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Asset Prices, Inflation and Monetary Control

Re-inventing Money as a Policy Tool

by

Peter Spahn

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Institut für Volkswirtschaftslehre (520)
Universität Hohenheim, 70593 Stuttgart

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Abstract

Low inflation on goods markets provides no reliable precondition for asset-market stability; it might even promote the emergence of bubbles because interest rates and risk premia appear to be low. A further factor driving asset demand is easy availability of credit, which in turn roots in the banking system operating in a regime of endogenous central-bank money. A comparison of Bundesbank and ECB policies suggests that credit growth can be controlled more efficiently if rising interest rates are accompanied by some liquidity squeeze that supports the spillover of a monetary restriction to capital markets. The announcement effect of a central bank Charter including the goal of financial-market stability helps to deter private agents from excessive asset trading.

Keywords: open-market policy; asset-price bubble; euro money market; ECB strategy

JEL code: E5

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1. Introduction

One of the outstanding characteristics of world macroeconomics in the last two decades has been the concurrence of comparatively low inflation on goods markets and high volatility on asset markets, i.e. periods of asset price inflation (bubbles) followed by the inevitable collapse; and although types and locations of asset markets that were seized by speculation varied - shares, real estate, natural resources, bonds and more sophisticated financial instruments - observers gained the impression that the point at issue was not just an accidental occurrence of a row of *independent* manias, but rather the new phenomenon of *general* asset price inflation. This impression was reinforced by the empirical finding of strong growth of liquidity, again on a world scale (Rüffer and Stracca 2006; Belke et al. 2008). Banking business soared; the ‘originate and distribute’ strategy enabled high growth rates of bank credit; and new financial instruments offered seemingly attractive yields for investors.

It should not be disputed that bubbles and over-banking to a large extent resulted from faulty regulation and thus can be contained by smart institutional micro policies. But besides these supply-side measures, a macroeconomic perspective might be able to present a monetary policy response as well. A straightforward reaction would be to embark on a restrictive policy course whenever goods *or* asset price inflation sets off *or* money growth figures appear to indicate that one or both types of inflation are imminent. The hesitation to follow such a recommendation are motivated from two points:

- The instability of money velocity has undermined policy strategies that tried to predict and to contain goods inflation by way of supervising and controlling a monetary intermediate target.
- True, excess money growth that does not flow into goods demand often, *but not always*, fuels asset price inflation. Moreover, the spillover process from the latter back to goods markets seems to be highly non-linear, and even uncertain with respect to its sign: wealth effects of rising asset prices might strengthen consumption, but the more dangerous topic is the deflationary impact of bursting asset bubbles that works through illiquidity, insolvency and bankruptcies.

Therefore it is reasonable to treat goods and asset-price inflation as distinct phenomena (without of course denying various two-way feedback mechanisms between these processes). But in this case, remembering the famous *Tinbergen* Rule, monetary policy also should dispose of *two independent* stabilization tools that can be applied to each type of inflation. Accordingly, this paper explores whether central banks, besides standard interest rate policies, can use quantitative management of base money supply as an *additional* tool that should be applied in times of extreme monetary disorder. Admittedly, this is an rather unusual idea because a uniform money market generally implies a strict price-quantity relationship so that the rate of interest and the quantity of high-powered money cannot both be regarded as exogenous. In the current financial crises however, central banks have demonstrated that the provision of liquidity to some extent can be disentangled from the choice of the target interest rate. It has to be analyzed

whether this instrumental set-up is bound to a low-interest regime, or can likewise be applied in an anti-inflation strategy.

The paper is organized as follows. The next Section argues that financial-market stability cannot be seen as a by-product of price stability; moreover, there are hints to a new trade-off indicating a higher risk for asset price bubbles to emerge particularly in periods of low inflation. The following two Sections present a comparison of the Bundesbank's and the ECB's way of policy making. The key point is that the former sometimes made use of quantitative money supply controls whereas the latter does not; in EMU, increases of short-term interest rates can go along with rising growth rates of base money. The last two Sections suggest to organize the money market as a ‚floor‘ system that allows, to some extent, an independent employment of the interest rate and the money supply tool. It is suggested to use open-market sales of long-term bonds as a means against emerging asset price bubbles.

2. Trade-off between Monetary and Financial Stability?

The venerable quantity theory of money can best be understood as providing a kind of ‚budget constraint‘ for the macro economy.¹ As the notion of a budget constraint is indispensable in economics, it is comprehensible that many economists resist the downgrading of monetarist components in monetary policy making (*Goodhart 2007*). But it is hard to deny that central banks all around the world succeeded to contain inflation by means of interest rate policies, without taking figures of monetary aggregates too seriously. This does not mean, of course, that the aforementioned budget constraint no longer exists, rather, central banks were able to control its position by means of direct interest rate policies.

The reasons for central banks' success of containing inflation are manifold. Supply functions are flat in the range of normal utilization rates; free trade fosters fierce competition; and wage rates are depressed on account of excess labour supply in the world market. Moreover, improvements in the institutional set-up and the instrumental techniques of central banks have increased their reputation around the world; this contributes to stable long-term inflation expectations (hovering around the target rate of inflation) so that supply functions are not prone to expectational upward shifts.²

¹ This can easily be visualized by transforming the quantity equation into a goods demand function which gives a downward-sloping line in an inflation-growth diagram.

² A caveat should be noticed however: measurement of long-term inflation expectations via financial-market indicators can be biased towards target inflation rates because heavy doses of communication used in inflation targeting strategies might distort the information content of asset prices. The more central banks succeed to steer market agents' beliefs, the less private information flows into market prices. It has thus been found that in inflation targeting countries long-term inflation expectations are uncoupled from actual inflation outcomes. „There is an intrinsic tension, which central banks cannot ignore, between their ability to manage private sector expectations and provide guidance to professional market participants, on the one hand, and their need to learn from markets, on the other hand“ (*ECB 2009a*, p. 86; cf. *Morris and Shin 2005*).

At the same time, instability of asset prices grew, more or less parallel to the Great Moderation of goods market inflation. The proposition that price stability is a precondition for stability on financial markets (*Bordo et al. 2000*) now appears in a less favourable light. An obvious hypothesis is that belief in the stable value of money relieves financial assets from inflation risk and thus increases the attractiveness of financial markets as a playing field for professional (and unprofessional) investors. Lower long-term interest rates then produce a spillover to other asset markets. Low inflation and low interest rates generally might lead market agents to take more risks (*Borio and Lowe 2002; ECB 2008a; Trichet 2008; Weber 2009*). Hence, the remarkable progress in understanding, techniques and performance of goods market inflation control might involuntary have sown the seeds of financial-market instability.

On a more technical level, it should not be ignored that the 'art of central banking' over the years has abandoned - for many good reasons (*Bindseil 2004*) - the attempts to exert effective quantitative control of high-powered money in the banking system. There were periods in some countries where monetary aggregates had been selected as intermediary targets, but even the ECB has downgraded money to a pure information variable. As a consequence, the banking system appears to operate without quantitative liquidity constraints - and the whole burden of controlling banking activities falls on price incentives, triggered by central banks' interest rate policies.

Before the latter road is explored further, one should ask whether asset markets need macro control if monetary policy succeeds to stabilize the path of goods prices. Taking into account how much effort the economics profession has devoted to the problem of explaining and controlling the level of goods prices, it is curious that asset prices have not attracted similar attraction in the history of economic thought. True, there is a literature on speculative bubbles on single asset markets, but this is no point at issue here; it has also been shown that temporary investments in those markets can well be justified on the ground of rational portfolio choice.

