Banking theories and macroeconomics.

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1. Introduction

A wider appreciation of the role played by bank money creation in the build-up of private debt to record proportions ahead of the global financial crisis has emerged since 2008. The view that macroeconomics is called to a renewed interest in the importance of financial markets developments for the real economy is the new mainstream. Such developments certainly represent a progress with respect to a recent trend in economic theory that has mostly, but not entirely, focussed on business cycles at the expense of their concatenation with financial ones.

There is still a long way to go for a new consensus approach to macro-financial modelling. The same notion of financial cycle lacks a common interpretation, yet the underlying idea to capture is unambiguous—the financial system behaves pro-cyclically due to self-reinforcing interactions between financing constraints and perceptions of value and risk. According to the Head of the Monetary and Economic Department at the Bank for International Settlements, Claudio Borio (2014, p. 186-7), new models of the financial cycle are based on conservative modelling strategies in spite of a crying need to tackle some head-on issues that the mainstream has failed to address:

a) Fluctuations are not the result of exogenous random shocks: both the business and financial cycles are driven by endogenous forces (booms do not precede busts; booms *cause* busts);

b) Busts are not a symptom of exogenous disturbances but one of stock disequilibria on the side of liabilities (equity and debt) that operate *sequentially*;

c) Potential (non-inflationary) output and *sustainable* output need be marked out: 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, macroeconomists should take up such significant methodological changes as the rejection of model-consistent expectations, the introduction of a

state-varying risk tolerance and, last but 'arguably more fundamental' step, a firmer take on the monetary nature of our economies:

> More importantly, the banking system does not simply transfer real resources, more or less efficiently, from one sector to another; it generates (nominal) purchasing power. Deposits are not endowments that precede loan formation; it is loans that create deposits ... Working with better representations of monetary economies should help cast further light on the aggregate and sectoral distortions that arise in the real economy when credit creation becomes unanchored, poorly pinned down by loose perceptions of value and risks. Only then will it be possible to fully understand the role that monetary policy plays in the macroeconomy. And in all probability, this will require us to move away from the heavy focus on equilibrium concepts and methods to analyse business fluctuations and to rediscover the merits of disequilibrium analysis. (Borio, 2014, p. 188)

If Borio is right in his suggestion to reverse the causality from deposit to loans, then the responsibility of dominant theories in inspiring ill-conceived reforms of banking regulation are likely to be heavy.

Kohn (1986) argues

Needless to say, this Post-Keynesian perspective over banking involves major adjustments to conventional policy narratives. **[…QE…]**

The paper's description of how banks work can be found in many central bank publications, say Mr Jakab and Mr Kumhof. More challenging is to incorporate it into the models used in macroeconomics. A failure to do so leads to a big underestimate of the effects of changes in bank lending on the real economy. The authors' models predict "changes in the size of bank balance sheets that are far larger, happen much faster and have much greater effects on the real economy" in response to shocks affecting the creditworthiness of bank borrowers than if banks are modelled as intermediaries. They also predict that bank lending will be procyclical, which means a boom in credit creation in good times and a rapid pullback in a downturn. The loanable funds model, on the other hand, predicts lending will be countercyclical, balancing out what is happening in the economy. In addition, the paper predicts banks will react to adverse circumstances by cutting back on lending rather than just charging more, as the mainstream models expect.

In Section 2, we point out the basic features of some representative Neo-Keynesian DSGE models with a financial sector. We concentrate on two essential elements of these models: i) their theoretical motivation for embodying credit relations into the macro model; ii) the characterization of the function of financial intermediation and, more specifically, of banking institutions. Given the essential features of NK−DSGE models, it is not surprising that what lays the grounds for the macroeconomic impact of credit relations and institutions is the presence of imperfections in credit markets (financial frictions). In our view, however, a crucial issue remains unsatisfactorily dealt with, namely the nature and the role of the banking system. We argue that the prevailing connotation of banks as intermediaries of loanable funds (ILF) is essential to all 'financial frictions' hypothesis: %If perfectly competitive markets were assumed, the introduction of credit relations into macroeconomic models would be unnecessary.

