

Rethinking Banking Supervision in a World of Excess Reserves

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As the subprime crisis of 2007 sparked broader financial problems, two facts about the banking sector became apparent. First, that banking institutions had grown much faster than the stock of assets in the economy over the preceding decades. Second, that banks had grown to be so interconnected that the failure of one was thought to spark off a cascade of bank collapses. Taken together these apparent facts gave rise to the general perception that the banks dominating the financial sector had become too big to fail. Since 2007 and mostly as a result of various quantitative easing a new feature of the banking sector has become apparent – a large amount of reserves held in excess of the regulatory requirements. In this paper we explain first how the banking sector was able to grow at a faster rate than the broader economy for a sustained period and also why banks grew interconnected to a degree not seen in other industries. Second, we provide a solution to these peculiarities by use of the existing excess reserve balances, and in this way demonstrate that various piecemeal regulations in place can be replaced by a simpler standard. The result is that banking operations would be standardized with other industries and that the key oddity of the banking sector – large and highly connected organizations – would be demotivated.

1 Introduction

The Great Recession brought the financial sector to the verge of collapse. One of the more salient threats was the risk that a large financial system would affect the real economy. In response, central banks across the world enacted unprecedented monetary policies such as quantitative easing or negative interest rates on bank reserves. These tools aimed to strengthen a fragile financial system, maintain lending at pre-crisis levels, and thus insulate the real economy from ill effects that it could be exposed to. The result was a large amount of reserve balances held by the banking system in excess of the regulatory requirements in place.

Rather than making the financial system more robust and ruling out another panic, these unprecedented measures have sown the seeds for more fragility and vulnerability. A response to these developments has been the introduction of tighter banking regulations and supervision via the Basel III agreement. These regulations have helped to induce a certain deleveraging and bolstering of bank capital ratios. Yet, the twin problems of a banking sector being “too-big-to-fail” and “too-interconnected-to-fail” have not been resolved.

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In this paper we analyze the peculiarity of the banking sector in order to explain first how the banking sector was able to grow at a faster rate than the broader economy for a sustained period and also why banks grew interconnected to a degree not seen in other industries. We show, that these problems have a common origin, which is neither adequately nor completely addressed by today's banking regulations. Banking supervision failed to prevent previous financial crises and will fail to do again if we do not address the root of the problem.

Second, we provide a solution to these imbalances by use of existing excess reserve balances, and in this way demonstrate that piecemeal regulations in place can be replaced by a simpler and more robust standard. The result is that banking operations would be standardized with other industries and that the key oddity of the banking sector – large and highly connected organizations – would be demotivated.

2 The peculiarity of banks

Probably no other sector is as heavily regulated as the banking sector (*Carletti and Vives (2009)*), and in no other sector does interconnectivity play such a prominent and threatening role. Interconnectivity is part and parcel of a specialized economy based on the division of labor. Interconnectivity, implied in human interaction, is necessary to maintain today's specialized societies and their standard of living. However, there is interconnectivity on the free market (i. e. free market interconnectivity) and there can be over-interconnectivity in some regulated markets such as banking (artificial interconnectivity).

When a barber's shop goes bankrupt, it does not cause troubles for other barbers. On the contrary, other barbers most likely will profit from the failure of their competitor as they acquire new clients and the decrease in competition allows for upward price pressures to form. The only industry where the bankruptcy of one company threatens to take down the whole industry is the financial sector. This was the case in 2008 with the bankruptcy of Lehman Brothers, which brought financial markets into panic mode.

Owing to the tight interconnectivity of financial companies, the bankruptcy of one firm threatened the solvency of the greater industry. The peculiarity of interconnectivity in the banking sector is one of the greater justifications for its strict regulation. In order to understand the optimality of a given regulation in solving the sector's inherent problems, we must first analyze the reasons for the uniqueness of the banking sector vis-à-vis other industries.

The origin of the peculiarity is well understood: banks have the legal privilege to operate with fractional reserves on demand deposits.^{1,2} Fractional reserve banks can create new perfect money substitutes (demand deposits) and acquire with them income-generating assets. By issuing loans against its deposit base, fractional-reserve banks increase the money supply, a process commonly illustrated through the money multiplier.

Prior to 2007 banks held their reserve balances at the minimum required level in order to maximize their lending facilities. For the industry taken as a whole, maximizing credit expansion reducing the reserve ratio is a profit-maximizing strategy. Unfortunately, this strategy is not without its pitfalls. As credit expansion continues, bank reserve and equity ratios are compromised and a reserve drain at any one bank may jeopardize its liquidity, and eventual solvency.

A problem that may arise for banks is that if they do not coordinate their credit expansion, an individual bank may lose reserves. When bank A expands credit faster than bank B, more bank A money substitutes will end up at bank B than bank B money substitutes at bank A. When bank A and B clear their money substitutes and demand redemption, bank A loses reserves and bank B gains reserves. If bank A continues to produce money substitutes at a higher rate than bank B, at some point bank A will become illiquid. If, however, bank A and bank B expand credit in the same rate, they do not lose reserves their claims against one another will cancel out. They maintain their absolute level of reserves while decreasing their reserve ratio.

In other words, there are natural limits to an isolated expansion of bank lending. Interbank settlement is a check on a bank's ability to expand credit, because a bank that expands credit faster than its competitors loses reserves. These natural limits, i. e. the outflows of liquidity resulting from interbank settlement, can be curbed by the emergence of an interbank loan market.

