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Systemic risk in Europe: Too big to save

Robert Engle, Eric Jondeau, Michael Rockinger 20 September 2014

With the recent Global Crisis, the interest in systemic risk and the interconnection between financial institutions has increased. This column investigates the case of European financial firms, where several factors can jeopardise a firm's financial health. Using data since 2000 to evaluate the firms' systemic risk, the authors find that for certain countries, the cost to rescue the riskiest domestic banks is too high. They might be considered too big to be saved.

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The Global Financial Stability Report of the IMF (2009) defines systemic risk as "a risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and that has the potential to cause serious negative consequences for the real economy". With the recent financial crisis, interest in the concept of systemic risk has grown. The rising globalisation of financial services has strengthened the interconnection between financial institutions. While this tighter interdependence may have fostered efficiency in the global financial system, it has also increased the risk of cross-market and cross-country disruptions.

Measures of systemic risk are generally based on market data. Two questions may be answered with such data because historical prices contain expectations about future events.

- First, how likely is it that extreme events will occur in the current financial markets?
- Second, how closely connected are financial institutions with one another and the rest of the economy?

Obtaining the answers to those questions is at the heart of most of the recent research on systemic risk. The shape of the distribution of financial returns and the strength of the dependence across financial institutions are both essential to determine the speed of the propagation of shocks through the financial system and the level of vulnerability to such shocks.

Focus on financial externalities

In the aftermath of the recent financial crisis, the literature has focused primarily upon externalities across financial firms that may give rise to liquidity spirals. In particular, it became clear that network effects must be addressed to fully capture the contribution of banks to systemic risk. Thus, these measures of systemic risk consider the risk of extreme losses for a financial firm in the event of a market dislocation. Acharya et al. (2012) and Brownlees and Engle (2012) have proposed an economic and statistical approach to measure the systemic risk of financial firms. Following Acharya et al. (2012), the externality that generates systemic risk is the propensity of a financial institution to be undercapitalised when the financial system as a whole is undercapitalised.

In this context, there are likely to be few firms willing to absorb liabilities and acquire the failing firm. Thus, leverage and risk exposure are more serious when the economy is weak. This mechanism can be captured by the expected fall in the equity value of each firm conditional on a weak economy. Then, the capital shortage for each firm is considered the source of a deadweight loss to the economy. In the econometric methodology proposed by Brownlees and Engle (2012) for US financial institutions, the model estimates the capital shortage that can be expected for a given firm if there is another financial crisis. The model is composed of a dynamic process for the volatility of each firm's return and its correlation dynamic with an overall equity index. Innovations are described by a non-normal (semi-parametric) joint distribution that reflects the sensitivity of the firm's return to

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extreme downturns in the equity market.

European institutions

In the case of European institutions, there are several additional issues beyond the aforementioned components to measure the risk exposure; for a given firm, a financial crisis may be triggered by a world crisis (such as the Subprime Crisis), a regional crisis (such as the European debt crisis), or even by a countrywide crisis (such as the Greek debt crisis for Greek banks). Thus, a natural extension of the previous models is a multi-factor model, where several elements may jeopardise a financial firm's health. Furthermore, the parameters of the model, in particular the sensitivity to market movements, may change over time. This, in turn, requires a model that allows for time-varying parameters. In this paper, we adopt the Dynamic Conditional Beta approach recently proposed by Engle (2012), in which a Dynamic Conditional Correlation (DCC) model is used to estimate the statistics that are required to compute the time-varying betas. Another issue with non-US institutions arises from the asynchronicity of the financial markets. A world crisis (for instance, initiated in the US market) may affect other regions either the same day or one day later. We design a specific econometric model to address asynchronous markets.

