Vítor Constâncio: Principles of macroprudential policy

Speech by Mr Vítor Constâncio, Vice-President of the European Central Bank, at the ECB-IMF Conference on Macroprudential Policy, Frankfurt am Main, 26 April 2016.

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Ladies and Gentlemen,

It is with great pleasure that I host this dinner today, in the first edition of our annual Macroprudential Conference, this time jointly organised with the IMF. The Single Supervisory Mechanism Regulation[1] confers upon the ECB and National Competent Authorities or National Designated Authorities specific powers and responsibilities in the field of macroprudential policy. This calls for substantive conceptual and analytical work in this new policy area which is very ambitious, requiring considerable research efforts that we want to stimulate by launching this series of annual conferences.

The financial crisis and its aftermath confirmed the need for system-wide surveillance and led to the establishment of macroprudential policy as a new policy area with the objective of addressing systemic risk.

At the European Central Bank (ECB), systemic risk is defined "as the risk that financial instability significantly impairs the provision of necessary financial products and services by the financial system to a point where economic growth and welfare may be materially affected".[2] Important in this concept is the fact that the materialisation of systemic risk brings along significant costs to the real economy – implying the destruction of economic value and leading to losses in terms of economic growth.

The literature has identified three broad sources of systemic risk: (i) macroeconomic shocks that are significant enough to cause distress in the financial system, (ii) the unwinding of imbalances in the financial system generated by excessive leverage, and (iii) contagion risk, created by increasing interconnectedness and herd behaviour.

Whatever the origin, the primary role of macroprudential authorities is to identify, measure and reduce systemic risk. Identification of risks clearly needs to be probabilistic, attempting to predict the level of overall risk of the system in different scenarios.

Many indicators to measure systemic risk have been proposed since 2008. Many of them though, have a "micro-level" dimension dedicated to calculate the contribution of significant institutions to systemic risk. The Marginal Expected Shortfall (MES), CoVar, CoRisk or Conditional Tail Risk (CRT), for example, fall under this category.[3] Taken in isolation, they are not useful to predict future levels of systemic risk, as they tend to use contemporaneous market prices and do not consider the system as a whole. The ECB has developed a Composite Indicator of Systemic Stress (CISS)[4] that comprises five aggregate market segments accounted for by a range of variables and time-varying rank correlations between them. More recently, the CISS indicator has been used by Hartmann et al. (2015), jointly with credit to the private sector and cycle variables (industrial production, inflation and a

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1 Council Regulation (EU) No 1024/2013 of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions.

2 See ECB (2009), Financial Stability Review, Special Feature B for a discussion on the concept of systemic risk.

3 For an overview, see Bisias, D., M. Flood, A. W. Lo and S. Valavanis (2012), *"A Survey of Systemic Risk Analytics",* Office of Financial Research Working Paper No. 0001, January.

4 Hollo, D., M. Kremer and M. Lo Duca (2012) *"A Composite Indicator of Systemic Stress in the financial system",* ECB Working Paper No. 1426, March.

short-term interest rate) in a MS-VAR, to illustrate the dynamic interaction of systemic financial instability and the macroeconomy in the euro area.[5] CATFIN, a VAR and Expected Shortfall measure at system-wide level calculated with non-normal distributions with fat tails, showing the predictive capacity of financial volatility regarding real economic downturns was proposed by Allen et al.[6] Similarly, Giglio et al. examine 19 measures of systemic risk for the US and 10 measures for the UK and the EU from the perspective of how well they forecast macroeconomic downturns.[7] They also build dimension-reduced risk indexes using principal components and partial quantile regression to demonstrate the robust performance of some indexes in anticipating future macroeconomic downturns.

These efforts in developing composite indexes are complementary to the on-going research on the concept of a financial cycle as a sort of a generalisation of the old concept of credit cycle, distinct from the concept of the economic or business cycle. The ECB paper presented this morning by Hiebert et al.[8] builds and extends on work done at the BIS.[9] It shows how credit and asset prices share cyclical similarities, captured in a synthetic financial cycle index that outperforms credit-to-GDP gap measures in predicting systemic banking crises, on a horizon of up to three years. They also demonstrate how the financial cycle is different from the business cycle.