An interbank loan allows banks to cooperate in credit expansion by helping each other out in times of temporary liquidity shortages caused by imperfectly coordinated credit expansion rates. If banks lend to each other, unpredictable short-term liquidity shortages can be smoothed. In addition, the interbank market is a way of collectivizing the profits generated by the credit expansion of an individual bank (*Gertchev (2012)*). This is so, because the creditor banks receive interest from the individual bank that initiated the credit expansion. It should be noted that these incentives for banks to cooperate via an interbank market exist only in a fractional reserve banking system. In a full reserve system, there would be no interbank loan market for

1 All other economic agents must hold full reserves on demand deposits, be it wheat depositories for grain, or non-banks for money deposits. For legal analysis of the privilege of fractional reserves see *Huerta de Soto (2012)*, *Bagus/Howden (2009a)*, *Bagus/Howden/Gabriel (2015)* or *Bagus/Howden/Bloch (2013)*.

2 It should be noted that Lehman Brothers was an investment bank. The collapse of this investment bank triggered the panic of 2008. Through its interconnectedness, the collapse of Lehman also affected commercial banks with their inherent fragility due to their fractional reserves. As a result of the Great Recession, investment banks have disappeared in the US. Bear Stearns and Lehman Brothers collapsed, Merrill Lynch was bought up by Bank of America, and Goldman Sachs and Morgan Stanley moved to the status of more highly regulated bank holding companies. While investment banks are not linked by the elasticity of money supply, i. e. they do not expand and contract credit, and the interbank market, they are linked to other financial institutions, such as commercial banks, through other channels discussed below.

reserves, since banks would, by definition, always have the necessary reserves to satisfy all redemption claims.

Today, the interbank market is influenced and supported by banking regulation. Banking regulation requires banks to hold minimum reserves with the central bank. In order to meet these minimum reserve requirements, banks trade reserves in the interbank market. Banks with excess reserves lend reserves to banks that need them. The existence of an interbank loan market is crucial for the interconnectivity of financial markets, which is discussed below.

In a fractional reserve banking system, banks have an interest in coordinated and controlled credit expansion. One instrument of coordination is the interbank market. However, the coordination, orchestration and monitoring of credit expansion can be ensured and improved by central banks and regulatory authorities.

The coordination of credit expansion has been one major reason for the introduction of central banks.³ Another reason for the introduction of central banks has been to stabilize the vulnerable financial system by providing a liquidity back-stop in times of trouble. Historically, the liquidity provision has been improved in two major steps. First, under the gold standard gold reserves were centralized in a central bank enabling it to provide (gold) funding for banks in trouble.⁴ Second, the introduction of pure fiat money standards, especially following the demise of the Bretton Woods agreement in 1971, allowed central banks to produce unlimited amounts of reserves to help banks in need of liquidity. It should be noted that the size of the interbank market tends to grow when a central bank is introduced because the risk of losses from interbank loans is reduced (*Gertchev (2012)*).

An important feature of the fractional reserve banking system is that it endogenously triggers the liquidity crises that central banks try to alleviate. Above all, the credit expansion of the fractional reserve banks leads to a fundamentally unstable financial system through recurring crises.⁵ This is because credit expansion causes interest rates to fall below the level they would otherwise attain (if they were determined by real savings). With the artificially lowered interest rate, investment projects that would not be carried out if interest rates were higher appear to be profitable. Induced by the artificially lowered interest rates, entrepreneurs engage in additional investment projects, although there is no corresponding increase in real savings necessary to complete these projects. These investment projects are usually carried out in capital-intensive, i. e. interest rate sensitive sectors. As a result, there is a discrepancy between investors and savers. Investors invest as if real savings have increased and savers do not increase their savings accordingly. In the beginning, there is an artificial boom. The newly created money invested in the new and ambitious projects causes wages and asset prices to rise. But at some point the discrepancy becomes apparent in the form of bottlenecks, relative price increases and a rise in interest rates.

The fundamental problem is that more investments have been funded than can successfully be completed with available real savings. Once it becomes apparent that

3 See *Huerta de Soto (2012)* and *Bagus/Howden (2012)*.

4 See *Hoppe (1994)* for the historical "devolution" of money and credit. *Howden (2014)* discusses the monopolization of this role by the Federal Reserve as one of the key elements of its emergence as the central bank of the United States.

5 Such reasoning typically falls under the rubric of Austrian Business Cycle Theory. See *Mises (1928, 1998)*, *Hayek (1929, 1931)*, *Garrison (2001)* and *Huerta de Soto (2012)*.

not all projects can be successfully completed and losses arise in the previously booming sectors of the economy, the boom turns to bust and a recession sets in.

These business cycles have important implications for the stability of the banking system. Crises regularly cause reserve drains for banks since in the recession bank assets (mostly mortgage loans) lose value due to bankruptcies, delinquencies, losses on other bank investments and falling asset prices. In addition, consumers default on their loans due to rising unemployment. When banks suffer losses during a recession, depositors or other creditors may lose confidence and withdraw their deposits or fail to renew their loans. As a result of dwindling equity capital and dwindling reserves, banks restrict lending. Credit contraction exacerbates the problems for highly indebted and ailing businesses and consumers.

In the course of the business cycle, the money supply becomes highly elastic; in boom periods it increases. In recessions the money supply falls. During a recession, bank losses can easily cause panic as depositors begin to withdraw their deposits massively, especially in the absence of a central bank. If one reserve bank fails due to losses and a bank run, the panic can infect other fractional reserve banks and the entire financial sector. History gives us many examples of business cycles that triggered a bank panic that led to the insolvency of the entire banking sector (*Huerta de Soto* (2012)).