The new challenge for stabilization policy is an asset inflation spanning over the whole range of markets. A well known analytical approach to capture the value of overall wealth is *Friedman's* concept of permanent income that gives an estimate of personal or society's wealth via the discount rate. From this it follows that controlling nominal income also puts a constraint on asset prices. But this depends, firstly, on asset prices being determined by 'fundamental' market forces, and portfolio theory has detected many reasons why this anchor might lose its bearings. Secondly, the fundamental value of assets, particularly shares, may be uncertain after historical events or significant structural change, e.g. the world economy's new shape after communism or the 'new economy' boom. Thirdly, there may be multiple fundamental equilibria, e.g., prices and rents of flats in quickly developing large cities or regions; also an inflation targeting strategy with endogenous money leaves the *level* of prices (on goods and asset markets) undetermined.

Taken together, except for states of long-run equilibrium, all these arguments provide plenty of reasons to feel concerned about the stability of asset prices. Worries are reinforced, if bank credits to finance new positions are easy available. After all, even if asset prices are governed by fundamental yield flows, a banking system acting without bind-

ing financial constraints is prone to a bubble of excess intermediation, i.e. a pyramid of credit and debt contracts that might pose a severe threat for the stability of financial markets. Possibly, interest rate increases might keep a check upon credit expansion and asset prices; however, for good reasons central banks usually practise the strategy of interest rate smoothing (*Cobham 2003*), and small-step increases are unlikely to put an immediate halt on an enfolding asset price bubble.

Obviously, also asset markets need a kind of budget constraint, which however up to now has not been deliberately provided by monetary authorities. This does not mean that constraints were absent. During the gold standard, the obligation to obey to the principle of ‚backing‘ bank money served as an anchor for both goods and asset prices. In fiat-money systems, formal restrictions were meant to fill the gap, but regulations more and more were seen as costly and thus came to be relaxed (*Borio and Lowe 2002*). Whereas the control of goods market inflation was substantially improved by institutional devices (new rules for central banking), commercial banking business and financial markets were expected to run more efficiently with less regulation. In any case, financial-market instability on a large scale is a relatively new phenomenon. Therefore taking a closer look on changes in the ‚art of central banking‘ might detect the sources of the enlarged elasticity in the banks' supply of finance.

3. The Bundesbank's Way of Policy Making: Traces of the ‚Scissors Effect‘

According to an oral tradition among German economists, the saying ‚keeping the money supply scarce‘ has been a principle of the Bundesbank's understanding of sound central banking already before the rise of monetarism. But it should not be neglected that until the break-down of Bretton Woods money creation mainly was governed by the foreign-exchange market. In 1974, the Bundesbank embarked on the experiment of a Friedmanian money supply management, but gave up soon because of high interest rate volatility in the money market; subsequently a variety of monetary aggregates were chosen as intermediate policy targets. Rated by the high number of target misses, the strategy was a failure, but inflation was kept firmly in check.³

Taking a cursory look at the path of *CMB* (the monetary base corrected for changes of reserve ratios) and short-term interest rates in Germany (Figure 1), provokes a reminiscence to the famous ‚scissors policy‘: a series of interest rate movements should be accompanied and accelerated by additional quantitative money supply measures (*Lutz 1936*, pp. 47-8; *Friedman and Schwartz 1963*, p. 272). It appears as if the Bundesbank

³ Even with hindsight, it is tiresome to correct all the myths about the Bundesbank's famous money supply control. Recently, a group of renowned ECB economists including *Otmar Issing* wrote that „at the end of 1978, the potential-oriented monetary targeting strategy had been established and had proven its value“ (*Beyer et al. 2009*, p. 21). But we know from an evaluation of internal debates that Bundesbank officials just at that time were ready to skip that strategy because of permanent expansive target misses. Actually it was the establishment of the EMS that let the idea of monetary targeting survive because the bankers wanted to keep the option of an alternative policy rule if the obligation to defend the exchange rate would prove to be a too-high risk for price stability (*Hagen 1998*).

had reduced the growth rate of high-powered money in each period of monetary restriction. But of course, *CMB* reflects the overall activity in the banking sector: the demand for minimum reserves and notes, which in the end depends on the volume of bank credit. This implies that the sudden stop of *CMB* expansion after 1965, 1973 and 1979 may simply show the effect of previous interest rate increases that finally managed to curb the banking sector's credit growth.⁴ But in each case, the Bundesbank actually attempted to execute some 'liquidity squeeze' in order to strengthen the message conveyed by its interest rate decisions.

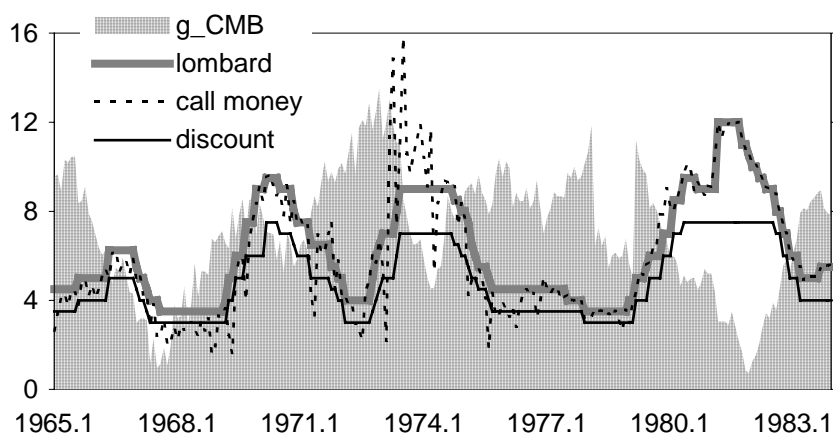


Figure 1: Growth rate (y-o-y) of CMB (monetary base corrected for changes of minimum-reserve requirements) and short-term interest rates in Germany

- During 1964-66, when rates were rising also abroad, the Bundesbank allowed commercial banks to replenish transaction-induced outflows of liquidity only at higher interest rates; also refinancing quotas were reduced. As can be seen from the behaviour of the call money rate, which remained within the interest rate corridor, the liquidity strain felt in the money market was not extraordinary though.
- This changed during the next episode where the call money rate for several months exceeded the lombard rate, indicating strict quantity rationing even with respect to the emergency-lending facility. After the collapse of Bretton Woods, foreign securities no longer represented liquid assets, and the Bundesbank succeeded to bring down banks' excess liquid balances nearly to zero.
- The next monetary restriction in the early 1980s, prompted by the aim to defend the internal and external value of the mark, was accompanied by substantial sales of currency reserves that implied concomitant liquidity losses in the German banking sector. These losses provided a convenient background for decisions on interest rate increases. The Bundesbank also stopped ordinary lombard borrowing, which was substituted by an 'extra' lombard facility at even higher rates; money market rates thus were kept inside the corridor.

⁴ The monetary restriction in the early 1990s is neglected here because of the intricate money supply effects accompanying the German currency union.

In all three periods, we can observe a fairly similar working of a monetary transmission process. The volume of bank credit, if plotted against credit interest rates, shows an anti-clockwise movement (Figure 2). The extension of bank loans is reduced along with rising interest rates; this pattern, if read with an analytical credit market diagram in mind, hints to a reduction of banks' credit supply (shift of the supply curve to the left), whereas in the depth of the recession, credit volumes shrink with decreasing interest rates (which shows a downward shift of the credit demand curve). Summarizing the evidence on the Bundesbank's way of controlling the money market, we find that quantity restrictions in the money market were applied, if feasible and necessary, in a controlled and smoothed way. The remarkable success of this type of liquidity management can be seen in the fact that narrow money and bank credit aggregates reacted in a systematic fashion to the course of the Bundesbank's interest rate policy.