2 Credit, finance and banking in recent macroeconomics

2.1 Some representative mainstream models

Recent years, in mainstream macroeconomics, have seen a growing interest in the study of credit markets and their interrelation with the rest of the economy. Such an interest grew significantly in the aftermath of the worldwide financial and economic crisis of 2007-8. An expanding literature is now devoted to incorporating the financial sector into macroeconomic models. Analysts are increasingly consciuous that 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. In the preent subsection, we briefly consider the latter.

Its analysis is carried out in the context of a New-Keynesian dynamic stochastic general equilibrium (DSGE) model. The New Keynesian approach is characterized by the analytical role played by

imperfections (frictions) in the real sector; Bernanke et al. take into account the role of imperfections in financial markets, too.[1] The critical assumption of their model 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 while a key driver of swings in borrowing, investment, spending, and production, changes in the external finance premium have countercyclical behaviour, that is inversely related to changes in borrowers' net worth (profits and asset prices). That being the case, financial intermediation does *accelerate* the business cycle.

Like Bernanke et al. (1999), Eggertsson and Krugman (2012) focus on borrowers' (firm-level) frictions[2]. They consider two different kinds of agents heterogenous in time preferences: a patient agent and an impatient agent, with the latter borrowing from the former. There is a limit on the amount that can be borrowed, though. The model analyzes the effects produced by a change, in particular a decrease, of the debt limit, which forces borrowers to deleverage. A decrease in the debt limit determines a fall in the interest rate, which can become negative if the decrease of the limit is large enough and this can give rise to a 'liquidity trap'.

Woodford (2010) emphasizes 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 as that at which intermediaries lend to final borrowers. In the real world, however, the external finance premium is positive (and fluctuating), mainly due to intermediaries' limited ability to leverage their positions. Constraints on the intermediaries' equity accelerate the business cycle: intermediaries react to positive (negative) changes in net worth by intensifying (lessening) their 'supply of intermediation' (Woodford, 2010, p. 32).

In all the 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; Woodford looks at the fluctuations of

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

[2] 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.

the lenders' net worth. In all cases, however, financial intermediation, if considered at all, is dealt with in very general terms, without providing any distinction between different intermediaries and, in particular, without paying much attention to commercial banks. We now turn to consider some models that analyse the financial sector in more detail.

We start with a recent paper by Boissay et al. (2016), which considers banks that are heterogeneous in efficiency (costs of intermediation) and are subject to 'frictions' like moral hazard and asymmetric information. In the interbank market, less efficient banks lend to the most efficient that, in turn, lend to firms. In a frictionless world, all inefficient banks would lend to the efficient ones, so that lending to firms is maximum and the economy reaches a first best in asset allocation. Frictions hamper the attainment of the optimum by making banks adopt a 'storage technology'[3]: a certain amount of savings is not directed to firms and a crisis takes place.[4]

Carlin and Soskice (2015, pp. 183-221), in the new edition of their macroeconomics textbook, carry out their analysis of the financial sector by considering two types of banking activities: i) commercial banking, based on the provision of core services (deposit taking, running the payment system, and loan extension); ii) investment banking, focusing on non-core financial services.[5] The former is associated with loan extension, fair value evaluation, and risk aversion; the latter is connected with trading and origination of debt securities and financial derivatives, mark-to-market evaluation (Adrian and Shin, 2009; Shin, 2010), and risk neutrality. The key factor in the analysis of the cycle is variations of the investment banks' leverage (the ratio of assets to equity).

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

[4] Boissay et al. single out two possible types of crises. The first type occurs when the economy is hit by a negative productivity shock: the banks' capacity to absorb assets to lend to firms falls below the current amount of assets and this brings about the crisis. The second type of crisis is endogenous. The excess supply of assets is the outcome of high growth. Because of a long period of high productivity, the supply of assets by the household eventually comes to exceed the banks' absorption capacity and the same process as above is triggered (Boissay et al., 2016, p. 20).

