



Endogenous money, soft budget constraint and the banking regulation

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ABSTRACT

A key observation of the endogenous money theory is that banks create deposits (money) by lending. This means that banks apparently face soft budget constraint in responding to demand for credit. However, there are several limiting factors, which can make the banks' money creation somewhat constrained, and can thus harden their budget constraint. Such factors include the need to preserve banks' profitability and the bank regulations (the capital and liquidity requirements). Previous literature on soft budget constraint (SBC) in banking mentioned government bailouts, central banks lender-of-last-resort policies, or the poorly informed depositors who over-finance banks, as reasons for the SBC for banks. Taking the endogenous money theory as a starting point, we use a different approach. We analyze whether the tools that aimed to keep the bank's budget constrain hard are appropriate for this purpose. Our analysis, as well as lessons from several recent bank crisis episodes suggest, that under current banking regulation SBC is an inherent feature of banking.

KEYWORDS

soft budget constraint, endogenous money, bank regulation

JEL CLASSIFICATION INDICES

B52, E5, G21, G28, L5

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1. INTRODUCTION

János Kornai in his long productive professional career always focused on general systemic issues. He paid close attention to the technicalities how the particular economic system worked but avoided going into discussing such particular technicalities. This helped him to reach a wider audience without inviting too much futile destruction from the unproductive and looking back mostly outdated and misleading controversies linked to the technical issues. He certainly was aware of the importance of financial issues, and he most likely explicitly took into account of these issues while he proposed the concept of soft budget constraint (SBC). This is clearly indicated by his later publications mentioning the importance of SBC in banking, but he never pretended that he would want to characterize this problem in banking from a systemic perspective. Rather, his notes represent a proposal for specialist in this field to apply his approach to this particular problem. In this paper we take up this challenge. We raise doubts about whether it is possible for banks to have hard budget constraint (HBC) under the current bank regulatory framework. We discuss the factors which contribute to the fact that SBC is a prevalent characteristic of banking. The theoretical background is the post-Keynesian endogenous money theory. This paper embraces the endogenous money view, but we will demonstrate that the SBC problem in banking is not limited to this approach. Similar concerns are also supported within the framework of the neoclassical loanable funds theory. The endogenous money theory demonstrates that commercial banks create money by lending (Lavoie 2014). The financing of firms is thus not constrained by savings as assumed by the neoclassical theory. The neoclassical loanable funds interpretation describes bank lending as financial intermediation between savings and investments, but which does not represent money creation.

A direct consequence of the different interpretation of the role of banks in money creation is that in the neoclassical loanable funds interpretations banks play a relatively passive role in financing of the economy, while the post-Keynesian endogenous money theory highlights the speculative aspects and sudden changes in risk perceptions leading to booms and busts (Palley 2011).

For the analysis we build on two different sets of the literature. The first one is the endogenous money theory. A simple description of the endogenous money theory means that in principle, banks can create unlimited amount of money, however there can be several constraints, including the demand for loans, to limit this money creation. A direct consequence of this is that banks are not faced with HBC in this process even in the competitive market economies. The second set of literature we build on is the SBC theory. We believe that the SBC theory of János Kornai is generally relevant for banking, and not just in certain situations influenced by the behavioural aspects of banks and government agencies or by the factors driving liquidity. Kornai (1980a, 1980b, 1986, 1992) developed the SBC concept for describing the behaviour of state-owned companies in the socialist economies. In these economies, the state-owned companies - even those that are technically failing - do not go bankrupt, because the state is bailing them out. Building on this, the state-owned enterprises are not necessarily forced to maintain profitably, as there are no hard consequences of making losses, i.e., they have an SBC. However, later it turned out that the concept of SBC had good explanatory power not only for the socialist economy, but also for many phenomena of the capitalist market economies.

As regards the role of banks in the SBC concept, the literature focused on the banks performing two distinct roles. First, banks can act as supporting organizations, which can be able and



ready to cover firms' deficit to try helping companies to survive. In this way if the supported companies successfully recover, banks can avoid losses. If not, the supportive behaviour can contribute to banks' failure. Second, banks themselves can be the subject of SBC counting on the often-observed fact that the government agencies would bail them out under pressure of risks caused by the potential consequences of a bank failure. Kornai et al. (2003) offered an overview of the literature and identified four typical cases of SBC for banks. These are the following: 1) Banks are often subject to the too-big-to-fail policy of government. If they are large enough, or if they may propagate systemic risks, they can anticipate that the government will bail them out to avoid a systemic banking crisis, which makes their budget constraint soft. 2) Banks as holders of bad loans against firms, which are important for the government from economic policy considerations. In these cases, the government may support banks with the explicit aim to help them to maintain financing of these companies, even in situations when there are doubt about their solvency. This also makes the banks budget constraint soft. 3) The central bank's lender-of-last-resort facility may also contribute to SBC. 4) Finally, the government may always justify interventions to avoid bank failure to reduce the risk of escalating financial crises. All these cases represent valid explanations both in the framework of the neoclassical loanable funds theory and in the endogenous money theory.

In this article we look at the of banks from a completely different perspective. Our starting point is that according to the endogenous money theory bank lending is not constrained by the availability of funding but still may be constrained by several external and internal factors. If these factors can effectively limit the banks' lending activity, then banks face HBC. If not, then banks' budget constraint is inherently soft. We point out that the ultimate constraint on banks' lending activities should be the regulation of banks' capital and liquidity by the supervisory agencies. However, neither capital nor liquidity rules are appropriate for this purpose. In other words, in the analytical framework of the endogenous money theory, banks have inherently SBC with repercussions for financial sustainability.

