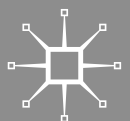

THE HANDBOOK OF GLOBAL SHADOW BANKING

Volume II
The Future
of Economic
and
Regulatory
Dynamics

Luc Nijs



The Handbook of Global Shadow Banking,
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Preface

In this second volume on global shadow banking, three main domains will be further explored. The first domain deals with the macroeconomic fundamentals of the respective shadow banking segments: why do they exist, what problem(s) do they solve, and why are some of these embedded risks so persistent? The second domain captures the global analysis of shadow banking markets. Shadow banking markets, regardless of which segment, are always modeled based on the regulatory environment and economic landscape of a certain jurisdiction. Therefore, despite the many commonalities, shadow banking markets differ in their dynamics, roles they play in the local market and the way exposures are created. A global analysis of those markets comes next. The last domain covered in the book deals with the many open-ends that the sector still characterizes. It gets philosophical every now and then, and related topics like regulatory arbitrage, contract imperfection and governance are brought into the analysis.

In the second domain, which encompasses Chaps. 2–6, I then branch out into a geographical survey to experience the shadow banking dynamics around the world, make comparisons, review different policy and regulatory responses, subject them to assessments and shed some light on the first feedback loops we received in recent years from all those changes. The last chapter (Chap. 7), before I draw some conclusions, reads like an anthology of unsolved issues. And with its 22 sections, it requires limited brainpower to understand that there are many issues. Most likely, this is because the regulation enacted so far carries limited cloud, risk in complex global networks is still less understood, tail risk is still largely neglected,¹ liquidity² is treated as a deity, and regulators are, besides being brainwashed by lobbyists on an ongoing basis, still very much confused about what to tackle. In the myriad and madhouse of macroeconomic and econometric modeling, it truly is nearly impossible to divide right from wrong, especially if your target is

¹ Also by market participants; see, for example, S. Chernenko et al., (2015), Who Neglects Risk? Investor Experience and the Credit Boom, Working Paper, mimeo.

² See for a stylized model of liquidity creation without banks: S. Kucinskas, (2015), Liquidity Creation Without Banks, VU University/Tinbergen Institute Working Paper, mimeo, August 17.

continuously moving. Complexity and opaqueness are killing any attempts to create effective and consistent regulatory framework in any field. The econometric madhouse, with its so-called analytical logic and its self-proclaimed truths,³ don't go well with the rational nature of verbal logic needed to create proper and effective regulation. The shadow banking markets is a poster child example of the problematic nature of the relationship between economic principles and the dogmatic disciplines of regulation, a relationship the 'law and economics' sphere has been digging into for over half a century now and with very few guiding principles so far.

Even more problematic is the fact that the self-constructed superiority of economists have led to a situation where economists, in their capacity of supervisors, lobbyists or otherwise have been driving regulatory content way too much, thereby ignoring the challenging differences between econometric and verbal logic, often using macroeconomic models that are one-sided,⁴ labeled as reflecting reality or the truth without any sort of critical questions being asked by regulators. The role of the regulator itself was often there to facilitate the legislative process. Very little else was added by them. If your counterparty is a well-structured, organized, cash-rich globally integrated financial system, you have everything to lose. And I realize that public interest might not be the first thing on regulators' minds these days anymore, although the stability of public financial markets is a public objective that benefits everybody.

Closing the trust deficit in order to maintain to stabilize the role of finance in society is not a matter of macroprudential policy and ex ante regulation. If an industry wants to interact with society, it will have to somehow account for the consequences of that interaction, especially in an industry that matters as much as the financial industry. That's why the distrust stems so much from the fact that society has extensively observed what happens when things go wrong. That financial capital crumbles under distress is something everybody understands and is able to give it its meaningful place in a capitalist society. But the wearing down of social capital following distressed events is something that is not easily repaired nor forgotten (as the losses here are the most enduring). And although banks and the financial industry have recovered some of their luster and poise, there is still a large bill that needs to be settled. Besides the trust element, there is still the element of 'purpose' in banking that needs to be redefined and that seems harder than it sounds.⁵

That problematic field includes the question of the nature of the economic discipline. In recent years, much has been said about the neoclassical monoculture taught at universities and that has a much wider range of implications than just the content of courses,

³ See, for example, M. Fourcade et al., (2015), *The Superiority of Economists*, *Journal of Economic Perspectives*, Vol. 29, Nr. 1, Winter, pp. 89–114.

⁴ Many welfare models, for example, are built on the dynamic stochastic general equilibrium model (DSGE model). This has created a very one-dimensional view of welfare optimizing policies, despite the fact that many questions can be asked about the intellectual integrity of the model and the recalibrations needed that didn't happen (yet); see: A.M. Shordone et al., (2010), *Policy Analysis Using DSGE Models: An Introduction*, FRBNY Economic Policy Review, October, pp. 23–43; M. Kolosa and M. Rubaszek, (2015), *How Frequently Should We Re-estimate DSGE Models*, *International Journal of Central Banking*, Vol. 11, Nr. 4, December, pp. 279–305.

⁵ A. G. Haldane, (2016), *The Great Divide*, Speech by Andrew G Haldane, Executive Director and Chief Economist of the Bank of England, at the New City Agenda annual dinner, London, May 18.

but also the normative nature of peer review and influence.⁶ One of the questions on which the jury is still out is, to what degree the regulatory framework is appropriate from a risk perspective given the overall risk sensitivity of an interconnected global marketplace?⁷ The group of 30 concluded before that the overall risk to stability is as great as ever.⁸ In a day and age when the nexus between banks and capital markets has come to full maturity and has truly gone global, the discussion about financial stability is one about financial markets and equally so about the real economy. The relevance and public interest dimension as such is never far gone.⁹ Caruana's approach¹⁰ seems balanced and convincing when he claims that regulation is only part of the problem in a context where banking seems to still qualify as a contaminated industry.¹¹