Over time bankers noticed these recurring problems and favored the introduction of a central bank that could support them with liquidity in times of crisis (*Goodhart* (1990)). Being supported by central banks, banks could engage in more aggressive credit expansion assured that if an adverse event were to occur some degree of liquidity could be provided to alleviate funding pressures. More commonly, this is recognized as the moral hazard issue surrounding bank bailouts in particular, although the problem is endemic to the banking system reliant on a central bank and occurs not only in poor economic climates when financial support from the central bank is forthcoming, but also in positive economic climates when the central bank seems not to intervene actively in the markets.

As a consequence, bank liquidity and equity ratios have been falling during the past centuries. Fragility has reached a point, where banks have become dependent on asset price markets. If asset price markets plunge in a recession, bank assets fall as well and may trigger insolvency or banking panics. Therefore, central banks have augmented their field of action. Not only do they provide liquidity to banks during recessions, but they have started to stabilize asset price markets.⁶ A disadvantage for central banks is that the nominal sums they have to create to stabilize asset price markets are enormous. In 2007 the total sum of assets held by depository financial institutions in the United States stood at about \$10 trillion, more than 10 times greater than the total assets held by the Federal Reserve. Since the banking sector's equity ratios stood only at around 10 %, a sharp decline on bank assets would have necessitated intervention from the Federal Reserve to stave off a broader financial panic. However, since the size of funding required by banks is several times larger than the size of the Federal Reserve the size of the intervention could easily lead to a hyperinflationary scenario. Therefore, it is a more rational strategy for monetary authorities to constrain credit expansion before this scenario arises, instead of relying on a medicine (inflation) that may prove worse than the disease (a lack of liquidity).

⁶ The "Plunge protection team" was founded in the US in 1988 by President *Reagan* in order to stabilize financial markets.

Here lies the rationale for bank regulation. Banking regulation aims at preventing credit expansion from running out of control. Minimum reserves ratios directly limit credit expansion. Monetary policy also influences credit expansion. Regulation such as Basel I and II limit the leverage of banks and, thereby indirectly restrict credit expansion. This is so because credit expansion, *ceteris paribus*, increases leverage: more liabilities are created while equity remains the same. Basel III introduces additional liquidity ratios and limits maturity mismatching and credit expansion more directly. In effect, all banking regulation aims to heal or limit a self-inflicted wound, namely, the ability of banks to create money from their holding of only fractional reserves.

3 Why Basel regulations fail

Banking regulation such as Basel I and II failed to prevent the Great Recession, Basel III will do no better. Besides the common repeated claim that private interests will always find a way around regulations, there are five theoretical reasons why regulations focusing on liquidity or equity levels will not accomplish their stated goals.⁷

First, and most importantly, restrictions on leverage or maturity mismatching do not go to the core of the problem, which is credit expansion without prior savings.⁸ At the most, liquidity regulations can limit credit expansion but do not eliminate it entirely.⁹ To the extent that a bank uses funding of zero maturity (deposits) to fund longer-dated investments, projects will be financed without the availability of savings being assured. This problem is commonly identified in cases of “sudden stops” or roll-over risk during financial crises, though it is an omnipresent feature of the banking system even in stable economic conditions.

Second, these regulations distort banking decisions. For example, they push banking investments into certain assets, which are favored by the regulation. By assigning favorable capital weights to government bonds or other rated securities, Basel regulations promote investment in certain asset classes. Indeed, in the Eurozone government bonds did not require any capital provisions prior to the crisis, and as a result increased investment into several countries (e. g., Greece, Portugal, Italy, Spain) that were not sustainable. Retrospectively such investments look foolish though this is only with the benefit of hindsight. Before the crisis such investments were ways for banks to minimize their capital requirements and thus maximize their profitability, all within a tightly regulated framework (Basel II) that aimed to specifically limit bank risk taking.

Third, regulation induces banks to follow a similar strategy.¹⁰ The use of the same standardized models of quantitative risk measurement leads to herd behavior. Banks tend to be invested in the same asset classes and become collectively vulnerable if these asset classes suffer losses. Following the same strategy will cause distortions such as overvalued asset classes or booms in some sectors of the economy (e. g.,

7 For the argument that banks will be able to find their way around regulation see already *Hayek* (1937a, p. 82) and *Simons* (1936, p. 17).

8 On the problem of maturity mismatching see *Bagus/Howden* (2009a, 2010a), *Bagus* (2012), *Block/Barnett* (2008, 2009), *Davidson* (2014).

9 A regulation prohibiting fractional reserves would be an exception to this rule, one that we deal with below.

10 Ironically, interconnectivity is a result of the policies of regulators aiming at the reduction of risks. See *Glavan/Anghel* (2013, p. 360); *Lacker* (2010) or *Rodriguez* (2003).

government debt, real estate). When these booms and price bubbles come to an end, all banking institutions are affected. This systemic concentration of risks makes the banking sector more vulnerable.

Fourth, banks may actually feel safer if they comply with the regulation and they believe everything is fine because the sector is supervised. They may not consider the true risks if the regulation and supervision suggests them that they are within the regulatory safety margins. Furthermore, they may speculate on a bail out or other government help, if they comply with the regulations. This false sense of security induces even more risky investment and more credit expansion.

With banking supervision, banks will not only feel more comfortable with their own strategy, they may believe also that other banks (interconnected with them) are kept in line by banking supervision. A more controlled credit expansion seems possible, as the others are supervised and fine; at least this is the pretense of banking regulation and supervision. Feeling secured as a well-regulated sector, banks can further expand credit, thereby increasing their leverage and reducing their reserve ratio. Hence, banking supervision has the unintended consequence of producing moral hazard and can even increase the financial sector's fragility.

