

Management of Risks to Financial Stability from the Perspective of a Central Bank

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Abstract. *This article investigates the main issues pertaining to a central bank's concerns relative to financial stability, as seen from the perspective of risks, sources and key ways of action. At macroeconomic level, central banks need to identify and monitor the risk that market operators face payment default towards local entities (companies, households, government) and/or foreign creditors. Moreover, central banks entrusted with supervisory and licensing tasks are also carefully examining the various risks threatening banks, be they credit risk, liquidity risk, market risk, or risks associated with exposure concentration and distribution. On financial markets, prices, profit margins, interest rates, net exposure to certain financial instruments must be monitored to be able to identify build-ups of risks, stress and significant drawbacks to its adequate functioning. Adding to these is the Contingent Claims Analysis (CCA¹), which involves oversight and assessment of risks in various sectors as well as of the needs to counter them, by drawing on the real market data to identify the probability of default in one sector or another and the impact on other sectors in an integrated manner.*

Key words: risks, financial stability, central bank

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1. Introduction

Financial stability has certainly become a priority worldwide, as central banks and other supervisory authorities attach special attention to preparing and publishing financial stability reviews, in which the issues pertaining to identification, treatment and oversight of risks thereto, as well as to the measures for their reduction are of the essence.

In order to easily comprehend the way of addressing systemic risks and the instruments employed for this purpose, a central bank's approach targets the three interlinked areas of financial stability, i.e. macroeconomy, financial institutions and financial markets. Against the background of a string of increasingly worrisome events at global level, a wide range of risks and contagion channels may generate financial instability, as the adequate instruments for their management have not been put in place yet. A one-size-fits-all solution is out of the question, since the adequate instruments should be tailored to the particulars of every economy, its structure, development level and its own regulatory system. The recent global financial crisis has shifted the attention of economic researchers onto the development of oversight instruments and the general framework of financial stability for risk identification and assessment, but even so there is still room for improvement.

¹ CCA is based on the theory put forth by Fischer Black and Myron Scholes in *The Pricing of Options and Corporate Liabilities*, *Journal of Political Economy*, 1973, and Robert C. Merton in *Theory of Rational Option Pricing*, *Bell Journal of Economics and Management Science*, 1973.

2. Identification and oversight of macroeconomic risks

At macroeconomic level, the central bank must identify and oversee the risk that market operators face payment default, namely the risk of over-indebtedness. This endeavour addresses all categories of loans, including those granted to households, companies and governments by foreign creditors.

During extended economic booms, companies and households tend to run heavily into debt with a view to fund projects with appealing economic prospects, which fuels the risk of failure to repay debt obligations in case of a recession. Financial institutions will thus overburden their balance sheets with the ensuing losses. If the losses are overly big, their solvency will come under pressure, panic-stricken depositors will rush to withdraw their savings and ultimately systemic stability will be affected by some financial institutions' large exposure. Hence, at macroeconomic level, financial instability may stem from events caused by interactions between financial activity and economic activity.

In a similar manner, the significant increase in public debt may generate financial instability. When a government encounters difficulties in repaying debts, it could fail to honour expenses on wages or public procurement contracts with private entities, thereby sending ripple effects on the economy. The state-of-affairs is all the more serious, as these governments usually rely on foreign currency loans to fund such expenditure.

Thus, in order to identify and oversee the risks to financial stability in the macro-economy, the central bank is mindful of the balance sheets of some groups of economic agents and private entities. Over-indebtedness to foreign creditors of any key market players or the economy as a whole may translate into financial imbalances that weaken the financial sector and lead to instability. Any significant increase in household debt is a matter of concern for the central bank, even when it is accompanied by a similar rise in income. Although over-indebtedness may be hard to assess, the central bank may consider comparing the current share of loans in the gross domestic product (GDP) to its track record², a basic indicator for market operators' level of indebtedness, which is usually calculated on the basis of information sent by financial institutions or other competent bodies. As there is no precise level beyond which households may be considered as being overly indebted, the central bank makes an analysis in terms of the evolution and the external macroeconomic and financial environment, the results pointing to possibly worrisome increases and warning signals requiring close monitoring.