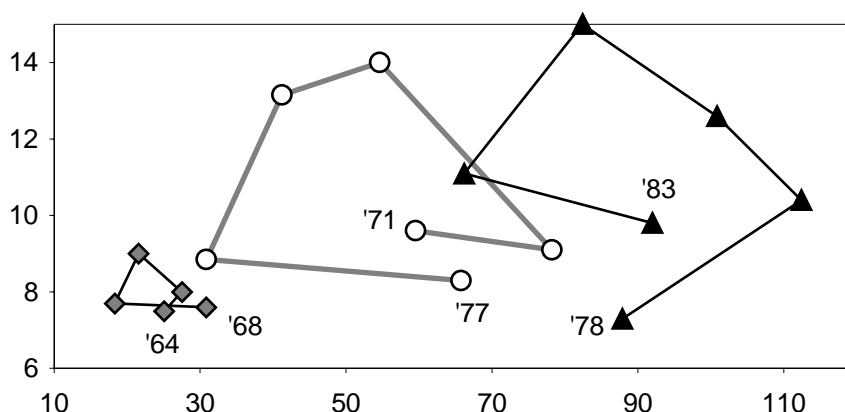


Figure 2: Credit market cycles: new bank loans (including securities) to private non-banks (DM bill.) and bank-credit interest rates in Germany

4. Independence of Interest Rates and Base Money Supply in EMU

For well understood reasons, the ECB tried to avoid the impression that the quantity of high-powered money was a demand-determined variable. Even when operating in the fixed-rate modus of its repo tender policies, the ECB most of the time fixed a maximum volume of refinancing credit that was extended to the commercial banking sector.⁵ This limitation was binding: during the first two years since its inception, commercial banks' bids exceeded the ECB's allotment of base money to a vast extent; the allotment-bid ratio finally, in summer 2000, fell below 1% (Figure 3). But overbidding in no way was caused by a liquidity shortage, it rested on the speculation of imminent policy rate increases that induced commercial banks to stock up on cheap reserves. After switching to variable-rate tender allotment, ratios normalized at around 80%, and their volatility fur-

⁵ In the following, the years 2008-10 are neglected in order not to mix up the peculiarities of 'normal' monetary policy making with the financial-market turmoil of the subprime crisis and its aftermath.

ther diminished when in March 2004 the duration of repo transactions was shortened to one week, thereby doubling their volume (ECB 2008b).

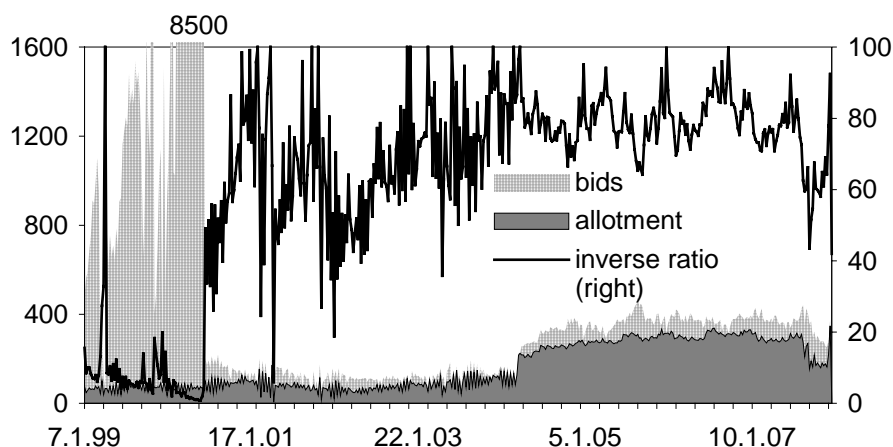


Figure 3: Commercial banks' bids and base money allotment (€ bill.) in ECB's main refinancing operations

Over the period 1999-2007, the ECB improved its liquidity management in a substantial way, marginal lending and deposit facilities were taken up less and less. This can be seen from an inspection of the interest rate corridor, where the borderlines are given by a 'penalty' lending rate and the deposit rate. The overnight interest rate (*EONIA*), as the price-theoretic gauge of supply-demand imbalances in the interbank money market, diverges from the ECB's main refinancing rate, but this volatility diminishes after 2003 (Figure 4).

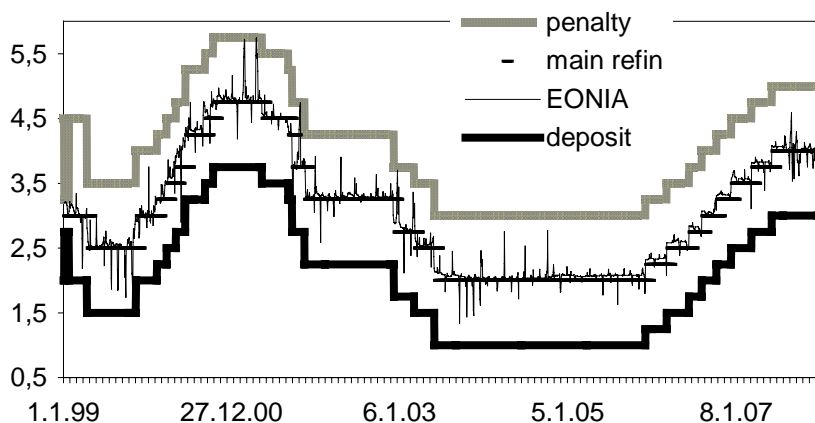


Figure 4: Interest rate corridor in EMU

Central bank balances were used, more or less completely, for keeping accounts with the ECB and distributing notes to the non-bank public (Figure 5). Taking account for the fact that note distribution did not begin before 2002, both components of base money developed quite evenly thereafter, with the growth rate of note circulation decreasing steadily over the years and the growth rate of central bank accounts (reflecting

mainly minimum-reserve requirements) tracking the volatility of commercial banks' business. Apparently, the dynamics of this business seems to be unaffected from the interest hike starting in late 2005.

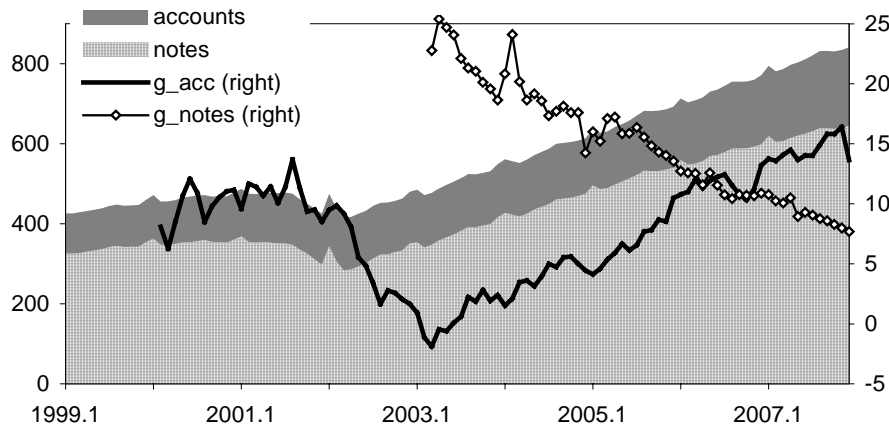


Figure 5: Use of central bank money in EMU (€bill., growth rates)

The bids-allotment ratio can be interpreted as a rough quantitative measure of liquidity strain in the money market; the stronger liquidity needs are felt in the banking sector, the more the ratio can be expected to increase. However there is hardly any perceptible connection between the course of interest policy and the quantity signal of money market imbalances (Figure 6). Within the full cycle from one interest rate peak to the next, one might expect a fainting excess demand when interest policy turns expansive, and an ever more visible excess demand when interest rates are on the rise; but the bids-allotment ratio, particularly after the shortening of repo credits' duration in 2004, stays around a value of 1.2.

