



WORKING PAPERS SERIES
DIPARTIMENTO DI
SCIENZE SOCIALI ED ECONOMICHE
n. 3/2017

Banking theories and Macroeconomics

Author/s:

Antonio Bianco, Claudio Sardoni

Banking theories and Macroeconomics.

A. Bianco and C. Sardoni, *Department of Social and Economic Sciences (DISSE), Sapienza University of Rome*

ABSTRACT. The recently expanding macro-financial literature is facing the analytical challenge to analyse the working of modern market economies without losing touch with the factual role played by financial institutions. Mainstream macroeconomic models that embody a financial sector are characterized by the understanding of banks as intermediaries of loanable funds (deposit-taking paving the way for loan extension). This approach to banking is increasingly considered as a major flaw in macroeconomic thinking. The Post-Keynesian theory of inside money creation is gaining momentum even in mainstream circles. The present article highlights the key differences of these alternative doctrines from a money supply perspective, so to stress the key aspects of the monetary dimension of the so-called financial cycle and the fact that monetary policy alone has no impact on aggregate expenditure.

JEL codes: E44; E51

Keywords: Financial Cycle; Money Supply; Banking; Inside Money; Liquidity Risk.

1. Introduction

In recent decades, mainstream macroeconomics was characterized by the underestimation of the macroeconomic relevance of financial contracts, debt, the possibility of defaults, etc. For many,¹ this was a major flaw. There exist alternative theoretical approaches, in particular the Post-Keynesian one², which have always given money and finance a key role for understanding the actual working of the economy. We take these alternative views into consideration only indirectly, and to the extent that some contributions within the mainstream have come to take similar positions.

Important attempts to embody credit and finance into macroeconomic models appeared before the eruption of the 2007-8 crisis (Kiyotaki and Moore, 1997; Bernanke et al., 1999). A growing urge to take into serious account the role of credit and financial markets has taken steps only in the very last decade, though. The view that macroeconomics and its policy indications are largely irrelevant, if not counterproductive, if they

¹ See, e.g., King, 2012; Goodhart and Tsomocos, 2011; Goodhart et al., 2013; Borio, 2014a, 2014b. Turner (2014, p. 174) has argued that, while incorporating sticky prices and wages, standard New Keynesian models ‘largely failed to reflect the perhaps still more important rigidities introduced by debt contracts, debt stock levels, and default processes.’

² For a survey of the Post-Keynesian approach to these topics see, e.g., Lavoie (2014, pp. 182ff).

ignore the financial and credit sector, is now common ground. Once credit and finance are embodied into the macroeconomic model, the analytical results obtained can be significantly different from those that ‘real’ models yield.

In Section 2, we review a number of mainstream macroeconomic models that, in a way or another, embody a financial sector. Free from all pretence of exhaustiveness, the section aims at pointing out some basic features of these models, in particular their shared view of banks as intermediaries of loanable funds. Section 3 focuses on the money multiplier doctrine so as to take a closer look at how banking intermediaries are assumed to operate.

Influential authors are taking issue with standard macroeconomic models in general and their view of banks in particular. The Head of the Monetary and Economic Department at the Bank for International Settlements is an eminent example. In complaining about conservative modelling strategies in new models of the financial cycle, Borio (2014a, pp. 186–7) calls for non-equilibrium approaches for taking into account the main facts of the financial cycle: fluctuations are driven by endogenous forces; busts are a symptom of stock disequilibria on the side of liabilities (equity and debt) that operate sequentially; stable inflation does not prevent the build-up of financial imbalances. In order to properly consider intra-temporal and inter-temporal coordination failures as the basic drivers of financial and business cycles, Borio recommends the rejection of model-consistent expectations, the introduction of a state-varying risk tolerance and last—but ‘arguably more fundamental’ step to take, stop considering banks as intermediaries: ‘the banking system does not simply transfer real resources ... from one sector to another; it generates (nominal) purchasing power. Deposits are not endowments that precede loan formation; it is loans that create deposits’ (Borio, 2014a, p. 188).

Similar concerns echoed from the Bank of England (McLeay et al., 2014a, 2014b; Jakab and Kumhof, 2015). Among other things, an erroneous view of the nature of banks leads to significantly underestimate the procyclical effects of changes in bank lending on the real economy (Jakab and Kumhof, 2015).³ In Section 4, we examine the alternative view of banking in more detail. If money is created when banks lend, the extent to which the money supply is larger than the monetary base critically depends on the investors’ willingness to borrow (‘animal spirits’). This has evident and important implications in terms of policy indications. Section 5 is devoted to these aspects.

³ The loanable funds model, on the other hand, predicts lending will be countercyclical, balancing out what is happening in the economy. In addition, Jakab and Kumhof (2015) suggest banks will react to adverse circumstances by cutting back on lending rather than just charging more interest, as the mainstream models expect.

2. Credit, finance and banking in recent macroeconomics

Mainstream economists are increasingly conscious how ill-founded are their works that fail giving due attention to the interrelation between financial markets and institutions and the ‘real’ economy. Yet, it would be inaccurate to hold that, before the crisis, mainstream macroeconomics ignored the role of credit markets and their interactions with the real economy altogether. Two significant pre-crisis contributions were Kiyotaki and Moore (1997) and Bernanke et al. (1999) to name a few.

The financial accelerator of Bernanke et al (1999) is a New-Keynesian dynamic stochastic general equilibrium (DSGE) model. This approach is characterized by the role played by imperfections (frictions) in the real sector; Bernanke et al. put in place a role for imperfections in financial markets, too.⁴ A central hypothesis is that both the amount and the cost (external finance premium) of borrowed funds depend on the dynamics of the entrepreneurs’ net worth (Bernanke et al., 1999, pp. 1347-8). This is captured by assuming that the external finance premium is a *key* driver of fluctuations in financial and real activities (credit, investment, production, etcetera) and changes in the external finance premium are inversely related to changes in borrowers’ net worth (profits and asset prices). Given this setting, financial intermediation does accelerate the business cycle.