At the same time, the upward trend in asset prices across the economy, especially property and assets traded on the capital market, may signal a rise in speculative trades and the inherent price bubble. In such circumstances, more and more market players are inclined to run excessively into debt, seeking to make big money in an easy way. Most often, asset prices tend to rise to unsustainable levels, together with debts incurred without any real grounds. Later, when the economy comes into balance and prices start falling, buyers might find themselves at a loss and even face bankruptcy.

Therefore, adequate management of macroeconomic risks by the central bank requires oversight of the ways households, economic agents and the economy as a whole get overly indebted, as well as of asset price movements.

Special attention should be attached to the growth rate of corporate debt in order to adequately identify and treat risks associated with financial institutions' loans to companies and corporate bond issues. During an economic upturn, firms make frequent recourse to borrowings, usually for longer periods, to make major capital

² The approach was first put forward by Borio and Lowe in *Assessing the Risk of Banking Crises*.

investments which are expected to be highly profitable. But if the economy grows at a slower pace, expected profits are late in coming and debt repayment is looming.

As such, it is relevant for the central bank's financial stability decisions, apart from the growth rate of a company's debts, the breakdown of debt (short-/long-term loans; the currency in which the borrowing was made) and the level of financial indicators such as the share of debt in total income/capital or the share of interest in total income. Similarly to household debt, corporate debt must be assessed at micro and macroeconomic level and in comparison to other countries.

The central bank makes basic assessments, including of the sovereign debt, for reasons associated with its responsibility as a "manager" of financial stability, identifying the risks and proposing corrective/remedial measures. The significant increase in public debt service jeopardises fiscal sustainability, the government's ability to duly repay its debt without going into default. Banks, pension funds, mutual funds are the usual holders of government bonds, viewed as safe or less risky. For this reason, the government entering into default/bankruptcy would significantly reduce the value of the portfolios of these entities, would heighten interest rate volatility in the economy and would disrupt the intermediation process, triggering severe financial instability. As with other categories of debt, the central bank is interested in public debt breakdown, including the currency in which the borrowing was made and its maturity, and the central bank must have enough foreign currency to repay instalments when due. The most relevant indicators for assessing fiscal sustainability are the public debt-to-GDP ratio and debt outstanding as a share in total government spending.

In certain cases, the central bank also looks at the state of contingent liabilities which, even if at some point they are not recognised on the balance sheet of a government, they call for ensuring funding sources when needed. This item includes future government obligations, starting from those related to public health services to those concerning state enterprises' debt financing.

Sovereign ratings established by the relevant external bodies and the yield spreads on the bonds issued by international risk-free countries (USA and Germany) are also benchmarks on which financial stability decisions are grounded. The recent sovereign debt crisis in Europe has shown that when fiscal sustainability is uncertain, the collapse of a country's rating, combined with an increase in the spread between the yield on bonds issued by the government and benchmark securities, makes debt refinancing very cumbersome, entailing government bankruptcy.

Experience has shown that the increase in debt to foreign creditors, also reflected by stronger capital inflows, may give rise to banking crises, posing a serious threat to financial stability. This is because capital inflows are easily channelled into stock market trades and speculative real estate transactions, fuelling price bubbles. When these bubbles burst, capital outflows occur quite fast, putting tremendous pressure on the domestic currency. In a fixed exchange rate regime for instance, if the central bank does not have enough reserves to meet capital withdrawal requests from the country, it could be forced to allow currency devaluation. Consequently, businesses with loans in foreign currency and income in domestic currency would find themselves in the position to no longer be able to pay their debts when due, and the local banking sector would get hurt by the exposure to such bubbles. All this considered, the central bank's concern for the magnitude of this exposure, belonging to various economic agents, and the denomination currency is fully justified.

Financial stability can significantly be affected also by swift growth, often unrelated to the fair/real value of asset prices, particularly those traded on the stock market and real estate assets. It indicates the existence of speculative transactions in the markets and may bring about systemic instability, since speculations involve borrowings to invest money in assets that are expected to bring quick gains. Once the speculative asset price drops to the real/justified level, those who took a loan in order

to engage in such transactions may face over-indebtedness issues, as the assets in their portfolio are worth far less than at the time of purchase.

In such a situation, the central bank keeps an eye on the growth rate of real estate prices and stock prices, along with the rise in lending intended for these markets. In line with the old-established practice, to compare the current performance to the track record and the experience of other countries may reveal useful information, all the more so as it is difficult to estimate *ex ante* whether prices at a certain point are artificial/far from fundamentals or whether or not they are subject to speculations. In addition, both market segments imply also specific analyses: for the real estate market the areas of interest for speculations such as business locations, luxury dwellings, plots of land, and the like, should be identified, while for the capital market the key indicators such as the price-earnings ratio (P/E) should be calculated.