And as regulation is not the only element in the solution mix, three critical elements play and will play a role for a long to come. There is not a single space in the regulatory sphere where the amount, layers and interaction between regulation, policies of all sorts and natures, as well as technical standards- and that on a global basis- are as intense as in the financial sphere. So three words deserve utmost attention: coherence, calibration and complexity¹²; and that against the backdrop of a well-functioning financial sector is crucial for generating dynamics related to growth and robustness¹³ while reducing or managing systemic risk. From the perspective of systemic risk, shadow banking can be defined

⁶See in detail: G. Racko et al., (2017), Economics Education and Value Change: The Role of Program-Normative Homogeneity and Peer Influence, *Academy of Management Learning & Education*, Vol. 16, Nr. 3, July 6, <https://doi.org/10.5465/amle.2014.0280>; Haldane focuses on the kaleidoscopic nature of the economic discipline and the 'more questions than answers'—background economics is emerged with as a grandchild of philosophy. See A. Haldane, (2016), *The Dappled World*, Speech given by Andrew G. Haldane, Chief Economist, Bank of England, GLS Shackle Biennial Memorial Lecture, November 10.

⁷A. Dombret, (2016), *The New Normal in Banking – Perspectives for Regulators*, Speech by Dr. Andreas Dombret, Member of the Executive Board of the Deutsche Bundesbank, at the Bundesbank reception as part of Eurofinance Week 2016, Frankfurt am Main, November 15 (bis.org).

⁸G30, (2016), *Shadow Banking and Capital Markets. Risks and Opportunities*, G30 Working Paper, Washington, DC, November.

⁹See regarding the nexus banks/capital markets: H. S. Shin, (2016), *The Bank/Capital Markets Nexus Goes Global*, Speech at the London School of Economics and Political Science, November 15, bis.org

¹⁰J. Caruana, (2016) *What Are Capital Markets Telling Us About the Banking Sector?*, Speech at IESE Business School conference on 'Challenges for the Future of Banking: Regulation, Governance and Stability', November 17.

¹¹C. Borio, (2016), *The Banking Industry: Struggling to Move On*, Keynote Speech at the 'Competition in Banking: Implications for Financial Regulation and Supervision', Fifth EBA Research, Workshop, November 28–29.

¹²Or put differently: (1) how is this all going to work together as one large well-functioning machine, (2) are these policies and regulation tuned-in to each other given the often different objectives the supporting institutions have, and (3) are we sure the lobbying-induced complexity will not make the instruments idle at a point in time that it really matters? See also: S. Ingves, (2016), *Finalising Basel III: Coherence, Calibration and Complexity*, Keynote speech at the second Conference on Banking Development, Stability and Sustainability, December 2, bis.org

¹³T. Adrian et al., (2016), *Vulnerable Growth*, Federal Reserve Bank of New York Staff Reports, Nr. 794, September.

as leveraging on collateral to support liquidity promises. Regulation then becomes efficient and welfare enhancing. The jury clearly is still out on the optimal model of regulation to be used and what we anyway can expect from it when it really matters.¹⁴ What we do know is that model-based, transaction-based regulation doesn't work to achieve a macro-level of financial stability. Holistic, systematic-proof regulation and policies are hard to design. Especially if it needs to be designed on top of the ashes of a regulatory infrastructure that has proven over and over again that it doesn't have the properties to observe systemic risk and protect macro-level financial stability. There is still quite some thinking that needs to go into how such regulation should be designed, what properties it should have and how it can deal with things that weren't foreseen, and possibly could not have been foreseen.¹⁵

So when I read that the Financial Stability Board (FSB) is moving to the next phase,¹⁶ I wonder what that phase is exactly. I truly hope not that we get overly excited by a novel regulatory infrastructure that hasn't been tested yet. Admittedly, and as the research examined has indicated, the capital requirement regulation has made the system better off.¹⁷ Whether that means a whole lot safer remains to be seen. I'm concerned that the jury is still out on that one. And that is a dangerous place to be at a time when memories about the financial crisis are fading and the willingness to go the extra mile in terms of reforms is showing mental fatigue. The numbers in the global economy have become bigger since the last crisis, and so have the numbers in the financial system (USD 260+ trillion in debt) and in particular in the shadow banking system, (USD 52 trillion in shadow banking assets [narrow measurement]).¹⁸ I'm not particularly sure if regulations and policies have properties to deal with such financial juggernaut.

Combined with the complexity and opacity of some parts of the financial infrastructure, there are still many places to hide. Regulatory arbitrage, contract imperfection, limited liability for corporations and their directors, and the continuous debt bias are still around and constitutive for many shadow banking activities. Nothing about that feels 'robust'. At least not in the way I would be looking for, after having witnessed the 2007–2009 abyss as a regulator or supervisor. Doing nothing wasn't an option, doing something an absolute necessity. But doing the right thing is an engagement of a whole different dimension. The illusion of monitoring, supervising, regulating and stress testing

¹⁴H. Nabilou and A.M. Paces, (2017), *The Law and Economics of Shadow Banking*, in Iris H. Chiu & Iain MacNeil (eds.), *Research Handbook on Shadow Banking: Legal and Regulatory Aspects*, Edward Elgar Publishing, Cheltenham, pp. 7–46.

¹⁵See the interesting and recent report on the matter: G. Prasanna et al., (2019), *Regulatory Complexity and the Quest for Robust Regulation*, Advisory Scientific Committee (ASC) ESRB Report Nr. 8, June 4, via [esrb.europa.eu](https://www.esrb.europa.eu)

¹⁶R. K. Quarles, (2019), *The Financial Stability Board: Moving to the Next Phase*, G20 Research Center, University of Toronto, June, pp. 140–141. I guess the true value is in his closing statements: '[m]uch progress has been made since the financial crisis. Yet the recent build-up of vulnerabilities in several areas reminds us that we cannot be complacent.'