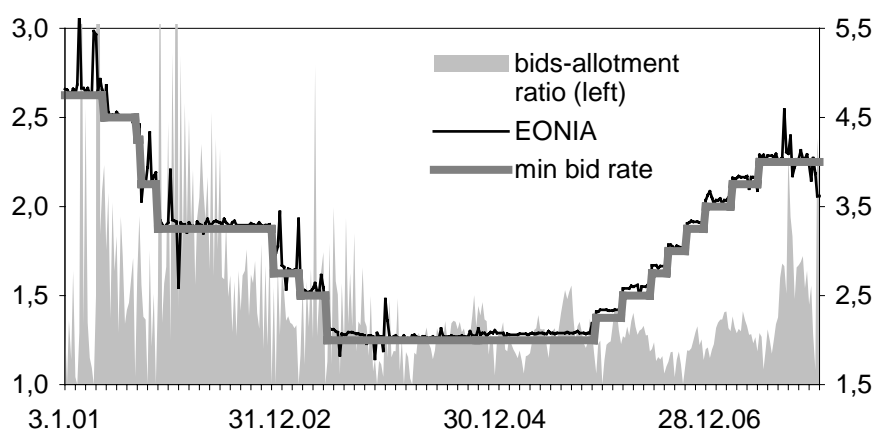


Figure 6: Excess demand for base money, EMU overnight interest rate and ECB's stipulated minimum-bid interest rates for repo transactions

The tendency of enduring equilibrium in terms of money supply and demand can also be read off from the close match between the market and the target rate of interest

over the whole period. Differences between these rates measure relative scarcity or abundance of money balances, given a policy stance of the ECB, but they do not reflect the overall sign of that policy stance. It is remarkable that during the series of interest rate increases since the end of 2005, there was obviously no growing scarcity of high-powered money; Figure 5 shows that the stock of base money (notes and accounts) remained on a steady path, with an *accelerating* growth rate of central bank accounts. Despite switching to a restrictive course of interest rate policies, the ECB was accommodating in quantity terms; the behaviour of balances' growth rate was procyclical.

Nevertheless, the spread of *EONIA* vis-à-vis the ECB's target rate is generally positive, which might be interpreted as the result of a liquidity deficit. In order to judge this argument we have to look more closely into the ECB's money market operations. In American-type repo auctions, banks are invited to place individual bids where final transactions are settled by using the individual bank's offered interest rate. Banks may place multiple offers at different interest rates, making the aggregated money demand function L look like a downward heading flight of stairs (Figure 7). The ECB announces a minimum bid rate i_{min} , but financial-market agents only conjecture about the final aggregate allotment M that the ECB calculates from data on (mainly) minimum-reserve requirements and note circulation.

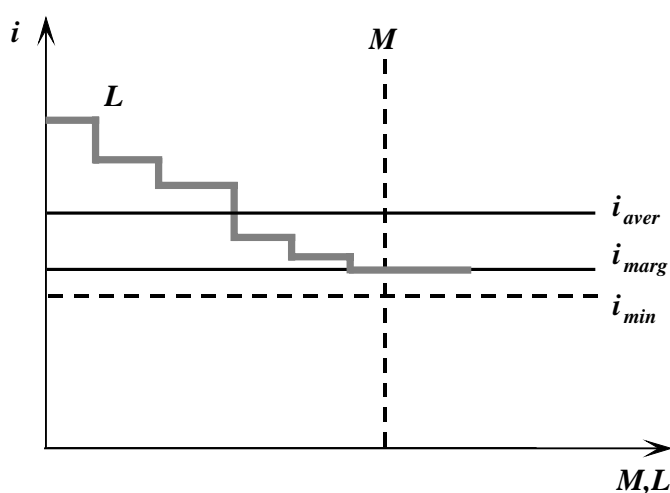


Figure 7: ECB's variable-rate tender auction with staggered money demand (multiple bids) and fixed allotment of base money

A bank may choose i_{min} as its individual interest offer, but runs the risk that with too many competitors pursuing the same strategy the allotment is rationed among all so that individual liquidity needs are not met. The aim to avoid that risk makes the demand curve steeper. „Banks insure themselves by bidding at higher rates to avoid unexpected rationing“ (Linzert and Schmidt 2008, p. 13). The demand curve can also shift upwards resulting in an intersection of L and M above the i_{min} line. This market equilibrium determines the effective marginal bid rate i_{marg} . As each bank pays its own offered rate there is also an average bid rate i_{aver} , which necessarily lies above i_{min} .

The ECB's former practice of two-week overlapping tender operations helped to smoothen the banks' bid behaviour, as a bank that found itself excluded from a present

repo transaction still disposed of the liquidity borrowed in the last transaction. The changeover to one-week repo transactions in March 2004 increased perceived liquidity risks on the part of banks.⁶ This can be seen from the spread building up between the marginal and the minimum bid rate during 2004 (Figure 8). Since then, the spread remained at around 5 bp in ‚normal‘ times. Whereas the spread $i_{aver} - i_{marg}$ is evident by construction, the spread between the *EONIA* and the average bid rate can be explained by the fact *EONIA* is the price for unsecured interbank lending whereas the ECB's refinancing credits are subject to collateral requirements. The usual interest-rate structure thus is $EONIA > i_{aver} > i_{marg} > i_{min}$.⁷

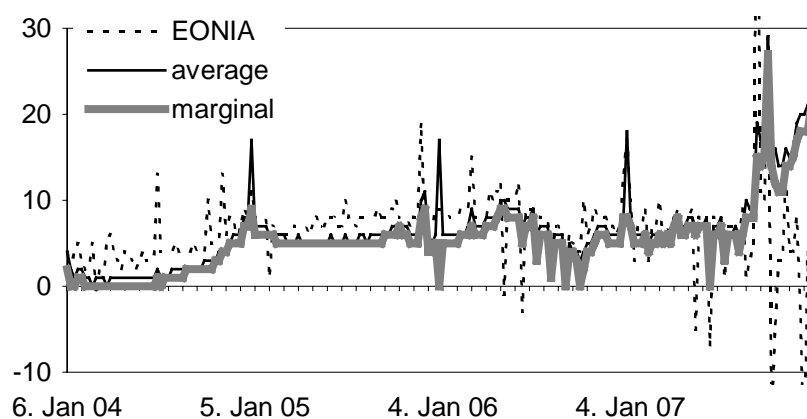


Figure 8: Spreads of EMU overnight rate, average and marginal repo rates as against minimum bid rate (basis points)

The upshot of all this is that the various spreads with respect to the minimum bid rate should not be seen as reflecting a deliberate policy of shortening the money supply. Rather these spreads are caused by structural features of the EMU money market and the techniques of liquidity provision. The series of interest rate increases that started in December 2005 basically had no bearing on the structure of these short-term rates.

True, there is no target for base money in EMU. But the accommodating behaviour of monetary policy with respect to the supply of narrow money obviously also had re-

⁶ „Prior to March 2004, when liquidity was obtained by overlapping two-week operations, banks always enjoyed a ‚liquidity buffer‘ provided by their allotment in the previous week. Being denied this buffer, concerns about receiving an allotment of desired size in each operation may have risen. Therefore, banks may dislike the uncertainty surrounding their allotment, and consequently bid more aggressively, i.e. placing bids above the expected marginal rate to increase the certainty of their pro-rata allotment. If many banks follow this strategy, an upward trend in the tender spread could become self-sustaining“ (Linzert and Schmidt 2008, p. 13).

