a sudden contraction of credit provided to private agents, or through a rise in the cost of credit (Bernanke and Gertler, 1989), which is likely to drive down corporate investment and household consumption. Although the literature focuses on the banking industry, the breakdown of companies other than banks, such as hedge funds or insurers, can also have a critical impact on the real economy, as was illustrated by the failures or near-failures of Long-Term Capital Management (LTCM) in 1998 or more recently of American International Group (AIG). The mechanisms involved may, however, differ. Unlike banks, insurers do not play a role in the monetary or payment systems and their activities are usually viewed as being safer than those of banker, as they rely on longer-term liabilities and on a strong operating cash flow. However, mutations in the insurance industry over recent years – characterized by an increased engagement in non-traditional activities such as credit default swaps – have significantly altered the risk profile of insurers. This has activated channels through which adverse shocks affecting the insurance industry may significantly harm the real economy (Billio et al., 2012; Harrington, 2009). Hedge funds can also impact the real economy through specific channels. In particular, the multiple financial activities of hedge funds (e.g. borrowing, their role as a counterparty in the derivatives markets or securities transactions) create exposures for other institutions. Illustrating this in terms of the real exposure channel (Bandt and Hartmann, 2000), a negative shock hitting the hedge fund industry that, for instance, results in a series of defaults to creditors may affect the whole financial system and in turn the real economy. Hedge funds can also impact the economy through the so-called market channel in which the propagation of risk arises from the usual aggressive trading strategies used in hedge funds. These trading strategies have the potential to feed financial bubbles and to exacerbate price declines during correction phases. In fact, hedge funds, in particular, are suspected to have played a role in the development and the spread of mortgage-backed securities (MBSs) and of collateralized debt obligations (CDOs), which contributed to the build-up and collapse of the housing bubble in the United States in the early 2000s (Kambhu et al., 2007; Dixon et al., 2012).

The existing literature has investigated extensively the transmission mechanisms of risks from one institution to another within the same sector (see, for instance, the literature on bank runs, Diamond and Dybvig (1983), or the detailed discussion concerning the insurance industry in Allen and Gale (2006)). Nevertheless, empirical evidence is still scarce regarding how disruptions in one particular sector can spread to the entire economy and whether a specific sector is more or less risky than another. Our paper is designed to fill this gap. To this end, using data for the Eurozone and the United States for a specific period, we first estimate the extent of the contribution to systemic risk of the banking, insurance and other financial services industries and second, we establish which of these industries contribute the most to systemic risk.

The empirical strategy developed in the paper to assess the contribution of the banking, insurance and other financial services sectors to systemic risk relies on the $\Delta CoVaR$ systemic risk measure recently proposed by Adrian and Brunnermeier (2011). There is one significant limitation of the original $\Delta CoVaR$ measure of systemic risk, i.e. the absence of a formal test to compare the relative contribution of each individual financial institution or financial sector. Importantly, we deal with this limitation by implementing the Kolmogorov–Smirnov test developed by Abadie (2002), which is based on bootstrapping techniques. Using daily data from September 21, 2004 to March 16, 2012 for the United States and the Eurozone, our empirical results show that each financial sector contributes significantly to systemic risk, with the insurance sector displaying the largest contribution in the United States. In the Eurozone, banks are found to be systemically riskier than the insurance sector, while the other financial services sector contributes the most to systemic risk. Interestingly, the impact of the different financial sectors on systemic risk is found to increase after the beginning of the subprime crisis. These results emphasize the need for financial regulatory authorities to adopt a simple, clear and easy to implement systemic risk measure. Regulatory authorities need to be aware that the different financial sectors represent different risks to the system and that specific actions may be needed to reduce the impact in terms of risk to the whole economy of these financial sectors.

The remainder of the paper is structured as follows. Section 2 discusses the literature on systemic risk measures and more precisely on the $\Delta CoVaR$ measure of systemic risk. The third section of the paper outlines the data employed in this empirical analysis. Section 4 lays out the empirical estimation framework of the $\Delta CoVaR$ and the procedure of a formal ranking of the different financial sectors with respect to their contribution to systemic risk. Section 5 presents our empirical findings and the results of the specific tests. Section 6 discusses results and Section 7 concludes.

2. Literature review

The European Central Bank (ECB, 2009) defines systemic risk as a risk of financial instability "so widespread that it impairs the functioning of a financial system to the point where economic growth and welfare suffer materially". In this paper, we do not limit our definition of the system to the banking sector or to the financial system, as is often the case in the literature, but rather focus on the second part of the definition, which is related to spillovers into the real economy itself. Accordingly, in the remainder of the paper, we use "the system" to refer to the real economy. Consequently, our main objective is to assess the impact on the real economies of both the Eurozone and the U.S. of adverse shocks affecting one of the different sectors in the financial system (i.e. the banking, insurance and other financial services sectors).