¹⁷See for a very good and recent literature review on the issue: BCBS, (2019), *The Costs and Benefits of Bank Capital – a Review of the Literature*, Working Paper Nr. 37, June 24, via [bis.org](https://www.bis.org). But the BCBS also makes the conclusion subject to a number of important considerations.

¹⁸FSB 2019 numbers.

leaves the idea that there is control. I see that slightly differently. Paper is patient, frameworks are bureaucratic in nature, nobody is really accountable and interventions are ex ante or ex post intrinsically insufficient. The central question then is, are we willing to accept everything the free market produces? But in this case, that is a confronting question because many shadow banking activities are triggered by regulation. The regulator therefore is part of the problem. And the central bank has admittedly become the lender of last resort and willing to underwrite private assets without limits. With such friends you don't need enemies.

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1

The Macroeconomic Dimensions of Shadow Banking

1.1 Introduction

It is well understood by now that the shadow banking (SB) industry, its players, activities and evolution do not occur in isolation. In fact they are a direct function of all elements including the nexus that shadow banking has with the many policy domains including microeconomic, macroeconomic and monetary and fiscal policies as well as financial regulation and supervision. Also the evolution and innovation in the financial sector impact its outlook, design and content. A look back in recent history provides ‘fuel’ for that line of thinking. Starting in the 1990s and pretty much all the way into the start of the 2008 financial crisis, the financial system (in the US but also elsewhere) did go through a period of rapid change, growth and innovation. Banking as an industry did transform away from the traditional intermediary functions as loan origination and deposit-taking and engaged into a ‘securitized’ banking model through which loans were ultimately distributed to entities in the shadow banking sphere.¹ The implication of that happening is that shadow banking entities came to replicate or at least engage in traditional banking activities including credit and maturity transformation. The consequence was that these shadow banking activities took the same risks as banks but with a (very) limited capital base. That combined with overleverage of the financial system overall created the by now well-known consequences which included financial stability and recessionary conditions.

What happened in the period 1990–2008 has however been in the making for decades though. Also in the period before 1990 shadow bank credit expanded each time banks went through traditional cyclical contractions. Even more, while consumer credit and mortgages held by traditional banks were positively correlated with gross domestic product (GDP), those holdings, outside the banking sector, were negatively correlated. The two aggregates

¹ G. Gorton and A. Metrick, (2012), Securitized Banking and the Run on Repo, *Journal of Financial Economics*, Vol. 104, pp. 425–451.

move in different directions following a monetary tightening.² It was Meeks et al.³ who demonstrated (through a general equilibrium model⁴) that the ability of traditional banks to securitize can stabilize the overall supply of credit in the system by offloading it in the shadow banking system, but that it ('the risk taking by those shadow banking entities') is also at the root cause of increased macroeconomic volatility.⁵ Their model doesn't however capture all complexities of shadow banking activities,⁶ financial innovation (and its flaws⁷) and regulatory change (prudential regulation and financial system regulation) as well as the imperfect or suboptimal working of some asset markets (e.g. pricing in the collateralized debt obligation, or CDO, markets⁸). Also the dynamics of special purpose vehicles and their use to reduce the amount of capital required are left out of scope.⁹ Their model is built on the understanding that there are 'two types of financial intermediary, each facing endogenous balance sheet constraints which depend on their net worth'.¹⁰ The commercial banks

²W.J. den Haan, and V. Sterk, (2010), The Myth of Financial Innovation and the Great Moderation, *Economic Journal*, Vol. 121, pp. 707–739; Y. Altunbas, et al., (2009), Securitization and the Bank Lending Channel, *European Economic Review*, Vol. 53, pp. 996–1009; E. Loutskina, and Philip E. Strahan, (2009), Securitization and the Declining Impact of Bank Finance on Loan Supply: Evidence from Mortgage Originations, *Journal of Finance*, Vol. 60, pp. 861–889.

³R. Meeks et al., (2014), Shadow Banks and Macroeconomic Instability, Bank of England Working Paper Nr. 487 (later on published Shadow Banks and Macroeconomic Instability, *Journal of Money, Credit and Banking*, Vol. 49, Issue 7, October 2017, pp. 1483–1516).

⁴Their model (p. 8) is built on four key assumptions: (1) Financial intermediation is key to channel supply of credit as deposit holders cannot enforce contracts; (2) 'financial institutions are unable to completely pledge the assets they hold on their balance sheets as collateral to raise funds from outside investors.' This causes creditors to limit their funding to banks and consequently to drive a wedge between the 'returns earned by savers and the costs incurred by borrowers'; (3) the shadow banking system is a valuable system as it allows 'collateral to be used more efficiently by transforming illiquid loans into tradable assets, thereby enhancing net aggregate liquidity'. See also: B. Holmstrom and J. Tirole, [2011], *Inside and Outside Liquidity*, MIT Press, Cambridge, MA, and Z. Pozsar et al., [2013], *Shadow Banking*, FRBNY Economic Policy Review, Issue December, pp. 1–16, who see value in 'gains from specialization and comparative cost advantages' but little in activities driven by regulatory arbitrage; and (4) 'commercial banks transfer aggregate risk to the shadow banking system (such transfers may be complete or partial), but risk is not transferred to unlevered investors outside of the intermediary sector.'

⁵Through a shock that came from within the system; see in detail: M. Gertler, (2010), *Macroeconomics in the Wake of the Financial Crisis*, *Journal of Money, Credit and Banking*, Vol. 42, pp. 217–219.

⁶Their focus is on shadow banks engaged in the bank-like activities of credit transformation (issuing fixed obligations against risky assets) and maturity transformation (issuing short maturity obligations against long maturity assets).

⁷For securitized assets, these flaws include poor underwriting incentives, flawed modeling assumptions and opaque security design; see in detail: A. S. Blinder, (2013), *After the Music Stopped*, Penguin Press, NY.

⁸J. Coval, et al., (2009), *The Economics of Structured Finance*, *Journal of Economic Perspectives*, Vol. 23, pp. 3–25.