The structure of the article is as follows. The next section gives a summary of the endogenous money theory and contrasts it with the neoclassical loanable funds theory. It is followed by the literature review of the SBC and its application for banks. The subsequent two sections analyze the constraints on bank lending in terms of their ability to make banks' budget constraint hard. The fourth section analyses external and internal factors other than bank regulation, while the fifth section provides a detailed analysis of bank capital and liquidity regulation. The last section summarizes our conclusions.

2. ENDOGENOUS MONEY CREATION

2.1. Endogenous money versus loanable funds

The loanable funds theory assumes that banks lend out previously collected deposits or loanable funds (Jakab – Kumhof 2019). This theory has a long, influential and well-established history.

The origins of the loanable funds theory goes back to the 1930s referring to the publications of the British economist Dennis Robertson (1934), Swedish economist Bertil Ohlin (1937a, b) and Ohlin et al. (1937). However, Ohlin attributed its origin to the Swedish economist Knut Wicksell (1898). Normally savings are deposited, and savings are that part of the income which is not used for consumption. As deposits are, in this way, closely linked to real income that was



not consumed, it is also tightly linked to production. Loanable funds are limited by production and their scarcity is determined by the decisions influencing the supply and demand of such funds. The supply and demand of loanable funds may depend on several factors, but the theory assumes that it responds to changes in interest rates.

The endogenous money view is radically different from the loanable funds view. Commercial banks endogenously create new deposits when they lend to enterprises.¹ New lending and consequently creation of new money is driven by the demand for credit (Rochon 1999; Ingham 2004; Palley 2013; Werner 2014a, 2014b; Lavoie 2014; McLeay et al. 2014a, 2014b; Ábel et al. 2016). Commercial banks assess the creditworthiness of the borrower and decide on giving the loan but in this decision, they are not constrained by the deposits of savers. The act of offering the loan the bank simultaneously registers a deposit on the client's account with the bank. When the client starts spending from this "deposit" the bank transfers the amount from its liquidity or may rely on the central bank facility to borrow reserves from the central bank. This means that short term interest rates are determined by the central bank's monetary policy and not by the market for loanable funds.²

Non-bank financial institutions which have no access to central bank liquidity facilities may also intermediate savings for lending, but they cannot create new deposits, or create money. Commercial banks having access to the central bank liquidity facilities can create money and finance enterprises. This type of financing is independent of previous production or savings. The supply of bank loans is rather elastic, banks can accommodate credit demand. However, the drivers of credit demand play a crucial role in this theory. Minsky (1977, 1982, 2008) emphasized the speculative aspects of credit demand. During booms firms are willing to invest in riskier assets which increases financial fragility. Sudden changes in risk perception may lead to fire sales of such assets, and thus, causing a financial crisis. In such situations the value of the collateral behind the loan may be seriously damaged, which may also influence banks willingness to refinance outstanding loans instead of facing bad loan problems. This aspect was clearly explored by Kornai et al. (2003), but they focus on the predictable pattern of banks' behaviour in crisis situations and do not cover other aspects of the crucial role of banks' behaviour leading to the emergence of such crises.

2.2. Funding liquidity creation

The process that banks need no prior deposits for lending because deposits are created by loans is often identified as "funding liquidity creation". This way the scope of the neoclassical loanable funds theory is expanded to cover those aspects of banking and credit which are in the core of the endogenous money theory. Thakor – Yu (2023) estimated how much funding liquidity the US banking system created. They calculated the amount of cash deposits available for banks and the additional deposit money creation that enables banks not to be constrained in lending by the

¹This theory may sound as a radical break with the traditional banking theory, but it is not so novel, as Schumpeter (1954) wrote: "It is much more realistic to say that the banks...create deposits in their act of lending than to say that they lend the deposits that have been entrusted to them." (Quoted by Thakor – Yu 2023: 3). Basil Moore's papers (1979, 1983, 1988a 1988b) gave a new impetus to the endogenous money theory.

²As of today, the theory of endogenous money has not been included in standard macroeconomics textbooks, but is widely endorsed by the economists at central banks, investment agencies and other financial institutions (Sheard 2013; McLeay et al. 2014a, 2014b; Deutsche Bundesbank 2017; Jakab – Kumhof 2019).



supply of cash deposits. Their calculation showed that during the 2001–2010 period, 92% of bank deposits were a result of funding liquidity creation. In the period of 2011–2020 funding liquidity creation represented 86% of bank deposits as the share of cash deposits has increased, but as a percentage of GDP it has increased to 57% of GDP (Thakor – Yu 2023: 21).

2.3. Credit shock

Because of its flexibility in adjustment to market demand the endogenous money creation by bank lending has a close co-movement with the business cycle. A brief characterization of the dynamics of the European economic crisis during 2008–2009 is given in the EU's Energy and Environmental State Aid Guidelines (EEAG):

“...a credit-fueled internal boom was spreading from the construction industry to the entire economy, pushing wages, prices and incomes from the provision of non-traded goods above the level sustainable in the long-run, creating the bubble that ultimately resulted in the European debt crisis.” (EEAG 2011: 77–78)

Credit shocks or rather credit crunches also played a special role in the transition to the market economy from socialist central planning. The credit market failure caused by the bad loan problem and restructuring of the state-owned banks led to bankruptcies and a severe recession (Ábel – Bonin 1994). Berglöf – Roland (1995, 1997) and Maskin – Xu (2001) demonstrated that the SBC problem remained an important factor even after a sound banking system has been established by macroeconomic stabilization and steps taken towards widespread bank privatization. Berglöf – Roland (1995) highlighted that poor quality of loan portfolios, inadequate collateral and weak capital base of both enterprises and banks are the key factors in explaining why repeated bank bailouts (sometimes masked as portfolio cleaning) were inevitable during the transition to market economies.