Like Bernanke et al. (1999), Eggertsson and Krugman (2012)⁵ focus on borrowers’ (firm-level) frictions⁵. They consider two different kinds of agents heterogenous in time preferences: a patient agent (lender) and an impatient agent (borrower). The amount of funds available to borrowing is limited. The model analyzes the effects produced by a change, in particular a decrease, of that limit, in consequence of which borrowers are forced to deleverage. The deleveraging brings about a fall in the interest rate. A ‘liquidity trap’ can arise if the decrease of the debt limit is large enough so as to make the interest rate negative.

Woodford (2010) focuses on the role of financial frictions in determining an inefficient supply of credit. In a world without financial frictions, savers lend to intermediaries at the same interest rate that intermediaries apply to final borrowers. In the real world, however, the external finance premium is positive and fluctuating. This is mainly due to intermediaries’ limited ability to leverage their positions: intermediaries react to positive (negative) changes in net worth—and thereby equity, by intensifying (lessening) their

⁴ For a survey of the literature on financial frictions, see also Brunnermeier and Eisenbach (2012).

⁵ In their analysis, Bernanke et al. do not address the problem of the role of bank-level frictions even though, when outlining possible developments and extensions of their work, they mention the possibility of letting also the net worth of the banking sector play a relevant role. In this case, an intermediaries’ borrowing constraint would be added to the final debtors’ borrowing constraint.

‘supply of intermediation’ (Woodford, 2010, p. 32). In a nutshell, Woodford proposes a financial accelerator due to bank-level frictions based on intermediaries’ equity.

In the three models considered above, financial markets are characterized by the existence of frictions and imperfections. Bernanke et al. (1999) and Eggertsson and Krugman (2012) concentrate on the analysis of the effects of changes in the borrowers’ net worth (firm-level frictions); Woodford looks at the fluctuations of the lenders’ net worth (bank-level frictions). In all cases, however, financial intermediation is considered in very general terms, without providing any distinction between different intermediaries and, in particular, without paying much attention to commercial banks.

Boissay et al. (2016) take a closer look at the financial sector. They consider banks that are heterogeneous in efficiency (costs of intermediation) and are subject to moral hazard and asymmetric information. Less efficient banks lend to the most efficient ones; in turn, efficient banks lend to firms. In a frictionless world, all inefficient banks would lend to the efficient ones: lending to firms would be maximum and the economy would reach a first best in asset allocation. Frictions hamper the attainment of the optimum by making banks adopt a ‘storage technology’⁶: a portion of savings is not directed to firms and a crisis takes place.⁷

In the new edition of their macroeconomics textbook, Carlin and Soskice (2015, pp. 183-221) take into account the financial sector by considering two types of banking activities: *i*) commercial banking, based on the provision of core services; *ii*) investment banking, focusing on non-core financial services. The former—that corresponds to the *banking book* of a universal bank, is associated with loan extension, fair value evaluation, and risk aversion; the latter—corresponding to the *trading book*, is connected with origination-and-trading of debt securities and financial derivatives, mark-to-market evaluation, and risk neutrality.

Drawing on the work of Tobias Adrian and Hyun Song Shin (Adrian and Shin, 2009; Shin, 2010), Carlin and Soskice present a model of the financial cycle based on banks’ risk-taking and trading book. The model captures the dramatic increase in banks’ leverage during the 2000s, in particular for investment banks; the interaction between the financial accelerator and asset price bubbles; the rise of markets for asset-backed securities. The model focuses on two classes of agents: active and passive investors, say investment banks and pension funds, respectively. Both groups carry the burden of demand in the secondary market for MBS,

⁶ This technology is inefficient because its rate of return is lower than the rate borrowers would pay.

⁷ Boissay et al. single out two possible triggers of crises. The first occurs when the economy is hit by a negative productivity shock, namely a decline in banks’ capacity to raise savings. The second trigger is of endogenous character: high growth brings about an excess of household supply of savings over banks’ absorption capacity, which in its turn activates the first kind of trigger (Boissay et al., 2016, p. 20).

the price of which is determined by demand and supply. Assume active investors adopt a leverage-targeting strategy and mark to market.

The key driver of the financial cycle is the perceived risk on MBS holdings. When agents are more optimistic about MBS risk, active investors try to buy MBS from passive investors. Actives' demand for MBS is only limited by their equity value and ability to borrow from passives what they need to stick to their targeted leverage. Typically, when MBS risk declines pension funds are more inclined to lend to investment banks, so that equity plays the role of the key constraint. In a nutshell, the idea is that actives borrow from passives in order to buy passives' holdings of MBS. This results in MBS price inflation (asset price bubble) which results in capital gains and thereby an increase in the value of actives' equity and hence a fall in actives' leverage constraint. The MBS price inflation (bubble) thus creates more demand for MBS (financial accelerator), which in its turn stimulates more MBS price inflation, and so on, in a bubble-accelerator circle. All this picture of course is reversed by an reversal of expectations about MBS riskiness.

This picture of the financial cycle quite well reflects other more complex and detailed contributions. Adrian and Shin (2011) show how the pervasiveness of leveraged intermediaries, which are different from ordinary banks and drive the financial cycle, calls for a different interpretation of the transmission process of monetary policy and, in particular, of the way how variations of the short-term rate affect the whole economy (risk-taking channel of monetary policy). Gertler et al (2016) argue that wholesale banking is at center-stage of financial crises, while retail banks remain substantially stable.

All these models, just like many others not considered here, have an important feature in common: all banks, either commercial or investment banks, are regarded as intermediaries. All financial intermediaries have to borrow from somebody in order to lend. Retail banks borrow from households; investment banks mainly borrow from other financial institutions. This view of the nature of banks is the mainstream since the work of Tobin (1963), in its turn largely inspired by Gurley and Shaw (1960).

Tobin's main objective was to criticize and reject the idea that banks are able to create money out of 'thin air'. His position was based on the downplaying of the distinction between money and other financial assets and, consequently, the distinction between banks and other financial intermediaries. In Tobin's view, all kinds of intermediaries simultaneously satisfy the portfolio preferences of two classes of agents, patient and impatient. The only relevant difference between banks and other intermediaries would be that the former take more liquid liabilities (demand deposits) that, from a money demand perspective, are perfect substitute of currency. For Tobin, savings allocation depends on the relative yields of deposits and alternative assets. When the yield of non-deposit securities is low, banks have scarce profitable lending and investment opportunities available. This view is consistent with the view of banks as intermediaries. Banks can lend to

the extent they can borrow from depositors. At the margin, the cost of borrowing equates the return on lending. In this respect, there is no difference between banks and other intermediaries.