⁹See for that in detail: M.K. Brunnermeier, (2009), *Deciphering the Liquidity and Credit Crunch 2007–2008*, *Journal of Economic Perspectives*, Vol. 23, pp. 77–100, and Z. Pozsar, et al., (2010), *Shadow Banking*, July, FRB New York Staff Report Nr. 458.

¹⁰Meeks et al., (2014), *ibid.*, p. 4.

originate the loans and decide how much of those to keep on their balance sheet and how much to offload. From there the securitization process starts as described elsewhere in the book. As indicated there, securitization doesn't mean that commercial banks are no longer exposed to risk. Commercial banks in their turn invest in securitized products as they are better quality 'collateral' material than an idiosyncratic loan book on a balance sheet of a commercial bank. They achieve that by 'exchanging a direct exposure to the real economy for an intra-financial claim',¹¹ thereby reducing their costs and possible constraints regarding funding and increase their leverage and profitability. The securitization process distributes that risk, often in a rather opaque way over multiple balance sheets of shadow banking entities creating vulnerability, but with the benefit that it expands the supply of credit by broadening the base of quality pledgeable assets. In case of an adverse shock in the system,¹² the traditional and shadow banking system moves in tandem as the supply of collateral from the banks dries up, reducing the shadow banking activities. That shortage of collateral also makes commercial banks reduce credit supply to the real economy.

Although shadow banks and traditional banks have separate economic functions, they both face financial constraints. The shadow banking market funds itself through the issuance of securitized products (among others). Those products were bought by, among others, commercial banks looking for higher-quality collateral. Nevertheless, shadow banks retain the more risky (equity or first loss tranches) of securitized products. The distribution of the remaining risk between shadow banking entities and investors relies heavily on the type of liabilities issued by the shadow banking entity. That can be: (1) asset-backed securities (ABS) may offer 'pass-through' exposure to an underlying collateral pool (risk sharing whereby the risk 'contingency of cash flows in the underlying loan pool' is shared between SB and investor)¹³; or (2) ABS represent fixed (non-contingent) claims,¹⁴ that is, brokers issue one-period discount bonds that promise a fixed return. The consequence of that is that the SB incurs all the risk embedded in the transaction. By doing so, the SB starts to incur bank-like risks (through credit and maturity transformation). This distinction is critical as Meeks et al. demonstrate that 'the composition of the ABS portfolio turns out to be a crucial determinant of both the relative volatility of bank and shadow bank credit, and the co-movement between them'.¹⁵ That risk is withheld in the financial system and concentrated on the balance sheets of financial intermediaries and not distributed to 'external' unlevered investors.¹⁶

¹¹ Meeks et al., (2014), *ibid.*, p. 4.

¹² For a literature overview of financial stability issues surrounding shadow banking and securitization, see: Meeks et al., (2014), *ibid.*, pp. 6–8.

¹³ H.S. Shin, (2009), *Securitisation and Financial Stability*, *Economic Journal*, Vol. 119, pp. 309–332.

¹⁴ Those instruments were favored in the market. Many reasons or arguments are available for that to happen: (1) portfolio preferences by institutional investors and foreign creditors, and (2) regulatory arbitrage to get some level of capital relief by commercial banks.

¹⁵ Meeks et al., (2014), *ibid.*, p. 11.

¹⁶ See also: N. Gennaioli et al., (2013), *A Model of Shadow Banking*, *Journal of Finance*, Vol. 13, pp. 1331–1364.

The results of the equilibrium model exercise performed by Meeks et al. demonstrate that difference. While in the first scenario (risk sharing) commercial banks are exposed to aggregate risk through both loan and ABS (or in general securitized products) prices, whereby the losses they make on ABS reinforce the losses they make on loans which reduces their balance sheet capacity and forces them to rebalance their portfolios away from loans and toward ABS (they anticipate that the ABS value will appreciate after the shock). The SB party also undergoes a reduction in balance sheet capacity, but ‘the decline in the mark-to-market value of their liabilities as the price of ABS falls offers partial protection to their net worth’.¹⁷ Indeed, they can expand their loan holdings by increasing leverage and using the widened loan-ABS spread. In the latter model (where the SB incurs all the risk as commercial banks hold fixed claims). Meeks et al. conclude, ‘the decline in asset prices triggered by the adverse productivity shock is now fully absorbed by shadow bank net worth, which undergoes a substantial contraction.’¹⁸ Asset and ABS values decline consequently. In this scenario, whereby commercial banks’ net worth is (partly) protected, they are able to expand their loan holdings even when scaling back on their loan activities. But, as Meeks et al. further conclude, despite that the ‘total effect on aggregate credit is a substantially larger contraction than under risk sharing securitization, resulting in larger declines in investment, and so a deeper recession’.¹⁹ That can be explained as follows: in this scenario commercial banks are less exposed to aggregate risk and so their balance sheet is less impacted. But without the ability to securitize their loan book, total credit will fall by more (compared with scenario one). To put it in perspective, under scenario one ‘commercial bank net worth receives an additional boost from the revaluation of their ABS portfolios post-shock. They therefore reduce their overall demand for ABS, inducing the loan-ABS spread to fall to eliminate the resulting excess supply.’ In the latter case, ‘the higher leverage of the shadow banking sector tends to create a large ABS supply response which again leads the loan-ABS spread to fall.’²⁰

A further implication is that under scenario two, the macroeconomic volatility observed is larger compared to model one and is caused by ‘the higher effective leverage of the financial system when shadow banks issue debt-like claims’. It was already indicated that commercial and shadow bank credit tend to move in different directions in response to business cycle shocks. But ‘the cyclical behavior of credit components and spreads depend on the source of the shock, as they depend on the differential responses of aggregate investment.’²¹ Or put differently, heterogeneity within the financial system produces different macroeconomic outcomes²² at least in case of a shock that affects directly the leverage of financial intermediaries (‘the collateral value of assets held or issued by the shadow banking system became impaired’).

¹⁷ Meeks et al., (2014), *ibid.*, p. 29.