The process of growing importance of intangible capital in the corporate capital structure can be considered as another important transition in the developed market economies. Del'Ariccia et al. (2020) analyzed the shift in the US bank portfolios in response to the historic change in corporate capital structure as intangible capital has increased in the US over the past five decades. In value terms, the stock of intangible assets such as, intellectual property, human capital, business strategy and brand equity has tripled since the 1960s, reaching \$3.6 trillion by the early 2000s (Corrado et al. 2009). This change brought about a significant shift in the composition of bank loan portfolios. Capital market financing of corporations and the increase of intangible capital since the mid-1980s explained 30% of the secular decline in the share of commercial lending in the banks' loan portfolios (Dell'Ariccia et al. 2020: 32). A relatively fewer commercial lending was balanced by increasing mortgage lending which was riskier.

3. SOFT BUDGET CONSTRAINT OF BANKS

3.1. The concept introduced by Kornai to explain shortages

Kornai (1980a) introduced the concept of SBC to describe the relationship between the state and the state-owned enterprises (see also, Kornai 1992). He explained the widespread shortage phenomena by using this concept. However, there are many aspects of market economies where



this concept is also applicable. The bailout of banks is an example for that. Recent financial crises provide many examples of this, from the Asian crisis of the 1990s to the 2008 financial crisis in the US and Europe (see, e.g., [Alexeev – Kim 2008](#); [Fink – Stratmann 2011](#); [Mihályi 2011](#)).

[Kornai \(2014\)](#) revisited the SBC concept. He explained why the SBC problem in banking might be prevalent even in the market economies:

“Economists analyzing crises have shown through cold facts of economic history the sequence of the following events. If a bank on the brink of collapse is not rescued, panic breaks out among depositors and other creditors fearful of not retrieving their money can. That is leading to the illiquidity of the bank, which in turn has a knock-on effect among other financial institutions, and ultimately the whole economy. This happened in 1929–1932 at the start of the Great Depression, and likewise, the most recent financial crisis was instigated by the failure of Lehman Brothers on 15 September 2008. It has often been possible to avert a crisis if the country’s financial administration or the banking sector itself bails out the collapsing bank; sometimes, foreign banks or international organizations also contribute to such rescues. ‘Too big to fail’ is the wisdom heard in the US business circles about the major banks. The practice has become so widespread (the Lehman Brothers’ case was exceptional in this respect) that banks now count quite consciously on such rescues. This is a typical example of the soft budget constraint syndrome in action”. ([Kornai 2014](#): 40–41)

SBC in banking is often linked to the availability of funds and changes brought about by liberalized capital movements which makes leveraging accessible ([Maskin – Xu 2001](#)). Capital inflow or cross-border lending increases the supply of financing in a country. A credit boom fueled by funds from abroad is consistent with the loanable funds theory. However commercial banks can only make loans if there is a demand, but if there is a demand, they are not constrained in accommodating that demand. An increase in bank liquidity would not make much difference as they do not need funds from abroad to do so. [Kohler \(2023\)](#) and [Febrero et al. \(2019\)](#) demonstrated that the cross-border interbank flows are largely a passive outcome of refinancing decisions of banks. In general, the issue of availability of funds is a cornerstone of the neoclassical loanable funds theory. The endogenous money theory, however, states that banks need no available funds to issue loans as those deposits are created by the action of signing the loan contract and registering the amount on the clients account with the bank as a current account deposit.

3.2. Relationship banking

The problem of SBC in banking is a two-faced phenomenon. On the one hand, banks behaviour is distorted by the expectation that the state would rescue them in case of the systemic banking problems, but on the other hand, banks also may impose not so hard budget constraint on large firms.

[Petersen – Rajan \(1995\)](#) and [Giannetti \(1999\)](#) noted that banks may be inclined to bail out the financially distressed enterprises assuming that in this way helping clients surviving as they may remain a source of profit in the future. Others (including [Peek – Rosengren 2005](#); [Caballero et al. 2006](#); [Hoshi 2006](#); [Arikawa – Miyajima 2007](#)) mentioned that banks to protect the quality of their own loan portfolio would hesitate to push troubled clients into bankruptcy, and instead, their attitude “to engage in “evergreening” of old loans to the nearly-insolvent firms to improve their own balance sheets” ([Arikawa – Miyajima 2007](#): 2). These cases represent SBC in practice.



Since the 1990's corporate finance of the Asian firms increasingly relied on bank financing. Especially in Japan and South Korea most of the loans of large firms were connected to a main bank and the loan concentration from main banks has increased. A not so surprising consequence of these developments was a significant change in bank behaviour, which is often mentioned as relationship banking. Dewatripont – Maskin (1995) pointed out that in such circumstances the banks did not impose HBC on their clients because the bank was also better off refinancing a poorly performing firm than to force it into bankruptcy.