⁷ In the second half of 2007, the beginning financial-market turmoil manifests itself in a larger spread, indicating a stronger ‚ex ante‘ liquidity preference on the part of commercial banks. At the same time however, the negative bias of the (very volatile) *EONIA* spread shows that banks felt to dispose of excess liquidity after borrowing from the ECB, which accordingly was invested in the money market. Later, after the fall of Lehman, these funds were reinvested in the ECB's deposit facility.

percussions on business conditions in the banking sector at large, on the growth of credit and of broader monetary aggregates. Despite structural breaks and evolution in the still developing monetary union, base money ($M0$) and broader monetary aggregates ($M1$ and $M3$) show rather close relationships (Figure 9). Just as the ECB lets the quantity of base money supply adjust to the commercial banks' needs, it accepts the path of broad money up to each point of time, when a refinancing operation is executed, as given. The evident non-controllability of $M3$, which hardly ever kept to its desired growth rate of 4.5%, appears to be rooted in the mechanisms and working techniques of the money market.

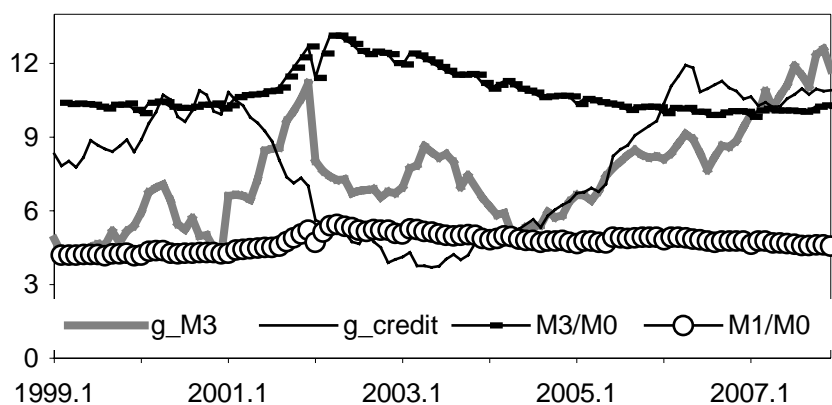


Figure 9: Growth of $M3$ and of EMU banks' credit to private non-banks, ratio of $M3$ and $M1$ to base money ($M0$)

The quantity of base money is no policy tool, neither is broad money. These aggregates are endogenously determined by activities in the banking sector, particularly by the path of credit growth. Monetary policy relies only on the relative-price effect that is triggered by a change of short-term interest rates: $\Delta i \rightarrow \Delta credit \rightarrow \Delta M3 \rightarrow \Delta base\ money$ (Disyatat 2008). The ECB adjusts base money supply not before its previous interest rate impulses have succeeded to alter the path of commercial banks' credits and deposits. However, the recent experience of a continuing increase of credits and deposits despite a series of restrictive interest rate moves since December 2005 (Figure 9) raises some doubts whether this instrument alone is always sufficient to control activities in the banking sector. Credit growth flattened out after a while, but $M3$ growth resumed. Obviously, EMU banks, in times of monetary restriction, feel hardly any liquidity stress in quantitative terms.

A striking difference to the above-sketched Bundesbank regime is the pattern of prices and quantities on the credit market (Figures 2 and 10). It has been argued above that a north-western movement of the market equilibrium point in times of a monetary restriction can be understood as a shift of the credit supply curve that in turn signals a fundamental reaction of the banking sector with respect to the policy stance of the central bank (ECB 2009b). This type of market behaviour cannot be observed after 2000. Particularly after 2005, loan supply simply follows a series of expansive credit demand shifts (the same pattern of market behaviour can be observed in the US already since the

1990s where the volume of new loans grew along with rising bank-credit interest rates and - not shown in Figure 11 - rising Federal Funds rates). ECB interest rate policies for a long time were not able to stop credit market dynamics. One may argue that a continuing credit market dynamic in spite of a monetary restriction simply means that interest rate increases were too moderate. But the key point is: restrictive interest rate policies *combined* with quantitative base money rationing convey a qualitatively different, i.e. stronger signal to the commercial banking system than any other series of interest rate increases, however strong.

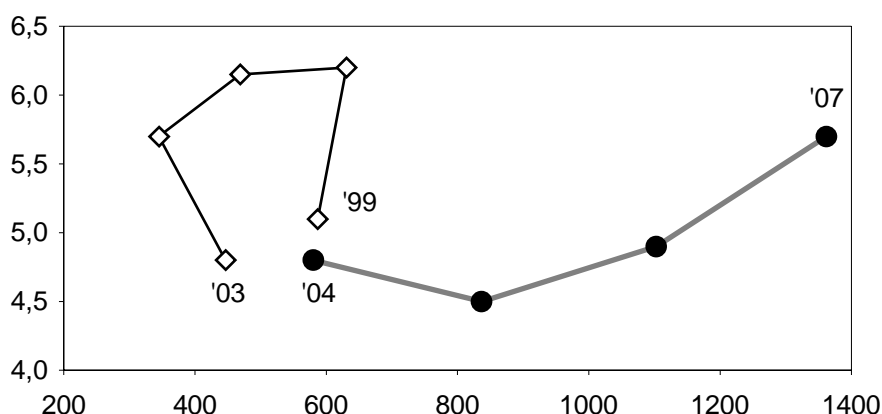


Figure 10: Credit market cycles: new bank loans (including securities) to private non-banks (€bill.) and bank-credit interest rates in EMU

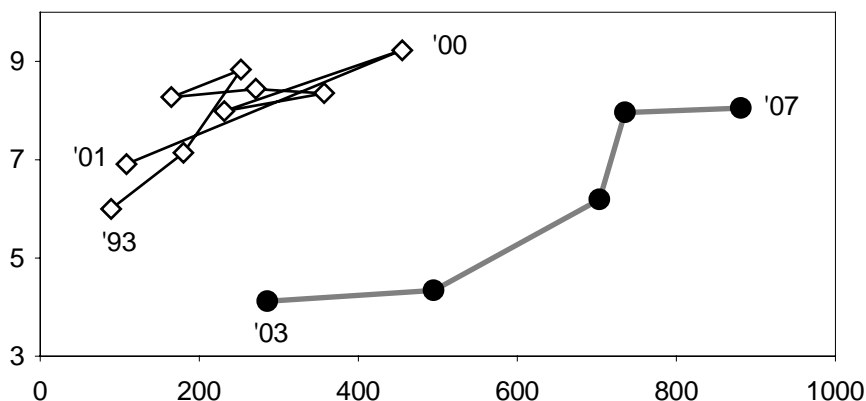


Figure 11: Credit market cycles: new bank loans to private non-banks (\$ bill.) and bank-credit interest rates in US

5. Organizing the Money Market as a Floor System

The preceding Sections intended to argue that modern financial markets' proneness to excessive credit growth and asset price bubbles is the consequence of a missing quantitative liquidity constraint imposed on the banking system. Rising central bank interest rates in a regime of monetary restriction hence give the commercial banks' credit supply

function a positive slope, which indicates that increased costs of liquidity provision is passed on to the banks' clients, but fail to stop credit market dynamics if the outlook on asset and/or goods market still looks prosperous and financial markets are liquid. It follows that ordinary interest rate policies (e.g., obeying a *Taylor Rule*) will suffice to stabilize macro cycles with moderate inflation, but ought to be supplemented by additional quantitative money supply measures if inflationary expectations are no longer anchored or in a case of true asset inflation.⁸

The key question now is: does the quantity of high-powered money represent an additional policy tool besides the central bank rate of interest? Until a decade ago, the answer would have been an unequivocal ‚no‘. *Poole* (1970) had clarified the case when monetary policy ought to fix the (long-term) interest rate, and not the quantity of money; later *Goodhart* promoted the view that monetary policy operations in general were executed in terms of interest rate setting *instead* of controlling monetary aggregates, „though, of course, one is the dual of the other“ (1989, p. 293). But then *Woodford* (2000) demonstrated that interest rate policies would work even in a cashless society, which implied that the management of monetary aggregates might be used for additional control purposes in a standard economy with a positive money demand.