¹⁸ Meeks et al., (2014), *ibid.*, p. 29.

¹⁹ Meeks et al., (2014), *ibid.*, p. 31.

²⁰ Meeks et al., (2014), *ibid.*, p. 31.

²¹ Meeks et al., (2014), *ibid.*, p. 32.

²² Meeks et al., (2014), *ibid.*, pp. 32–33.

Securitization shocks lead to a material reduction in real-economy activity even when offset with cuts in official interest rates and enhanced provision of liquidity.²³ The reason for that is that the assets held by the shadow banking system become less effective for raising secured funding.²⁴ The immediate implication of that is a reduction in the supply of securitized assets (banks keep loan portfolios in their books, but selling by SB pushes prices downward impacting commercial banks—the SB balance sheets are highly levered and thus balance sheet adjustments are material). The secondary implication is ‘that shadow bank liabilities become less valuable as collateral for commercial banks’.²⁵ The implication is that commercial banks now have to hold more ABS in their portfolio and are less attractive compared to loans. This has material policy implications²⁶ as Meeks et al. conclude that ‘a policy that raises asset values through direct loan purchases is more effective than a policy that supports the price of ABS (by lending to shadow banks by purchasing asset-backed securities), reducing funding costs for shadow banks’²⁷ and that ‘the ability of banks to securitize loans when their net worth is impaired can have a beneficial effect on the macroeconomy, acting as a stabilizing force for aggregate activity and credit supply. But when securitization is accompanied by high leverage in the shadow banking system, as is the case when ABS have debt-like characteristics, the economy instead becomes excessively vulnerable to aggregate disturbances.’²⁸

1.2 Shadow Banking Dynamics and Monetary Policy

A further domain that deserves attention and that is related to the discussion above is the question that deals with the question to what degree monetary policy is instrumental to the size and dynamics of the shadow banking market, its players and the content of the transactions. The drivers behind the SB market were discussed, in particular to what degree monetary policy related to the growth or slowdown of commercial banking assets and inversely, as discussed above, the slowdown or growth of the shadow banking assets and level of securitization activity. Front-running the actual discussion in this matter, it can be reported that Nelson et al. have considered part of this question and conclude that ‘a contractionary monetary policy shock has a persistent negative impact on the asset growth of commercial banks, but increases the asset growth of shadow banks and securitization activity’²⁹ and ‘cast doubt on the idea that monetary policy can usefully “get in all the

²³M. Del Negro, et al., (2011), *The Great Escape? A Quantitative Evaluation of the Fed’s Liquidity Facilities*, Staff Report Nr. 520, Federal Reserve Bank of New York.

²⁴Meeks et al., (2014), *ibid.*, p. 34.

²⁵Meeks et al., (2014), *ibid.*, p. 35.

²⁶See in detail: Meeks et al., (2014), *ibid.*, pp. 35–39.

²⁷Meeks et al., (2014), *ibid.*, p. 39.

²⁸Meeks et al., (2014), *ibid.*, p. 40.

²⁹B. Nelson et al., (2015), *Do Contractionary Monetary Policy Shocks Expand Shadow Banking?*, Bank of England Working Papers, Nr. 521 (later on published *Journal of Applied Econometrics*, Vol. 33, Issue 2, March 2018, pp. 198–211).

cracks”³⁰ of the financial sector in a uniform way’. Their starting point is what interests us the most; that is, was monetary policy an (important) driver of financial intermediaries’ balance sheet dynamics and evolution in the run-up to the 2008 crisis? Should monetary policy have been more considerate when it comes to the excessive ‘leverage’ buildup and respond in a countercyclical way? These are relevant questions given the fact that US interest rates have been (very) low for a protracted period of time. It also raises questions, to what degree ‘monetary policy’ has effects beyond the reach of the traditional regulatory tools, that is, the effects of monetary policy on the balance sheet growth of financial intermediaries (both commercial banks and shadow banking entities).

Their findings demonstrate that the contribution of monetary policy shocks on asset growth in the financial sector as a whole has been small (less than 10% of the variation in asset growth of US commercial and shadow banks during the period 1966–2007). There is a direct link between the balance sheet dynamics of commercial and shadow banking entities and the role of monetary policy in ensuring financial stability.³¹ The literature on ‘monetary policy shocks’ is not new³² but has traditionally been focused on the impact of the macroeconomy³³ and concluded that the impact is relatively modest when measured at the level of GDP (e.g. impact on GDP of a 100 basis point shock). More recently larger effects were identified of monetary policy shocks on asset prices.³⁴ Since the outbreak of the 2008 financial crisis, the scholarly attention has shifted toward the question ‘how monetary policy may affect the balance sheet dynamics of financial intermediaries’. In short, the answer was that monetary policy might be an important factor *vis-à-vis* intermediaries’ balance sheets.³⁵ But until recently very little efforts had been going into quantifying that relationship.³⁶

³⁰J.C. Stein, (2013), *Overheating in Credit Markets: Origins, Measurement, and Policy Responses*, Speech, February 7, Federal Reserve Board.

³¹T. Adrian and H.S. Shin, (2009), *Money, Liquidity and Monetary Policy*, *American Economic Review*, Vol. 99, Issue 2, pp. 600–605.

³²It goes as far back as C.A. Sims, (1980), *Macroeconomics and Reality*, *Econometrica*, Vol. 48, Issue 1, pp. 1–48.

³³B.S. Bernanke, (2005), *Measuring the Effects of Monetary Policy: A Factor-Augmented Vector Autoregressive (FAVAR) Approach*, *The Quarterly Journal of Economics*, Vol. 120, Issue 1, pp. 387–422, and H. Uhlig, (2005), *What Are the Effects of Monetary Policy on Output? Results from an Agnostic Identification Procedure*, *Journal of Monetary Economics*, Vol. 52, Issue 2, pp. 381–419.