Considering all banks as mere intermediaries has important theoretical implications. The theory underlying such a view of banks necessarily is that of the loanable funds (see, e.g. Robertson, 1934 and, in critical terms, Keynes, 1937).⁸ If imperfections and frictions were assumed away, considering or not financial intermediaries would be of no theoretical and analytical relevance: intermediation is an unnecessary complication.⁹ Frictions and imperfections prevent ultimate savers from directly lending to ultimate borrowers, and financial intermediation plays a non-trivial role because external finance is more expensive than internal finance. This is due to a costly state of verification: lenders pay an auditing cost to observe borrowers' realized returns (Townsend, 1979).

3. The money multiplier and the IOM banking theory.

What is the relation, if any, between a volume of monetary base—currency and central bank *reserves*, and a (normally much) broader amount of money supply—currency and bank *deposits*? This question is key to all possible understanding of the monetary dimension of our economic systems. The theory of the deposit multiplier—or money multiplier (MM hereafter) provides a widely accepted answer: base money carries the weight of the money supply.

The MM doctrine is based on the view of banks as intermediaries of loanable funds in a 'fractional reserve' environment:

- i. 'Loanable funds' typically consist of means of payment one cannot refuse to accept in either non-interbank or interbank transactions, that is currency and central bank reserves, respectively. As legal tender, base money is a liability of the public sector. Being originated 'outside' the private banking sector, base money is also called *outside money*;
- ii. Banks are seen as *deposit-taking* financial corporations: entities that 'have financial intermediation as their principal activity. To this end, they have liabilities in the form of deposits or financial instruments (such as short-term certificates of deposit) that are close substitutes for deposits' (SNA2008, §4.105);

⁸ However, as pointed out by Lindner (2015), it is not easy to find recent works in which the acceptance of the theory of loanable funds is explicitly stated.

⁹ Reliance on the loanable fund theory is obvious in models with no intermediation like Eggertsson and Krugman (2012) and Eggertsson and Mehrotra (2014).

- iii. Bank deposits are typically *reservable* in that depository institutions are obligated to maintain reserves against them in the form of deposits at the central bank.

Following an established pedagogic tradition (e.g., Samuelson and Nordhaus, 1995; Blanchard and Johnson, 2013; Cecchetti and Schoenholtz, 2015), let us briefly expose in accounting terms the MM doctrine by assuming that banks neither pay nor charge any interest to counterparties. The MM story starts with a bank borrowing an amount S of outside money.¹⁰ We gain in simplicity of intuition without losing in generality of argument if we assume that the bank is borrowing currency (CUR). The bank is compelled to hold a fraction ($0 < \varphi < 1$) of its borrowings in central bank reserves (CBR). After that, bank lend out ‘excess’ ($1 - \varphi$) reserves and take possession of a final borrower’s promise to pay called ‘loan’ (LOA). The final borrower borrows in order to spend, so borrowed funds eventually are re-borrowed by a bank and a subsequent intermediation cycle can start. Table 1 captures the accounts relative to a i^{th} intermediation cycle and, more in general, the view of bank lending as intermediation of loanable funds subject to a fractional reserve rule. As the circulation of loanable funds can take many forms, let us consider a simple direct transfer of loanable funds from final borrowers to new depositors, and neglect the parallel transfer of the assets the final borrower has purchased by the new depositor. In this last passage we deflect from the quadruple entry principle, but this shortcut is irrelevant to the coherence of the money multiplier doctrine.

¹⁰ Providers of loanable funds match that outflow with a claim on the deposit-taking corporation called deposit. Differently from standard debt securities, bank deposits are generally accepted means of payment. That is why agents typically hold deposits as either transaction requirement or reserve assets, and hold other debt securities as investment assets.

Table 1

	Depositors		Banks		Borrowers		Central Bank	
	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$
<i>deposit-taking</i>								
cbr								
cur	$-(1-\phi)^{i-1}S$		$(1-\phi)^{i-1}S$					
dep	$(1-\phi)^{i-1}S$			$(1-\phi)^{i-1}S$				
loa								
cnw		\emptyset		\emptyset				
<i>reserve-fractionating</i>								
cbr			$\phi(1-\phi)^{i-1}S$				$\phi(1-\phi)^{i-1}S$	
cur			$-\phi(1-\phi)^{i-1}S$				$\phi(1-\phi)^{i-1}S$	
dep								
loa								
cnw				\emptyset				\emptyset
<i>bank lending</i>								
cbr								
cur			$-(1-\phi)^i S$		$(1-\phi)^i S$			
dep								
loa			$(1-\phi)^i S$			$(1-\phi)^i S$		
cnw				\emptyset		\emptyset		
<i>borrowers' spending</i>								
cbr								
cur	$(1-\phi)^i S$				$-(1-\phi)^i S$			
dep								
loa								
cnw		$(1-\phi)^i S$				$-(1-\phi)^i S$		

For sake of accounting simplicity, the MM doctrine is generally exposed with the assumption that intermediation cycles repeat indefinitely; Table 2 captures the accounts coming out of the sum of infinite subsequent intermediation cycles under the further simplifying assumptions that new depositors deposit the whole sum they receive from final borrowers and banks always lend to the maximum possible extent.

Table 2

	Depositors		Banks		Borrowers		Central Bank	
	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$	Δ_{ass}	$\Delta_{\text{liab/n.w.}}$
cbr			S				S	
cur	$-S$		\emptyset		\emptyset		$-S$	
dep	$\phi^{-1}S$			$\phi^{-1}S$				
loa			$\frac{1-\phi}{\phi}S$			$\frac{1-\phi}{\phi}S$		
c.n.w.		$\frac{1-\phi}{\phi}S$		\emptyset		$-\frac{1-\phi}{\phi}S$		\emptyset

Table 2 captures in accounting terms the main features of the MM doctrine:

- The MM process leaves the volume of base money (CUR+CBR) unaltered:* by the end of the multiplication process, the central bank has retired an amount of currency equivalent to the sum deposited at the beginning of the first intermediation cycle (S); the monetary base is unaffected as the central bank issues an equivalent amount of bank reserves, too. On these grounds, the MM doctrine regards the volume of base money as an independent (exogenous) variable of the volume of money supply;
- The (indefinite) reiteration of intermediation cycles results in a ϕ^{-1} -fold multiplication of savings (base money) into deposits (money supply) that takes place when banks *borrow*;
- This deposit multiplier process relies on depositors' willingness to hold bank money, rather than outside money, in reserve—that is on depositors' confidence in the *solvency* of banks, not on the *liquidity* of bank money per se (which is ideally never in question).