The ensuing debate on various ways to organize the money market, including the question of paying interest on central bank accounts, confirmed the two-instruments view in the case of a ‚floor system‘: here the central bank stands ready to supply base money M on demand at the chosen target interest rate i^* , which at the same time is the yield paid on (voluntary and mandatory) accounts with the central bank. This deposit rate puts a floor to the market rate of interest as no commercial bank will lend money to other financial-market agents at lower rates than i^* if excess funds can be placed at the central bank. As a consequence, the commercial banks' interest-elastic money demand function L is kinked at point A. At the right of A, the money market absorbs any ‚excess‘ amount of base money (AB in Figure 12) because these funds find their way back to the central bank's deposit account. This enables the central bank to vary the amount of base money by way of open-market transactions in long-term or high-risk paper, thereby offering ‚liquidity services‘ to financial markets (*Goodfriend* 2002; *Disyatat* 2008; *Keister et al.* 2008).

⁸ An example for the first case is the period of high inflation and dollar depreciation at the end of the 1970s, which called for a regime shift in monetary policy. The former president of the Bundesbank *Emminger* claimed to have contributed to a ‚monetarist conversion‘ of the new Fed chairman *Volcker* at a high-level meeting in Hamburg: „During the discussion of the Fed's power to strengthen the dollar, Volcker asked: Do you think that US interest rates are not high enough? [...] I intervened and reported to have heard from US business representatives times and again that, though finance may be costly, it is still easily available. Leading American bankers had declared not to feel bothered by high interest rates as long as they know that refinancing is not restricted; high rates simply would be passed on to their clients. I added that in the current inflationary atmosphere it is not interest rates that is important, but the quantity of money provided by the central bank. Now something unexpected happened: Volcker agreed at once and repeated: Yes, the truly decisive variable is the quantity of money“ (*Emminger* 1986, pp. 396-7, my translation).

Basically, this is a liquidity trap scenario, just right to depict current quantitative-easing policies of some central banks. Apart from the zero-bound problem, monetary policy is free to vary the target interest rate and the quantity of high-powered money independently from each other. The obvious advantage of this strategy is that the central bank can use two instruments; its operations have an impact on both money and capital markets, and thus the term structure of interest rates, if short-term repo transactions with the banking system are supplemented by open-market sales or purchases of long-term securities. However, two points might raise concern:

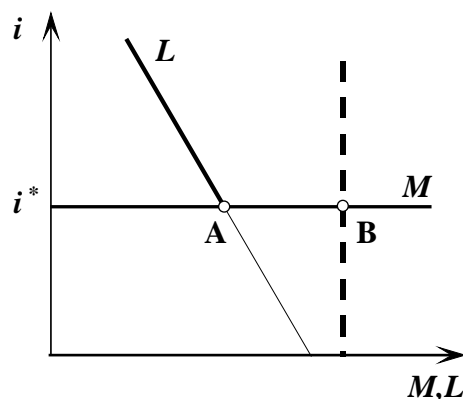


Figure 12: ‚Floor‘ money market with target = deposit rate

- If the central bank executes open-market transactions on a large scale, it has to be equipped with a sizeable stock of long-term paper, presumably government bonds, which creates an unwanted interdependence between monetary and fiscal policy that might impede the political autonomy of monetary authorities.
- If the central bank offers the cheapest admission to base money via unlimited (repo) borrowing at the target rate, the interbank money market ceases to play an important role. Currently, in the ECB corridor system (*Whitesell* 2006; *ECB* 2008b), variations of the money-market rate vis-à-vis the target rate in both directions provide information on the state of the market. In the floor system, the money market rate practically will not diverge from the target rate.

6. The Proposal: A Budget Constraint for Asset Markets

The basic question however is the efficiency of the floor system in the case of a monetary restriction. A macroeconomic expansion typically is accompanied, and driven, by credit growth that also leads to an increased money demand on the part of commercial banks; assume a stylized scenario where the money demand function has shifted from L_0 to L_1 and the target interest rate is increased from i_0^* to i_1^* (Figure 13). There are several options for the course of monetary policy:

- Money supply is kept at M_0 , letting the money market settle at point C. This indicates that the financial market stays as (overly) liquid as before. Monetary policy only relies on the relative-price effect of (slowly) rising interest rates.

- More in line with the aim of slowing down macro dynamics is a reduction of money supply to M_1 , with a money-market equilibrium at D. Here, the central bank still supplies base money on demand of commercial banks, but abstains from injecting additional funds into the market. The downward adjustment $M_0 \rightarrow M_1$, by selling long-term paper, is likely to support the transmission of higher interest rates from the money to the capital market.
- The last and more radical option is to trigger a liquidity squeeze by $M_0 \rightarrow M_2$. At the new target interest rate i_1^* , money demand exceeds money supply, which activates the interbank money market and leads to an equilibrium in E. Here the market interest rate exceeds the target rate, and the long-term interest rate presumably will also rise.

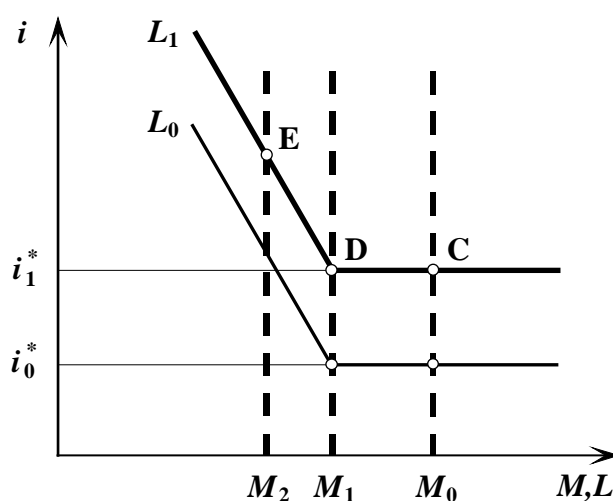


Figure 13: Monetary restriction in a floor system

Obviously, the last-mentioned option will be most effective to stop an severe inflationary process on goods and/or asset markets. One basic drawback is that it violates the modern norm of monetary policy making, i.e. to adjust base money supply to the needs of the banking system in order to guarantee a smooth working of financial markets. A policy of shortening the money supply thus also undermines the information function of the target rate, which no longer serves as an attractor of market yields. This causes a ‚signalling‘ problem: either the central bank is considered as being unable to realize the target rate that it has communicated to the public, or it might be reproached for deviating from the announced target. However, a massive reduction of base money that causes a gap between the effective and the target interest is no part of the regular way of policy making; central banks will recur to this measure on rare occasions only. Here, an announcement that the scissors strategy might cause money market rates to rise beyond the target rate will even emphasize the central bank's determination to bring (asset and/or goods) prices back on track.

A further fundamental objection to the scissors strategy is that, although it comprises *two instruments* that in fact to some degree are independent, it is questionable whether these instruments can really be directed towards *two different goals*, namely to stabilize goods and asset prices. It is evident that transmission processes from both instruments

to the two types of inflation cannot be strictly separated; at best it is a question of a gradually differentiated assignment. A liquidity shortage imposed directly upon the banking system most probably will have its strongest impact on loan supply. But there is hardly any clue as to whether banks, when perceiving liquidity pressure, will cut back lending for purchasing financial assets more than lending for acquisitions in the real sector, and both parts of these credits cannot easily be assigned to speculative and non-speculative purposes.