Fifth, there is regulatory arbitrage.¹¹ Banks try to circumvent banking regulations, finding new ways to continue credit expansion. This is the reason, why Basel I was substituted by Basel II and why Basel II is substituted by Basel III. In a bid to maintain profitability, both absolute and relative to other financial institutions, banks try to innovate to skirt around regulations. Credit expansion may disappear in one way, only to reappear in other forms. Banking regulation misses a moving target and often addresses the last crisis.

It has been understood that interconnectivity is a source of potential systemic risk (*Babus* (2006); International Monetary Fund (2011)). Regulators have tried to overcome the short-comings of the Basel regulations also by improving bank supervision. The idea of macroprudential regulation is to take care of the inconnectivity of the banking system as a whole instead of regulating individual banks.¹² *Bernanke* (2011, 3) states:

[B]ecause of the highly interconnected nature of our financial system, macroprudential oversight must be concerned with all major segments of the financial sector, including financial institutions, markets, and infrastructures; it must also place particular emphasis on understanding the complex linkages and interdependencies among institutions and markets, as these linkages determine how instability may be propagated throughout the system.

Yet, banking supervision is faced with a fundamental knowledge problem.¹³ The free market is a system of dispersed knowledge where participants interact with each other agreeing on prices that can serve for subsequent coordination. The importance of the free market knowledge generation has been emphasized by *Mises* (1998) and

11 See on regulatory arbitrage, for instance, *Jones* (2000) for the capital arbitrage induced by Basel I, *Calem/Follain* (2007) for the arbitrage induced by Basel II and *Buchak/Matvos/Piskorski/Seru* (2017) on the shadow banking that evolved from regulatory arbitrage.

12 For proponents of macroprudential regulation and an overview of the literatura see *Borio* (2003), *Clement* (2010), *Brunnermeier/Crocket/Goodhart/Persaud/Shin* (2009), *Hanson/Kashyap/Stein* (2011), *de la Torre/Ize* (2013), and *Galati/Moessner* (2013).

13 See *Salter* (2014) and *Glavan/Anghel* (2013) for the information problem that macroprudential regulators face.

Hayek (1937, 1945), and was refined by Kirzner (1973) and Rothbard (2001). Supervisors cannot know which banking strategy is prudent. They cannot understand the interconnectivity and linkages of the banking system. They do not know neither the risks of bank strategies, nor the expectations of market participants, or what the future brings. They cannot know which is the equilibrium banking strategy. Bank supervisors simply the practical and particular knowledge of individual bankers of their businesses. Individual bankers have a much better practical knowledge on the risks of their strategy. There simply does not exist an objective knowledge on a prudent banking strategy. The attempt to regulate banks via macroprudential policies amounts to a "pretense of knowledge" (Hayek (1988)).¹⁴ In fact, as long as banks operate with fractional reserves they are prone to create booms and bust. With fractional reserves banks can by definition never satisfy a withdrawal of all deposits. Central supervision of banks amounts to central planning of banking strategies and is bound to fail as the Great Recession has shown.

Regulators and bureaucrats also face certain incentives, which may divert from effective regulation (Glavan/Anghel (2013); Salter (2014)). Regulators are likely to be influenced by interest groups as the public choice literature starting with Buchanan and Tullock (1962) has shown. In particular, banks may influence regulators; a process which has been dubbed "regulatory capture" (Stigler (1971)). As a consequence of the interest groups involved, banks are likely to be bailed out in a crisis situation and they can expect it.

4 Bank Interconnectivity

Insolvency is important not just on the bank level but from an industry wide standpoint due to bank interconnectivity. There are several reasons for an artificially high bank interconnectivity that would not occur in a genuinely free market.

First and as already outlined above, due to the privilege of holding fractional reserves, central banking and implicit government guarantees, credit expansion allows the banking sector to grow to a size larger than it would grow on the unhampered market. Bank balance sheets are artificially large and the sheer size of banks make an interconnection between them more likely. The larger a bank is, the more likely it is that it will have a commercial relationship with another. Usually this is by sharing common clients. If an individual is a client of several banks and default on his debt obligations, several banks are affected. Another way to consider the relationship between bank size and the interconnectivity of the system is that, *ceteris paribus*, the larger the bank the more difficult it is for another bank to *not* interact with it. In fact, Barattieri/Moretti/Quadrini (2016) show that leverage and interconnectivity went hand in hand in the 2000s.

The growth of the banking sector and the interconnectivity of its constituent banks go hand in hand. Credit expansion has allowed the financial sector to grow in relation to GDP, especially after the breakdown of the Bretton Woods system.

¹⁴ See also Huerta de Soto (2012, ch. 8) for the informational problems of central planning for the banking system.