³⁴Most recently: M. Gertler and P. Karadi, (2014), *Monetary Policy Surprises, Credit Costs and Economic Activity*, *Journal of Monetary Economics*, Discussion Paper. See further references: Nelson et al., (2015), *ibid.*, p. 2.

³⁵In detail: T. Adrian and H.S. Shin, (2008), *Financial Intermediaries, Financial Stability, and Monetary Policy*, Staff Reports Nr. 346, Federal Reserve Bank of New York (published as Jackson Hole Economic Symposium Proceedings, Federal Reserve Bank of Kansas City, pp. 287–334) and T. Adrian and H.S. Shin, (2010), *Financial Intermediaries and Monetary Economics*, in *Handbook of Monetary Economics*, Elsevier, Vol. 3, chap. 12, pp. 601–650.

³⁶With the notable exception of I. Angeloni, et al., (2013), *Monetary Policy and Risk Taking*, Discussion Paper. They confirm the earlier findings of both (1) Y. Altunbas et al., (2010), *Bank Risk and Monetary Policy*, *Journal of Financial Stability*, Vol. 6, Issue 3, pp. 121–129, and (2) G. Jiménez et al., (2014), *Hazardous Times for Monetary Policy: What Do Twenty-Three Million Bank Loans Say About the Effects of Monetary Policy on Credit Risk-Taking?*, *Econometrica*, Vol. 82, Issue 2, pp. 463–505.

Woodford indicates: ‘the increase in the riskless short-term rate did reduce demand and checkable deposits of households and firms, but this did not prevent a net increase in the overall liabilities of financial intermediaries, including shadow banks.’ Nelson et al. contribute to our understanding of the nature (and quantification) of the causal relationship between interest rate and balance sheet dynamics.³⁷ The increase (100 basis points) of the central banking rate has a persistently negative effect on commercial bank asset growth (−0.1%), while it had a positive effect on shadow banking asset growth (+0.2%). However, they also conclude that the impact of contradictory monetary policies was larger in the past (1970–1980s) than during the low interest rate environment post-9/11. After 9/11 ‘policy shocks contributed positively to commercial bank asset growth, but shadow banking activity that expanded rapidly due to increasing securitization seemed to have been curbed by expansionary monetary policy shocks’.³⁸ They therefore argued that the ‘overall importance of unexpectedly loose policy in the pre-crisis build up was small relative to other contributing factors’.³⁹ To the extent there is an effect it is the ‘financing and liquidity position’ of banks that seem to be the key determinants of the impact of monetary policy shocks on the balance sheets of commercial banks. They facilitate the policy transmission. This has important policy implications as the financial system may be unable, due to asymmetric information, to channel liquidity to solvent but illiquid intermediaries.⁴⁰

The countercyclical impact on shadow banking activity might point, according to Nelson et al., at a ‘waterbed effect’ whereby ‘commercial banks can circumvent tighter funding liquidity constraints following a contractionary policy shock by possibly increasing their securitization activity, leading to a migration of lending activity beyond the regulatory perimeter to the shadow banking sector’. It allows them to transform illiquid loans into more liquid assets and who, once removed from the balance sheet of the commercial banks, are financed by the issuance of tradable securities (rather than with bank assets).⁴¹

They strengthen their model by taking into account the role of asset prices and their impact on the ability of shadow banking entities to intermediate funds.⁴² Falling asset prices erode collateral value which shadow banking entities use to obtain short-term

³⁷Their model is based on that of Christiano et al.: see L.J. Christiano, et al., (1999), *Monetary Policy Shocks: What have we Learned and to what End?*, in *Handbook of Macroeconomics*, (ed.) J. B. Taylor, and M. Woodford, Elsevier, Vol. 1, chap. 2, pp. 65–148.

³⁸Nelson et al., (2015), *ibid.*, pp. 7–8.

³⁹Their findings are in line with W.J. Den Haan, and V. Sterk, (2011), *The Myth of Financial Innovation and the Great Moderation*, *The Economic Journal*, Vol. 121, Issue 553, pp. 707–739. They found that following a monetary policy contraction nonbank mortgages increase as opposed to standard bank mortgages that exhibit a significant reduction. Also see: E. Loutschina, (2011), *The Role of Securitization in Bank Liquidity and Funding Management*, *Journal of Financial Economics*, Vol. 100, Issue 3, pp. 663–684.

⁴⁰See, for example, X. Freixas and J. Jorge, (2008), *The Role of Interbank Markets in Monetary Policy: A Model with Rationing*, *Journal of Money, Credit and Banking*, Vol. 40, Issue 6, pp. 1151–1176.

⁴¹Nelson et al., (2015), *ibid.*, p. 9.

⁴²M. Gertler and N. Kiyotaki, (2010), *Financial Intermediation and Credit Policy in Business Cycle Analysis*, in *Handbook of Monetary Economics*, Elsevier, Vol. 3, chap. 11, pp. 547–599.

funding.⁴³ The credit crunch caused deleveraging and a further reduction of asset prices. Credit constraints in the financial system substantially amplify the impact of policy shocks on asset prices and on the balance sheet dynamics.⁴⁴ Reflecting asset prices in their model, Nelson et al. report that the 1% increase in central banking rate ‘continues to be pro-cyclical for commercial bank asset growth’ and ‘countercyclical for shadow bank asset growth’.⁴⁵ Over longer periods of time, however, they identify a ‘stable relationship between monetary policy shocks and commercial bank asset growth’ and ‘a countercyclical impact on shadow bank asset growth’.⁴⁶

One of the drivers behind that countercyclicality could very well be ‘securitization’. The knowledge we already had was that securitization made monetary less efficient (by lowering the interest elasticity of output).⁴⁷ Since securitization provides commercial banks with additional sources of funding, it makes commercial banks less prone to cost of funding shocks. The implication is that the regulator can less efficiently direct bank lending through monetary policies.⁴⁸ So, the bottom-line question is whether securitization activities enhance the countercyclical impact of monetary policy shocks on shadow banking or more precisely whether the countercyclical effect of monetary policy works through securitization. To answer that question Nelson et al. estimate ‘the impact of policy shocks on GSE (Government Sponsored Entities) asset growth’.⁴⁹ The answer to that question is positive⁵⁰ and supports the understanding provided by Loutskina that securitization has reduced the sensitivity of aggregate lending supply to traditional bank funding conditions and weakened the credit channel of monetary policy.