[5] In the real world, a single 'universal bank' can well carry out these two types of activities. As it happens, the former activities correspond to the 'banking book' of a universal bank, the latter to its 'trading book'.

Carlin and Soskice concentrate on investments on the secondary market for financial assets by investment banks (risk-neutral) and savers[6] (risk-averse). Investment banks buy mortgages from retail banks and use them as raw material to produce securitized assets. The price of mortgage-backed securities is determined by the interplay of demand and supply. The price upswing starts with a reduction of the perceived risk associated with the financial assets. As a consequence, savers reduce their demand for assets whereas banks do not. Assets are transferred from savers to investment banks.

The banks' demand for assets when their price is rising is limited only by their equity and their ability to borrow from savers, who are ready to lend to them in so far as their loans are risk free, i.e. the investment banks' equity is large enough to cover the worst possible scenario. In this situation, the banks' leverage goes up. The increase in the asset price determine capital gains for the banks, with an increase in their equity which induces them to borrow more.

An unexpected reversal of beliefs about the riskiness of assets causes a fall in their prices, with capital losses for the banks, which can become insolvent. Carlin and Soskice (2015, p. 207) show that the banks' leverage is decreasing in the risk of assets and point out that it is the risk perceived by savers that plays the crucial role: a fall in perceived risk makes savers willing to lend more to the investment bank and vice-versa.

The picture of the financial sector presented by Carlin and Soskice reflects quite well other more complex and detailed contributions like, for example, Adrian and Shin (2011) and Gertler et al. (2016). Adrian and Shin show how the existence of leveraged intermediaries, which are different from ordinary banks and drive the financial cycle, requires a different interpretation of the transmission process of monetary policy and, in particular, of the way in which variations of the short-term rate affect the whole economy ('risk-taking channel of monetary policy'). Gertler et al. analyze the role of shadow banking, which they call wholesale banking, and argue that it is this sector that is at center-stage of financial crises, while retail banks remain substantially stable.

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[6] The term 'savers' denotes not only households but also institutional investors like pension funds.

2.2 Banks as intermediaries and the theory of loanable funds

All the models considered above, as well many others not considered here, have an important feature in common. In these works, all sorts of banks, retail as well as investment banks, are regarded as mere intermediaries. All financial intermediaries have to borrow from somebody in order to lend, even though lenders are different. Retail banks borrow from households while investment banks mainly borrow from other financial institutions. This view of the nature of banks is that currently dominant,[7] and dates back at least to Tobin's pioneering work in the 1960s (Tobin, 1963).[8]

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 importance of the distinction between money and other financial assets and, consequently, of the distinction between banks and other financial intermediaries.[9] As it happens, 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.[10] For Tobin, savings allocation depends on the relative yields of deposits and alternative assets: if the yield of non-deposit assets falls, profitable lending and investment opportunities available to banks decline and, eventually, the marginal return on lending will equate the marginal cost of attracting additional deposits. In this respect, there is no difference between banks and other intermediaries.[11]

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[7] Werner (2014) provides a possible historical account of how prevalent views of the nature of banks have evolved over time.

[8] Tobin's approach to money and banks, which he calls the 'new view', in turn, was largely inspired by Gurley and Shaw (1960).

[9] Both banks and other intermediaries satisfy simultaneously the portfolio preferences of two classes of agents, which we may denote as patient (lenders) and impatient (borrowers) agents.

[10] The reasons why the existence of intermediation is justified are standard: expertise, risk, spreading, … (Tobin 1963, p. 411).

[11] In his article, Tobin also criticizes the [money supply] doctrine of the money multiplier. He correctly rejects the hypotheses that the borrowers' expenditures totally convert themselves into deposits with banks and that banks always lend to the maximum possible extent. These criticisms are basically correct and they can be accepted, even though the view of banks as mere intermediaries is rejected.