Relationship banking may lead to SBC for large clients not just because the bank handles the initial loan as “sunk cost” facilitating future revenues but also because “...banks may have an incentive to dress up their balance sheets. Suppose that a bank's balance sheet is deteriorating, and the bank is highly committed to an unprofitable borrower; it may decide to supply the additional lending to a borrower not based upon an evaluation of its future reconstruction, but to dress up a non-performing loan to meet capital” (Arikawa – Miyajima 2007: 16.)

Dewatripont – Maskin (1995), Bolton – Scharfstein (1996), Boot (2000), and Omiccioni – Carmignani (2007) acknowledged the benefits of close banking relationships, but emphasized possible risks, including SBC and the liquidity risk. They also noted that firms realizing that they can easily renew their loans, it may lead to opportunistic behaviour or excessive risk-taking in the firms' investment decisions.

3.3. Monetary policy and the soft budget constraint in banking

Kornai et al. (2003) addressed the factors contributing to the SBC and how changes in those factors may lead to HBC. They mentioned the impacts of both fiscal and monetary policy. In our approach of this paper the importance of monetary policy deserves special attention as banks' lending or money creation is limited by the demand for credit, which is influenced by monetary conditions controlled by monetary policy. Through several instruments and measures of monetary policy, central banks are able to influence the demand for credit. This is an external factor for banks and the endogenous money theory revealed that monetary policy may be the ultimate constraint in money creation (McLeay et al. 2014a, 2014b).

However, there are several periods and cases when monetary policy is not effective in limiting banks' money creation. First, in the periods of very low interest rates monetary policy have a very limited room for maneuvering to influence the demand for credit – in this case monetary policy would want to increase the demand for credit. The zero lower bound problem first emerged in the 1990's in Japan (McCallum 2003; Ueda 2005), became a common problem in many countries following the 2008 global financial crisis (Swanson – Williams 2014; Gambacorta et al. 2014). Second, the economic history is full of the history of monetary failures. Third, as several country case studies prove it, the monetary transmission mechanism is far from being perfect (Égert – MacDonald 2009; Fan – Jianzhou 2011; Mishra et al. 2012; Acharya 2017). Fourth, according to the original sin hypothesis, in countries with a high private sector foreign currency denominated debt, monetary policy is ineffective to influence demand for credit in the local currency (Eichengreen – Hausmann 1999; Hausmann – Panizza 2003). In other words, there are many periods and situations in which monetary policy is not able to act as an effective constraint on credit demand.



4. BANKS' LIMITS TO MONEY CREATION AND THE SOFT BUDGET CONSTRAINT

For banks to have HBC, they need limits beyond monetary policy to restrict their ability to grant unlimited credit. These constraints, which are inherent to the operational characteristics of banks (i.e. internal factors), are as follows: 1) profitability requirement: banks, as profit-oriented companies, have to make profit on lending; 2) internal risk management practices: banks, as professional risk managers, have to be able to manage the risks of newly granted loans, and 3) regulatory requirements: banks, as strictly regulated companies, have to meet the regulatory requirements (McLeay et al. 2014a). If these factors are effective, banks have HBC, if they are not, banks budget constraint is inherently soft.

4.1. Bank profitability requirement and credit risk management practices

In principle, banks' profitability requirement means that their inherent interest is to finance good projects, which can repay loans. To do so, besides the selection of a diversified portfolio of seemingly good projects, banks provide the service of professionally monitoring and enforcing debt contracts, called delegated monitoring (Diamond 1984, 1996). However, several times, banks may misjudge both the quality of projects and the creditworthiness of borrowers. Banks' over-optimism is particularly common in the booming phase of the economic cycle. Banks' behaviour is inherently pro-cyclical (Adrian – Shin 2010; Huizinga – Laeven 2019; Borio 2020). Banks' procyclical behaviour can contribute to private sector over-indebtedness, and consequently to cyclical economic crises (Kumhof – Jakab 2016). Moreover, banks short-term profit interests are often not served by financing good projects, but by finding innovative solutions to be able to profitably finance not-so-good projects (Arping 2012).

There are many examples of this in the history of recent bank failures. This includes the emergence of the originate-to-distribute banking model based on securitization and the bank failures that resulted from its collapse, such as WaMu in the US or Northern Rock in the UK. Under the originate-to-distribute banking model, banks were temporarily able to profitably finance customers who would not have been creditworthy under a strict, prudent credit assessment. Subprime lending can also be interpreted as a consequence of the banks' SBC. Another example of how profitability requirements not necessarily create HBC is the spread of FX lending in the early 2000s in several Central and East European (CEE) countries. In these countries, FX lending appeared to increase bank profitability in the short run, as it significantly increased the demand for FX loans with lower interest rates than domestic currency denominated loans. At these lower rates several – otherwise not creditworthy- clients seemed to be creditworthy. However, with the drying up of the foreign exchange markets and the corresponding rise in foreign exchange rates, and the depreciation of local currencies, foreign currency loans that previously looked good and profitable became a source of significant losses for banks. This episode of FX lending in the CEEs is also a case for the lack of HBC. As these examples show, the short-term profit interest of banks encourages excessive credit risk taking, even though banks are supposed to be professional credit risk managers.