Thus it cannot be avoided that a fully-fledged monetary restriction that comprises higher interest rates and a constrained money supply will affect both goods and asset markets. A more differentiating policy can only be achieved by additional signalling effects of central bank communication. One of the main reasons for excessive credit growth and asset price bubbles is the commercial banks' expectation that monetary policy will refrain from any restriction as long as goods price inflation remains within the target range (*Borio and Lowe 2002*). It is therefore indispensable to extend the central banks' mission: they ought to be obliged to take measures against the build-up of bubbles, so that banks perceive a higher risk if the monetary authority declares to be concerned about rising asset prices.

The Two Pillars of the ECB now appear as if ideally constructed for a dual target, and the Monetary Pillar should be assigned to the diagnosis and therapy of financial-market instability. Whereas *De Grauwe and Gros (2009)* suggest to proceed to discretionary variation of minimum-reserve requirements, the preferred instrument of this paper's proposal are purchases and sales of long-term bonds, activated in times of need, which have to be announced in public in order to send appropriate signals to financial-market agents. These open-market policies can be initially applied even without varying the rates stipulated for short-term refinancing operations.

This leaves the most troublesome part of this paper's suggestion: how to identify a bubble? It is difficult, but not impossible. *Borio and Lowe (2002)* present an aggregate asset price indicator (consisting of equities, residential and commercial real estate) that proves to be fairly useful in predicting financial imbalances. The most convincing argument for preserving the ECB's Monetary Pillar was that broad money growth could be used as an indicator for asset price bubbles (*Issing 2005*). Excessive growth of bank credit and monetary aggregates, measured as long-run ratios against GDP, provide a reliable early-warning sign for asset market bubbles (*Alessi and Detken 2008; Gerdesmeier 2009*). Further research might improve the ability to forecast speculative manias. But, of course, eventually financial-market stability is a fuzzy goal of economic policy like others.⁹

Putting the focus on the detection and containment of bubbles is important but may still miss the key point: the repeated emergence of (at least ex post) obvious imbalances on various asset markets can be understood as a manifestation of an 'overbanking' trend on a large scale. The metaphor of a 'decoupling' of the financial sector from the sphere

⁹ Alluding to the days when full employment was a policy goal, *Blinder (1988, p. 3)* suggested a pragmatic view on another identification issue: „Involuntary unemployment is like pornography: it's hard to define, but you know it when you see it.“

of the ,real‘ economy has been a key topic in heterodox camps of economists and non-economists for quite some time, but remained largely neglected in mainstream economics (Menkhoff and Tolksdorf 2001). The world financial crisis of 2007-? let the saying of ,casino capitalism‘ gain more widespread acknowledgement. Even a cursory view on the development of gross lending in the commercial banking sector shows that, already since decades, financial transactions appear to outpace more and more the volume of production activities (Figures 14 and 15).

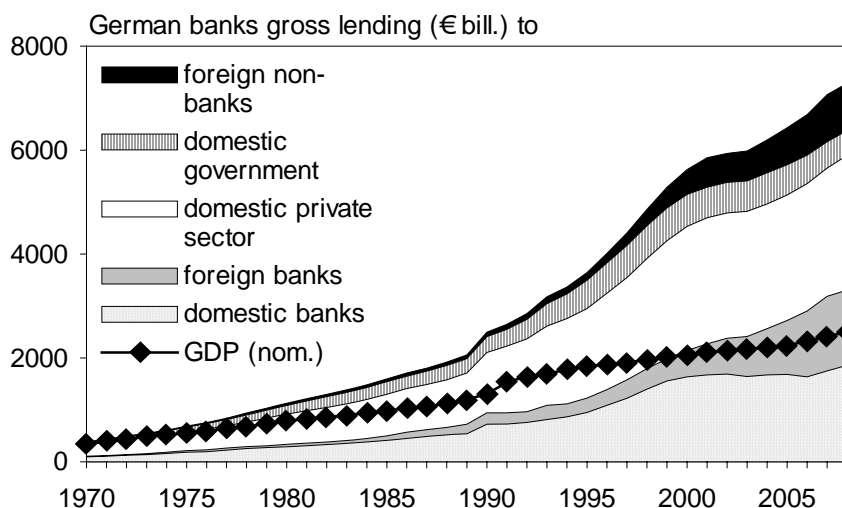


Figure 14: Dynamics and structure of bank lending in Germany, compared to nominal GDP

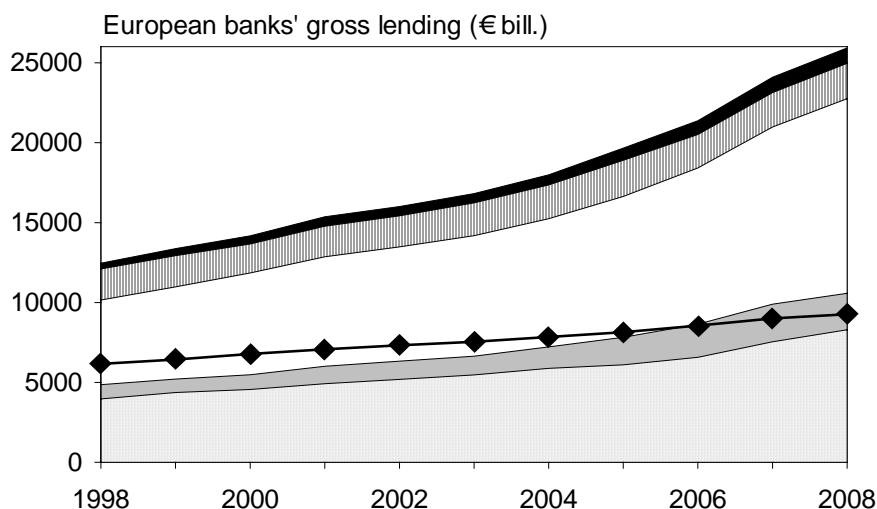


Figure 15: Dynamics and structure of bank lending in EMU, compared to nominal GDP (same keys as in Figure 14)

A closer inspection reveals that gross credit growth stepped up after 1990, where the world economy entered a new era, and that loans to foreign banks and non-banks gained

increasing shares in overall credit supply.¹⁰ Internationalization of banking and working with high leverage ratios turned out to be key elements in the process of creating and disseminating ‚toxic‘ assets. Low central bank interest rates during some years have been named as one cause of the piling-up of asset prices; but unrestricted access to central bank balances prevailed over the whole period. Securitization, which reduced the banks' funding needs in event of monetary tightening, further contributed to the banks' perception that liquidity is no limiting factor (*Altunbas 2007*).

The eruption of the financial crisis let banks realize that liquidity is an endogenous variable that besides the behaviour of the central bank also depends on the liquidity preference on the part of market agents.¹¹ One important monetary policy lesson that was deduced from the crisis is that central banks should monitor and react to commercial banks' leverage (*Adrian and Shin 2009b*). Also the revision of the modern dogma of demand-determined base money supply might help to deter commercial banks from the belief that ever-growing credit extension particular to the financial sector can be maintained without micro and macro risk.

7. Conclusions

Modern central banking has learnt to stabilize goods demand by interest rate policies and to anchor inflation expectations by building credibility via competence and political independence. Goods market inflation is under control, in principle, but asset price inflation is not. Whereas goods prices are relatively sticky, being determined by slowly changing production costs, asset prices are both more flexible, because of asset trading in stock markets with high-speed price adjustment, and less determined, because of uncertain or multiple fundamental equilibria, speculation and herding. If then ample credit is easily available, the emergence of bubbles appears to be inescapable.