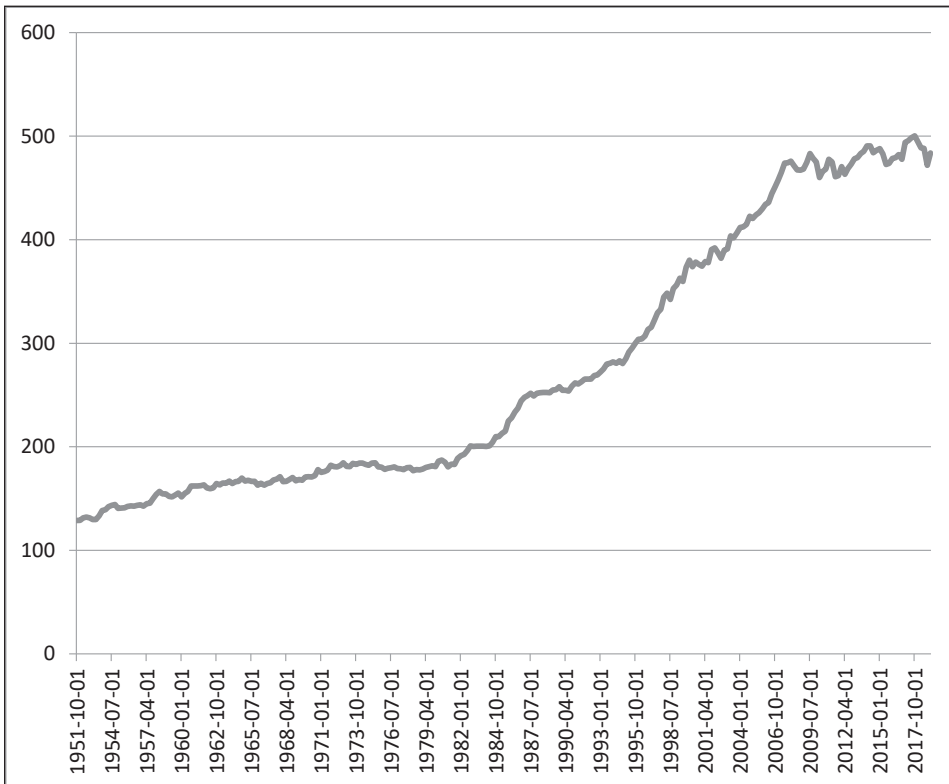


Figure 1: US Financial sector total assets to GDP (Source: FRED)

As can be seen in figure one, the size of the financial sector relative to GDP has increased from 120 % in 1951 to almost 500 % today. Similarly, interconnectivity of the banking sector increased.

Second, banks are interconnected through domino effects in highly indebted economies. In fiat money systems with a tendency for the money supply to increase substantially over the long run and price inflation to ensue, it becomes more attractive to indebt oneself to acquire assets instead of saving first because price inflation will reduce the real value of debt and push up the asset's value over the long run.¹⁵ Moreover, by indebting oneself, the debtor becomes an early receiver of the new money and profits from monetary redistribution. This occurs because an early recipient of newly created money can spend it at the existing prices, though this act puts upward pressure on inflation and relatively harms latter recipients of money (e. g., those who do not borrow). This phenomenon is the nub and kernel of the "Cantillon Effect", first assessed in *Cantillon [1755]* (1959). If in such an over-indebted economy one debtor fails, he may easily bring down with him other debtors in a kind of domino effect. In other words, if one bank collapses, it may take down its highly indebted creditors. These in turn will jeopardize other creditors and so on. Some of these individuals and companies will likely be clients of others banks. In other words, without the

15 See Hülsmann (2013), Bagus (2015a) or Bagus/Marquart (2015) on the artificial indebtedness of fiat money systems.

need to share clients (first reason above), in a highly indebted economy the default of one debtor may force several other players to default affecting the whole banking system. Thus, in a fiat money system banks are additionally interconnected through the general over-indebtedness of economic actors.

Third, banks are also interconnected through their investments in similar asset classes. When a bank suffers losses and its clients request to withdraw funds, it requires liquidity. When a bank needs liquidity and sells certain assets (stocks or bonds) the price of these assets will fall and affect the balance sheets of other banks. Bank losses may induce, in turn, their clients to withdraw their funds. As these banks encounter funding problems, other banks may liquidate assets, thus accelerating the price fall.¹⁶ As we have seen above, this interconnectivity is fostered by banking regulation that induces banks to follow similar strategies and invest in similar asset classes to boost profitability. As banks are invested in similar asset classes a price decrease in a narrow range of assets affects them all. Banking regulation induces banks to become more interconnected through their shared asset markets.

Fourth, there is direct bank cooperation, e. g., through the interbank market. Banks lend to and support themselves in order to boost their capacity to expand credit.¹⁷ The interbank market allows neglecting brief inequalities in credit expansion that could cause short-term losses of reserves even though credit is expanded at the same rhythm in the medium term. Precautionary reserves, assets held as a reserve against these short-term losses, may be reduced if there is an interbank market. Via the interbank market, which would be much more reduced or unnecessary in a full-reserve system (because there would be no need for it), banks are interconnected.¹⁸

Interbank lending as a percentage of total bank liabilities increased rapidly following the end of the Bretton Woods period, doubling from 4 to 8 % between 1973 and 1981 as credit expansion soared. The 1980s, however, witnessed a decrease in interbank lending, and throughout the mid-1990s until the crisis of 2008 it held relatively steady between 4 and 6 % of total bank liabilities. Partly this can be explained through financial innovations that decreased the need for banks to hold reserve balances, and thus reduced the necessity of turning to the interbank market to cover reserve shortfalls. Sweep accounts, for example, allowed banks to skirt reserve requirements by transferring reservable deposits to time deposit accounts for overnight maturities, and thus decreased the need to cover reserve shortfalls in the interbank market. During the crisis of 2008 central bank lending replaced the interbank market as few banks had excess reserves or high-quality collateral to lend out. Today the interbank market is small by historical standards, though this is an artifact of the historically high amounts of excess reserves held, which negate the needs for banks to turn to the interbank market or the central bank to maintain their reserve requirements.