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).[12] If imperfections and frictions were assumed away, considering or not financial intermediaries would be of no theoretical and analytical relevance. Introducing intermediation would be an essentially unnecessary complication.[13] Frictions and imperfections prevent ultimate savers from directly lending to ultimate borrowers, and financial intermediation plays a non-trivial role because external finance for firms can be 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). This theory was criticized also by Keynes (1937).

The critique of the loanable funds theory dates back to the 1930s and was carried out by Keynes (1937). More recently, others have carried out a thorough criticism of the theory. We shall come back to this issue in more details later on. Here, it will suffice to mention the basic criticism made by Lindner (2015), for whom the acceptance of the loanable funds theory relies on the confusion between saving and lending: the act of saving does not necessarily imply the act of lending to somebody who wants to invest.

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[12] 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.

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

3. The IOM banking theory.

What's the relation, if any, of a given amount of monetary base—currency and central bank *reserves*, with a (normally) much broader money supply—currency and bank *deposits*? This question is key to all possible understanding of the monetary dimension of our economic systems. At its core lays the question of the money supply and hence the nature of bank deposits. The theory of the deposit multiplier—or money multiplier (MM hereafter) provides a widely accepted answer to our question: 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 essentially 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' (SNA, 2008, §4.105);

iii. Bank deposits are typically *reservable* in that depository institutions are obligated to maintain reserves against their liabilities (and vault cash) in the form of deposits at the central bank.

Following an established pedagogic tradition (e.g., Samuelson and Nordhaus, 199X; 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. Of course, this is a didactically convenient yet overly unrealistic shortcut that blurs all motivation to transact in credit markets. Here, this shortcut is cancelling changes in net worth out. The MM story starts with

a bank borrowing an amount of outside money.[14] 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 of its borrowings in central bank reserves (CBR). After that, bank lend out 'excess' 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 ith 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.

[Table 1 here]

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 here]

Table 2 suffices to display in accounting terms the following features of a fractional-reserve monetary system:

a) *The MM process leaves the volume of base money* (CUR+CBR) *unaltered:* at the end of the multiplication process, the same central bank has retired an amount of currency equivalent to the sum deposited at the beginning of the first intermediation cycle ; the monetary base is

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[14] 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.

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;

b) The (indefinite) reiteration of intermediation cycles results in a -fold multiplication of savings (base money) into deposits (money supply) that takes place when banks *borrow*;

c) 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 *borrowed*, the MM story is based on the view of banks as *intermediaries* of outside money (IOM).

4. The OIM view of banks.

When saying '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 with its emphasis on the role of credit creation in the monetary process. Its origins trace back to by Henry Dunning Macleod's intellectual reaction, in mid-19th century, to Sir Robert Peel's banking doctrines. This alternative approach was the mainstream from end-19th to mid-20th century. In the second half of the 20th century the loanable funds approach came back to the fore, although with less uncritical support from central bankers than academic economists. As it happens, the first New-Keynesian DSGE model to embody this 'credit creation' theory is from two economists 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 theory of banking is that banks, in the act of lending, do not intermediate outside money (IOM) but originate inside money (OIM hereafter). Inside money is purchasing power originated by the private monetary institutions. Statistically speaking, it amounts to 97% of money supply (McLeay et al, 2014b, p. 15). The process of origination of inside money 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 in exchange for the borrower's obligation to repay *at a future time*. Clearly, is a discount factor applied on the face value of the borrower's obligation, so that is the debt principal and is interest —with , where is the interest rate the borrower acknowledges to the bank.[15] 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 loans[16], 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 'fully understand the role that monetary policy plays in the macroeconomy' (to state it in Borio's words, once again) via a broad credit channel is that the cornerstone of analysis is no longer saving , but debt . So as it is the bank, not the depositor, to originate the deposits, so it is the bank's customer, not the bank itself, to originate the loan: as a

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[15] In national and business accounting, fair value conventions (SNA 2008, 13.62; IFSR9, 2014) 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 of assets/credits and an equal-sized extra amount of liabilities/deposits; the borrower, vice versa, holds an extra amount in liquid assets/deposits and an equal-sized extra amount of liabilities/loans.