They conclude that indeed monetary policy is a powerful tool tackling financial excesses as it has a reach far beyond that of financial regulation, but also that ‘a monetary contraction aimed at reducing the asset growth of commercial banks would tend to cause a migration of activity beyond the regulatory perimeter to the shadow banking sector. The monetary response needed to lean against shadow bank asset growth is of opposite sign to that needed to lean against commercial bank asset growth’⁵¹ which reduces the effectiveness of monetary policy in this respect. That reinforces the need for prudent regulation as advocated by the Financial Stability Board (FSB)⁵² in order to ‘moderate excessive swings in risk taking by commercial banks’ and maintain monetary policy as a last line of defense

⁴³ M.K. Brunnermeier, (2009), Deciphering the Liquidity and Credit Crunch 2007–2008, *Journal of Economic Perspectives*, Vol. 23, Issue 1, pp. 77–100.

⁴⁴ M. Gertler and P. Karadi, (2011), A Model of Unconventional Monetary Policy, *Journal of Monetary Economics*, Vol. 58, Issue 1, pp. 17–34.

⁴⁵ Nelson et al., (2015), *ibid.*, p. 10.

⁴⁶ Nelson et al., (2015), *ibid.*, p. 11.

⁴⁷ A. Estrella, (2002): Securitization and the Efficacy of Monetary Policy, *Economic Policy Review*, (May), pp. 243–255.

⁴⁸ E. Loutskina, (2011), The Role of Securitization in Bank Liquidity and Funding Management, *Journal of Financial Economics*, Vol. 100, Issue 3, pp. 663–684.

⁴⁹ For an extensive definition of GSEs, see Nelson et al., (2015), *ibid.*, p. 31.

⁵⁰ For an explanation of the differential impact of monetary policy shocks on the balance sheet dynamics of commercial banks and shadow banks, see Nelson et al., (2015), *ibid.*, pp. 13–21.

⁵¹ Nelson et al., (2015), *ibid.*, p. 22.

⁵² FSB, (2013), Strengthening Oversight and Regulation of Shadow Banking, Report, Financial Stability Board.

against financial instability concerns.⁵³ The larger question at stake, given these findings, is ‘whether traditional interest rate policy is at all effective in curbing excessive credit booms fueled by shadow banks’.⁵⁴ The answer to that is far from certain positive, as was the case with macroprudential policies.⁵⁵

The aforementioned ‘waterbed effect’ has proven robust across different assumptions and model specifications. Securitization activity rises after monetary contractions and therefore challenges the effect of monetary policy to achieve financial stability in the market. It will force a disproportionately large size of the monetary policy response (needed to curtail rapid commercial bank asset growth) relative to the past, and it would potentially lead to asymmetric impact across the financial sector (nonuniform impact of monetary policy tools). As I advocate elsewhere in the book, regulatory tools are needed that ‘address the buildup of leverage in the regulated sector more directly than monetary policy does’.⁵⁶ Elsewhere in the book I will review the current regulatory instruments applied in both the traditional and shadow banking market and illustrate the ‘in my understanding’ material benefits of using a Pigovian type of instrument to tackle the issue. Monetary policy ultimately contributed little to the balance sheet expansion of US financial intermediaries post-9/11, leaving room for argumentation toward financial innovation and others as a potential driver.⁵⁷

1.3 Liquidity Transformation in the Shadow Banking Sector

The intermediaries in the shadow banking system aim to produce or maximize liquidity. They do so by issuing securities that behave as ‘cash’ (i.e. very liquid), but under distress when collateral becomes—as discussed—scarce, it turns illiquid. The need of investors, in times of distress, for crash-proof assets forces the shadow banking system to move toward ‘collateral-intensive’ assets. That in itself results in the fact that the SB system shrinks, reducing liquidity and increasing the risk premium, which make prices and investments to fall. Moreira and Savov⁵⁸ also indicate that it is often followed by a slow recovery and collateral runs. A scarcity of capital within the financial network aggravates the bust in

⁵³L.O. Svensson, (2013), *Some Lessons from Six Years of Practical Inflation Targeting*, mimeo, Stockholm School of Economics.

⁵⁴Nelson et al., (2015), *ibid.*, p. 22.

⁵⁵S. Aiyar, et al., (2014), *Does Macro-Prudential Regulation Leak? Evidence from a UK Policy Experiment*, *Journal of Money, Credit and Banking*, Vol. 46, pp. 181–214.

⁵⁶Nelson et al., (2015), *ibid.*, p. ii.

⁵⁷S. Honkapohja, (2014), *Financial Innovation and Financial Stability – Comments*, Speech, Bank of Finland and B.S. Bernanke, (2009), *Financial Innovation and Consumer Protection*, Speech, Federal Reserve Board.

⁵⁸A. Moreira and A. Savov, (2014), *The Macroeconomics of Shadow Banking*, Yale/Stern School of Business Working Paper (later on published as in the *Journal of Finance* Vol. 72, Issue 6, 2017, pp. 2381–2431).

any economic cycle.⁵⁹ The macroeconomic dimensions of a business cycle and accompanying regulation run through the balance sheets of financial intermediaries as they are the power box of the economy. The nexus between the macroeconomy and the financial sector seems to fall apart in times of distress. In fact, at those times it is demonstrated that liquidity and wealth generation deviate.

Moreira and Savov document that ‘securities are liquid only to the extent that they are backed by sufficient collateral to make their payoffs insensitive to private information’.⁶⁰ ‘A security is liquid if its expected payoff does not depend too much on private information about the state of the economy. This makes it immune to adverse selection and allows it to trade without incurring price impact or other costs.’