Based on this research, we conclude that financial variables (credit volumes and asset prices) in EU countries have historically exhibited higher average volatility than economic variables (volume of activity in goods and labour markets, as well as consumer prices). Financial cycles have also exhibited a higher duration than business cycles on average. Lastly, asymmetries appear to exist, whereby financial cycles tend to build up slowly and correct more abruptly.

Taken together, these findings have at least two policy implications. First, they establish a rationale for differentiated financial and macroeconomic policies, and are thereby fundamental to the newly established macroprudential policy area. Policies targeting financial cycles, such as countercyclical macroprudential policies, can act as a powerful complement to policies targeting the business cycle, such as monetary policy. Policy trade-offs may emerge in the short-run, as the propensity for such cyclical divergence seems to be greatest at short frequencies. Second, the results present a strong case for a differentiated national application of macroprudential policies, amid a far from complete convergence of country financial cycles. This latter aspect is particularly compelling in a currency union with shared monetary policy, where macroprudential policies represent an additional and potentially powerful element to cushion conditions specific to member states. This underpins several principles that should guide macroprudential policy that I would like to address in the remaining of my remarks.

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5 Hartmann, P., K. Hubrich, M. Kremer and R.J. Tetlow (2015) *"Melting down: systemic financial instability and the macroeconomy"* mimeo, February.

6 Allen, L., T.G. Bali and Y. Tang (2012) *"Does systemic risk in the financial sector predict future economic development?"* The Review of Financial Studies, vol. 25, No. 10, October, pp. 3000–3036.

7 Giglio, S., B.T. Kelly and S. Pruit (2015) *"Systemic risk and the macroeconomy: an empirical evaluation",* NBER Working Paper No. 20963, February.

8 Hiebert, P., I. Jaccard, T.A. Peltonen and Y. Schüler (2016) *"Characterising the financial cycle: a multivariate and time-varying approach",* ECB-IMF Conference on Macroprudential Policy Frankfurt, 26–27 April 2016.

9 Borio, C., M. Drehmann and K. Tsatsaronis (2012) *"Charaterising the financial cycle: don't lose sight of the medium term!",* BIS Working Paper No. 380, June.

Principles of Macroprudential Policy

The ultimate objective of macroprudential policy is to prevent and mitigate systemic risk, which includes strengthening the resilience of the financial system and smoothening the financial cycle, in order to preserve the effective provision of financial services to the real economy. In shaping the macroprudential policy framework, six aspects can be identified as guiding principles:

First, ***macroprudential policy should be pre-emptive and strongly counter-cyclical***. Early identification of risks is an essential first step in the policy-setting process supported by early warning indicators and models to predict potential sources of systemic risk. Macroprudential policy should then act forcefully to smoothen the financial cycle avoiding that it reaches a dangerous peak.

Second, and relating to the first, ***macroprudential policy should rely on the concept of the financial cycle*** in order to assess the position of the economy, predict its development and appropriately calibrate the use of macroprudential instruments. The concept of a financial cycle is therefore crucial for the rationale of macroprudential policy, justifying the need for dedicated policy instruments. To effectively tame the financial cycle, a time-varying dimension is crucial in the design of policy instruments – that is, the instruments must be adjustable over the cycle. Counter-cyclical capital and liquidity requirements are thus important tools.

Third, ***the real estate component in the financial cycle is of paramount importance.*** This implies that instruments in the macroprudential policy toolkit should contain borrower-side tools to influence the demand for credit, in addition to capital-related measures conditioning bank credit supply. Financial asset prices are admittedly difficult to tame with targeted policy intervention. However, regarding loans for housing, policy tools such as Loan-to-Value or Debt-Service-to-Income (LTV or DSTI) ratios, need to be part of the macroprudential toolkit in order to effectively reign on or, at least, influence real estate asset prices, as these are among the most important drivers of the financial cycle. The announced revision of the CRDIV/CRR should provide an opportunity for the extension of the available instruments, as LTVs and DSTIs are not included in the current EU regulation. Clearly, measures addressing the credit supply side by banks – such as increased capital requirements, counter-cyclical capital buffers or dynamic provisioning – can be easy to activate but have proven to be of modest effectiveness. Furthermore, as non-banks play an increasingly important role in the provision of credit, measures targeting only the banks could just result in shadow-banks taking a considerable size of the mortgage business and fuelling a boom in house-prices.

Fourth, ***stress tests of the banking and financial system must have a macroprudential dimension***. Such comprehensive assessments need to be embedded in a macro-financial environment. They entail an assessment of the position of a specific economy in the financial cycle since, for example, the adequate level of capital requirements cannot be dissociated from a country's position on the cycle.

Fifth, ***macroprudential policy is complementary to monetary policy and should share the same status as a policy area.*** Central banks must have responsibilities in both policy areas even if they are not involved in microprudential supervision. Several reasons justify this set-up. Both areas need to work in close co-operation; central banks are more sensitive to macro-financial stabilisation goals; they possess more information about financial markets and the economy. Finally, the alternative model of joining macroprudential policy with microprudential supervision faces the problem that their supervisory objectives are focused on avoiding individual banks' distress, for which they are accountable. In this perspective the UK institutional framework is, in my view, the most adequate. In the European monetary union, while monetary policy is designed for the euro area as a whole, macroprudential policy should be country-specific, even if co-ordinated, since financial cycles are not fully synchronised across countries.

Sixth, macroprudential policy should go beyond the banking sector and encompass market-based finance institutions and products. As this sector continues to expand and increase its role in lending to the real economy, as its interlinkages with the wider financial sector deepen, and as the footprint of large institutions grows, non-banks are clearly gaining in systemic importance. Moreover, the more policy-makers are effective in using macroprudential tools to constrain excessive leverage and credit growth in the banking sector, the more likely it becomes that there will be excessive adjustments in the non-bank sector through leakages. For these reasons, the coverage of the macroprudential framework needs to be extended to the shadow banking sector.

Let me elaborate on one principle: macroprudential stress tests of the banking sector and their extension to non-banks.

Macroprudential Stress Tests

This year, the ECB is taking part in the EBA EU-wide Stress Testing in a fully-fledged capacity as microprudential and macroprudential supervisor. This capacity is collectively shared with the national competent institutions of the countries in the Single Supervisory Mechanism.

The macroprudential policy responsibilities have added a new dimension to stress testing that goes beyond the assessment of solvency of individual banks under a baseline and adverse scenarios. Macroprudential stress tests should provide, in association with the projected scenarios, indicators to measure and predict the overall level of systemic risk, the position of the economy in the financial cycle and consequently the adequate stance of macroprudential policies.

Differently from supervisory exercises where results are expressed in terms of capital shortfalls or no additional capital requirements by bank, macroprudential stress tests might show that capital positions are either insufficient to preserve financial stability of the system or, in different circumstances, are excessive for the system as a whole requiring easing or release of macroprudential measures. Only with this type of macro stress tests can we reach conclusions about the stance of macroprudential policy.

This concept of macroprudential stress tests, which have to be top-down exercises, requires that we go beyond the traditional approach of microprudential capital exercises.[10] These further requirements consist of an integrated approach between micro and macro components which encompass primarily four main aspects: (i) a dynamic approach that includes consideration of the bank's reaction to the scenarios; (ii) a comprehensive two-way interaction between banks and the real economy; (iii) the assessment of contagion effects stemming from interconnectedness among financial institutions, including non-banks in the shadow banking sector; (iv) finally, the analysis of the interaction with other non-financial sectors that are relevant for banks' risk management.

Let me dwell upon these four points, which are being addressed at the ECB.

Dynamic approach including the bank's reaction to the scenario: Going beyond the static assessment of solvency of individual banks, macroprudential stress tests should account for more realistic features, in particular banks' behavioural reaction to the stress which could come in the form of deleveraging, straight capital increases or work-out of non-performing loans. To take that into account, the dynamic balance-sheet is implemented in

[10] See also keynote address by V. Constâncio (2015), "*The role of stress testing in supervision and macroprudential policy*", London School of Economics Conference on Stress Testing and Macroprudential Regulation: a Trans-Atlantic Assessment, 29 October: http://www.ecb.europa.eu/press/key/date/2015/html/sp151029.en.html.

our framework by allowing banks to re-optimise their portfolio according to the risk-return optimisation criterion.[11]

To account for ***two-way interactions of banks with the real economy*** we have developed Dynamic Stochastic General Equilibrium (DSGE) models which are being calibrated at the individual country level to assess these effects.[12]

Adequate levels of capital requirements, beyond regulatory minima, should depend on structural and cyclical factors, notably the overall position of a country in the cycle. A general equilibrium framework is thus needed to account for the overall impact of higher capital ratios that can constrain banks' capacity to provide credit to the economy while, at the same time, can bring down the cost of credit by reducing banks' default probability. The optimal level of capital requirements is thus one that balances the costs linked to more expensive equity funding with the benefits of a lower rate of bank defaults. Results from this model-based approach can quantitatively assess the impact on overall GDP indicating that, as the capital ratio increases, household consumption and borrowers' welfare first increase and then decrease, thus highlighting the importance of correctly taking into account the starting point – and the position in the cycle – when assessing the effects of a policy measure.

We have also assessed banks' response to capital shortfalls, using a GVAR model, also used to examine the cross-border effects of deleveraging. This empirical work confirms common wisdom that, in response to a negative shock to the leverage, banks tend to shed assets instead of raising capital while keeping the leverage constant.[13]

The macro-feedback nexus is however not the only reason why an initial shock to an entity can be amplified at the system-wide level. What I mean here, and this is my ***third point, are the effects related to financial contagion emerging from interconnectedness*** and resulting from dynamic interactions between the financial economic agents that can embed non-linear features that could lead to fire-sales. Direct financial contagion via the interbank channel has been one of the features of the ECB top-down stress tests for some years already and we have been regularly publishing the results of the second round effects (related to possible domino effects in the interbank market) in the ECB Financial Stability Review. Yet, macroprudential stress tests should also consider the second round effects from indirect contagion, most prominently due to possible fire-sales, which could also emerge as an outcome of interactions between banks and shadow banks. We are developing *agent based models* that could take account of these interactions and allow for endogenous asset price determination.[14] This implies that the macroprudential stress test framework should encompass the direct stress test of shadow bank balance sheets.

Recent ECB research suggests that the shadow banking sector has a natural tendency to grow until it becomes systemically important for the entire financial system and endangers the stability of the banking sector.[15] Stress testing shadow banks could unveil the

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11 G. Hałaj, (2013), *"Optimal asset structure of a bank – bank reactions to stressful market conditions",* ECB Working Paper Series No. 1533.

12 Darracq Paries, M., C. Kok, and D. Rodriguez Palenzuela (2011), *"Macroeconomic propagation under different regulatory regimes: evidence from an estimated DSGE model for the euro area",* International Journal of Central Banking, December. See also, Clerc, L., A. Derviz, C. Mendicino, S. Moyen, K. Nikolov, L. Stracca, J. Suarez and A. P. Vardoulakis, (2015), *"Capital regulation in a macroeconomic model with three layers of default",* International Journal of Central Banking, June.

13 Gross, M., C. Kok and D. Żochowski, (2016), *"The impact of bank capital on economic activity: Evidence from a Mixed-Cross-Section GVAR model",* ECB Working Paper Series No. 1888, March.

