

Working paper summary

Googling SIFIs

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Macro prudential regulation is driven by the need to address systemic risk. The relation between the financial sector and the real economy means that systemic risk can significantly affect employment and output. Despite this relation, few empirical models of systemic risk have explored the interaction between financial and non-financial firms. The authors propose a methodology based on the Google PageRank algorithm to measure the systemic risk in financial markets, and rank systemically important financial institutions (SIFIs). By taking into account both the financial sector and the real economy; this research demonstrates the efficacy of intervention programs, such as the Troubled Asset Relief Program (TARP), as circuit breakers in the propagation of crises. This is not evident in applications which address only financial firms.

Connectedness is fundamental to systemic risk and lies at the heart of the transmission of both expected and unexpected shocks around the economy. This research provides a framework for a systemic risk index, based on the interconnectedness of firms from all sectors of the economy. The research relies firstly, on understanding systemic risk as interconnections within a system of irregular risk shocks, and secondly, on exploiting the technology of interconnectedness algorithms, as typified by Google search engines. Through this, a dynamic index of overall systemic risk is produced, termed the general systemic index, together with an up-to-date ranking, the SIFIRank, for every systemically important financial institution (SIFI) included. This approach captures both the cross-sectional and time dimensions of systemic risk.

The adaptation of the Google search engine algorithm is used to account for the interconnections of firms in the economy, and facilitates a ranking of the most systemically important. Equity market data, along with firm characteristics, facilitates a timely measure, with greater coverage than when relying on bank level exposure data.

The connections between over 500 US companies included in the S&P 500 Index between 2003 and 2011 were examined in the research. The risk shocks to each company are modelled with daily realised volatilities calculated from high frequency market trading data, and augmented by firm characteristics of leverage, liquidity and size.

The research provides five main findings.

First, the general systemic risk index increases leading up to September 2008 and peaks just before the Lehman Brothers bankruptcy. The index drops abruptly after the AIG rescue and the approval of the TARP program. It increases again in April 2010 as a result of the spillover from the European sovereign debt crisis.

Second, the inclusion of real sector firms highlights the potential importance of these linkages for policy actions. When real economy linkages are excluded from our measure, the reduction in systemic risk associated with policies such as TARP is decreased substantially.

Third, the approach of the Basel Committee on Banking Supervision is applied to the SIFIRank to divide systemic importance into four buckets representing increasing levels of additional loss absorbency requirements. Four banks are consistently in the top 10 most systemically important financial firms throughout the sample period.

Fourth, the SIFIRank is compared with the ranking of systemic risk (SRISK), an alternative for detecting changes in the systemic riskiness of individual firms. A direct comparison of the results from our SIFIRank with the SRISK shows important differences. While both measures indicated growing systemic risk for a number of key firms in the lead up to September 2008, the policy interventions of TARP and the AIG rescue calmed the concerns of transmission via interconnectedness, while SRISK measures remained high. A clear result from the comparison is that at times the SRISK ranking is quite volatile, to an extent that seems to limit its usefulness for macro prudential policy regulators. This is not the case for the SIFIRank.

Fifth, plotting average systemic risk against the variance of the SIFIRank for each firm highlights two areas of considerable regulatory interest. The first consists of firms which are consistently ranked amongst the most risky and rarely move outside of this range. The second is firms with an average systemic ranking but with high variance. These are firms which on average do not seem to be a source of concern, but which have potential to quickly become a problem. Financial firms are predominantly found in these two groups, which supports the regulatory emphasis placed on understanding and perhaps limiting the exposure of the economy to these institutions.

This proposed measure of systemic risk via interconnectedness between the financial and real economy sectors may prove to be a useful tool for macro prudential regulation. Additionally, the findings support the claim that macroeconomic policy interventions into the 2008 crisis had a stabilising effect. Policy interventions such as the TARP and the rescue of AIG halted the decline in the financial sector relative to the real economy firms. If the aim of these interventions was to impede the spread and amplification to the real economy, this could be considered successful. However, these policy interventions did not alter the relative riskiness or interconnectedness of the financial sector itself.