[16] Or debt securities and all that is non-outside money.

rule, *one can only originate/create her own liabilities*. This principle implies that the creation of inside money—that is 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.

A most astonishing consequence of the OIM theory of bank lending may seems to be banks' capacity to face no limit to the creation of inside money. Yet, that's not the case. The fact that banks hit no resource constraint to money creation does not imply that they hit no financial constraint at all. [note on Borio and Lindner on this distinction?] To see this, let us assume that the bank extends a loan in favour of a customer who aims at buying an extant real asset—say a piece of real 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 here]

This means that when a bank creates liquidity (inside money), it 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 not sufficiently prudential, the bank reaches a situation in which its CBR holdings are too little for the bank 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 (Mehrling, 1999) [interpreted as a risk of not being able to *refinance* its position].

Liquidity risk is the fundamental endogenous constraint on inside money creation[17]. 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 reserves and hence an increase in liquidity risk. In other words, merging banks reduce the probability that their own creation of inside money ends in a fall 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 deposit or loan (Bola, 2004);

iii. *Originate-to-hold deposits*. Another strategy of liquidity risk management relates to the simple fact that banks borrow funds from households, i.e., 'deposit-taking'. Until they hold the liabilities/deposits so originated (depositors do not withdraw funds/outside money), banks hold the funds thereby gathered and thereby are 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 that an inflow of funds from purchasers does follow. A notorious kind of OTD approach is the securitization of assets. In this case, banks pledge the value of their assets/loans (which, it is worth to remember, is normally expected to increase due to 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

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[17] 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).

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),[18] with shadow banking being associated to the issuance of the latter.[19] Differently from other approaches to shadow banking based 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.

L'OTD ha due effetti principali: se il mercato sconta un ABS in modo leggero, allora questi bassi tassi di sconto costituiscono un formidabile fattore di rilassamento dei lending standards richiesti dalle banche, cioè fare subprime lending e con ciò aumentare la possibilità di NPL. D'altro canto, la proliferazione di soggetti titolari di diritti su un medesimo sottostante−−esasperata dalla possibilità di fare ABS2 (CDO), ABS3 (CDO2), …, ABSn, implica necessariamente un aumento strutturale della possibilità che attivi finanziari non-performing contagino i bilanci di altri operatori.

Differently from lending, however, the management of liquidity risk cannot be financed with self-produced funds.

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[18] Its proponents, however, adopt a IOM approach to banking.

[19] 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.

4. Theoretical and policy implications.

Recent experience has given an extraordinary impetus to research on the financial factors at play in macroeconomic dynamics. Beside research After drilling on Financial frictions … The credit channel. Bernanke 2007. Risk taking channel of MoPo (review Adrian and Shin, 2011 – FI&ME). More fundamental issues are also being considered, namely the nature of banks.

Considered after the lending event, the IOM and OIM approaches to banking do not seem to differ much. Once we admit that the borrower does unfalteringly spend her credit, whether the bank raises reserves before of after the fact appears to be a mere matter of a different perspective over the very same thing.[20] Yet, under the IOM theory of banking we do not rigorously approach money supply, nor appreciate how pervasive and urgent is for banks to actively manage the intrinsic limit to private (inside) money creation—liquidity risk. The IOM theory rules that out by its root hypothesis that banks can only make loans out of *excess* reserves.

Monetary policy *must* accommodate counterparties' demand of reserves for disorderly liquidity risk can, as in the US 1907 crisis, end in disruptions in the payment systems (with banks getting out of the execution of payments on their customers' accounts). In consequence, the Federal Reserve was instituted in 1913. Since than, the necessity of central banking and its lending of last resort function was beyond question even in the US [cf Bagehot]. As the public confidence in the bank-based payment system is necessary, supply of *base* money is to be 'endogenous'. This principle does not alter the fact that liquidity risk management is costly and, as such, affects bank profitability.