4.2. Bank profitability requirement and liquidity risk management practices

By lending banks perform maturity transformation, as they typically lend for long-term while deposits are short term, i.e., banks are exposed to run (Diamond – Dybvig 1983). Banks are the



professional liquidity risk managers and as such are able to manage the liquidity risk arising from maturity transformation. In principle, professional liquidity management also limits banks' ability to lend, as it requires banks to maintain an adequate level of liquid assets and sufficient funding structure. However, the banks' short term profit interest is often served by not prudent liquidity risk management, but by maintaining more fragile, but more profitable liquidity position. We also can quote several famous failure cases to demonstrate this.

For example, the 1984 failure of Continental Illinois, then the seventh largest bank in the US, is a typical case in this regard. The balance sheet structure of the Continental Illinois was different from the usual, as loans were financed primarily from the wholesale money markets rather than deposits, providing the bank with cheap but volatile funding. Continental Illinois had an aggressive and risky growth strategy, accumulating large debt portfolios in assets such as the energy sector and Mexican assets. The unfolding Mexican sovereign crisis, followed by the fall in energy prices, undermined the wholesale markets' confidence in the bank's stability. Volatile, easy to withdraw funds were withdrawn from the bank in a rapid, electronic bank run (Acharya et al. 2009). The most recent case illustrating the contradiction between the proper management of maturity transformation and the short-term profit interest of banks is the collapse of the American Silicon Valley Bank (SVB) in March 2023. The liabilities of the bank mainly consisted of large, uninsured sight deposits by well-informed, financially literate start-up companies, while high-quality long-term bonds of the US Government Sponsored Entities made up most of its assets. SVB purchased those bonds in the period of very low interest rates to realize interest income between the sight deposit and bond rate. However, as the interest rate started to increase, the bonds value decreased and caused large losses for the bank. Information about the bank's problems reached depositors instantly via social media, resulting in an immediate bank run and the bank's failure. As these examples show, the short-term profit interest of banks encourages excessive liquidity risk taking, even though banks are supposed to be the professional liquidity risk managers.

Given that neither the banks' profitability requirements nor the banks' internal risk management practices guarantee a stable banking system with HBC, the remaining question is whether the banking regulation can grant it.

5. CAN BANK REGULATION IMPOSE HARD BUDGET CONSTRAINT ON BANKS?

In practice when banks are confronted with a conflict between either the exposure to the risk of clients' creditworthiness or a potential liquidity risk in their own portfolio and their short-term profit interest, they tend to decide in favour of the short-term profit motive. In principle, banking regulation is intended to force banks to resolve these conflicts and to operate in a prudent, non-excessive risk-taking manner, i.e., within the HBC. We raise doubts about the capacity of the system of bank capital and liquidity regulation to fulfil this role.

5.1. Capital regulation and the budget constraint for banks

The capital requirement for credit risks is calibrated to ensure that banks' potential losses are covered by their capital and if needed by their owners, but not by the state or by their depositors.



If banks' profit goes to the owners and losses to the depositors, it encourages excessive risk-taking and creates SBC. If owners are enforced to cover potential bank losses, banks have a HBC. In other words, the higher the banks' capital requirements, and the higher the owners' loss absorption capacity then this contributes to a harder budget constraint for banks. Capital regulation is therefore one of the regulatory tools that may impose HBC for banks. But is it able to guarantee that?

Capital requirements regulation of banks prior to the 2008 global financial crisis did not result in HBC. The pre-crisis period was marked by dilution of capital, which means that regulators accepted more-and-more debt-like instruments as part of banks' regulatory capital. According to the global and European rules (Basel Accords, European regulations and directives) banks must hold at least 8% of regulatory capital relative to their risk-weighted assets. However, the concept of regulatory capital has been significantly diluted before the crisis, as banks innovated several types of hybrid capital items that did not give the owners control rights but appeared to have loss-absorbing capacity like that of the capital. For the buyers these hybrid bonds appeared to be low risk/high return investment. Investors assumed that the banks' need for the additional issues of such hybrids and their perceived intention to maintain their reputation, banks would take them as ordinary debt obligations (Resti – Sironi 2010). According to the survey of the [Committee of European Banking Supervisors \(2007\)](#), in the pre-crisis EU the largest volume of hybrids was issued by banks in the UK, Germany, Spain and the Netherland. As a result, on extreme, no more than 2% equity and disclosed reserves (i.e., the money of the shareholders) were available for loss absorption.

The post-crisis banks regulatory package, the Basel III, and its European version, the capital requirements regulation and directive, have completely re-regulated the capital requirements. The new regulation significantly increased the required level of shareholders contribution, called CET1 (Common equity tier 1) requirement. Its minimum level became 4.5%, more than double of the earlier 2%. The requirements for inclusion of hybrids in regulatory capital also became much tighter. On the top of the 8% risk-weighted capital requirements, the post-crisis regulation also introduced several so-called capital buffer requirements, that must be met by CET1 capital. Banks must build up these capital buffers from their profits in good times and can use them in bad times, i.e., their level can go down as low as 0. (The types of buffers are listed in [Table 1](#)). This means that they may be able to meet the minimum capital requirement without restraining their credit expansion. In addition to the increased risk-based capital requirements additional limits for banks' leverage were also introduced. It required that banks' total (non-risk-weighted) assets must also be backed by at least 3% capital. The purpose of this regulation is to ensure that the capital requirements cannot be reduced too much by shifting the banks' asset allocation towards the low-risk-weighted categories by regulatory arbitrage. Moreover, since the introduction of Basel II regulation in 2007, the supervisory authorities have the right to require more capital in the so-called Pillar 2 framework. Pillar 2 is about the right of supervisory authorities to require additional capital in top of the general obligatory requirements on individual basis, in line with the risk profile of banks. [Table 1](#) summarizes the composition of CET1 capital requirements, as it is today, while [Figure 1](#) shows the CET1 ratio for the largest American and European banks.