Renowned experts³ concluded that the rise in lending accompanied by higher asset prices may signal a build-up of systemic risks ahead of a banking crisis. The upsurge in lending shows that companies are over-indebted and henceforth less capable to withstand shocks, whereas unsubstantiated asset price spikes reflect a distorted market mechanism, a breakaway from real fundamentals.

History has shown that when any of the real economy sub-sectors faces debt repayment difficulties, the financial sector undoubtedly takes a blow. Financial institutions that have funded sub-sectors in distress will incur significant losses, sometimes being forced to cap lending and stick to the loans in their portfolios. At the same time, this state of affairs hampers effective functioning of the capital market, whose activity may come to a halt, since financial institutions are often key players in these markets. Ripple effects ensue: the lack of funding causes financial market liquidity to recede, economic activity slows down markedly, affecting in turn the capability to repay debts.

3. Identification and oversight of risks associated with financial institutions

As mentioned above, the central bank's concern for preserving financial stability also includes close monitoring of such risks arising from financial institutions at individual and systemic level.

Financial institutions are threatened by a variety of risks that should be analysed, monitored and managed accordingly: credit risk (the risk that bank debtors cannot pay their debts when due), market risk (when price changes and interest rates on the market adversely affect the financial position of an institution), liquidity risk (when an institution is likely to fail to honour its obligations to meet requests and the institution cannot dispose of its holdings otherwise than significantly lowering market prices, thus incurring huge losses), operational risk (when operational issues are likely to inflict losses on the financial institution: fraud, unforeseen catastrophes, etc.). More precisely, when financial institutions must absorb losses following the default of some of their customers and these losses are substantial, the major risk is that their capital is badly hit, thus jeopardising their market position and their credibility as perceived by depositors, which may trigger bank runs.

In a world where financial institutions are increasingly interconnected via indirect and direct exposures and the contagion effect is increasingly pronounced, regulatory and supervisory authorities focused more on checking the practices of these institutions in terms of risk management and internal control. At the same time it was confirmed and agreed that the bankruptcy of one or several financial institutions may

³ Borio and Lowe, *Assessing the Risk of Banking Crises*; Borio and Drehmann, *Towards an Operational Framework for Financial Stability*.

not necessarily destabilise the financial system as a whole in the event that such entities are not too big or systemically important. Equally, the seeming “soundness” of individual financial institutions may not reflect their true state of health and the resilience of the system as a whole following the intricacy of processes, interconnectedness and interactions among such entities. For instance, while individual financial institutions may have enough capital buffers to cope with shocks, when panic sets in, it would be much more reasonable for them to stop mutual lending. On the contrary, this approach may heighten (credit and liquidity) risks to the system. The problem may easily be exacerbated when, in response to heightened risks, all institutions opt simultaneously for disposing of their assets, thereby putting pressure on each other and causing prices to collapse.

By putting all these assumptions together, the need has emerged to identify and monitor inherent risks, which are specific to the financial system as a whole, apart from those related to individual entities. This is an ongoing, dynamic process, which is influenced by specific developments and peculiarities of each crisis. For example, amid the recent global financial crisis, special attention was attached to risk distribution within the financial network and risk concentration at the level of systemically important entities.

To get an as comprehensive as possible image about how risks are spread across the financial system, network analysis techniques have been implemented in an effort to assist in identifying and structuring direct and indirect connections between the financial institutions in this network. Through such an approach, the authorities have paved the way for a correct and full understanding of the spillover and distribution of risks to the financial system, where institutions engage in bilateral transactions, support each other, promoting resilience and facilitating access to funds for those in need of liquid funds from counterparties that have them in excess. Early adoption of adequate corrective action is more difficult to perform in the absence of adequate information on the links within the financial system. Under the circumstances, supervisory authorities and financial institutions are not aware where the greatest risks are located or which entity is most exposed.

However, financial entities are still at risk of contagion which, insofar as the network of relationships and interconnectedness gets more intricate, tends to be dangerous, as it comes from several sources, including the collapse of interbank lending or of prices of assets in their portfolios. Since the collapse of a systemically important entity may threaten the stability of the entire system, it can be concluded that accompanying risks can directly be linked to systemic risk, which is why their identification and oversight becomes a strategic concern.