A corollary of the OIM approach to banking is that (financial) saving[21], i.e., a residual flow adding to available loanable funds, does not constitute an effective constraint on the macroeconomic performance; the truly basic constraint is the state of long-term expectations, in particular of non-financial borrowers, whose animal spirits rule the roost of net capital formation [see Lindner 2015]. In our terms, the cornerstone of macroeconomic analysis is no longer saving, but debt (liability). In other terms, the resource constraint is not at all a financing constraint, as the IOM implies. (Borio and Disyatat, 2015), it is necessary to single out   reserve/financing constraints. Issues

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[20] Having this in mind we have here proposed, for sake of symmetry, the terminology IOM/OIM.

[21] With the legal reserve ratio and the willingness of the public to hold deposits rather than currency.

related to self-reinforcing interactions between financing constraints and perceptions of value and risk—the financial cycle, are more at home in the OIM approach to banks. To the extent that this approach yields better accounts of the actual working of monetary economies, it also puts us in a better position to keep up with the distortions that arise in the real economy as perceptions of value and risk fail to conform to the rational expectations model.

Cf. DSGE anatomy. Liquidity risk. Jakab and Kumhof (2015): banks create deposits of new money through lending, and in doing so are mainly constrained by profitability and solvency considerations.

[interest rate policies] Both directly and indirectly (via interbank market), monetary policy can significantly impact on the cost to manage liquidity risk.

[balance sheet policies] When it is accepting a wider gamut of eligible assets as collateral for refinancing operations, the central bank is essentially both acting as a market-maker and removing such assets from the balance sheets of banks. The central bank keeps asset prices higher than they would otherwise be, and makes banks more liquid than they would otherwise be. 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 EU, a decrease in national interest rate spreads).

HERE SYMMETRY.

1970s monetarism: price stability.

Monetary policy is generally supposed to channel through the real economy via the influence on both the cost and the availability of loanable funds (bank reserves), and thereby on   What the effect on credit? … This theory can't work, and indeed it does not work. At best, stimulus of

So as the QE does not activate a credit channel when liquidity is provided, so it does not activate a contraction in credit when liquidity is absorbed. (symmetry of the a-monetarist argument, rif. Bianco 2014??)

A central bank's equity, while having some "political economy" significance, has little economic significance (Sheard, 2013, p. 12): in case the central bank incurs capital losses that more than wipe out its equity by selling the assets accumulated by doing QE, it can still issue base money and set a policy rate. The central bank is not likely to lose monetary control unless those assets are so troubled that their value is sufficient only for draining too little of the reserves created to purchase them. In this case, the monetary authority can withdraw reserves with the help of the fiscal authority: issuance of public debt notes adds to government deposits, a central bank's liability, that can be converted into equity.

What's the link, if it exists, of the little importance of CB equity with negative interest rates? Are negative rates a solution? The case of Japan.

Negative interest rates: bad because do not lead to an acceleration of money circulation velocity, the problem is always the state of long-term expectations; these are rather likely to further depress due to the central bank signalling of exceptional adverse conditions. Of course, this also means that NIR are likely to do the opposite of what they are supposed to do, i.e., to ease financial conditions.

BOE (1694) after a crisis (macro-financial stability), FED after 1907 crisis (lending of last resort) … ECB (price stability) would better come in consequence of the present crisis!

For a survey of the Post-Keynesian position on banks and the supply of money, see Lavoie (2014). This approach to the banking system seems to have been attracting new interest recently.

For \citet[p. 188]{bori-2014a}, banks are not mere intermediaries that transfer resources from one sector to another. In other words, deposits with banks `are not endowments that precede loan formation; it is loans that create deposits'. This view of the nature and role of banks contributes to a better understanding of `the aggregate and sectoral distortions that arise in the real economy when credit creation becomes unanchored, poorly pinned down by loose perceptions of value and risks'. This view of credit and banks implies the rejection of all `saving glut' interpretations of unsustainable credit and asset price booms.\footnote{\citet{bordis-2011} suggest that the actual

cause of the financial crises was rather the `excess elasticity' of monetary and financial regimes with respect to such financial imbalances.}

\citet[p. 168]{tur-2014} holds that `banks do not just, as too many economics textbooks wrongly imply, intermediate existing money into credit. Rather, they create new credit and money de novo and introduce maturity transformation risks.'