As [Figure 1](#) shows, for the largest, systematically most important banks' CET1 to risk weighted asset ratios are typically in the range of 10–18%. As regards the non-risk weighted leverage ratios, they are typically between 5 and 10% for most of the European countries



Table 1. The structure and level of CET1 capital requirements

	% of risk weighted assets	Cumulated CET requirements, %
CET 1 requirement out of 8% obligatory capital requirements	4.5	4.5
Capital conservation buffer (fixed size)	2.5	7.0
Counter-cyclical buffer (in times of credit boom)	up to 2.5	up to 9.5
G-SII or O-SII buffers (additional requirement for globally or otherwise systematically important institutions)	up to 3.5 or 2.5	up to 13 or 11.5
Systemic risk buffer (in case of emergence of systemic risks)	up to 3	up to 16 or 14.5
Pillar 2 requirements	discretionary, no numerical regulatory limit	typically 10–20

(Figure 2), and also for the largest US banks. In other words, even in the case of the most well-capitalized banks, bank owners do not put their own money at risk, and manage the risk-weighted assets that are 6–10 times larger than their invested capital and non-risk-weighted assets that are 10–20 times larger. Our question therefore can be re-formulated as follows: Are the significantly tightened capital rules of Basel III able to limit excessive risk-taking by banks for short-term profit motives, if the profit is generated on assets representing a multiple of the invested capital? If the answer is yes, the capital regulation can impose HBC.

However, our answer is a definite “No” for several reason. First, the risk weighted capital requirements, especially the CET1 requirement are too low to absorb potential losses of banks (Thakor 2014). Second, the risk-weighting system encourages regulatory arbitrage to allow the same risks to be taken with lower risk weights, and thus, lower capital requirements. As 20 prominent economists wrote in an open letter published in the Financial Times about the risk-weighting system “This system encourages “innovations” to economize on equity, which undermine capital regulation and often add to systemic risk. The proliferation of synthetic AAA securities before the crisis is an example.” (Admati et al. 2010). Third, the effectiveness of the leverage ratio requirement, introduced after the crisis, is highly questionable, as in extreme cases it allows to grant 33 units of credits per unit of capital. Even with the average leverage ratios of around 6–7% banks can lend 14–16 times more than their capital.

For these reasons, Admati (2016) argued that the Basel III regulatory reform was a missed opportunity to establish a well-capitalized, crisis-prone banking system. According to the influential book of Admati and Hellwig (2013), 30% of (non-risk weighted) assets would probably be a sufficient capital requirement, out of which 20% would be the regulatory minimum, and the additional 10% would operate like the present capital buffers. The authors suggested a regulatory regime, in which the moral hazard of excessive risk taking is significantly reduced, as much bigger part of the losses must be covered by the shareholders. However, in the Basel III



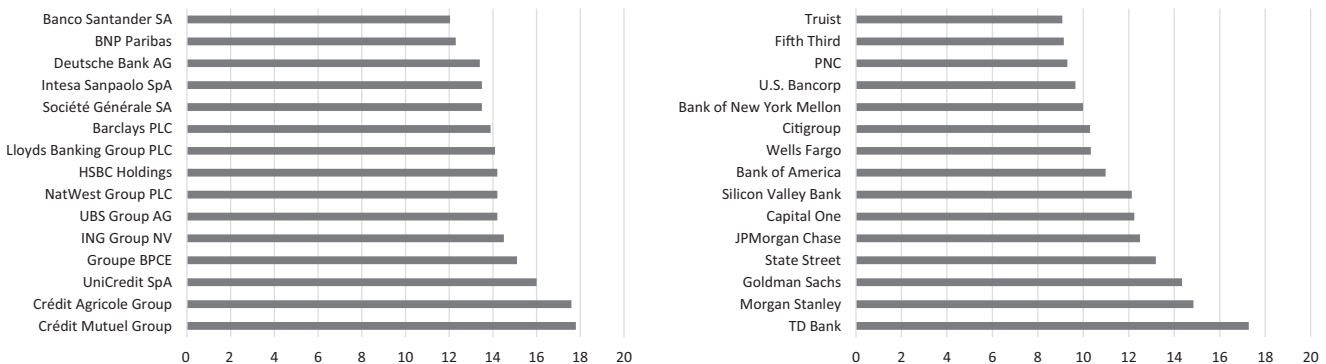


Fig. 1. CET1 ratio for largest European and American Banks, 2022 (%)

Source: [statista.com](https://www.statista.com)