¹⁶ See *Brunnermeier* (2009) for the connections and destabilizing spirals that evolve.

¹⁷ See *Gertchev* (2012) on the interbank market as a result of fractional-reserve banking.

¹⁸ Full-reserve banks could still be interconnected through longer-dated loans, bonds or as being counter-parties in derivatives.

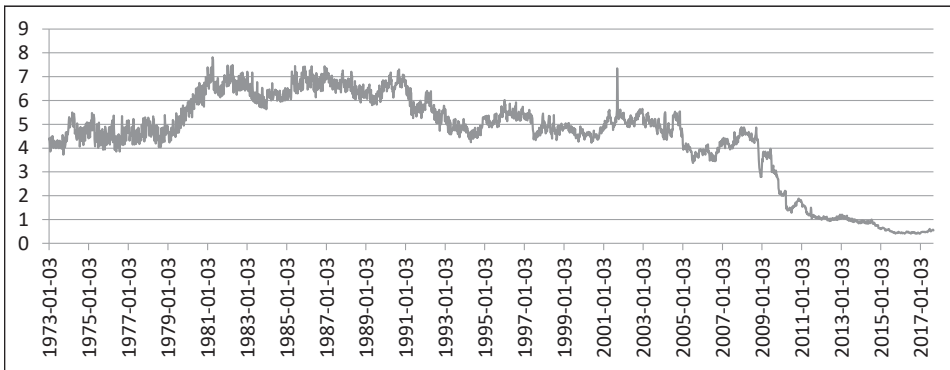


Figure 2: Interbank lending in the US as percentage of all liabilities (discontinued at the end of 2017; Source: FRED)

Fifth, in a fractional-reserve banking system banks are connected indirectly through the elastic money supply. When after an economic boom, a recession sets in, banks suffers losses on their assets and lose reserves. If one bank restricts credit, the money supply shrinks and there is a tendency of prices to fall. When prices fall, debtors find it more difficult to service their debt. When they restructure or default, there may be more losses for banks, which induces them to restrict credit further. A general credit contraction and price deflation sets in, which sometimes has been called a “deflationary spiral” (Fisher (1933)). Through its effect on general profitability and solvency, banks are interconnected through “deflationary spirals.”

Sixth, there is even an incentive for banks to become more interconnected with other banks in a world of central banking and implicit or explicit government guarantees.¹⁹ Once a bank is sufficiently interconnected with other banks that its fall will severely affect the solvency of the banking sector as a whole, it is more likely that it will be supported or bailed out by the central bank or other banks. To be intertwined with the banking sector becomes a competitive advantage and lowers funding costs, because one can depend on the government’s support. Once a bank becomes “too-interconnected-to-fail” it has a competitive advantage over banks that appear not to be too interconnected to fail. The possible bail out or support limits its shareholder’s losses and therefore increases the bank’s risk-adjusted returns.²⁰

5 Excess reserves

In a world of excess reserves interbank lending is much reduced because there is no need for it. Banks may fund themselves cheaper by using their reserves. Excess reserves are the result of expansionary monetary policy and quantitative easing in the wake of the financial crisis. Central banks all over the world started to substitute wholesale markets by lending cheaply, against less quality collateral and over

¹⁹ See Glavan/Anghel (2013, 364).

²⁰ Banks have become more interconnected before the last financial crisis. See Barratieri et al. (2016). The general deleveraging after 2008 reduced interconnectivity.

longer terms to banks.²¹ Central banks, moreover, started to purchase from and lend to banks providing them with additional reserves, which grow above the minimum level required. In times of high uncertainty, and a lack of solvent demand, bank held on to these reserves, which in the beginning paid even a small interest. Later, banks started to pay for their excess reserves as central banks introduced negative interest rates. Even then, banks preferred to pay a fee for their excess reserves rather than to finance overindebted agents in a still struggling economy. Overindebted actors themselves did reduce their loan demand. The monetary expansion and creation of excess reserves by central banks compensated for the credit contraction during the Great Recession. As a result, banks hold much higher reserve ratios now than at the onset of the Great Recession.

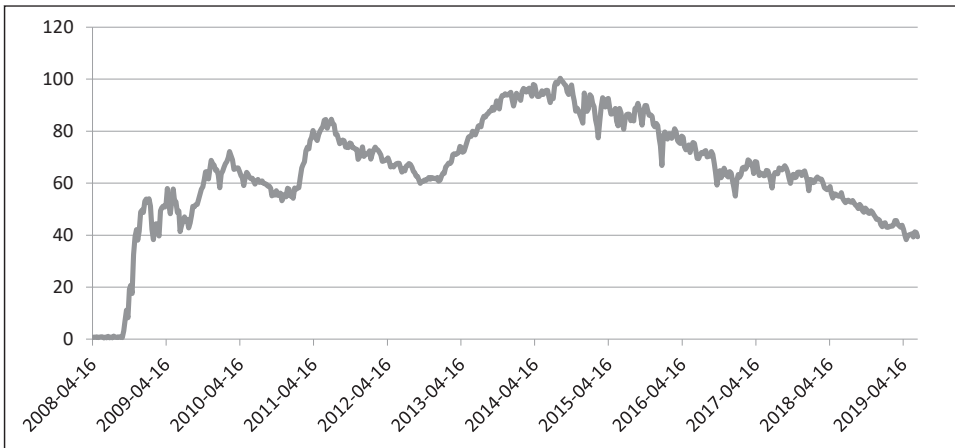


Figure 3: M1 Reserve Ratio of US commercial banks 2008–2019 (Source: Fred)

In 2014 the reserve ratio for the money supply M1 touched the 100 % mark. From this maximum the reserve ration fell to 40 % by 2019. The development illustrates that full reserve banking is not an illusionary policy goal, but was close to be reality in the past.

6 Reforming regulations

The policy implications of our analysis are straight-forward. Capital and reserve requirements do not cure the core of the problem, which is the capacity of banks to create credit out of thin air and operate with fractional reserves. Capital will just evaporate in a recession when banks harvest the losses of malinvestments that they themselves made possible through credit expansion. Similarly, liquidity regulations and reserve ratios below 100 % cannot guarantee the survival of fractional reserve banks if there is no central bank that can create unlimited liquidity. Again note, that the creation of unlimited liquidity comes with important costs, namely moral hazard on part of the banks and more pronounced economic cycles and the possibility of the

21 On the implication for central Banks'balance sheets namely a deterioration of their quality see *Bagus/Howden (2016a)*. On case studies of central banks'balance sheets see *Bagus/Howden (2009)* or *Bagus/Schimi (2010)*.

loss in confidence in the currency itself, when central banks deteriorate the quality of their balance sheet and produce high amounts of money.

In order to eradicate the instability of the banking sector, the root of the problem must be ended, namely the privilege of fractional reserve banking, i. e. the capacity of banks to lend without prior real savings. As all problems ultimately rest in the privilege of banks to create money, the problems will only be solved completely if the privilege ends. With full or 100 % reserve banking, banks' liquidity is always guaranteed.²² Full reserve banks can, by definition, always return the deposits of their clients. No other liquidity ratios imposed by regulators are necessary.

As for the problem of maturity mismatching, there will evolve and have evolved rules for longer maturities, such as the Golden Rule that had emerged on the market.²³ Investment banks engage in excessive maturity mismatching if they are encouraged to do so by a rising money supply (credit expansion) or by government and central bank bailout guarantees (*Bagus (2012)*). Without the moral hazard provoked by government intervention, there is no reason to believe that banks would not be able to manage their liquidity autonomously. There would be no need for prescribed liquidity ratios.

In a full reserve banking system banks' solvency issues do not affect the availability of demand deposits.²⁴ Even if a bank goes bust, it can pay back its depositors. Central banks are no longer needed. Moreover, as the expansion of credit unbacked by real savings becomes impossible the recurring booms and bust, the main source of vulnerability of the banking sector is reduced. In addition, in a full reserve system leveraging is not as attractive because the low cost funding through deposits has become impossible. We can expect higher equity ratios.²⁵ In sum, full reserve banks are always liquid (i. e. can pay out their demand deposits) and insolvency does not affect their capacity to pay their demand deposits. Yet, what happens to interconnectivity?

Interconnectivity is greatly reduced in a full reserve system. Let us go through our six reasons for artificial interconnectivity in current fractional reserve fiat money systems.

First, without the privilege to create new money at virtually zero cost and lend it, balance sheets of banks and the size of the financial sector will be much smaller. The smaller the size of banks, the fewer commercial relations they will have with each other *ceteris paribus*. While it is possible that banks have the same clients in a full reserve world, their reduced size and importance reduces also the number of same clients. It is likely, that banks commercial relations fall overproportional as they do not need each others' support so much with full reserves.

22 A critic might respond that regulatory arbitrage also occurs in a full reserve system. In other words, banks could try to get around full reserve requirements by financial innovation. While this reasoning is correct, it is no argument against the full reserve system, in the same way, that the argument that murderers will try to fool the police is no argument against the prohibition of murder. The judicial system has to be careful with financial innovations and require for all equivalents of demand deposits full reserves. See *Huerta de Soto (2012)*, ch. 9.

23 See *Hübner (1853)* for the "Golden Rule" of banking which consisted in matching maturities.

24 On the meaning of full availability see *Bagus/Howden (2016b)*.

25 Especially, if the central bank is also abolished and governments abstain from saving banks which will be more political feasible, once they become less interconnected. Why banks become less interconnected in a full reserve system we will discuss below.

Second, without credit expansion one reason for indebting oneself ends, namely to be among the first who receive the new money. If the fiat money supply continues to increase, because the central bank or the government produce money directly, then there remains an incentive to incur debt in order to profit from the devaluation of nominal debts when the purchasing power of money falls. Therefore, it is vital to combine the "regulation" of full reserve banking with the elimination of the central banks and the introduction of a commodity standard such as a gold standard. With full reserve banking, central banks are no longer needed to guarantee demand deposits in a full reserve system and can, therefore, be abolished.²⁶ A commodity standard eliminates the government's influence on the money supply. If gold is reestablished as money, we can expect constant or slightly falling prices as the stock of gold historically has increased between 1 and 2 % per year and economic growth has been at the same level or higher. In a world of slightly but continuously falling prices, the fiat incentive to incur debt disappears. An economy in which economic actors are less indebted is less vulnerable to defaults and more robust. The chance of debt default domino effect is lower. Hence, in a commodity full reserve banking system the interconnectivity of banks through debt defaults is reduced.

Third, while banks will still be affected through investments in same asset classes. Yet, as their solvency will be higher, since leverage becomes less attractive, they can withstand price falls better. Banks will also diversify in their investment strategy once banking regulation is disposed off that pushes them currently into certain asset classes, clustering risks.

Fourth, in credit expansion it is important for banks to cooperate in order to not lose reserves. The interbank market is the most important vehicle of cooperation between banks to satisfy short-term liquidity needs, when banks need reserve to comply with the mandatory reserve ratio. In a full reserve system, the interbank market becomes obsolete reducing banks' interconnectivity (*Gertchev (2012)*).