Textbooks are used to tell the same MM story in a monetary policy perspective: central banks issue new bank reserves when purchasing debt securities from counterparty banks on the secondary market. After that, central counterparties find themselves with an extra amount of 'excess' reserves available to finance new lending operations, and a process of money multiplication can thereby follow. In this case, the MM process is based on outside money as central bank reserves rather than currency (as ours). Either way, a definite assumption is fundamental to the MM doctrine—'Individual banks can't make loans that exceed their excess reserves' (Cecchetti and Schoenholtz, 2015, p. 465). Excess reserves consisting in outside money that the banks have mostly *borrowed*, the MM story is based on the view of banks as *intermediaries* of outside money (IOM).

4. The OIM view of banks.

When he claims that ‘Deposits are not endowments that precede loan formation; it is loans that create deposits’, Borio is referring to a long-established approach to the theory of banking antithetical to the IOM theory and characteristic of Post-Keynesian economics. Its origins trace back to by Henry Dunning Macleod’s intellectual reaction, in mid-19th century, to the banking doctrines of Sir Robert Peel. Since then, the consensus around the approach à la Macleod has been stronger among practitioners and central bankers than academic economists. As it happens, the first New-Keynesian DSGE model to embody this alternative approach has been devised in joint work by an economist at the International Monetary Fund and another at the Bank of England:

In the real world, the key function of banks is the provision of financing, or the creation of new monetary purchasing power through loans, for a single agent that is both borrower and depositor. Specifically, whenever a bank makes a new loan to a non-bank customer X, it creates a new loan entry in the name of customer X on the asset side of its balance sheet, and it simultaneously creates a new and equal-sized deposit entry, also in the name of customer X, on the liability side of its balance sheet. The bank therefore creates its own funding, deposits, in the act of lending. And because both entries are in the name of customer X, there is no intermediation whatsoever at the moment when a new loan is made. No real resources need to be diverted from other uses, by other agents, in order to be able to lend to customer X. What is needed from third parties is only the acceptance of the newly created purchasing power in payment for goods and services. This is never in question, because bank demand deposits are any modern economy’s dominant medium of exchange, in other words its money. (Jakab and Kumhof, 2015, p. 3)

The key tenet of this alternative theory of banking is that, in the act of lending, banks originate inside money (OIM hereafter). Inside money is purchasing power originated by private monetary institutions. Statistically speaking, it amounts to 97% of money supply (McLeay et al, 2014b, p. 15). The OIM process is the same as outside money: non-central banks fund their lending operations not with excess reserves, but by creating new purchasing power through origination of brand new deposits (inside money) that the public holds to be as good—in terms of market and funding liquidity, as central bank liabilities (outside money). Therefore, the single commercial bank extends a loan by simply crediting the borrower’s deposit account of the principal value of the credit. In doing so, the single bank *i*) creates its own funding—‘The business of Banking chiefly consists in buying debts by creating other debts’ (Macleod, 1866, p. 46), and *ii*) has a direct impact on money supply.

A bank lending transaction consists in the swap of a bank’s obligation to *immediately* pay $(1 - \lambda)D$ in exchange for the borrower’s obligation to repay D *at a future time*. Clearly, λ is a discount factor applied on

the face value D of the borrower's obligation, so that $(1 - \lambda)D$ is the debt principal and λD is interest—with $1 - \lambda = (1 + l)^{-1}$, where l is the interest rate the borrower acknowledges to the bank.¹¹ That in banks' balance sheets the acquisition of new assets/loans is not matched by a withdrawal of excess assets/reserves but by the origination of new liabilities/deposits is precisely what is meant when saying 'Deposits are not endowments that precede loan formation; it is loans that create deposits'.

Under this approach, two categories of bank deposits should be distinguished: *i*) deposits backed by outside money, i.e., connected with a depositor/creditor's placements of funds; *ii*) deposits backed by loans¹², i.e., originated by the bank in its lending transactions. Only the latter kind of deposits is what the term 'inside money' is what is referred to (McLeay et al, 2014a, p. 12). Having this in mind, let us stress that at the heart of this OIM interpretation of bank lending lies a *mutual indebtedness* (debtor-debtor) relation between 'lender' and 'borrower', not the standard creditor-debtor relation (Kim, 2011; Sgambati, 2016) as with deposits backed by outside money and the standard IOM view of bank lending. In this sense, Mehrling (2011, p. 72) argues that 'the essence of banking is a swap of IOUs'.

A second key aspect to take notice of in order to understand the role that monetary policy plays in the macroeconomy via a broad credit channel is that the cornerstone of analysis is no longer saving (S), but debt (D): it is not the depositor, but the bank itself to originate the deposits, and it is not the bank, but its customer to originate the loan. As a rule, *one can only originate her own liabilities*. This principle implies that the creation of inside money, which accounts for almost the whole of the excess of money supply over the monetary base, does essentially rely on bank customers' willingness to borrow, not on banks' willingness to lend. As a consequence, fractional reserve and depositors' confidence in the solvency of banks no longer hold the stage in explaining the essential dynamics of money supply. It is bank customers' soaring confidence in long-term prospects ('animal spirits') the necessary and sufficient condition for an expansion in (narrow) money supply as measured, e.g., by the MZM aggregate in UK, or the M1 aggregate in EU.

It could seem to be an astonishing consequence of the OIM theory that banks face no limit to the creation of inside money. Actually, that's not the case. The fact that creation of inside money is not constrained by existing loanable funds does not mean that banks are not constrained at all. To see this, let us assume that the bank extends a loan in favour of a customer who aims at buying an existent real asset—say a piece of real

¹¹ In national and business accounting, fair value conventions (SNA2008, 13.62; IFRS09) recommend to evaluate credits as the sum of principal outstanding and interest earned (though not paid). This means that the *initial recognition* of a bank lending transaction ends in a quadruple entry: the bank holds an extra amount $(1 - \lambda)D$ of assets/credits and an equal-sized extra amount of liabilities/deposits; the borrower, vice versa, holds an extra amount $(1 - \lambda)D$ in liquid assets/deposits and an equal-sized extra amount of liabilities/loans.