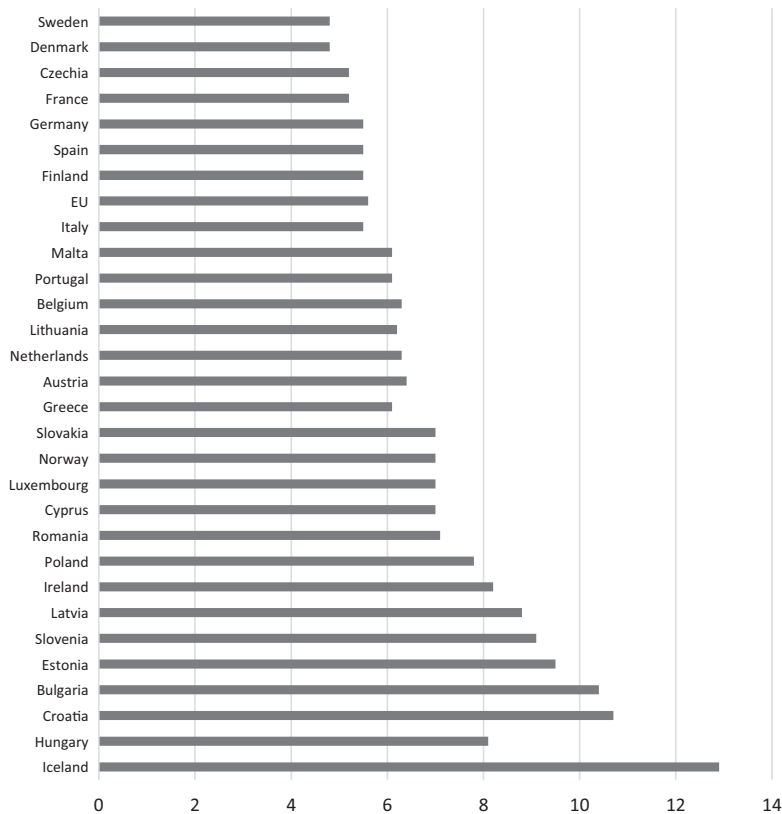


Fig. 2. Leverage ratio for EU banking systems, Q1 2022 (%)

Source: [statista.com](https://www.statista.com)

framework, the basic logic of earlier capital regulation remained unchanged, i.e., it let banks to operate with high leverage and tried to make the regulation more sophisticated, more risk-adjusted and more comprehensive. This resulted in hundreds of pages of banking regulation, which is difficult to follow and easy to arbitrage, but still unable to impose HBC on banks.

5.2. Liquidity regulation and the budget constraint for banks

Before the global financial crisis there were no generally accepted global or European standards for liquidity regulation. During the crisis, interbank markets dried up and liquidity disappeared completely from the markets, highlighting the need for bank liquidity rules. In response to these developments, Basel III and the related European banking regulations requires to comply with two liquidity ratios, the short-term liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) for a one-year horizon.

According to the LCR requirements, banks must have a liquidity buffer of high-quality liquid assets, which is big enough to ensure survival in a liquidity stress situation, i.e., when the volatile



sources are withdrawn from the bank. LCR rules define how to calculate the net cash outflow and the liquid assets for coverage. That is, according to the LCR rules, the volume of the strictly defined high quality liquid assets must be higher, than the 30 days net liquidity outflow, which is also strictly defined. To determine the liquidity outflow, the regulation assigns a run-off rate to each category of liabilities (BCBS 2013). For example, the run-off rates for retail deposits are 3% or 10% depending on whether the deposit is stable or not, while for corporate deposits it is 25% or 40% depending on whether it is generated by clearing, custody and cash management activities, or not.

On average, the LCR of the European banks is high above the requirement (Figure 3). Does it mean, that they are resistant to liquidity shocks, as the LCR requirements prevent excessive maturity transformation, and thus represents HBC for banks? As the Silicon Valley Bank’s case highlighted, due to modern communication facilities and the social media, the run-off rates can be much higher than those estimated by the regulators. For the Silicon Valley Bank, the outflow of corporate deposits was almost 100%, as well-informed start-ups immediately became informed of the potential failure. That is why the run was called “the first Twitter-induced” bank run (McHenry 2023). As the role of the immediate communication channels become more-and-more widespread, the run-off factors for uninsured deposits can converge to 100%. In light of these developments the regulators perception on stickiness of deposits must change in the future. Moreover, in the specific stress scenarios the high-quality liquid assets determined by the regulators, can turn out to be not so high quality. For example, we can refer to the government bonds and the US agency bonds,³ which, with the end of the period of zero lower bound, as interest rates started to increase, suffered significant capital losses.

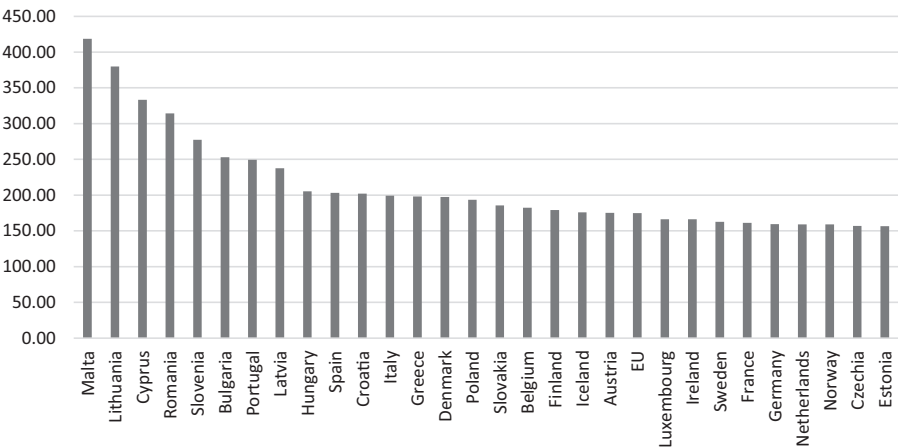


Fig. 3. LCR for European banking systems, 2021 (%)
Source: [statista.com](https://www.statista.com)

³US agency bonds are securities, issued by the US government-sponsored entities, such as Freddie Mac or Fannie Mae. They have a higher credit risk than the Treasury bonds, but much lower than private companies because they are expected to be supported by the US government.