Fifth, in a full reserve system, there cannot occur credit contractions. Credit contractions reducing the money supply and prices sharply are an important indirect connection between banks causing debt deflation spirals. This channel for interconnectivity is impossible in a full reserve system.

Sixth, there still remains the incentive to become "too-interconnected-to-fail", yet it becomes a less viable strategy. This is so, because banks will be smaller in a full reserve system, making their failure more political feasible. As we have seen in the points above, the system is less interconnected, is not vulnerable to bank runs or general banking panics, is likely to have higher equity ratios and therefore more robust. Therefore, in such a system the government can more plausibly assure that there will be no political bail outs. With such expectations, banking strategies to get more interconnected are less likely to occur.

In a full reserve system, the elimination of the too-big-to-fail and the too-interconnected-to-fail problem, the rationale for banking supervision becomes obsolete. There is simply no need anymore to supervise banks in order to protect demand depositors, because depositors can always withdraw their money.

²⁶ It is a myth that one needs central banks to increase the money supply faster than economic growth. An economy can thrive with falling prices. See *Huerta de Soto (2012)* or *Bagus (2015b)*.

7 Conclusion

The peculiarity of banks is that they have the privilege, in contrast to other economic agents, to operate with fractional reserves. The capacity to create money at virtually no costs explains the vulnerability of the banking sector and the economy at large. It explains the artificial large size of the banking sector. The banking sectors artificial interconnectivity is also an indirect and direct result of this privilege. Traditional banking regulation such the Basel regulations only alleviate the symptoms of the privilege, such as low equity ratios or excessive maturity mismatching. Yet, such banking regulation creates new problems in form of unintended consequences such a regulatory arbitrage or concentration of risks. Most importantly, traditional banking regulation does not eliminate the symptoms because it does not go to heart of the problem. Regulators try to alleviate the shortcomings through harsher banking supervision. Yet, there are important knowledge problems in such an approach. Regulators do not have the practical knowledge necessary to operate successful banks. The simplest solution is to eradicate the root of the problem. Establishing a full reserve system, ideally combined with the abolishment of central banks and the introduction of commodity standards,²⁷ makes the economy more robust and eliminates the “too-big-to-fail” and the “too-interconnected-to-fail” problematic. In such a system banking supervision becomes obsolete. It is true that the chances of establishing a full reserve commodity money banking system are rather slim due to vested interests in the current system. Consequently, the strategy to be pursued must be twofold. Firstly, the public must be constantly educated about the advantages of such a system, one of which is to reduce the interconnectivity of banks thereby increasing their stability.²⁸ Secondly, in the short term, a policy of gradual convergence towards the long-term objective should be pursued. The long-term objective serves as a benchmark. This benchmark can be used to assess policy proposals to see whether they are heading in the right direction. Above all, any progress in the right direction that can be made in the short term is very welcome. While a full reserve system may at first sight seem like a distant utopia, we should not forget that with the current excess reserves we are already halfway towards such a system and we should take advantage of the unique situation.

²⁷ For a road map see *Huerta de Soto* (2012), ch. 9.

²⁸ This is not the place to fully describe all the advantages that a financial system based on a full reserve commodity money would have. For an in-depth analysis of the benefits of such a system, including preventing business cycles, promoting sustainable economic growth, reducing the size of the state, promoting peaceful and harmonious cooperation, etc., see *Huerta de Soto* (2012, pp. 745–760). For the costs of such a system and a response to possible objections, see *Huerta de Soto* (2012, pp. 760–787). Suffice it to say that the resource costs of a full commodity standard pale in comparison to the costs of the current fiat money system in the form of banking crisis and business cycles.

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Umdenken der Bankenaufsicht in einer Welt voll Überschussreserven

Als die Subprime-Krise des Jahres 2007 zu größeren finanziellen Problemen führte, wurden zwei Problembereiche im Bankensektor deutlich. Erstens, dass die Bankinstitute in den vergangenen Jahrzehnten viel schneller gewachsen waren als das Bruttoinlandsprodukt. Zweitens, dass die Banken so gewachsen waren, dass das Versagen einer einzelnen hinreichend großen Bank eine Kaskade von Bankenzusammenbrüchen auslösen konnte. Zusammengefasst ließen diese offensichtlichen Fakten die allgemeine Wahrnehmung entstehen, dass die den Finanzsektor dominierenden Banken zu groß geworden waren, um zu scheitern („too big to fail“). Seit 2007 und vor allem durch verschiedene quantitative Lockerungen ist eine Neuerung im Bankensektor zu erkennen – es wurden mehr Reserven gehalten als regulatorisch erforderlich ist. In diesem Beitrag erklären wir zunächst, wie der Bankensektor über einen längeren Zeitraum hinweg schneller wachsen konnte als die Gesamtwirtschaft und warum die Banken in einem Maße miteinander vernetzt waren, wie es in anderen Branchen nicht der Fall war. Zweitens bieten wir eine Lösung für diese Besonderheiten unter Verwendung der bestehenden überschüssigen Reservesalden und zeigen so, dass verschiedene stückweise bestehende Regelungen durch eine einfachere Norm ersetzt werden können. Das Ergebnis ist, dass das Bankgeschäft mit anderen Branchen standardisiert wird und dass eine Kerneigenschaft des heutigen Bankensektors – große und hoch vernetzte Unternehmen – demotiviert wird.

JEL-Classification: G18, G21, G2