Box 1
The growing systemic footprint of Chinese banks

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Emerging market economies have experienced accelerated financial deepening since the onset of the financial crisis. Consequently, financial stability risks emanating from emerging markets may spill over more widely to the global financial system. A key focus in this regard has been China, not least given the sheer size of its banking sector and the country's growing role in international finance. Against this background, this box investigates the risks related to the growing size and systemic importance of Chinese banks and their possible implications for euro area financial stability.

Chinese banks have increased their weight and systemic relevance in the global financial system since 2008. The total assets of China's banking sector have increased from 205% to 305% of Chinese GDP over the last decade, while the market capitalisation of Chinese banks relative to the global stock market capitalisation of banks rose from 13% in 2008 to 20% in 2017. At individual bank level, this is reflected in the rapidly growing number of Chinese banks among the 100 largest banks in the world and in the growing number of Chinese banks in the Financial Stability Board's (FSB's) G-SIB list and their respective rankings (see **Chart A** – left panel). Moreover, metrics of systemic risk point to a growing systemic relevance of Chinese banks. Their SRISK – a measure of individual banks' contributions to the undercapitalisation of the global banking system in times of distress – has increased compared to the pre-crisis period and now exceeds that for banks in the euro area and other advanced economies (see **Chart A** – right panel), while more recently the SRISK measure has stabilised.[10]

[9] For more details, see the panel contribution by Benoît Cœuré, member of the Executive Board of the ECB, at the 29th workshop on "The Outlook for the Economy and Finance", Villa d'Este, Cernobbio, 6 April 2018, and Quaglietti, L., "Implications of rising trade tensions for the global economy", *Economic Bulletin*, ECB, Issue 3, Box 1, 2018.

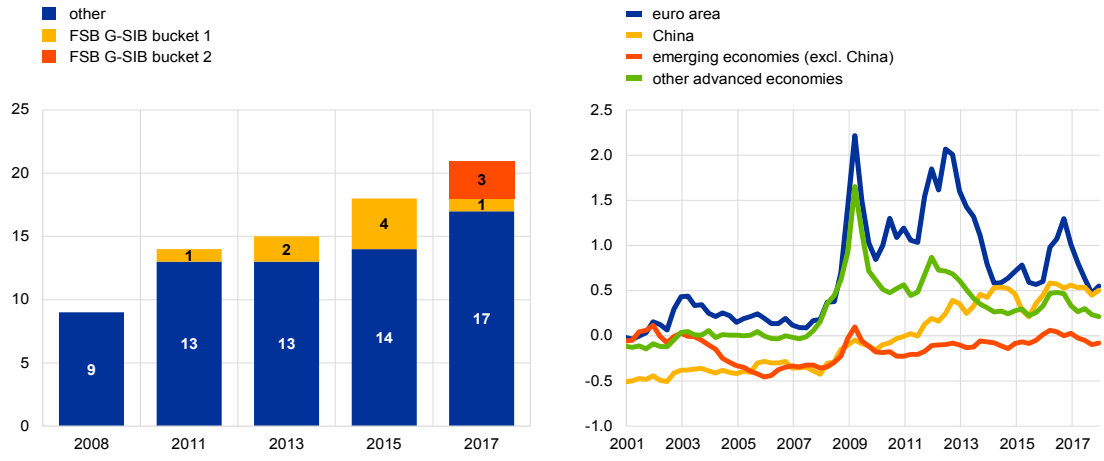
[10] The aggregate SRISK measure includes 31 large banks from China and Hong Kong and therefore may underestimate the risks stemming from the large number of small to medium sized banks. As most banks in this aggregate are backed by the Chinese government, an elevated level of SRISK translates into higher sovereign risk – which might in turn spill back to the financial sector.

Chart A

Increasing weight of Chinese banks in the global financial system not only in terms of their size, but also as regards their systemic importance

Number of Chinese banks among the worlds' 100 largest banks based on total assets (left panel) as well as SRISK as a share of global stock market capitalisation (right panel)

(Left panel: 2008-17, number; right panel: Q1 2001 – Q4 2017, percentages)



Sources: FSB, SNL Financial, New York Stern V-Lab and ECB calculations.
Notes: The FSB's G-SIB list was introduced in 2011. G-SIBs are allocated to five buckets based on their systemic footprint as measured according to BCBS methodology. SRISK quantifies the capital shortfall conditional on a severe and prolonged stock market decline. A positive (negative) value of SRISK suggests an expected capital shortfall (surplus) of the underlying banks in the case of a systemic event. For further details on the computation of SRISK, see Brownlees, C. and Engle, R., "SRISK: A Conditional Capital Shortfall Measure of Systemic Risk", *The Review of Financial Studies*, Vol. 30, January 2017, pp. 48-79. Other advanced economies cover Australia, Canada, Norway, Japan, Denmark, Sweden, Switzerland, the United Kingdom and the United States.

Chinese banks have become more interconnected with the rest of the world via both direct and indirect financial and trade channels. While China's transactions in international portfolio assets (such as equity and fixed income securities) remain subject to tight quota, bank loans, in particular Chinese banks' outbound investments, have been far less restricted. Zooming in on the euro area, direct euro area banking exposures to China remain negligible, in spite of having risen considerably in recent years both in absolute terms and relative to total assets. Supervisory data suggest that direct exposures of significant euro area institutions to the Chinese financial sector remain limited at below 1% of their total assets, with a strong concentration in France and Germany. Interconnectedness may, however, also arise on the liability side of euro area banks' balance sheets, where rollover risks may emerge to the extent that Chinese banks serve as providers of (wholesale/interbank) funding. Available data, while scarce, would suggest that this funding source for euro area banks is negligible at the current juncture.

