



Good for one, bad for all: Determinants of individual versus systemic risk



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ABSTRACT

We analyze a sample of large international banks in major advanced economies and examine the impact that bank-specific factors have on an institution's solvency risk and its contribution to systemic risk. We focus on the five categories that the Basel Committee on Banking Supervision has recently proposed as indicators of systemic importance. Our findings suggest that unstable funding is the main factor driving systemic risk. Furthermore, the combination of significant trading activities with global presence appears to exacerbate spillover risks to the global financial system. Interestingly, whereas trading activities contribute to the build-up of correlated or 'wrong-way' risk they help to mitigate individual solvency risk. Conversely, a decentralized approach to liquidity management seems to alleviate individual solvency risk but amplifies the transmission of financial distress across the financial system. This suggests that a macro-prudential approach to financial regulation should focus not only on scaling up micro-prudential measures but also on enabling the efficient transfer of risk between financial institutions.

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1. Introduction

The traditional model of financial intermediation – borrow short, lend long, hold loans to maturity – makes financial institutions particularly sensitive to the market conditions that feature credit and liquidity risk. Furthermore, the overreliance on short-term wholesale funding interconnects the results of a single player with the actions undertaken by the others, causing a distinctive source of uncertainty in the financial industry known as systemic risk. It is particularly striking that although bank managers could implement different strategies to handle the heterogeneous sources of uncertainty, what turns out to be best from an individual perspective may on the other hand exacerbate systemic risk. For instance, the pro-cyclical deleveraging of the trading book is an effective tool to alleviate individual funding constraints, but it

propels financial contagion. Similarly, the sudden curtailment of short-term credit mitigates the credit risk of the lending institution, but it transfers funding risk to its borrowing counterparts. Even the holding of the market portfolio, profusely advocated by traditional risk management practices to diversify away idiosyncratic risk, leads to the build-up of systemic risk because of the prevalence of highly correlated exposures in the trading book of firms that are highly intertwined in wholesale funding markets.

In the aftermath of the global financial crisis, the Basel Committee on Banking Supervision (BCBS) introduced a battery of new regulatory initiatives to promote a more stable banking sector. The so-called Basel III regulatory framework seeks to enhance the resilience of individual financial institutions by strengthening their capital buffer and by building counterbalancing capacity to absorb liquidity shocks. However, as Goodhart et al. (2004) show, there is a trade-off between efficiency and financial stability.

This paper argues however, that these measures are essentially micro-prudential in nature, and may not guarantee the efficient transfer of risk between market participants as they are not perfectly aligned with the overall macro-prudential objective. To address systemic risk, the BCBS adopted supplementary

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measures in December 2011 including the proposal of a methodology to identify Global Systemically Important Banks (G-SIBs) and the calibration of the additional loss-absorbency capacity that they should have. The assessment methodology involved is based on five categories that measure size, interconnectedness, substitutability, cross-border activity, and complexity of the bank; see BCBS (2011) for details. The approach gives the same relative importance to these factors, and implicitly treats them as if they were independent. Whereas the theoretical literature has emphasized the non-linear effects created by the interaction between loss spirals and funding spirals (Brunnermeier and Pedersen, 2009), the additive model that characterizes the assessment methodology may underestimate the systemic importance of institutions that display correlated risks; see Otter-Robe et al. (2011). Acharya (2009) affirms that prudential regulation should operate at a collective level, regulating each bank as a function of both its joint (correlated) risk with other banks as well as its individual (bank-specific) risk. Then, the potential conflict between the variables that mitigate systemic risk and reduce individual solvency risk should be formally addressed.

In this paper, we make a step toward filling the gap between micro-prudential and macro-prudential policies by characterizing empirically how the main systemic factors outlined by regulatory assessment methodology contribute to individual solvency risk and the spread of systemic risk in the global banking industry. To this end, we analyze a sample of 47 global financial institutions operating in 16 advanced economies over the period July 2001 through December 2010. Our main aim is to quantify the expected marginal response of different measures of systemic and individual risk to (standardized) changes in the BCBS systemic categories, after controlling for other features in the time-series dynamics of this process. We characterize the dynamics of the unobservable systemic risk process by means of the so-called CoVaR methodology of Adrian and Brunnermeier (2011), and consider the credit default swap spread and the KMV–Merton probability of default as direct measures of firm-specific solvency risk. The relative importance of these factors, and the possibility of interactions between the different categories are addressed in pooled time-series cross-sectional regressions with multi-way cluster-robust standard errors accounting for bank and dates as clusters. Our study contributes to the current policy debate providing empirical evidence on whether the regulatory systemic factors are equally important or not, whether the different categories are independent or not, and identifying the firm-specific characteristics which, while shedding individual risk from the balance sheet, may aggravate systemic risk.