¹² Or debt securities and all that is non-outside money.

estate (RE). By laying out the accounting structure of the impact of the customer's expenditure, Table 3 hints to the general rule that transfers of bank money (changes in banks' liabilities) are matched by changes in the bank's holdings of central bank reserves (changes in assets): soon after a bank creates inside money, it experiences an equivalent decline in its CBR holdings (outside money).

Table 3

	RE seller		seller's bank		buyer's bank		RE buyer	
	Δ assets	Δ liab/n.w.						
cbr			I		$-I$			
deposits	I			I		$-I$	$-I$	
RE	$-I$						I	
c.n.w.		\emptyset		\emptyset		\emptyset		\emptyset

This means that, in creating inside money, the bank is likely to end improving its net worth; yet, before earning any interest, the bank worsens the liquidity of its position. If its lending behaviour is imprudent, the bank takes a chance to end with too little CBR holdings to settle interbank payments. The real cost that the bank bears to create liquidity is an increase in *liquidity risk*—the risk to be in short supply of reserves in case risks of unanticipated payments do materialize. A classic instance of liquidity risk is referred to depositors' *runs*, that is when banks can raise base money at a slower pace than clients demand to redeem deposits; another classic instance risk is when bank loans underperform, in which case liquidity risk is driven by credit risk. As it happens, at the heart of Minsky's financial instability theory lies the notion of credit risk as a special case of a broad-ranging liquidity risk—a risk of not being able to refinance position (Mehrling, 1999).¹³

Liquidity risk is the fundamental endogenous constraint on inside money creation¹⁴. The need to manage liquidity risk associated to inside money creation provides banks with a robust incentive to raise and avoid leaks of outside money. Banks can manage the liquidity risk in several ways:

- i. *Bank Mergers*. Table 3 suggests that when the bank of the buyer and the seller of the asset whose purchase is financed with borrowed funds is the same, that bank does not experience an outflow of

¹³ de Boyer des Roches (2013) reviews the wide range of analyses among classical economists regarding the bank liquidity risk.

¹⁴ This claim is in line with Fontana's suggestion for generalising Post-Keynesian (Horizontalist and Structuralist) analyses of endogenous money (Fontana, 2009) based on a 'continuation theory' approach à la Hicks (Fontana, 2004). Hicks's continuation theory consists in a sequential approach to economic dynamics based on transaction costs, liquidity constraints, and expectations formation (Bianco, 2016).

reserves and hence an increase in liquidity risk. Merging banks reduce the probability that their inside money creation results in an outflow of central bank reserves;

- ii. *Interbank borrowing.* Banks can borrow reserves from other banks with ‘excess’ reserves (interbank market). Mutatis mutandis, the principles of interbank lending are essentially the same as those of ordinary refinancing operations, lending of last resort and repo financing. In all these cases, the issue arises as to whether the borrowing bank and national accountants would better classify the corresponding liability as deposits or loans (Sola, 2004);
- iii. *Originate-to-hold deposits.* Another strategy of liquidity risk management relates to the simple fact that banks borrow outside money, e.g. from households (deposit taking). Until banks *hold* the liabilities/deposits so originated (depositors do not withdraw deposits), banks hold the funds thereby gathered and hence keep themselves in a better position to manage liquidity risk;
- iv. *Originate-to-distribute debt securities.* Alternatively, banks can raise funds by originating liabilities/debt securities to distribute (sell) so as to acquire outside money directly from purchasers, or indirectly from their banks. A notorious instance of the OTD approach to liquidity risk management is the securitization of assets. In this case, banks pledge the value of their assets/loans (which, it is worth to remember, is typically expected to increase with interest maturation) as collateral of an asset-backed debt security (ABS) and raise liquid funds by distributing (selling) the ABS on the market. Since the discount factor the market applies does essentially rely on the perceived (market) liquidity of the ABS, such an operation takes place with the agency of a financial vehicle corporation so as to rule out the possibility (feared by ABS buyers) that the income from collateral is used to satisfy other creditors’ claims.

As far as macro-modelling is concerned, it is interesting to notice that whereas the IOM interpretation of banking entails a horizontal integration of the financial system (all financial entity is an intermediary), the OIM interpretation favours a vertical integration: the financial system is interpreted as a great bank (S122) which incorporates such entities as money market mutual funds (S123) and ‘other financial intermediaries’ (S125). Interestingly, a recent *Global Financial Stability Report*, the IMF (2014) puts forward an ‘activity’ concept and measure of shadow banking based on the distinction between ‘core’ (deposits) and ‘non-core’ (debt securities and loans) liabilities (Shin and Shin, 2011; Harutyunyan et al, 2015),¹⁵ with shadow banking being associated to the issuance of the latter.¹⁶ Differently from other approaches to shadow banking based

¹⁵ Its proponents, however, adopt a IOM approach to banking.

¹⁶ Harutyunyan et al (2015) point out that the non-core liabilities measure can be constructed either gross or net of intra-shadow banking system (SBS) balance sheet positions. In the former case, we have a broad measure of the SBS; in the latter, a narrow measure: these measures complement each other and can be interpreted as the upper and the lower bounds of the estimated size and interconnectedness of the SBS in a given country (or country grouping). The broad measure can be especially useful for financial stability assessment purposes.

on the characteristics of financial entities, and much the same as our suggested interpretation of the OTH/OTD duality, this activity-based concept seems to be especially suitable for devising parsimonious macroeconomic models.

5. Theoretical and policy implications.

Recent experience has stimulated research on the financial factors at play in macroeconomic dynamics. Beside refinements and updates of firm-level and bank-level frictions in otherwise standard approaches to banking and macro-modelling, increasing attention is being directed to reconsidering fundamental issues as the very nature of bank lending, thereby laying the grounds for a revival of the OIM approach. Considered after the lending event, the IOM and OIM approaches to banking do not seem to differ much. If it is admitted that the borrower does unfalteringly spend her credit, whether the bank raises reserves before or after the fact may seem to be a mere matter of a different perspective over the very same thing.¹⁷ Yet, with the IOM theory of banking we are left with a merely notional doctrine of money supply (Carpenter and Demiralp, 2012) and overlook that liquidity risk management is a basic concern for banks: the MM doctrine of money supply tacitly rules liquidity risk out by the IOM root-hypothesis that banks can only make loans out of ‘*excess*’ reserves.