Providing liquidity is clearly linked to and constrained by the supply of collateral as that liquidity promise must be backed by assets. The scarcity of that collateral under distress is fueling the growth of the shadow banking sector. The shadow banking sector engages in liquidity transformation as it allows greater liquidity for each dollar/euro of available collateral. Moreira and Savov comment, ‘[w]hereas an always-liquid, money-like security requires enough collateral to remain informationally insensitive at all times, even in a crash, a near-money security that is only liquid absent a crash uses collateral mainly when it is more abundant, making it cheaper to produce.’⁶¹ As such, the liquidity frontier is created by the amount of collateral available and the demand determines the distribution of securities at any given point in time. It also explains why shadow banking securities are less in demand as a crash is increasingly likely—that is, those shadow banking securities will become less liquid as the likelihood of a crash increases. As such investors will behave on the trade-off between sensitivity of the liquidity supply and the demand for liquidity, as the likelihood of a crash ‘drives a wedge between the current value of an asset and its collateral value’.⁶² That creates the following understanding as reflected in Table 1.1.

The collateral decelerator implies the slowdown of the economic regression but also makes that a future economic recovery is more protracted. The already highlighted ‘flight to quality (assets)’ following an uncertainty shock and the resulting rise in collateral premia make ‘safe, collateral-rich assets appreciate even as overall prices are falling’⁶³ (collateral mining).⁶⁴

⁵⁹ M.K. Brunnermeier and Y. Sannikov, (2014), A Macroeconomic Model with a Financial Sector, *The American Economic Review*, Vol. 104, Issue 2, pp. 379–421.

⁶⁰ Moreira and Savov, (2014), *ibid.*, p. 2.

⁶¹ Moreira and Savov, (2014), *ibid.*, p. 2.

⁶² Moreira and Savov, (2014), *ibid.*, p. 3.

⁶³ That is something we have been witnessing even years after the 2008 crisis. Moreira and Savov indicate, ‘[t]he negative co-movement between safe and risky assets during crashes reduces the information sensitivity of diversified asset pools, allowing intermediaries to expand the liquidity supply’; Moreira and Savov, (2014), *ibid.*, p. 4.

⁶⁴ Demand for collateral causes (under uncertainty) investment in the safe but unproductive asset to pick up (‘collateral mining’); see Moreira and Savov, (2014), *ibid.*, p. 21.

Table 1.1 Shadow banking dimensions under different macroeconomic phases

Uncertainty is low	Uncertainty is high (uncertainty shock)
<p>Agents are willing to hold SB assets with small margin over cash</p> <p>Liquidity framework expands which promotes savings and allows SB collateral to lever up</p> <p>Enhanced savings create lower funding costs for intermediaries, passed on to agents as a lower discount cost</p> <p>Lower discount costs lead to higher prices ('the liquidity transformation enabled by shadow banking lowers the funding cost of the productive asset, boosting its price'^a), investments and growth.^b The effect is higher for assets with low collateral value (riskier mortgages or loans) and shifts the capital mix in the economy toward more risk</p> <p>Liquidity supply more fragile as 'real assets' are crowded out</p> <p>Low levels of uncertainty fuel shadow banking activities and assets and more liquidity transformation which leads to economic enhanced level of activity and growth but simultaneously to higher levels of economic vulnerability ('shadow banking increases the economy's exposure to uncertainty shocks')</p>	<p>Agents flee to crash-proof assets and liquidity</p> <p>Spread between SB assets and regular assets widens</p> <p>Supply of liquidity drops sharply (intermediaries try to meet redemptions). The result is less liquidity transformation, less liquidity and higher discount rates</p> <p>Collateral-intensive shift of asset purchase</p> <p>Discount rates and risk/collateral premia rise</p> <p>Collateral runs^d (aka margins spiral), and movement and prices and haircuts reinforce each other (collateral decelerator)</p> <p>Investments, prices and growth fall.</p> <p>Intermediaries turn to storage-like assets (e.g. T-bonds)</p> <p>Liquidity transformation, and not liquidity supply, leads to growth^e ('a highly liquid economy need not coincide with a fast-growing one'^f) as growth remains low even when intermediaries have 'restocked' their balance sheet with crash-proof liquidity assets</p> <p>Intermediaries don't stop investing in productive capital under uncertainty because of a lack of intermediary capital or a lack of investment opportunities but lower levels of liquidity transformation due to a shrunk SB market</p>

^aMoreira and Savov, (2014), *ibid.*, p. 19^bBy increasing the supply of liquidity for a given amount of collateral, shadow banking lowers discount rates and pushes up prices, investment, and growth'; Moreira and Savov, (2014), *ibid.*, p. 20^cMoreira and Savov, (2014), *ibid.*, p. 3. The link between liquidity transformation and economic fragility is well documented in recent years; see: (1) M. Baron, and W. Xiong, (2014), Credit Expansion and Neglected Crash Risk, Working Paper, (2) J. Bai, Jennie, et al., (2013), Measuring the Liquidity Mismatch in the Banking Sector, Working paper, (3) M. Schularick, and A. M. Taylor, (2012), Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008, American Economic Review, Vol. 102, Issue 2, pp. 1029–1061*(continued)*

Table 1.3 (continued)

^dMoreira and Savov comment: '[c]ollateral runs are a side effect of shadow banking and the fragility it generates. At times of high liquidity transformation, an uncertainty shock not only contracts liquidity provision, increasing discount rates and reducing prices, it also increases the volatility of liquidity provision going forward. The heightened exposure to future uncertainty shocks makes discount rates more sensitive to crashes. As a result, collateral values drop faster than prices (haircuts rise), further amplifying the contraction in the supply of liquidity'; see Moreira and Savov, (2014), *ibid.*, p. 4

^eJ. Bai, et al., (2013), *Measuring the Liquidity Mismatch in the Banking Sector*, Working Paper

^fMoreira and Savov, (2014), *ibid.*, p. 20