From the perspective of the individual bank, the fact that lending goes along with deposit creation does not change the fact that *the bank owes its depositors the full amount they deposited*. The key difference between deposits and other kinds of debt is not that deposits are "like money" or that deposits may be created by lending, but rather that the bank provides depositors with services such as payments through checks and credit cards or ATM machines that make funds available continuously. The demand for deposits depends on these services, as well as the interest that the bank may offer, and it may also depend on the risk of the bank becoming insolvent or defaulting. (Admati and Hellwig, 2015. p. 9)

This story, however, is not that straightforward. The MM doctrine relies on the interpretation of banks as intermediaries of loanable funds and bank lending as transfer of 'excess' outside money. Excess central bank reserves, however, are not funds loanable to non-banks. So to paraphrase Adam Smith, it is not from the butcher, the brewer, or the baker's acceptance of central bank reserves that we expect our dinner. For the money multiplier to work following an expansionary monetary policy, banks should be allowed to swap excess reserves for currency. However technically possible, such a swap would be practically cumbersome (inefficient).

Even admitting that the swap occurs, another issue arises: actually, when lending, banks do not hand borrowers physical currency: borrowers do not exit the bank with a bag full of banknotes; rather, they hold a right to draw a sum (debt principal) from a checking account, i.e., a right to use bank money, and a liability versus the bank (called loan) which is worth the debt principal plus a certain amount of interest.

Table 1

	Depositors		Banks		Borrowers		Central Bank	
	Δass	Δliab/n.w	Δass	Δliab/n.v.	Δass	Δliab/n.w.	Δass	Δliab/n.w.
deposit-taking								
cor								
cur	$-(1-\phi)^{i-1}S$		$(1-\phi)^{i-1}S$					
dep	$(1-\phi)^{i-1}S$			$(1-\phi)^{i-1}S$				
loa								
cnw		$\varnothing$		$\varnothing$				
reserve-fractionating								
cor			$\phi(1-\phi)^{i-1}S$					$\phi(1-\phi)^{i-1}S$
cur			$-\phi(1-\phi)^{i-1}S$				$\phi(1-\phi)^{i-1}S$	
dep								
loa								
cnw				$\varnothing$				$\varnothing$
bank lending								
cor								
cur			$-(1-\phi)^iS$		$(1-\phi)^iS$			
dep								
loa			$(1-\phi)^iS$			$(1-\phi)^iS$		
cnw				$\varnothing$		$\varnothing$		
borrowers' spending								
cor								
cur	$(1-\phi)^iS$				$-(1-\phi)^iS$			
dep								
loa								
cnw		$(1-\phi)^iS$				$-(1-\phi)^iS$		

Table 2

TABLE 2. *The macro-financial accounts of the MM doctrine.*

	Depositors		Banks		Borrowers		Central Bank	
	Δass	Δliab/n.w.	Δass	Δliab/n.w.	Δass	Δliab/n.w.	Δass	Δliab/n.w.
cbr			S					S
cur	$-\mathbf{S}$		$\varnothing$		$\varnothing$			$-S$
dep	$\phi^{-1}S$			$\phi^{-1}S$				
loa			$\dfrac{1-\phi}{\phi}S$			$\dfrac{1-\phi}{\phi}S$		
c.n.w.		$\dfrac{1-\phi}{\phi}S$		$\varnothing$		$-\dfrac{1-\phi}{\phi}S$		$\varnothing$

Table 3

TABLE 5. *The RE buyer pays the seller off*

	RE seller		seller's bank		buyer's bank		RE buyer	
	Δassets	Δliab/n.w.	Δassets	Δliab/n.w.	Δassets	Δliab/n.w.	Δassets	Δliab/n.w.
cbr			I		$-I$			
deposits	I			I		$-I$	$-I$	
RE	$-I$						I	
c.n.w.		∅		∅		∅		∅

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