Monetary Frameworks

Jean-Pierre Landau

this version May 30, 2012- very preliminary- not for quotation

> *"Aspirin is one of our most effective, versatile and widely used drugs. Yet doctors do not completely understand how this important tool of their trade works. Economists are in a similar position with respect to monetary policy. " (Bernanke, 1988)*

To implement monetary policy, Central Banks need a framework: an intellectual method to guide the actions they take in order to fulfill their mandates. A monetary framework is also a communication tool. It must rest on a clear and understandable description of monetary policy implementation. Central Banks want to influence expectations. For that to happen, economic agents must easily relate policy decisions to their ultimate objectives, as defined by their mandates.

Monetary frameworks are closely related to the transmission mechanism of monetary policy. Monetarism, based on targeting money aggregates, was predicated on some stability in income velocity of money. The demise of monetarism, as a framework for policy, came because that transmission mechanism did not work , at least in the short run. The relationship between money and nominal GDP proved highly unstable and could not provide a useful guide for policymaking,.

Over the last decade, inflation targeting has been the dominant framework, both in advanced and emerging economies. Inflation targeting is associated with a neo Keynesian model where monetary policy acts only through interest rates. Changes in (nominal and real) interest rates are directly transmitted to the economy through a simple, inter-temporal substitution effect whereby they induce expenditures shifting across time. Money and financial institutions play no role in that mechanism, and credit is implicitly supposed to

respond only to interest rate movements. To quote Borio, models used by Central Banks "are, in effect, real models disguised as monetary ones".

A second component of inflation targeting is the emphasis given to anchoring inflation expectations. The anchor is provided by the reaction function of the Central Bank. Most of them are seen as following the "Taylor principle": they would move nominal interest rates by more than changes in inflation expectations, thus ensuring that the real interest rate reacts to deviations from the inflation target.

If Central Banks are successful in driving market expectations (which is the definition of credibility) small, even negligible, changes in interest rates are sufficient. The monetary transmission channel looks powerful since the economy seems to react very strongly to any move in the policy rate. At the limit, expectations of future Central Banks actions are sufficient to stabilize the economy. This has sometimes been called the "Maradona" approach to monetary policy[1]. That such an argument could be made is a testimony to the brilliance, but also the fragility of inflation targeting. Intuition, at least, suggests that auto stabilization through expectations of future actions only works for small shocks around equilibrium; not for the big nonlinear discontinuities which have characterized the crisis.

Obviously, ignoring the financial sector does not provide a realistic description of the economy. It may lead to over or under- estimate the elasticity of output to interest rate since potential amplification effects are omitted. The crisis has reminded us that financial frictions exist. They matter both for financial stability, which is obvious, and for the transmission of monetary policy, a point which should have been obvious but was somehow forgotten. There is no need to reach the zero lower bound to entertain doubts about the capacity of interest rates to counter those powerful financial dynamics.

[1] Coming from a comparison drawn by M. King with a famous goal scored by Diego Maradona, when he just had to run straight while British defenders expected him to go left or right, thus positioning themselves in such a way that he had a direct path to the goalpost. (King, 2005)

In many regards, inflation targeting has developed as a "practice ahead of theory" (King, 2005). It is something of a miracle that a neo Keynesian framework, which all but ignored the credit channel and financial frictions, could inspire so successfully policymaking for the last two decades. This is testimony to the talents of central bankers and the high level of credibility they have achieved. The benign inflation environment may also have played a role. Inflation targeting was never tested in the worst possible circumstances: a negative and lasting supply shock. On the contrary, most of the last decade has been marked for advanced economies by a succession of positive supply shocks and negative demand shocks (which makes attaining the "divine coincidence ¨ of stabilizing inflation and output simultaneously much easier).

Today Central Banks have taken new responsibilities to promote and preserve financial stability. They cannot ignore the role of the financial sector in transmitting, amplifying, or originating shocks to the economy. How will it affect their approach to monetary policy implementation? This paper seeks to explore that that important question.

Most policymakers would, take comfort in the fact that, beside interest rates, other instruments – macro prudential tools – are available. The discussion therefore concentrates on whether those tools should - or not- be complemented by monetary policy moves to "lean against" asset and credit cycles. This discussion about the strategy of monetary policy and is beyond the scope of this paper. It misses, however, an important point: instruments are not independent.

In an ideal world, an independent Central Bank in charge of monetary policy would coexist (or merge) with an equally an independent macro prudential authority. Also, ideally, monetary and macro prudential policies can be conducted separately because instruments are different. There is no assignment problem since authorities have at their disposal as many policy instruments as objectives

In the real world, unfortunately, the same dynamics affect both financial stability, on the one hand, and monetary transmission channels, on the other. Any macro prudential policy would presumably try and influence the evolution of maturity transformation and leverage. By

doing so, however, it would also have a monetary impact. And, conversely, changing the monetary stance, by moving policy rates, also may have an influence on financial stability.

Macro prudential tools therefore, cannot easily be separated from monetary instruments. Indeed, under some circumstances it has been shown (Cecchetti et al) that, capital requirements and interest rates are perfect substitutes as monetary tools. Central Banks do not operate in a pure "Tinbergen" world where two objectives – price and financial stability – would be pursued with two independent set of instruments. They have to manage different policies with *interacting* instruments and that makes operational independence of monetary policy much more problematic (if the transmission mechanism can be affected by decisions made by other less independant- authorities)

In addition, in the real world, mandates and accountability regimes are very different for price and financial stability. Central Banks are independent, but macro prudential authorities are not. In all major jurisdictions, Governments, and Parliaments, are deeply involved in the organization and management of macro prudential supervision. Likewise, while price stability mandates are precisely defined and often quantified, financial stability mandates are specified in very broad terms.[2]

The situation is therefore confusing and this raises important challenges for the future. At the risk of oversimplifying, Central Banks associated with – or responsible for –financial stability may find themselves with (1)two separate missions: price and financial stability; (2) two different accountability regimes: full independence for monetary policy; coordination or

[2] There are good reasons for this situation. In devising and implementing macro supervision, authorities are facing delicate trade-offs between efficiency and stability in the financial system. Deep social choices are involved, which, arguably, can differ across countries and periods of time. Also, as recent experience has shown, financial stability may ultimately involve fiscal commitments.

Also , and most importantly i, we lack the analytical framework upon which both a financial stability mandate and operational independence could be validly and legitimately anchored. Central Bank independence has closely followed theoretical breakthroughs, in the 1970s, in our understanding of inflation dynamics. That robust, and commonly shared analytical background on what monetary policy could – and could not – achieve was essential in establishing the primacy of price stability and the legitimacy of independence in monetary policy making. We are very far away from such a theoretical agreement on the causes of financial instability, on the real trade-offs between efficiency and stability in finance, on the role of innovation and, finally, on the origins and detection of asset and credit bubbles.

subordination mode for financial stability; and (3)two interacting sets of instruments: interest rates and macro prudential tools (a situation made even more complicated when unconventional monetary policies are implemented)

It is not difficult to imagine situations where actions that Central Banks take on pure monetary policy grounds are nevertheless contested in the name of financial stability. To some extent, this has always been a possibility. The difference, now, is that institutional frameworks exist through which – implicit or explicit – challenges to Central Banks operational independence can materialize.

It wil be more difficult, for economic agents in the future, to relate Central Banks actions to their ultimate objectives: first because those objectives are more numerous; and second, because the transmission mechanisms are more complex. The power of the reaction function to anchor expectations - essential to inflation targeting- may be diminished[3]. This could lead to a significant weakening of the overall framework. There is no sign, yet of such a weakening but the period is, in many regards, exceptional: interest rates have hit the zero lower bound in most advanced economies, non-conventional measures are in place and not expected to be reversed for some time; and, finally, macro prudential policies are much talked about but not yet really implemented.

The situation has led some economists to pronounce the¨ death of inflation targeting" (Frankel, 2012). Such a diagnosis would appear premature. Indeed, major Central Banks (the FED and Bank of Japan) have recently moved closer to the canonical model of inflation targeting by stating explicitly quantified objectives and definitions of price stability. The Fed move is highly significant since it has a "dual" mandate and went into great length in detailing its approach.

One key issue for future is how monetary frameworks will adjust to the possibility of financial disruptions and the existence of financial frictions. At the moment, the reactions of

[3] all the more so since perception of fiscal dominance may be present in some advanced economies

Central banks have been twofold: outlining exit strategies, based essentially on controlling interest rates; and, as mentioned, strengthening policy frameworks by quantifying inflation targets. A third element may be missing: a more realistic and clearer description of the transmission mechanism in normal times and its relationship with the policy framework.

The rest of this paper is devoted to exploring qualitatively some consequences for monetary frameworks when a more realistic (and complex) vision of the transmission mechanism is taken into account.

financial frictions

Monetary policy is implemented through interactions with financial markets and institutions. Central Banks control the short term riskless interest rate and/or the money base. They rely upon arbitrage and asset substitutability to transmit those changes to a broader set of assets and markets. They also implicitly rely upon some elasticity of credit to interest rate to impact the economy through the credit channel.

Transmission of monetary impulses is affected by financial frictions. In a broad sense, those may be defined as the constraints and forces which impede arbitrage or limit asset substitutability (thus weakening the interest rate channel). Financial frictions also encompass the conjunction of maturity transformation and leverage which drives the expansion or contraction of financial institutions' balance sheets, thus the overall equilibrium in credit markets (the credit channel). Those two definitions are closely related: The functioning of the credit channel, but also the interest rate channel depend on financial intermediaries being able to fund themselves and arbitrage across different market segments, instruments and maturities.[4]

.

[4] Dysfunctional credit markets were a major reason why Central Banks embarked into exceptional liquidity provision, credit easing and asset purchases.

There is an influential body of work on the credit channel of monetary policy and the financial accelerator. Nevertheless financial markets, as already mentioned, were absent from monetary frameworks and also from most (DSGE) models used by Central Banks to assess economic conditions and define a policy stance .The crisis has brought a change as Central Banks become increasingly involved in preserving financial stability; and unconventional monetary policies saw direct interventions by Central banks in bond and credit markets

Incorporating financial markets in a monetary policy framework is not easy. Transmission mechanism will depend of the structure of the financial sectors, which are different between countries and changing over time. The "elasticity" of a financial system - as measured by changes in the size of balance sheets, major aggregates or risk premia to a move in the policy rate – is time and country specific. A lot of work remains to be done to fully understand financial market dynamics and incorporate them into a stable and communicable framework for policy. An integrated approach has to account for the dynamics of both credit and money; and base and broad money. Based on existing research and literature, one can only conjecture, about the changes that will prove necessary.

At this stage, I will present my own personal conjecture: first, quantities, as well as prices, may play an increasing role in the conduct of monetary policy in the future; and second, amongst quantities, those having some of the attributes of money will be prominent. These two arguments will be developed in reverse order.

money, liquidity and credit

The relationship between credit and money is a very ancient topic in monetary economics. Textbook presentations would present money creation as a result of credit by the banks. So, to oversimplify, credit drives money. Interpretation of recent research, and the experience of the crisis, throws a new light on this issue. They emphasize the creation of "private money" between financial intermediaries. They show that credit and money may jointly play

a role in the transmission mechanism. And crucially, if there is a causality to be found, it may run in the reverse direction. Namely, money may drive credit.[5]

The following arguments will be made : credit supply shocks are important; they are obviously influenced by capital constraints but also money and liquidity dynamics ; regulating liquidity independently of monetary policy may prove difficult; therefore, the unstable relationship between base and broad money has important implications for Central banks' role as lender of last resort .

Credit supply shocks

A long-running debate in macroeconomics is whether financial frictions manifest themselves mainly through shocks to the demand for credit or to its supply (Adrian and Shin, 2012).

Credit supply shocks are absent from monetary policy frameworks. Mostly, it is assumed that the volume of credit responds to interest rates. When quantitative credit constraints are introduced into models, they mainly appear on the demand side, borne out of limits coming from the borrower's situation (cost of verification, information asymmetry).

But credit supply shocks occur. Current banking deleveraging in Europe and US is a case in point, a process which seems very insensitive to the level and changes in interest rates. More persistent patterns can also be observed. Adrian and Shin (2010) document the procyclical behavior of leverage in a broad class of banks before and during the crisis. In a low risk environment, banks have bigger balance sheet capacity because each unit of asset carries less risk. They tend to use fully this capacity, hence the increase in leverage. In a riskier environment, leverage contracts. This means that supply effects dominate demand in the evolution of credit; and, as a consequence, credit rationing or credit expansion maybe difficult to control through interest rates only.

[5] I should emphasize, on this point, that it is my personal interpretation of the litterature

Inside ("private") money

In the traditional banking model with fractional reserves. banks would only lend (and create broad money) in some multiple of their reserves. In contemporary financial systems, the relationship is different[6]. With financial innovation, new forms of financial intermediation have appeared.

A significant part of credit creation takes place inside the financial system and involves maturity transformation through a "long chain" of financial intermediaries, whether banks or "shadow banks". Securitization plays a major role. Financial intermediaries permanently both issue and trade very short term debt instruments - especially through repo markets operations. That mechanism allows maturity transformation and fuels leverage.

Liquidity is central to that process. To a large extent, it is "privately" created inside the financial system, between banks and with non-bank entities: "an important fraction of private money creation now takes place entirely outside of the formal banking sector, via the large volumes of short-term collateralized claims created in the "shadow banking" sector" (Gorton and Metrick 2010).

Private money creation is largely endogenous and depending on the (time varying) propensity of intermediaries to take counterparty risk on each other. When inside liquidity dried up during the crisis, credit stopped.

In ordinary times, Stein (2010) argues that, even in a conventional banking system, with no repos or securitization there a tendency to create more private money than is optimal.
The reason is that maturity transformation is profitable and intermediaries do not internalize the social costs of financial fragility , when, for instance , a shortage of funding triggers fire sales and accelerated deleveraging, with negative consequences for the economy.

Overall, creation and destruction of liquidity between financial intermediaries drive their, leverage and the evolution of credit. The consolidated balance sheet of the financial sector can expand or contract for a given level of interest rate. Hence, monetary (and credit) multipliers may be highly unstable as leveraging and deleveraging takes place independently

[6] Reserve requirements are not considered as major tools for monetary policy, and to the extent they exist, there is no intention, on the part of policymakers, to use them to directly regulate broad money creation.

of policy rates. "In this richer environment, monetary policy as it is conventionally practiced is generally not sufficient to rein in excessive money creation" (Stein, 2010)

Regulating liquidity

For many policymakers the appropriate response to this situation would run along the following lines:

- Central Banks implement monetary policy through changes in policy interest rates (a "price" effect)

- They also can influence financial stability through the amount of central bank money (reserves) dispensed to financial institutions (a "quantity" effect)

- Although, in principle, one cannot control both prices and quantities, there are practical ways to make those instruments independent of each other. Paying interest on reserves or, more generally, implementing a "corridor" approach, enable Central Banks to dissociate the amount of liquidity they provide from the price attached to this liquidity provision (Goodhart, 2008). Thus, money can be "divorced" from monetary policy, giving authorities an additional degree of freedom to pursue both price and financial stability objectives (Keister et al,2008). The so called "separation principle" (between liquidity provision and monetary policy) holds.

That approach has served us well during the crisis and may certainly continue to do so when the times come to exit unconventional policies. Exit can be done in a number of different sequences, starting either by raising interest rates or by restricting access to Central Bank money or both.

This analysis, however, is limited to Central Bank (base) money. A different approach - focussed on broad money - would yield different insights. As we have seen, depending on risk aversion and productivity shocks, the balance sheet of the financial sector can expand or contract (Brunnermeier and Sannikov, 2011). Hence, monetary multipliers may be highly unstable as leveraging and deleveraging takes place independently of policy rates.

Kashyap and Stein (2012) argue that authorities can independently control money and interest rates by (1) using the remuneration of compulsory reserves as one component of the policy rate and (2) regulating the quantity of excess reserves to achieve the desired policy rate. That quantity would act as a "cap and trade" amount of liquidity allowed in the system, with the money market ensuring it is efficiently distributed between financial intermediaries. Crucially, however, the control of broad money would rely upon an expanded system of reserve requirements which would include all non bank intermediaries issuing short term debt (with the exception of Money Market Mutual funds). In effect, this would reconstitute the traditional fractional reserve mechanism for controlling liquidity.

capital, inside and outside money

The focus in this paper on liquidity does not mean that capital is secondary. Quite the contrary. Brunnermeier and Sannikov (2011) build an integrated approach where capital and money interact. Intermediation involves risk and the ability of financial institutions to lend and create money depends on their financial health. The amount of inside money expands (or contracts) following (productivity) shocks to the real economy. When private intermediation contracts, the demand for money is met by outside (base) money. The money multiplier is endogenous. Inflationary or deflationary spirals can develop according to the internal dynamics of the financial sector. Recapitalizing banks is essential to avoid those spirals and monetary policy helps by increasing banks wealth when long term interests go down.

monetary policy and lender of last resort (LLR)

The ability of Central Banks to be effective LLR while keeping control of monetary policy rest on the separation principle. When the money multiplier is unpredictable and unstable, that separation becomes less robust at the level of broad money.

What gives "bank deposits " the character of money is their ability to be exchanged against currency or Central bank money[7]. Once the private sector has created money, the Central bank has no choice but to make it convertible in its own currency. That convertibility creates moral hazard problem and tensions which were extremely apparent in various jurisdictions during the crisis.

Going forward, it may be that Central Banks will have to find effective ways to control private money creation if the balance is to be restored in the LLR function (and if the assumption made in this paper that interest rates may not prove sufficient to that effect is correct)

Prices and quantities in monetary policy

Almost by definition, a financial friction involves a quantitative constraint on arbitrage. Nevertheless, the proposition that quantities should play a role in monetary frameworks is highly controversial.

As a casual observation, one can notice that a great number of policies are formulated in quantitative terms. All prudential ratios are based on quantities. An important part of non conventional policies (not related to interest guidance) is formulated in terms of quantities (asset purchases) even when the change in prices is the ultimate objective.

That, by itself, is not conclusive. Central Banks may use quantities out of convenience rather than necessity. Their practice may not be grounded in specific theoretical propositions or vision. Indeed, there is great reluctance in the economic profession, and amongst policy

[7] "As transactions balances and so the means of exchange in our payments system, the moneyness of bank deposits lies at the core of credit intermediation" (Tucker, 2007)

makers to consider that quantities matter. When deciding on it Large Asset Purchase Program (LSAP) the Federal Reserve took great care in explaining that it was not quantitative easing, i.e. the transmission mechanism was not expected to operate through the liability side of its balance sheet and the quantity of reserves. Rather, the effect would be through a change in the relative prices of assets leading to portfolio rebalancing and increase risk taking. Most central banks are using aggregates as inputs into their decision process. Few, the ECB may be the most important – would formalize that into communicable framework.

More fundamental observations, however can be made:

- Quantities are a necessary part of the description and analysis of the behavior of financial intermediaries and monetary transmission. Adrian and Shin, (2010),for instance, find it useful to approach the measure of liquidity, a notoriously difficult endeavor, by the size of financial intermediaries' balance sheets

- It may be that, in modern financial systems, some quantities drive some prices rather the reverse. Research by the same authors shows that some quantitative indicators have predictive power on risk premia. (Adrian and Shin, 2010)[8]

- Quantities may be relevant when price elasticity is small or non-existent. That is the case for liquidity in some extreme states of the world. In a normal state, ne can safely assume that the demand for money / liquidity is sensitive to its price. That is no more the case in exuberant or stress periods. Those regime changes are characteristic of bubble or crisis episodes which policymakers want to prevent or detect.

- one could conjecture that leverage and maturity transformation are influenced by expectations on the quantity of future liquidity available. By nature, investors and financial intermediaries are liquidity constrained and would not engage into maturity transformation unless reasonably assured that future liquidity needs will be met.

[8] "The close association between balance sheet variables and asset return forecast ability is consistent with the hypothesis that balance sheets convey information on risk premia through fluctuations in the willingness to bear risk."

conclusions and policy lessons

Maybe one consequence of the financial crisis is that the era of monetary policy without money is over.

Interest rate remains pivotal. But monetary policy may not rest forever on a single tool, or instrument. Beyond setting interest rate, there may be merits in controlling, in a loose sense, the amount of money creation and liquidity transformation in the economy. "In a loose sense", here, does not mean that money should be targeted as such, nor even enter into any policy rule or reaction function. There should be no return to old fashioned monetarism. But there should be awareness that money plays a role in the transmission mechanism, so that monetary dynamics should be closely watched as indicators of possible financial frictions.

In particular, there might be merits in observing closely and trying to influence those aggregates and quantities which determine how fast and with which amplitude, interest rates movements are transmitted to the economy. