

# Macroprudential policy in a changing financial system

Remarks by Vítor Constâncio, Vice-President of the ECB, at the second ECB Macroprudential Policy and Research Conference, Frankfurt am Main, 11 May 2017

***This is the full text of a speech delivered in abridged form in Frankfurt on 11 May***

Ladies and Gentlemen,

It is a pleasure to welcome you to the second macroprudential policy and research conference of our annual series.

Macroprudential policy emerged from the crisis as a new tool to deal with systemic risk in the financial sector. Recognition that microsupervision of individual institutions was not sufficient to ensure financial stability led to the emergence of a new policy area. A new authority was needed to be accountable and responsible for monitoring and preventing the build-up of endogenous systemic risk in the financial sector.

As many other crises, the recent one had its origins in excessive leverage and excessive credit or debt creation in the financial system as a whole. This was partly due to the fast growing activities and entities outside the regulated financial sectors.

These excessive imbalances were not considered a risk by the economic thinking of the time. The efficient market hypothesis dominated, conflating allocative efficiency with information processing efficiency. In the prevalent macro models, the financial sector was absent, considered to have a remote effect on the real economic activity. In these model frameworks, macroeconomic fluctuations resulted mostly from technological or productivity shocks or from monetary policy unexpected measures. The economy was supposed to be mostly self-correcting and move quickly towards its steady state. No defaults of any agent were possible. Thus, excessive debt could not be a problem. As many wrote, for any debtor there was a creditor and so debt was a non-event at the macro level. This ignored the fact that banks create money by extending credit *ex nihilo* within the limits of their capital ratio. A loan, with its inherent risk, creates a deposit which is money. In fact, not all deposits originate from previous savings that the system only intermediates.

As credit expanded and assets grew, the share of the financial sector in total GDP increased exponentially. Another indicator of that expansion, are the profits from the U.S. domestic financial sector that exploded from 8% of the non-financial corporations profits at the beginning of the 1980's, to a peak of 68% in 2003 and has hovered around 30% in the past few years.<sup>[1]</sup> This increase was the product of two developments: increased leverage in the banking sector and the expansion of shadow banking.

The expansion of the financial sector was not enabled by savings invested in the capital of financial institutions but by a redefinition of risk capital and its endorsement by regulators. To quote a known specialist in risk management, Aaron Brown, "Who

paid for all this growth? Did people suddenly start saving more or taking money that had been other places and giving it to Wall Street? No and no... It was quants who created the money to pay for the party ...We did it by redefining the basis of value from cash or gold in the vault to risk equations... Quants know how to create true capital, and you don't need a printing press or sovereign powers. The keys are derivatives and securitization".<sup>[2]</sup>

On the eve of the crisis, some significant European banks had a leverage ratio (equity over total assets) of just 1.5% while capital ratios were well above the regulatory minimum of 8%. The "magic" of internal models to calculate risk weights in regulatory capital explains the difference, although the low leverage ratio meant that a mere loss of 2% in assets would wipe out the banks' capital.

The second development underlying the expansion of finance relates to the rapid growth of the shadow banking sector. In the euro area, financial sector indebtedness in 2007 roughly amounted to euro area GDP and represented half of total debt across all other sectors.<sup>[3]</sup> The non-bank, non-insurance financial sector in 2007 accounted for overall €17 trillion in the euro area, which has now further risen to €31 trillion.<sup>[4]</sup>

An appropriate concept of shadow banking conflates entities and activities involved in a vast array of services related to securitisation, repurchase agreements (repos) and securities financing transactions (SFTs), as well as OTC derivatives. The latter allow for risk transformation and exchange via swaps, comprising credit default swaps, interest rate or forex swaps. Several of these activities can be conducted either by regulated banks or by non-regulated institutions. Two aspects make these activities relevant: first, they contribute to the creation of a credit system based on secured short-term market funding; second, these new liquidity instruments are akin to money but are not counted in the usual monetary aggregates. <sup>[5]</sup>

These two features – the emergence of a new market credit system and the significance of forms of money not viewed as such – is what justifies the "shadow banking" designation.<sup>[6]</sup>

The origins of this new credit system relate to the emergence of very sizeable cash pools that could not find safety in banks' insured deposits and were in search of safer forms of placing that cash in the short term.<sup>[7]</sup> Securitisation, with tranches and enhanced ratings, repurchase agreements (repos) creating inside liquidity as well as risk transformation and exchange via OTC derivatives were the three main instruments created to place these "safer" private short term assets.

The crisis came when crashing housing prices raised doubts about securitisations and when chains of inside liquidity created by repos with re-hypothecation and re-use of the same securities<sup>[8]</sup> collapsed with rising haircuts and resulting illiquid markets. That is why Gary Gorton characterises the 2007/2008 financial crisis as a "run on repo".

We live now in a collateralised financial system where unsecured interbank transactions have been continuously declining.<sup>[9]</sup> The increased demand for safe assets and the relative shortage of official sector safe assets were responsible for the attempt to create private "safer" assets whose value proved to be illusory at the first stressful situation. This shortage of safe assets facing a huge demand is one of the important causes behind the very low levels of government bonds yields. These low rates are in fact lower than real rates of return of capital invested by non-financial firms pointing

out that any concept of natural rate of interest cannot simply be a result of the marginal productivity of real capital as Wicksell and other neo-classical economists believed. Ricardo Caballero and co-authors introduced the concept of a "safety trap" <sup>[10]</sup> to illustrate that a shortage of safe assets has emerged in advanced economies giving rise to the phenomenon of potential currency wars in the international economy.<sup>[11]</sup>

Jeremy Stein and Gary Gorton have insisted on a dimension of macroprudential policy associated with the use of sizeable Central Banks balance sheets, beyond the cyclical reasons justifying such a policy, in order to influence, (via open market operations and reverse repos), the supply of safe assets and maintain the quality of collateral that the financial system requires.<sup>[12]</sup> According to them, this policy of permanently keeping significant Central Bank balance sheets would discourage the expansion of private short-term "safer" liabilities. This move from private to "manufactured" short-term "safer" liabilities would have a positive effect on financial stability. I will not dwell on the merits of such a proposal. I just wanted to draw attention for the broad dimensions of financial stability concerns associated to the crisis and highlight the complementarities between monetary and macroprudential policy. Macroprudential policy is indeed essential to complement monetary policy as the business and financial cycles are not always synchronised. This is even more the case in a monetary union where vulnerabilities identified in each country can be addressed with macroprudential policy, allowing for the appropriate heterogeneity, while countries remain subject to a single monetary policy.

However, the most commonly used concept of macroprudential policy does not refer to the management of collateral quality but rather to the use of financial regulation to ensure the resilience of the system and to smooth the financial cycle which implies that the policy has to be actively pre-emptive.

To deal with the risks created by shadow banking activities or market-based finance new statistical definitions and adjusted reporting requirements are needed to include the quasi-money services provided by shadow banking in monetary statistics as well as to record changes in risk exposures generated by OTC derivatives in flow-of-funds statistics.<sup>[13]</sup> Without this reporting, which should also include the flow of collateral among types of agents, a comprehensive risk assessment for the system as a whole, identifying the ultimate bearers of risk, is not possible.<sup>[14]</sup> In Europe, the Securities Financing Transactions Regulation (SFTR) and European Market Infrastructure Regulation (EMIR) are first steps in that direction.

Data coverage alone is however not enough: regulation of the non-bank sector activities also remains insufficient.

Let me therefore turn to my second topic, the regulatory reform agenda.

## The regulatory reform agenda – a concerted ongoing effort towards a more stable financial system

Since the crisis, we have made sizeable progress towards a comprehensive regulatory overhaul at the international level. This regulatory reform was conceived from a macroprudential perspective which is important to underline as regulation that designs a robust financial system is the first and fundamental step in macroprudential policy. Much work has focused on making banks safer by bolstering their capital and introducing regulatory liquidity ratios. Importantly, a Leverage Ratio (LR) was

introduced to put an ultimate break on the expansion of the sector, although calibrated at 3% it still allows total assets to be 33 times Tier 1 capital.

Reforms were also introduced to deal with shadow banking activities and some non-bank institutions. Although insufficient in some areas, they have contained the inherent risks of this sector. Broker-dealers in the U.S. have become more strongly encapsulated into banking structures. While this was always the case in Europe, stricter requirements for certain capital market activities, like market making and trading in derivatives and repos, embedded in the CRR/CRD IV, EMIR and SFTR, have contributed to constrain some investment banking activities.

The lessons from the crisis led to the collapse of securitisation activity. This has reduced assets of euro area-based financial vehicle corporations involved in securitisations, which shrank by almost a third to EUR 1.8 trillion over that period. In 2016 euro area ABS issuance stood at around 250 billion EUR, compared to more than 1 trillion EUR in 2008.<sup>[15]</sup> In Europe, where securitisations based on European assets showed quite low default rates, we are trying to revive simple and transparent securitisations.

There have also been important regulatory changes in the area of OTC derivatives.

**First**, data on OTC derivative transactions are now being collected via trade repositories. These data fill an important gap, and provide public authorities with information for the analysis of systemic risk. Yet, data quality needs to be improved so that the full benefits can be reaped.

**Second**, central clearing of certain derivative contracts, most prominently interest rate swaps, has become mandatory. In Europe, this obligation currently applies to major dealers and large banks, and is in the process of being rolled out to the rest of the financial sector. Unfortunately, the requirement applies only to new contracts. Joint work of the ECB and ESRB has shown that there is still a large outstanding stock of non-cleared bilateral exposures.<sup>[16]</sup>

**Third**, all standardised derivatives were supposed to trade on regulated trading platforms "where appropriate".<sup>[17]</sup> This would increase transparency and bring competition into a market that is heavily dominated by a small set of very large dealers able to exert considerable market power. Progress in this direction has been very slow and trading on regulated trading platforms remains to be implemented in Europe under MiFID 2.

While the overall progress in making derivative markets safer has been quite notable, additional work needs to be done.

One area that still lacks reform concerns re-hypothecation and re-use of collateral. The recent reports by the Financial Stability Board are in my view not sufficiently far-reaching,<sup>[18]</sup> and initiatives on the international level to limit collateral velocity have largely stalled. We need to take up this agenda again, even if not easy in the current environment. Indeed, the trend seems to go in the opposite direction. There is a push to exclude repos from the Leverage Ratio calculation underway that not only weakens the standard but also eliminates the only brake to banks' capacity to the unconstrained creation of inside liquidity.

Another insufficiency concerns the narrow scope of regulating initial margins for repos and SFTs that apply only to non-centrally cleared operations and exclude transactions

based on government debt.<sup>[19]</sup>

Notwithstanding this, and in spite of the still pending finalisation of the Basel III standard, we have to recognise that the implemented regulatory reforms made our financial system more robust and stable.

Let me now venture into brief considerations about the design of our monetary and financial systems from the perspective of the issuance and use of short-term debt as quasi-money. Douglas Diamond stated that "Financial crises are everywhere and always about short term debt".<sup>[20]</sup> I illustrated already how this was entirely the case in the recent crisis. The resulting question is whether this monetary dimension of widespread use of private issued short-term debt should be recognised and regulated in ways akin to regulation historically applied to banks as issuers of deposits. It took a long time until, after a fierce debate among economists, banks deposits started to be accounted for as money. Likewise, it is not by chance that money market funds units are included in the M3 monetary aggregate. If the unconstrained creation of private short-term debt has been at the origin of financial crises, one should not be surprised that deeper reform proposals emerged to deal with the problem.

Two authors have recently addressed the issue of money and quasi-money creation by private institutions, coming up with bold and controversial proposals that might never be considered in practice. This might be the case, even if both proposals are more reasonable than the justly discarded proposal of narrow banking, in spite of the recent re-emergence of the issue and support by well-known authors.<sup>[21]</sup>

The first proposal is the one of Morgan Ricks, described in his recent book "The Money Problem".<sup>[22]</sup> It is inspired by the introduction of deposit insurance after the Great Depression whereby, in exchange for a fee, deposits in regulated banks were guaranteed. That reform fully recognised the monetary nature of retail deposits and stabilised the banking sector. The new idea could be to extend such a concept to all other forms of short-term debt against higher fees. The author reveals a greater ambition to completely overhaul the system by proposing to limit the issuance of short-term debt to specially regulated financial institutions that could only hold as assets, loans and good bonds of any maturity. The whole book is an intellectual *tour de force* with a cogent description of the new system with the promise to end financial crises stemming from the "alchemy" of money and finance that multiplies the creation of liquidity to unstable limits.

The proposal could be however reduced to a much less ambitious scheme of extended insurance similar to the one existing for deposits to other forms of quasi-money short-term debt instruments. From a different perspective, a proposal to ensure liquidity to short-term debt is presented by the former Bank of England governor Mervyn King in his book precisely titled "The Alchemy of Money".<sup>[23]</sup> Instead of a scheme akin to deposit insurance, he proposes that all financial firms would be required to report all assets that are funded through short-term liabilities to the monetary authority and negotiate an asset-specific haircut. In the case of a liquidity emergency, the central bank would apply this haircut and provide liquidity against the underlying assets without any further conditions. Effectively, outside liquidity would step in whenever inside liquidity would fail. The ex-ante commitment, including the negotiation of haircuts, would in principle curb creditors' incentives to rely heavily on short-term liabilities in the first place. This proposal remains however quite controversial, not least due to the possibility of significant losses for the central bank and the impracticalities surrounding its implementation.

Both books provide a deep understanding of potential crises in our heavily collateralised financial system with abundant short term debt and constitute commendable attempts to confront and address deep seated problems of our socio-economic organisation.<sup>[24]</sup> However, in the end, in spite of the experience of both authors, their proposals seem too complex to be within the realm of practical possibility, especially in the present environment emerging in advanced economies of reversing several recent regulations in a sort of desperate drive to go back to the old normal that led the world into crisis.

## Macroprudential policy as response to systemic risk

Coming back to the field of practical macroprudential policy, let me make some remarks about the activity in the euro area in this domain as well some references to papers on this conference. I will do this under the cover of the six principles of macroprudential policy that I enumerated in last year's conference.<sup>[25]</sup>

**The first** principle is that macroprudential policy should be pre-emptive and strongly counter-cyclical. Indeed, since November 2014, when the ECB has been granted macroprudential responsibilities and competence to top-up the measures taken by national authorities, more than 100 decisions of macroprudential measures have been taken. In the area of capital buffers, these include decisions to identify global and domestic systemically important financial institutions; decisions to calibrate the systemic risk buffer and countercyclical capital buffers, sectoral capital requirements for real estate and housing and use of the Loan-To-Value (LTV) and Debt-To-Income (DTI) type of measures.

**Second**, the concept of the financial cycle is crucial for the rationale of macroprudential policy, as it justifies targeted policy intervention already early in the cycle. A time-varying dimension is at the very heart of policy making which implies that capital and liquidity requirements should be adjustable over the cycle. In the first session, the papers by Enrique Mendoza and Jean-Charles Rochet, helps us understand the best ways to deal with systemic risk.

**Third**, the real estate component is of paramount importance in the financial cycle, and instruments on the borrower-side such as LTV or debt-(service-)to-income (D(S)TI) ratios pertain to the macroprudential policy toolkit to influence the demand for credit and raise household as well as bank resilience. Overall, nine euro area countries have currently activated either LTV or LTI/DTI type of measures.<sup>[26]</sup> In addition, some countries have adjusted risk weights to counter real estate risks from a macroprudential perspective. The ECB Governing Council has called for the implementation of legislative frameworks for borrower-based measures in all euro area countries to complete the macroprudential toolkit for the real estate sector. The ongoing review of the macroprudential framework in the EU provides an excellent opportunity to make these tools available to macroprudential authorities of all EU countries.

**Fourth**, stress tests of the banking and financial system must not be limited to microprudential supervision but need to be embedded in a macro-financial environment and take a macroprudential dimension. This afternoon, Mathew Pritsker, Mark Flood and Jérôme Henry will talk about the latest advancements for stress testing and how they can take into account the macroeconomic dimension and respective feedback loops. The ECB's new analytical tool STAMPE, aimed at providing a macroprudential dimension to stress tests was recently published in an e-book.<sup>[27]</sup>

**Fifth**, macroprudential policy is complementary to monetary policy as both policies share the goal of macro-financial stabilisation through the forward-looking dynamic macro-risk management. Most Central banks across Europe must have responsibilities in both policy areas, even if they are not involved in microprudential supervision. The papers by Michael Kiley and Jae Sim and by Andrea Ferrero and Richard Harrison provide a good discussion of the relationship between the two policies. On the other hand, the paper by Caterina Mendicino and Kalin Nikolov adds default and macroprudential policy to a DSGE type of model commonly used to analyse monetary policy.

**Sixth**, macroprudential policy should reach beyond the banking sector and encompass market-based finance institutions and products in order to overcome the *boundary problem* that Charles Goodhart, whom I thank again for his participation in our Conference, referred to at the beginning of the crisis.<sup>[28]</sup> Leaving market-based finance outside of the macroprudential perimeter would not only leave the door wide open for the transfer of credit intermediation outside the banking perimeter, but we would also close an eye on the inherent liquidity and leverage risks of securities finance transactions and asset management.

Major and concerted efforts at all levels of regulation are needed. I very much welcome the release of the Policy Recommendations by the Financial Stability Board (FSB) to address structural vulnerabilities arising from asset management activities. They cover liquidity mismatch between fund investments and redemption terms, operational risk, securities lending activities and leverage reporting by investment funds, including synthetic leverage built up usually with OTC derivatives. Leverage requirements for investment funds, already partially introduced in Europe, represent an important point. The aim should be to extend leverage ratio requirements to a broader set of financial institutions and to account for the risks posed by synthetic leverage from the use of derivatives as recently proposed in Dirk Schoenmaker et al.<sup>[29]</sup>

This leaves me with the aspect of implementing regulation and the design of the institutional framework. This last point is covered by Paul Tucker in his keynote address, whom I thank again for having accepted to participate in our conference.

## Concluding remarks

Let me conclude.

Much has been done on the regulatory and the macroprudential policy side in order to make the financial system safer. However, as credit intermediation and liquidity creation extends to the non-bank sector, it is important to expand our regulatory and policy efforts to the shadow banking sector. Moreover, the boundary problem should be addressed by increasing the coverage of macroprudential measures to the non-bank sector and by focusing the design of policy measures to activity rather than institution-based instruments. Finally, we need to build new statistical data to account for quasi money type of instruments and for risk transfers via derivatives.

I am very much looking forward to the contributions at this second edition of our annual conference and wish you all very productive debates over these two days.

Thank you for your attention.

*Speech text has been updated on 11 May 2017 to include a dropped word.*

- [1] Source: US NIPA series of Domestic Financials Profits (excluding the Federal Reserve) over Non Financial Corporate profits with inventory valuation adjustment.
- [2] Brown, Aaron (2012) "Red-blooded risk: the secret history of Wall Street" John Wiley & Sons Inc.
- [3] Fahr et al. (2011) "A Monetary Policy Strategy in Good and Bad Times: Lessons from the Recent Past", *Economic Policy*, 28: 243–288.
- [4] This broad measure is from Q3 2016 and includes gross volumes related to all financial intermediaries except banks and ICPFs. It covers non-money market investment funds (non-MMFs), money market funds (MMFs), financial vehicle corporations (FVCs), and other financial intermediaries. See section 4, ECB Report on Financial Structures, October 2016.
- [5] See Greenwood R. , Hanson S.G., and Jeremy C. Stein (2015), "A Comparative-Advantage Approach to Government Debt Maturity," *Journal of Finance* 70, No. 4 (2015) pp. 1687:1718
- [6] See Constâncio, Vitor (2014) "Beyond traditional banking: a new credit system coming out of the shadows", speech at the 2nd Frankfurt Conference on Financial Market Policy: Banking Beyond Banks, organised by the SAFE Policy Center of Goethe University.
- [7] See Pozsar, Z. (2011) "Institutional Cash Pools and the Triffin Dilemma of the U.S. Banking System", IMF Working Paper 11/190; Claessens S. and L. Ratnovski (2014) "What Is Shadow Banking?", IMF Working Paper 14 /25; Singh M. (2012), "Puts" in the shadow", IMF Working Paper 12/229; Perotti E. (2013), "The roots of shadow banking", CEPR Policy Insight 69; Pozsar, Z. (2014) "Shadow Banking: The Money View", Office of Financial Research Working Paper 14-04
- [8] See Singh M., and P. Stella (2012), "Money and Collateral", *IMF Working Paper* 12/95, April.
- [9] See Gorton, G. and P. He (2016) "Optimal monetary policy in a collateralized economy" *NBER Working Paper No. 22599*.
- [10] Caballero, R.J. and E. Fahri (2017) "The safety trap" mimeo, version January 2017.
- [11] Caballero R.J., E. Fahri and P-O. Gourinchas (2015) "Global imbalances and currency wars at the ZLB", *NBER Working Paper No. 21670*.
- [12] See Greenwood R., S.G. Hanson and J. C. Stein (2016 ) "The Federal Reserve's Balance Sheet as a Financial Stability Tool", Federal Reserve Bank of Kansas Economic Policy Symposium in Jackson Hole. Gorton, G. and P. He (2016) "Optimal monetary policy in a collateralized economy" *NBER Working Paper No. 22599*; J. C. Stein (2012) "Monetary Policy as financial stability regulation" in *The Quarterly Journal of Economics* (2012) 127, 57-95
- [13] See Pozsar, Z., T. Adrian, A. B. Ashcraft and H. Boesky (2013), "Shadow Banking" *Economic Policy Review* Federal Reserve Bank of New York, 19(2), 2013 and Bakk-Simon et al., "Shadow Banking in the Euro Area: An Overview," *ECB Occasional Paper No. 133*, April 2012.
- [14] Pozsar, Z. (2014), "Shadow Banking: The Money View", *OFR Working Paper 14-04*, July.
- See also Benoit, S., J-E. Colliard, C. Hurlin and C. Pérignon (2017), "Where the Risks Lie: A Survey on Systemic Risk", *Review of Finance*, 21 (1), 109–152. Brunnermeier, M., G. Gorton and A. Krishnamurthy, "Risk Topography", *NBER Macroeconomics Annual* 2011 26 (2012): , 26, 149-176. Adrian, T., B. Begalle, A. Copeland and A. Martin "Repo and Securities Lending" in Risk Topography. Systemic Risk and Macro Modelling, ed. Brunnermeier and Krishnamurthy, 2014.



[15] According to figures from the Securities Industry and Financial Markets Association (SIFMA)

[16] See Abad, J., I. Aldasoro, C. Aymanns, M. D'Errico, L. Fache Rousová, P. Hoffmann, S. Langfield, M. Neychev and T. Roukny, "Shedding light on dark markets: First insights from the new EU-wide OTC derivatives dataset", *ESRB Occasional Paper No. 11*.

[17] See G20 Communiqué of the Pittsburg meeting in September 24-25, "All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest."

[18] See Financial Stability Board (2017) "Non-cash collateral re-use: Measure and metrics", Policy Report and Financial Stability Board (2017), "Re-hypothecation and collateral re-use: Potential financial stability issues, market evolution and regulatory approaches", Policy Report.

[19] The official decisions on the matter can be seen in BIS (2015) "Margin requirements for non-centrally cleared derivatives", Basel Committee on Banking Supervision, March, and Financial Stability Board (2015), "Regulatory framework for haircuts on non-centrally cleared securities financing transactions", November.

[20] Douglas, D. in a Panel Discussion on Financial Regulation at the Becker Friedman Institute, University of Chicago, 6 Nov 2010 (video at eight minutes mark).

[21] See Kotlikoff, L. (2011) "Jimmy Stewart is dead: ending the world's ongoing financial plaque with limited purpose banking" John Wiley & Sons (2011); Benes, J. and M. Kumhof (2012) "The Chicago Plan revisited", *IMF Working Paper 12/202*; Wolf, M. (2015) "The shifts and shocks: what we've learned and have still to learn from the financial crisis" Penguin.

[22] Ricks, M. (2016) "The money problem: rethinking financial regulation" Chicago University Press

[23] King, M. (2016) "The alchemy of money: money banking and the future of the global economy" Published by Little, Brown.

[24] Regarding the Mervyn King book the same cannot be said about the analysis of monetary policy and the macroeconomy.

[25] See Constâncio, V. (2016) "Principles of Macroprudential policy", speech at the first ECB Macroprudential and Research Conference.

[26] LTV measures are in place in CY, EE, FI, IE, LV, LT, NL, SI, SK, LTI/DSTI measures are in place in CY, EE, IE, LT, NL, SI, SK. The most recent borrower-based measures are the adjustments in LTV limits in Ireland (November 2016) and a combination of LTV and DSTI limits with maximum maturity restrictions in Slovakia (January/March 2017).

[27] See Constâncio, V. (2017) "**Macroprudential stress tests: a new analytical tool**". VoxEu, February 2017.

[28] See Goodhart, C. (2008), "The Boundary problem in financial regulation", *National Institute Economic Review, Vol. 206, No 1, pp 48-55*, October.

[29] A convincing argument for a wide application of leverage ratios can be found in Schoenmaker and Wierts (2016), "Regulating the Financial Cycle: An Integrated Approach with a Leverage Ratio", Duisenberg school of finance - *Tinbergen Institute Discussion Paper, TI 15- 057 / IV / DSF 93*. The risks from synthetic leverage have been outlined in ECB Financial Stability Review (2015) "Synthetic leverage in the investment fund sector" Box 7, May. See also V. Acharya (2014) "A Transparency Standard for Derivatives," in *Risk Topography: Systemic Risk and Macro Modelling*, M. Brunnermeier and A. Krishnamurthy (eds), Chapter 6