In this paper we have added three novel variables to the literature in order to measure the effect of cross-jurisdictional activity, substitutability, and the liquidity management of the bank. The main empirical findings of this analysis can be summarized as follows. First, among the five systemic categories, funding risk, measured by the ratio of short-term wholesale funding to assets, is the main determinant of systemic risk. One standard deviation increase in this variable leads to an increase in the contribution to systemic risk of 6 basis points in quarterly asset returns. Furthermore, this effect is compounded by the contribution of the loan to deposit ratio that generates an additional 6 basis points of diminished financial system returns. This evidence highlights the role of non-core liabilities in enhancing the vulnerability of the financial system to market shocks (Shin, 2010). As a result, interconnectedness between financial institutions on the liability side emerges as the main factor underlying financial instability.

Second, the interaction of the business model with cross-border activities is the most relevant source of systemic risk. We proxy

the business model by trading profit to net revenue ratio, while cross-border operations are captured by the ratio of foreign assets in total assets. One standard deviation increase in the interactive term of these variables adds up to 25 basis points of quarterly asset returns to systemic risk. Interestingly, the characteristics of investment banking activities or international diversification do not seem sufficient to trigger systemic risk by themselves. It is the interaction between both dimensions which exacerbates the instability of the global financial system. This feature suggests that shocks to the trading book and cross-border activities reinforce each other implying a larger shock than the sum of their separate effects. This result is consistent with the contagion of individual fragility through the loss spiral created by the fire-sales of assets in global markets. Consequently, systemic risk thus appears to be triggered by common exposures to market risks in correlated international markets (Nier, 2011). Moreover, Hawkesby et al. (2007) show that there is a high degree of comovement in the equity prices of large complex financial institutions.

Third, in a sample characterized by large international banks, the differences attributable to size, either measured as total assets or as the ratio to domestic GDP, or substitutability, proxied by the weight in the payments system and measured by the ratio of deposits to home country overall deposits, do not seem to play an incremental role in propagating systemic risk. These results suggest the existence of an offsetting effect to the greater loss given default impinged by large institutions upon the financial system by their enhanced risk management practices from their greater diversification opportunities.

Fourth, the management of liquidity at a centralized level is associated with lower systemic risk. We proxy the centralization of liquidity of a consolidated entity by the ratio of debt issuance by the parent, including money market instruments issued by shadow banks originated by the parent, to the overall issuance of the consolidated group. One standard deviation increase in the ratio of centralized liquidity is associated with a reduction in systemic risk of 6 basis points of quarterly asset returns. This result highlights the diversification benefits achieved from the reallocation of liquidity across affiliated entities under financial distress.

Fifth, the analysis reveals pressure points in macro-prudential regulation by revealing potential trade-offs between the determinants of systemic risk and the factors enhancing individual resilience. Our analysis suggests that solvency risk is mitigated by trading profit to overall net revenue ratio. This result is consistent with the role of financial markets in spreading individual risk. Similarly, the individual probability of default decreases when liquidity management is decentralized at the subsidiary level. Ring fencing of liquidity acts as a firing wall that protects the consolidated entity from default. The only factor that emerges as a generator of both systemic and individual risk is the loan to deposit ratio. One standard deviation increase in this variable raises its credit default swap spread by 27 basis points and increases its probability of default by 0.8 percentage points.

These results point to the main message of the paper. The funding of the balance sheet through unstable sources of funding exerts a multifaceted effect on risk. It exacerbates the risk of the individual institution thus increasing its probability of default and, at the same time, it increases the risk of spillovers to the financial system from its fragility. By contrast, the relative size of the trading book and the liquidity management strategy appear to have conflicting effects on individual and systemic risk, thus skewing the distribution of aggregate risk in financial markets. This result calls for a cautious approach to the design of regulatory standards that aim to increase the resilience of the overall financial system. Macro-prudential regulation should address not only individual solvency risk but also the potential for negative spillovers among market

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