14 Calimani, S., G. Hałaj, D. Żochowski, *"Fire-sales in an ABM of banks and shadow banks",* mimeo.

15 Ari, A., C. Kok, M. Darracq Paries and D. Żochowski, (2015), *"Shadow banking in general equilibrium",* mimeo, European Central Bank.

vulnerabilities in this sector and help assessing the potential for spillover of the stress in that sector to the rest of the financial sector.

This brings me to my fourth point. ***Interaction between banks and the non-financial sectors:*** a macroprudential stress test framework should integrate, to the extent possible, all sectors of the economy to properly account for vulnerabilities that may emerge from any of them. Chiefly important are the household and corporate sectors. At the ECB, work is well underway with the view to extend the stress testing framework to the household sector[16], using data from the ECB Household Finance and Consumption Survey.[17]

The model combines a macro part – capturing macro variables that shape household balance sheets over time – and a micro part – built around a household member level logistic model for its employment status – in a fully integrated manner. The framework allows us to compute probability of default (PDs) and loss given default (LGDs) for mortgage exposures directly at the household sector level and link them to macroeconomic stress scenarios. The model-framework offers, for example, insights into how borrower-based instruments – such as LTV and DSTI ratio caps – influence the economy Intuitively, the effect of LTV caps derives primarily from reducing loss given default (LGD) parameters, as the LTV ratio is directly related to the value of the underlying collateral in a mortgage loan. The effect of DSTI caps, on the other hand, stems mainly from the reduction in household capacity to serve the debt, thus their probability of default (PD). These results are confirmed by the model.

This module is being integrated in the ECB top-down stress testing framework to account for a consistent stress scenario and for dynamic adjustments of individual households' balance sheets in response to shocks and related second round effects.

Finally, as just illustrated, enhancements to the ECB macroprudential toolkit go beyond stress testing as the complete set of models also provide a tool for impact assessment of macroprudential policy instruments. As policy instruments are targeted to address systemic risk, assessing macroprudential measures in a consistent manner requires accounting for spillovers, including to the real economy, also taking account of their impact on various sectors as well as layers of interaction between those sectors.

Conclusion

Let me conclude. The ECB has been working hard on developing analytical tools for the effective implementation of macroprudential policy. The ECB's new legal competences in macroprudential policy relate primarily to the power to top-up measures adopted by national authorities and the assessment of possible spillovers to other countries in connection with the reciprocity principle laid down in the legislation. In this vein, the ECB has been analysing the numerous macroprudential measures adopted by member states that, so far, we have decided not to aggravate.

Concerning the governance framework, we have created an internal Macroprudential Coordination Group and established the Macroprudential Forum – integrating the Governing Council and the Supervisory Board – to discuss all matters related to financial stability and macroprudential policy. We are taking our new responsibilities very seriously. The robustness of our assessments is key and, for this reason, analytical and research work in the macroprudential policy area has been stimulated and has been fruitful, as evident in my

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[16] Gross, M. and J. Poblacion, (2015), *"Assessing the efficacy of borrower-based macroprudential policy using an integrated micro-macro model for European households",* ECB Working Paper No. 1881. See also Ampudia, M., H. van Vlokhoven and D. Żochowski, (2016), *"Financial fragility of euro area households",* Journal of Financial Stability, *forthcoming*; see also: ECB Working Paper Series No. 1737.

[17] For details, see the Household Finance and Consumption Network webpage, https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_hfcn.en.html.

remarks. Since March this year, the ECB started publishing a Macroprudential Bulletin[18] that will inform about the analytical work being done, the policy decisions adopted and assessed, as well as analysis of relevant regulatory developments. This will further contribute to enhance transparency in our assessments. We look forward to maintaining a lively dialogue with the community of people in official institutions, in the financial sector and in academia who are interested in the new important field of macroprudential policy.

Thank you for your attention.

This is the full text of a speech delivered in abridged form at the ECB on 26 April.

[18] ECB Macroprudential Bulletin, (2016), Issue 1: http://www.ecb.europa.eu/pub/pdf/other/ecbmpbu201603.en.pdf?f584ec27e20fd378bdca2d6f68d5d7b9.