The NSFR requirements formulate a basic principle of prudent banking, namely that the long-term assets should be financed by stable and not by volatile funds. This means that banks must have at least as many stable funds (called available stable funds) as required by the regulation (called required stable funds), depending on the composition of their assets. As Figure 4 shows, the NSFR for the Euro-area banks, on average, are well above the minimum requirements and this is also true for all EU member states. However, the required stable funds can be significantly underestimated by the regulators. A recent example is the 15% stable funding requirement for the US agency bonds, which really represented a very low credit risk, but highly exposed to interest rate risk. The risk of underestimation has materialized in the case of Silicon Valley Bank. On the other hand, the available stable funds can be significantly overestimated. For example, according to the NSFR rules (BCBS 2014), 50% of the short-term deposits with maturity less than one year by the non-financial firms can be considered as stable funds. However, as it also turned out in the case of Silicon Valley Bank, these funds tend to be not so stable in stress situations. As in relation to LCR the NSFR requirements also indicate that the assumptions on stickiness of deposits are questionable. Consequently, neither the LCR nor the NSFR, or any similar ratio requirements are able to impose HBC on banks. This is the reason why, after the collapse of the Silicon Valley Bank, and the failure of Credit Suisse and other banks in March 2023 several very radical approaches have been formulated. For example, Paul Tucker, former deputy governor of the Bank of England, in a Financial Times interview⁴ suggested that banks should keep 100% collateral with central banks on their short-term deposits. Another example is the wide-range debate on the deposit insurance coverage. Many argued that the deposit insurance should be 100% for sight deposits.

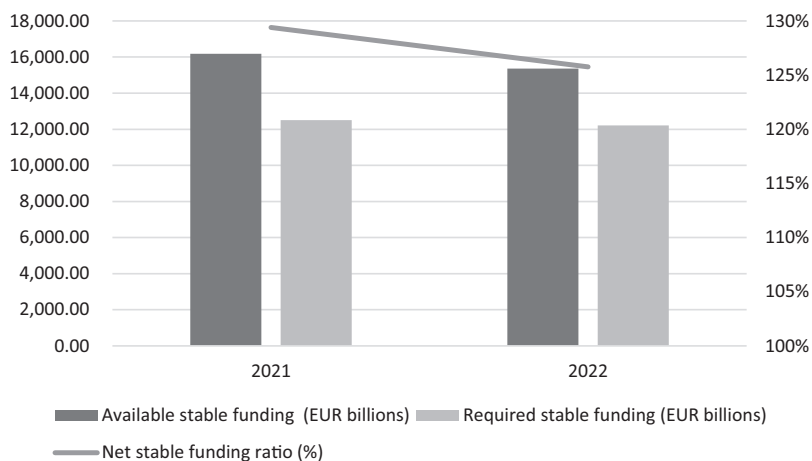


Fig. 4. NSFR ratios for Eurozone banks

Source: ECB Supervisory statistics.

⁴<https://www.ft.com/content/f0fe6555-7929-4b4d-8739-028b3b0aad4e>.



6. CONCLUSIONS

A key observation of the endogenous money theory is that in the modern economies more than 80 per cent of money in circulation is created by commercial bank lending (*inside money*). The state also creates money by printing cash and by the central bank buying government papers issued for financing the budget deficit, but this (*outside money*) represents only a small fraction of the money in circulation. Commercial banks need no previously collected deposits to issue loans, as the deposits are created by those loans. When the banks record a loan contract on the asset side of their balance sheet, they also record a deposit on the account of the enterprise credited. In this process, banks act not as financial intermediaries, but they create new money. When the enterprise repays the loan, this money is cancelled. There are several factors that limit the commercial banks' lending capacity, but the really binding limit is the demand for credit itself. However, credit demand can be excessive, either because of the overoptimism of companies and banks in the upward phase of the economic cycle (procyclicality) or simple because of the companies' distorted perception of risks.

The short-term profit hunger of banks may further stimulate credit expansion, rather than limiting it through good credit- and liquidity-risk management practices. In this paper we argue that neither the profitability requirement nor the internal risk management practices of banks can guarantee HBC. Setting a HBC is therefore left to bank regulation. We assessed the recent changes in international banking regulations introducing new capital and liquidity requirements, which are much stricter than before. We demonstrated, that neither of these regulatory tools can impose HBC. Moreover, the modifications of the regulation i.e., make it more detailed, more comprehensive, more sophisticated, more risk-based – is not at all a way that can guarantee HBC. In the present regulatory framework, the SBC problem in banking is inherent and not just a particular syndrome under specific situations of liquidity circumstances, availability of funding or time inconsistency. Therefore, if we want banking regulation that imposes a HBC on banks and thereby supports financial stability, we need to rethink the role and regulation of banks in the economy. This thinking has started after the 2008 crisis and gained momentum in 2023 after the collapse of the Silicon Valley Bank and Credit Suisse.

If the aim is to overcome the problem of banks' SBC, either a new approach to the role of banks (such as a narrow banking system) or a new approach to bank regulation (such as multiple CET1 requirement and/or a new approach to bank liquidity requirements) is needed. If this does not happen, the banks' budget constraints will remain soft, which will inevitably lead to individual and systemic banking crises from time to time.

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