Monetary policy must accommodate counterparties’ demand of reserves for disorderly liquidity risk is liable to disrupt the payment systems as in the US 1907 crisis. It was in consequence of that crisis that the Federal Reserve was instituted in 1913. Since then, Bagehot’s wisdom—the necessity of central banking and its lending of last resort function, reached the other side of the Atlantic. As the public confidence in the bank-based payment system is necessary, supply of *base* money needs be ‘endogenous’ (demand-led). By corollary, there is no link between levels of the policy rate and amounts of bank reserves. This ‘decoupling principle’¹⁸ does not alter the fact that all form of liquidity risk management is costly and, as such, affects bank profitability, so that banks may display a tendency to underestimate liquidity risk in very profitable conditions and, vice versa, overestimate it in slightly profitable ones.

A key corollary of the OIM approach to banking is that saving—a residual flow magnitude that sequentially adds to loanable funds, does not constitute an effective constraint on the macroeconomic performance. From a purely monetary perspective, that constraint is rather the state of entrepreneurs’ long-term expectations: the cornerstone of macroeconomic analysis is debt (liability), not saving (asset). The financing constraint is other

¹⁷ It is having this symmetry in mind that we propose here the terminology IOM/OIM.

¹⁸ Borio and Zabai, 2016, p. 3.

than the resource constraint; in the IOM perspective the financing constraint is a resource constraint. Expanding on their actual difference, Lindner (2015) argues that changes in interest rates do not depend on excess saving and that the post-war version of the idea that saving does finance investment is likely to stem from the invalid application to a monetary economy of non-monetary neoclassical growth models (Ramsey 1928; Solow 1956; Diamond 1965). Building on the difference between saving and financing, Borio and Disyatat's (2015) challenge popular analytical frameworks in international finance based on current accounts and net capital flows (Feldstein and Horioka, 1980; Lucas, 1990).

In presenting the OIM approach, we point up the role of long-term expectations of entrepreneurs in feeding a monetary process subject to the endogenous entropy of liquidity risk. The financing constraint is other than the resource constraint and is endogenously determined—essentially depends on entrepreneurs' willingness to finance investment by originating final debt which, in its turn, depends on expectations about consumers' willingness to spend (effective demand). In a nutshell, within the OIM approach to banking and money supply the macro-monetary dynamics is dominated by final debtors' expectations about the sustainability of their debt. This point leads us straight to the head-on issues of the financial cycle raised by Borio (2014, p. 186-7) that the mainstream has failed to address and that we have recalled in the introduction: *a*) cycles are driven by endogenous forces; *b*) busts are the sequential result of coordination failures; *c*) sustainable output and non-inflationary output are separate concepts.

By definition, debt commitments apply to a plurality of periods. While attending to development goals, debt and investment plans originate sequences of information and transaction costs that increase the exposure of the system to the costs of managing negative unpredicted events: the boom sows the seeds of the subsequent bust. When entrepreneurs turn bearish, they are still coping with the costs directly or indirectly associated to bullish debt commitments. In the downturn of the cycle, banks attach greater weight to liquidity risk pending on their balance sheets: it is harder for entrepreneurs to have credit to refinance *extant* debt positions at the time it is most needed. More than this, however, the downturn in aggregate expenditure makes entrepreneurs' prospects about the sustainability of their *new* debts highly uncertain if not overtly pessimistic. The double coordination issues of entrepreneurs—with banks for extant debt, and consumers for new debt—culminates in a depressive vicious circle that can only be broken by 'exogenous' positive shocks in aggregate expenditure. In the given situation, such a shock can only come from fiscal policy.

One may be tempted to think of the given situation as one of a liquidity trap. Yet, the stimulus that central bankers policy alone can give to boost credit is at best indirect. Monetary policy implementation measures can be divided into 'conventional'—interest rate policies, and 'unconventional'—balance sheet policies (Borio and Zabai, 2016). In the former case, monetary policy can impact only on the cost to manage liquidity risk, not on entrepreneurs' debt sustainability expectations. More in general, interest rates play a marginal role in final debtors' expectations about the sustainability of their debt (Hicks 1989, ch. 13). The same

applies to ‘credit policy’ (a kind of balance sheet policy), with which central banks ease the private sector financial conditions.¹⁹ When, for example, the central is accepting a wider gamut of eligible assets as collateral for refinancing operations, it is essentially acting as a market maker so to keep asset prices higher and banks more liquid than they would otherwise be.²⁰ An impact on entrepreneurs’ debt sustainability expectations is unlikely.²¹ Monetary policy alone can do nothing to stimulate aggregate expenditure.

Post-crisis balance sheet policies could and indeed did prevent collapses in the payment system induced by liquidity crises. Their actual impact on output and inflation appears to be third- if not fourth-rate. It couldn’t be otherwise: the decoupling principle between base money and the policy rate points to, by corollary, a parallel decoupling between base money and (consumer) price inflation. In the last ten years, the stock of outstanding bank reserves (‘deposit liabilities’) issued the Eurosystem vis-à-vis euro area monetary and financial institutions (MFI) has increased by a factor of ten. In the period 1999–2007, the volume of outstanding reserves was stable at about 0,3T€. Following the first symptoms of disorder in US MBS markets,²² reserves dramatically increased, peaking 3,31T€ in August 2012, than plummeting at 1,42T€ in July 2014 and the climbing up again at (partial datum) 3,01T€ in August 2016²³. This four-year V-shaped figure of bank reserves is particularly instructive inasmuch as it is combined by a level of the HICP²⁴ stuck fast at 100: neither a 50% cut in reserves, nor a 100% increase, had any impact on inflation. These data confirm the theoretical notion, based on a OIM approach to banking, that base money is decoupled not only from the policy rate but also the price-level.

¹⁹ Central banks try to do so by modifying the discount window facility; lessening collateral, maturity and counterparty terms on central bank operations; acquiring private sector assets (commercial paper, ABSs, bonds, and even equities).