When Lehman Brothers, a medium-sized investment bank, was left to go bankrupt in the midst of the global financial crisis, the ensuing stress and panic that swept the financial system appeared to herald a general collapse. This was possible not because of the size of the institution in itself, but because of the strong links it had with many other financial institutions and markets elsewhere. It is only natural that the authorities that grasped this causality relationship have immediately become interested in identifying and assessing systemically important financial institutions. Thus, if by that time the notion of risk concentration in the banking system was covered by the too-big-to-fail concept, after the global crisis that followed, the notion expanded to include concepts such as too-connected-to-fail and systemically important financial institutions (SIFIs).

In 2011-12, Basel Committee for Banking Supervision (BCBS) released circulars on assessing the systemic importance of financial institutions at local and global level (*Global Systemically Important Banks and Domestic Systemically*

*Important Banks*⁴). Five categories of assessment indicators were proposed, including size, interconnectedness, lack of readily available substitutes, global (cross-jurisdictional) activity, and complexity. Based on this methodology, 25 global systemically important banks were identified, while domestic systemically important banks were to be identified by local authorities, their classification depending much on the national context. The results of local analyses helped central banks to better grasp risk concentration in local banking systems, to assess and monitor them on a regular basis, while the identification of globally important banks enhanced decision-makers' ability to manage the functioning of the banking system as a whole and oversee the risk exposures of institutions with systemic impact.

4. Identification and oversight of risks on financial markets

As a rule, the information on prices of and yields on financial products and derivatives and those on net positions of market players should provide details on these goods and, implicitly, financial market transactions. The central bank is interested in monitoring their developments to be able to identify potential signs of any menace to financial stability coming from financial markets. For instance, the "twin increase" in credit and capital value points to a build-up of risks which, most often, is accompanied by speculations and price bubbles.

Financial market indicators provide useful insight into risks, accumulated stress and the elements that at some point hamper the financial system and may be calculated based on information relative to financial market transactions.

In fact, financial market players are increasingly inclined to initiate transactions when prices of financial products (stocks, bonds, subprime-mortgage-backed securities, or the acquired financial products) are on the rise and, in order to fulfil this objective, resort to borrowings. This gradually leads to price bubbles, i.e. assets are traded at unreasonably high levels relative to economic fundamentals. Nevertheless, when asset prices enter a downward drift, cascade effects ensue, inflicting heavy losses on market players and their creditors (banks). While the brisk climb in prices of financial products is clearly an indication of a risk build-up, heightened volatility of such prices may derive from higher stress and stronger turmoil on financial markets. The agents' uncertainty surrounding market information may prompt them into trading only at extreme prices or sit on sidelines, their behaviour having negative consequences across the (financial and economic) system. Price volatility is examined via two key indicators: historical volatility, based on historical values of prices, and implied volatility, based on current information, insofar it becomes available.

This performance must be closely monitored by any central bank, even though it is not easy to set *ex ante* the highest price, below which the risk of default/bankruptcy cannot materialise and financial stability is not at risk.

Market players attach particular attention to the returns on various financial products and, implicitly, the spreads between net gains of several such products with identical maturity. Their investment decisions are often influenced by these spreads.

The unwritten rule is that the return on riskier products (corporate bonds) should be higher than that on risk-free or less risky products (sovereign bonds), as some sort of "reward" for the buyers who choose to invest their money by taking higher risks. This credit spread between the returns on the two categories of financial products (risky and less risky) is very low in periods of stability, judging by the rationale that during those periods even risky projects are less likely to fail and buyers enjoy a smaller risk premium. On the contrary, when the spread narrows markedly over a

⁴ *Global Systemically Important Banks*, Basel Committee on Banking Supervision.

longer time span, the build-up of risks economy-wide augments accordingly and funding for risky projects can easily be ensured.

Such was the case on financial markets prior to the outbreak of the full-blown 2007-10 crisis. This state of affairs was referred to as the paradox of financial stability⁵.

Central banks may opt, when making financial stability analyses, for the historical values of the indicator and compare them to the current values and other relevant indicators specific to financial markets, since there are no precise rules regulating the best yield spread on the two above-mentioned categories of financial products.