Indirect exposures may be a cause for concern, as they can generate adverse repercussions for global financial markets. This was demonstrated during the 2015 Chinese equity market turmoil that spilled over to global equity markets. Although in that episode the stock market correction did not originate in China's financial sector, a combined Chinese economic and financial crisis scenario might have a larger impact on global financial markets, including those in the euro area. Moreover, if stress in the Chinese banking sector were to reduce Chinese banks' capacity to finance the domestic economy, this might hamper global growth through trade channels which could have an impact on euro area banks via second round effects, such as higher credit risk.

Empirical evidence points to increased spillover risks from Chinese to euro area bank stock prices. Of the various spillover channels outlined above, the indirect exposures appear to have the largest stress potential but are at the same time the most difficult to quantify. One way to proxy

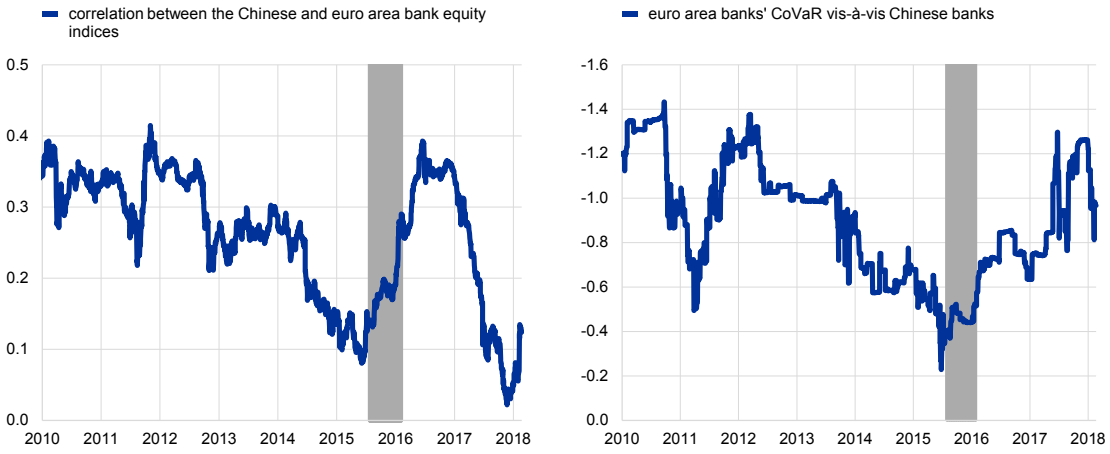
spillover risk is to look at the (tail) dependencies of euro area and Chinese banks' stock prices. To abstract from the potential impact of home-grown problems in the euro area banking sector (as indicated by marked corrections in euro area bank stock prices in early 2016) on changes in the (stock price) correlation, the focus is on the period from the middle to the end of 2015, which was characterised by a pronounced stock market correction in China. In general, the correlation of bank stock prices in the two jurisdictions has declined overall in recent years (see **Chart B** – left panel).[11] To better capture the tail dependencies and mitigate some of the shortcomings of the simple correlation approach, the more sophisticated conditional VaR (CoVaR) measure scaled by the prevailing level of market volatility is used. The results suggest that euro area bank equities have, in spite of lower correlations, become more sensitive to tail risks in the equity price of their Chinese peers since mid-2015 (see **Chart B** – right panel).

Chart B

Heightened co-movement in bank stock prices during stock price turmoil in China and increased sensitivity of euro area banks to tail risks in Chinese banks

Correlation between Chinese and euro area bank stock price indices (left panel) and euro area banks' CoVaR vis-à-vis Chinese banks (right panel)

(left panel: Jan. 2010 – Feb. 2018, correlation coefficient; right panel: Jan. 2010 – Feb. 2018; standard deviations (inverted scale))



Sources: Thomson Reuters and ECB calculations.
Notes: Left panel: The line shows the rolling correlation coefficient over a 260-day window between the euro area and the Chinese (international) bank equity indices. The shaded area represents the Chinese equity market turmoil in the second half of 2015 and early 2016. Right panel: The CoVaR corresponds to the median price change in the euro area bank equity index in response to the materialisation of the 5% lower tail of the return distributions of six large Chinese banks: Bank of China, Bank of Communications, China CITIC Bank, China Construction Bank, China Merchants Bank, and Industrial and Commercial Bank of China. The CoVaR measure is computed on a two year rolling window of daily observations and reported in terms of standard deviations of the Chinese bank index. See Adrian, T. and Brunnermeier, M.K., "CoVaR ", *American Economic Review*, Vol. 106(7), July 2016, pp 1705-41.

All in all, increased spillovers from Chinese banks may have heightened financial stability implications for euro area banks. Increased spillover risks are likely to be a reflection of the growing size and systemic importance of Chinese institutions. A further increase in the systemic footprint of Chinese banks and the ever-increasing interconnectedness of the Chinese financial system with the rest of the world may generate adverse repercussions for the global financial system, including in the euro area, in the event of any future episode of financial stress.

[11] The dynamics of the correlation coefficient need to be put into perspective, as correlations are driven by the prevailing levels of volatility – see Forbes, K. and Rigobon, R., "No Contagion, Only Interdependence: Measuring Stock Market Comovements", *Journal of Finance*, Vol. 57(5), October 2002, pp. 2223-61.