New evidence

Our empirical analysis is based on a large set of approximately 400 European financial firms, which includes all banks, insurance companies, financial-services firms, and real-estate firms with a minimum market capitalisation of one billion euros and a price series starting before January 2000. We investigate several aspects of systemic and domestic risks among European financial firms. In particular, we evaluate the relative contribution of countries and individual firms to the aggregate systemic risk in Europe. Our approach allows us to explicitly identify global systemically important financial institutions (G-SIFIs), using the terminology of the Basel Committee on Banking Supervision, by estimating a firm's capital shortfall in case of a worldwide shock or a Europe-wide shock. We also identify domestic systemically important financial institutions (D-SIFIs) by investigating the impact of the rescue of a firm on the domestic economy.

At the end of the study period (31 July, 2014), the total exposure of the 100 most systemically risky firms was 810 billion euros.

- The countries with the highest levels of systemic risk are France and the UK.

These two countries contribute to approximately 55% of the total exposure of European financial institutions (Table 1).

Table 1. Systemic risk by country

Country	SRISK (billion euros)	Mkt Cap. (billion euros)
France	250.41	321.64
United Kingdom	188.18	599.58
Germany	114.08	176.70
Italy	62.89	159.88
Netherlands	46.23	86.99
Switzerland	34.51	232.37

- The five riskiest institutions over the recent period have been Deutsche Bank, BNP Paribas, Barclays, Crédit Agricole, and Société Générale.

Together, they bear almost 314 billion euros, i.e., 39% of the total expected shortfall in the case of a new financial crisis (Table 2).

Table 2. Systemic risk by financial institution

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Rank	Name	Country	SRISK (billion euros)	Mkt Cap. (billion euros)
1	Deutsche Bank	Germany	70.01	34.10
2	BNP Paribas	France	67.88	60.45
3	Barclays	United Kingdom	63.10	44.64
4	Crédit Agricole Group	France	58.74	51.75
5	Société Générale	France	54.16	28.70
6	Royal Bank of Scotland Group	United Kingdom	39.11	49.71
7	ING Groep	Netherlands	33.16	38.49
8	London Stock Exchange Group	United Kingdom	29.26	6.58
9	BPCE Group	France	28.02	55.35
10	UniCredit	Italy	25.16	32.73

- Even after correcting for differences in accounting standards, the total systemic risk borne by European institutions is much larger than the one borne by US institutions.

For certain countries, the cost for the taxpayer to rescue the riskiest domestic banks is so high that some banks might be considered 'too big to be saved'.

- For ING Group in the Netherlands, Credit Suisse in Switzerland, Danske Bank in Denmark, Barclays in the UK, BNP Paribas in France, or Bank of Greece in Greece, the systemic risk measure represents more than 3% of domestic GDP (Table 3).

Table 3. Systemic risk by financial institution in % of GDP

Rank	Name	Country	SRISK (% GDP)	SRISK (bln Eur)	Mkt Cap. (bln Eur)
1	ING Groep NV	Netherlands	5.6	33.2	38.5
2	Credit Suisse Group	Switzerland	3.9	18.6	33.1
3	Danske Bank	Denmark	3.7	9.0	21.3
4	Barclays	United Kingdom	3.4	63.1	44.6
5	BNP Paribas	France	3.4	67.9	60.5
6	Bank of Greece	Greece	3.3	5.9	0.3
7	Crédit Agricole Group	France	2.9	58.7	51.7
8	Nordea Bank	Sweden	2.7	11.1	39.6
9	Société Générale	France	2.7	54.2	28.7
10	Deutsche Bank	Germany	2.6	70.0	34.1

Concluding remarks

The European Banking Union will start soon. At the end of this year, the ECB will be the single supervisor of the largest banks of the Eurozone. Given the uncertainty about the quality of bank's balance sheets, the ECB has undertaken an Asset Quality Review (AQR) and stress tests to evaluate the potential capital shortfall of large banks, including domestic systemically important banks. The AQR and stress tests are relatively expensive and time consuming processes, which require a lot of inputs from banks. It will be interesting to compare the results of the AQR with our ranking. Furthermore, our methodology can be used to measure how bank conditions have changed over time and serve as a monitoring system as the Eurozone banking system evolves.

Authors' note: Systemic risk measures based on the methodology described in this paper are available on the CRML (Center for Risk Management -- Lausanne) website at http://www.crml.ch.

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