Contrary to those described above is the state of affairs during stress periods, when the yield spreads on the risky and less risky financial products are large, adding to the probability of failure of risky projects. Buyers are willing to invest in risky assets only for higher profits, which makes project financing costlier. A case in point is that of Greece, during the sovereign debt crisis in Europe in 2010, when the spreads between yields on riskier Greek government bonds and those on less risky German bonds were so wide that the Greek government was unable to refinance its own instruments and had to ask for international assistance.

In the risk analyses performed during the crisis (2007-10), central banks attached particular attention to the spread between Libor⁶ and OIS⁷ (Libor-OIS), an important yardstick for financial system stress, which may reflect credit risk across the banking system, market perception of endemic risk economy-wide, as well as the liquidity risk on financial markets. Libor-OIS is the difference between Libor rate and OIS rate, a relevant indicator of credit risk across the banking system at times of stress. A wider spread is indicative of banks' reluctance to fund other similar institutions because of bankruptcy suspicion. For instance, in early August 2007, Libor-OIS rate stood at around 0.13%, but just after Lehman Brothers collapsed on 17 September 2008 it surged to 3.5%.

5. The central bank and the integrated approach to risks to financial stability

The area of concern for financial stability encompasses thus macroeconomic issues, financial institutions and financial markets. Interdependence relationships between these sectors called upon central banks to take an integrated approach to identifying, assessing, monitoring and managing risks to financial stability.

It is recommended to put in place a composite indicator or an all-encompassing instrument capable of capturing in detail all the significant developments in the three areas. The best solution is an advanced approach, with a forward-looking component, to conduct an integrated assessment of inter-sector contagion risk via Contingent Claims Analysis (CCA).

CCA implies taking information from financial markets to be used in estimating the probability of default for an economic agent. In this vein, the first regulatory

⁵ Borio and Drehmann, *Towards an Operational Framework*.

⁶ Libor, or the London Interbank Offered Rate, is the average of interest rates estimated by most banks in London and agreed for granting/taking unsecured interbank loans. It is calculated for ten currencies with 15 different maturities (the shortest is overnight, the longest is one year). Libor is a frequently used benchmark to calculate short-term funding costs among banks and among other financial market players (British Bankers' Association, "BBA Libor", <http://www.bbalibor.com/>). Libor implies credit risk, since it involves unsecured funds.

⁷ Overnight-indexed-swap is a fixed/floating interest rate (swap) whereby a counterparty agrees on a fixed rate, referred to as OIS rate, in the national currency, at maturity, in exchange for paying compound interest, based on floating reference rates, in the national currency, at maturity. The reference rate is often correlated with the overnight rate. OIS rate implies a very low credit risk, as transactions do not imply an initial cash-flow. Payments between the two counterparties are effected at maturity.

framework was prepared in 2008⁸ to help in assessing and ensuring integrated correlation of sectoral risks. This method chiefly suggests to examine the balance sheet of an entity from the wide perspective of the probability to face payment default as a result of: unexpected external shocks – that might produce adverse effects on portfolio assets – the operator might become unable to repay debts – bankruptcy – the operator's creditors may become rightful owners of the collateralised assets, which in turn become contingent claims. Thus, the market price and the volatility of stocks traded in the market could be subject to direct oversight by containing the probability of sectoral shocks.

Eventually, by linking the outcome of this intricate analysis model to those of the models employed for monetary policy purposes, central banks will better comprehend the interconnectedness between the economic sector and the financial sector, paving the way for designing new test scenarios underlying financial stability decisions.

6. Concluding remarks

Theory and practice have both revealed the complexity of financial stability as a central bank objective and how dangerous could be its being overlooked. As Corbo (2010) noted, "Central banks have traditionally focused on treating financial crises, but they also have an important role in helping to prevent them". In other words, financial stability must play a paramount role in central policies, and, in this vein, identification and oversight of all categories of risks, together with prompt interventions to mitigate/manage them, are of the essence to successfully fulfil this objective.

Even though central banks are not able to cover all aspects pertaining to financial stability, at this moment no other purposely-established institution can attain this task, and no institutions, other than central banks, have in place instruments with a similar impact on financial stability and the risks thereto. What is now certain, particularly in the aftermath of the recent global financial crisis, is that adequate risk management in all interconnected sectors, namely macro-economy, banking system, financial markets, government policies, etc., can make a crucial difference between staying afloat and economic or financial collapse at local, regional, or even world level.

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