Quantitative constraints in the provision of liquidity in the banking system have been abolished by moving to fiat-money systems, and by adopting ever more sophisticated money-market control techniques, where any non-price money demand rationing creates inefficient noise. It is a ‚fair-weather‘ strategy, nevertheless, that relies only on small-step (expected) interest changes. Their immediate effect is to steepen the banks' credit-supply curve, but the volume of loans continues to grow as long as the cumulative impact of past and expected interest moves induces a new risk assessment on the part of commercial banks and their clients, which makes credit supply and demand functions shift to the left. In a normal business cycle, this may suffice to achieve macro stabilization before inflation reaches double digits. However, profit expectations on asset markets can be different in dimension; therefore, the lags involved in modern interest rate policies are too long so that bubbles already might have grown to an extent that leaves a crash as the only way of correction.

¹⁰ For a longer-term view on this issue see *Schularik and Taylor (2009)*.

¹¹ „The language of ‚liquidity‘ suggests a stock of available funding in the financial system which is redistributed as needed. However, when liquidity dries up, it disappears altogether rather than being reallocated elsewhere“ (*Adrian and Shin 2009a*, p. 603).

If the money market is organized as a floor system, interest rates and base money can be varied - to some extent - independently. It is suggested to use money supply management as a separate tool assigned to the aim of financial-market stability. The efficiency of this instrument can be expected to stem from two aspects:

- the announcement effect, which signals to market agents that the central bank is determined to stop asset price bubbles from growing beyond reasonable limits, and thus cushions price dynamics because of higher risk;
- the liquidity effect, which forces banks to restrict credit growth, sell assets and thus contribute to increases of long-term rates of interest.

Re-inventing money as a policy tool is not meant to indicate a return to monetarist theories and concepts that were propagated to control goods market inflation. Rather, it is an attempt to establish a kind of a ‚budget constraint‘ on asset markets that probably cannot be put up by interest rate policies alone.

References

- Adrian, Tobias* and *Hyun Song Shin* (2009a), Money, Liquidity, and Monetary Policy, in: American Economic Review, Papers and Proceedings, Vol. 99, pp. 600-605.
- Adrian, Tobias* and *Hyun Song Shin* (2009b), Prices and Quantities in the Monetary Policy Transmission Process, Staff Report No. 396, Federal Reserve Bank of New York.
- Alessi, Lucia* and *Carsten Detken* (2009), ‚Real Time‘ Early Warning Indicators for Costly Asset Price Boom/Bust Cycles: A Role for Global Liquidity, ECB Working Paper, No. 1039, Frankfurt.
- Altunbas, Yener* et al. (2007), Securitisation and the Bank Lending Channel, ECB Working Paper, No. 838, Frankfurt.
- Belke, Ansgar* et al. (2008), Global ‚Excess‘ Liquidity: Does It Matter for House and Stock Prices on a Global Scale? in: Journal of Financial Transformation, Vol. 24, pp. 145-154.
- Beyer, Andreas* et al. (2009), Opting out of the Great Inflation: German Monetary Policy after the Break Down of Bretton Woods, ECB Working Paper, No. 1020, Frankfurt.
- Bindseil, Ulrich* (2004), The Operational Target of Monetary Policy and the Rise and Fall of the Reserve Position Doctrine, ECB Working Paper, No. 372, Frankfurt.
- Blinder, Alan S.* (1988), The Challenge of High Unemployment, in: American Economic Review, Papers and Proceedings, Vol. 78, pp. 1-15.
- Bordo, Michael* et al. (2000), Aggregate Price Shocks and Financial Instability: An Historical Analysis, NBER Working Paper, No. 7652, Cambridge.
- Borio, Claudio* and *Philip Lowe* (2002), Asset Prices, Financial and Monetary Stability: Exploring the Nexus, BIS Working Paper, No. 114, Basel.
- Cobham, David* (2003): Why Does the Monetary Policy Committee Smooth Interest Rates? in: Oxford Economic Papers, Vol. 55, pp. 467-493.
- De Grauwe, Paul* and *Daniel Gros* (2009), A New Two-Pillar Strategy for the ECB, CESifo Working Paper, No. 2818, München.
- Disyatat, Piti* (2008), Monetary Policy Implementation: Misconceptions and Their Consequences, BIS Working Paper, No. 269, Basel.
- Emminger, Otmar* (1986), D-Mark, Dollar, Währungskrisen, Stuttgart.

- European Central Bank* (2008a), The Role of Banks in the Monetary Policy Transmission Mechanism, in: Monthly Bulletin, August, pp. 85-98.
- European Central Bank* (2008b), 10th Anniversary of the ECB, Monthly Bulletin, Special Edition, May.
- European Central Bank* (2009a), Expectations and the Conduct of Monetary Policy, in: Monthly Bulletin, May, pp. 75-90.
- European Central Bank* (2009b), Monetary Policy and Loan Supply in the Euro Area, in: Monthly Bulletin, October, pp. 63-80.
- Friedman, Milton and Anna J. Schwartz* (1963), A Monetary History of the United States: 1867-1960, Princeton 1990.
- Gerdemesmeier, Dieter et al.* (2009), Asset Price Misalignments and the Role of Money and Credit, ECB Working Paper, No. 1068, Frankfurt
- Goodfriend, Marvin* (2002), Interest on Reserves and Monetary Policy, in: Federal Reserve Bank of New York, Economic Policy Review, May, pp. 1-8.
- Goodhart, Charles A. E.* (1989), The Conduct of Monetary Policy, in: Economic Journal, Vol. 99, pp. 293-346.
- Goodhart, Charles A. E.* (2007), Whatever Became of the Monetary Aggregates? in: National Institute Economic Review, Vol. 200, pp. 56-61.
- Hagen, Jürgen von* (1998), Geldpolitik auf neuen Wegen 1971-1978, in: *Deutsche Bundesbank* (ed.), Fünfzig Jahre Deutsche Mark: Notenbank und Währung in Deutschland seit 1948, München, pp. 439-473.
- Issing, Otmar* (2005), The Monetary Pillar of the ECB, Contribution to the Conference 'The ECB and Its Watchers VII', Frankfurt.
- Keister, Todd et al.* (2008), Divorcing Money from Monetary Policy, in: Federal Reserve Bank of New York, Economic Policy Review, September, pp. 41-56.
- Linzert, Tobias and Sandra Schmidt* (2008), What Explains the Spread between the Euro Overnight Rate and the ECB's Policy Rate? ECB Working Paper, No. 983, Frankfurt.
- Lutz, Friedrich A.* (1936), Das Grundproblem der Geldverfassung, in: Geld und Währung, Tübingen 1962, pp. 28-102.
- Menkhoff, Lukas and Norbert Tolksdorf* (2001), Financial Market Drift: Decoupling of the Financial Sector from the Real Economy? Berlin et al.
- Morris, Stephan and Hyun Song Shin* (2005), Central Bank Transparency and the Signal Value of Prices, in: Brookings Papers on Economic Activity, No. 2, pp. 1-43.
- Poole, William* (1970), Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model, in: Quarterly Journal of Economics, Vol. 84, pp. 197-216.
- Rüffer, Rasmus and Livio Stracca* (2006), What Is Global Excess Liquidity, and Does It Matter? ECB Working Paper, No. 696, Frankfurt.
- Schularik, Moritz and Alan M. Taylor* (2009), Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008, CEPR Discussion Paper, No. 7570, London.
- Trichet, Jean-Claude* (2008), Risk and the Macro-Economy, Contribution to the Conference 'The ECB and its Watchers X', Frankfurt.
- Weber, Axel A.* (2009), Challenges for Monetary Policy in the Financial Crisis, in: *Deutsche Bundesbank* (ed.), Auszüge aus Presseartikeln, No. 23, Frankfurt, 3.6.09, pp. 3-5.
- Whitesell, William* (2006), Interest Rate Corridors and Reserves, in: Journal of Monetary Economics, Vol. 53, pp. 1177-1195.

Woodford, Michael (2000), Monetary Policy in a World Without Money, in: *International Finance*, Vol. 3, No. 2, pp. 229-260.

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