²⁰ In their investigation on the impact of ECB balance sheet policies on the financial systems of non-euro area EU countries, Ciarlone and Colabella (2016) point to the existence of portfolio rebalancing and a banking liquidity channel.

²¹ By accepting public debt securities as collateral for loans, the central bank is easing the financial conditions in the direct favour not private but of public borrowers. In the case of ECB, the unofficial objective of credit policies is the reduction of national interest rate spreads. Saraceno and Tamborini (2015) argue that for the ECB balance sheet policies to help closing individual countries’ output gaps, fiscal accommodation at the country level should also intervene.

²² It may be worth to recall that the ECB reacted to such disorders *before* the Federal Reserve (in order to protect German banks’ exposure on US markets).

²³ ECB data (Key euro area indicators), <http://www.ecb.europa.eu/stats/keyind/html/index.en.html#real>, Series Key: BSI.M.U2.N.C.L20.A.1.U2.1000.Z01.E . In August 2012

²⁴ The Harmonised Index of Consumer Prices (HICP) covers monetary expenditure on final consumption by resident and non-resident households on the economic territory of the euro area; Series Key: ICP.M.U2.N.000000.4.INX; Unit: 2015 = 100.

Lastly, the main theoretical implications for the monetary dimension (the money supply) of the financial cycle can be sharply framed. Central to the financial cycle is the notion of self-reinforcing interactions between financing constraints and perceptions of value and risk. Under the IOM approach, it is saving (supply of loanable funds) plus all supplementary parameters of the money multiplier to determine the financing constraint. Savings amount to creditors' loanable funds, i.e., 'excess' reserves, upon which no substantial liquidity risk is attached. That is how, in the IOM perspective, perceptions of value are essentially perturbed by credit risk; that is why Basel I was mostly concerned with credit risk. Under the OIM approach, the financing constraint relies on entrepreneurs' expectations about the sustainability of their debt positions. Perceptions of (sustainable) value are markedly concerned with liquidity risk,²⁵ as the new Liquidity Coverage Ratio in Basel III.²⁶

References

Adrian, T., and Shin, H. S. "Money, liquidity, and monetary policy." *American Economic Review*, 2009, 99 (2), 600–605.

Adrian, T., and Shin, H. S. "Financial intermediaries and monetary economics." In B.M. Friedman and M. Woodford (eds.), *Handbook of Monetary Economics*, vol. 3A, pp. 601–650, North Holland, 2011.

Basel Committee on Banking Supervision. "Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tolls." Bank for International Settlements, January 2013.

Bernanke, B.S., Gertler, M., and Gilchrist, S. "The Financial Accelerator in a Quantitative Business Cycle Framework." In J.B. Taylor and M. Woodford (eds.), *Handbook of Macroeconomics*, vol. 1C, ch. 21, Amsterdam: Elsevier, 1999.

²⁵ Interestingly, in the first DSGE model to adopt the OIM approach (Jakab and Kumhof, 2015) banks are mainly constrained by profitability and solvency considerations. Liquidity risk—which is liable to increase even when solvency risk is decreasing, is not considered.

²⁶ 'The objective of the LCR [Liquidity Coverage Ratio] is to promote the short-term resilience of the liquidity risk profile of banks. It does this by ensuring that banks have an adequate stock of unencumbered high-quality liquid assets (HQLA) that can be converted easily and immediately in private markets into cash to meet their liquidity needs for a 30 calendar day liquidity stress scenario. The LCR will improve the banking sector's ability to absorb shocks arising from financial and economic stress, whatever the source, thus reducing the risk of spillover from the financial sector to the real economy.' (Basel Committee on Banking Supervision, 2013, p. 1).

- Bianco, A. “Hicks’s thread (out of the equilibrium labyrinth).” *Cambridge Journal of Economics*, 2016, 40, 1229–1245.
- Blanchard, O., and Johnson, D.R. *Macroeconomics*, 6th ed., Boston: Pearson, 2013.
- Boissay, F.; Collard, F.; and Smets, F. “Booms and banking crises.” BIS Working Paper Series, 545, 2016.
- Borio, C. “The financial cycle and macroeconomics: What have we learnt?” *Journal of Banking and Finance*, 2014a, 45, 182–198.
- Borio, C. “Macroprudential policy and the financial cycle: Some stylized facts and policy suggestions.” In G. A. Akerlof, O. J. Blanchard, D. Romer and J. E. Stiglitz (eds.), *What Have we Learned? Macroeconomic Policy after the Crisis*, Cambridge (Mass.): MIT Press, chap. 6, pp. 71–85, 2014b.
- Borio, C., and Disyatat, P. “Capital flows and the current account. Taking finance (more) seriously.” BIS Working Papers No 525, 2015.
- Borio, C., and Zabai, A. “Unconventional monetary policies: a re-appraisal.” BIS Working Papers No 570, July 2016.
- Brunnermeier, M.K., and Eisenbach, T.M. “Macroeconomics with Financial Frictions: A Survey.” NBER Working Paper, 2012 (18102).
- Carlin, W., and Soskice, D. *Macroeconomics. Institutions, Instability and the Financial System*, Oxford: Oxford University Press, 2015.
- Carpenter, S., and Demiralp, S. “Money, reserves, and the transmission of monetary policy: Does the money multiplier exist?” *Journal of Macroeconomics*, 2012, 34, 59–75.
- Cecchetti, S.G., and Schoenholtz, K.L. *Money, Banking, and Financial Markets*, 4th ed., New York: McGraw-Hill, 2015.
- Christiano, L.J.; Motto, R.; and Rostagno, M. “Risk Shocks.” *American Economic Review*, 2014, 104 (1), 27-65.
- Ciarlone, A., and Colabella, A. “Spillovers of the ECB’s non-standard monetary policy into CESEE economies.”, Banca d’Italia, *Questioni di Economia e Finanza*, no. 351, September 2016.

de Boyer des Roches, J. “Bank liquidity risk: From John Law (1705) to Walter Bagehot (1873).” *The European Journal of the History of Economic Thought*, 2013, 20 (4), 547–571.

Diamond, P. “National Debt in a Neoclassical Growth Model.” *The American Economic Review*, 1965, 55 (5), 1126–1150.

Eggertsson, G. B., and Krugman, P. “Debt, Deleveraging, and the Liquidity Trap: A Fisher-Minsky-Koo Approach.” *Quarterly Journal of Economics*, 2012, 127 (3), 1469–1513.

Eggertsson, G.B., and Mehrotra, N.R. “A model of secular stagnation.” NBER Working Paper 20574, 2014.

Feldstein, M., and Horioka, C. “Domestic saving and international capital flows.” *Economic Journal*, 1980, 90, 314–29.

Fontana, G. “Hicks on monetary theory and history: money as endogenous money.” *Cambridge Journal of Economics*, 2004, 28 (1), 73–88.

Fontana, G. *Money, Uncertainty, and Time*, New York: Routledge, 2009.

Gertler, M., Kiyotaki, N., and Prestipino, A. “Wholesale banking and bank runs in macroeconomic modelling of financial crises.” NBER Working Paper 21892, 2016.

Goodhart, C.A.E., and Tsomocos, D.P. “The Mayekawa Lecture: The role of default in macroeconomics.” *Monetary and Economic Studies*, 2011, 49–72.

Goodhart, C.A.E., Tsomocos, D.P., and Shubik, M. “Macro-modelling, default and money.” Special Paper 224, LSE Financial Markets Group, London, 2013.

Graziani, A. *The Monetary Theory of Production*, Cambridge (UK): Cambridge University Press, 2003.

Gurley, J.C., and Shaw, E.S. *Money in a Theory of Finance*, Washington: The Brooking Institution, 1960.

Harutyunyan, A., Massara, A., Ugazio, G, Amidzic, G., and Walton, R. “Shedding Light on Shadow Banking.” IMF Working Paper, n.1, 2015.

Hicks, J.R. *A Market Theory of Money*, Oxford: Clarendon Press, 1989.

IFRS09. International Financial Reporting Standard no. 9 — Financial Instruments, London: IFSR Foundation, 2014.

IMF. *Global Financial Stability Report*, October 2014, Washington, DC: International Monetary Fund.

Jakab, Z., and Kumhof, M. “Banks are not intermediaries of loanable funds—and why this matters.” Working Paper 529, Bank of England, London, 2015.

Keynes, J.M. “The ‘ex-ante’ theory of the rate of interest.” *Economic Journal*, 1937, 47 (188), 663–69.

Kim, J. “How Modern Banking Originated: The London Goldsmith-bankers Institutionalisation of Trust.” *Business History*, 2011, 53 (6), 939–959.

King, M. “Twenty years of inflation targeting.” The Stamp Memorial Lecture, London School of Economics, 2012.

Kiyotaki, N., and Moore, J. “Credit cycles.” *Journal of Political Economy*, 1997, 105 (2), 211–248.

Lavoie, M. *Post-Keynesian Economics: New Foundations*, Cheltenham: Edward Elgar, 2014.

Lindner, F. “Does Saving Increase the Supply of Credit? A Critique of Loanable Funds Theory.”, *World Economic Review*, 2015, 4, 1–26.

Lucas, R. “Why doesn’t capital flow from rich to poor countries?” *American Economic Review*, 1990, 80, 92–96.

McLeay, M., Radia A., and Thomas, R. “Money in the modern economy. An introduction.” *Bank of England Quarterly Bulletin*, 2014a, 54 (1), 4–13.

McLeay, M., Radia A., and Thomas, R. “Money creation in the modern economy.” *Bank of England Quarterly Bulletin*, 2014b, 54 (1), 14–27.

Macleod, H.D. *The Theory and Practice of Banking*, 2nd edition, London: Longmans, Green, Reader, & Dyer, 1866.

Mehrling, P. “The Vision of Hyman P. Minsky.” *Journal of Economic Behaviour and Organization*, 1999, 39, 129–158.

Mehrling, P. *The New Lombard Street. How the Fed Became the Dealer of Last Resort*. Princeton & Oxford: Princeton University Press, 2011.

Modigliani, F., and Miller, M. “The Cost of Capital, Corporation Finance and the Theory of Investment.” *American Economic Review*, 1958, 48 (3), 261–297.

Ramsey, F.P. “A Mathematical Theory of Saving.” *The Economic Journal*, 1928, 38 (152), 543–559.

Robertson, D.H. “Industrial fluctuation and the natural rate of interest.” *Economic Journal*, 1934, 44 (176), 650–656.

Samuelson, P.A., and Nordhaus, W.D. *Economics*, 15th edition, New York: McGraw-Hill, 1995.

Saraceno, F., and Tamborini, R. “How can it work? On the impact of quantitative easing in the Eurozone.” DEM Working Papers no. 2015/03, November 2015.

Sgambati, S. “Rethinking banking. Debt discounting and the making of modern money as liquidity.” *New Political Economy*, 2016, 21 (3), 274–290.

Shin, H.S. *Risk and Liquidity*, New York: Oxford University Press, 2010.

Shin, H.S., and Shin, K. “Procyclicality and Monetary Aggregates.” NBER Working Paper, 16836, 2011.

Sola, P. “The distinction between deposits and loans in macro-economic statistics.” Background Paper BOPTEG Issue #30. IMF Committee on Balance of Payment Statistics, Balance of Payment Technical Expert Group (BOPTEG), October 2004.

Solow, R. “A Contribution to the Theory of Economic Growth.” *The Quarterly Journal of Economics*, 1956, 70 (1), 65–94.

SNA2008. European Commission—International Monetary Fund—Organization for Economic Co-operation and Development—United Nations—World Bank, *System of National Accounts 2008*, New York, 2009.

Tobin, J. “Commercial banks as creators of ‘money’.” Paper 205, 1963, Cowles Foundation, New Haven.

Turner, A. “Leverage, financial stability, and deflation.” In G. A. Akerlof, O. J. Blanchard, D. Romer and J. E. Stiglitz (eds.), *What Have we Learned? Macroeconomic Policy after the Crisis*, Cambridge (Mass.): MIT Press, chap. 13, pp. 165–175, 2014.

Werner, R.A. “Can banks individually create money out of nothing? The theories and the empirical evidence,” *International Review of Financial Analysis*, 2014, 36, 1–19.

Woodford, M. “Financial Intermediation and Macroeconomic Analysis.” *Journal of Economic Perspectives*, 2010, 24 (4), 21–44.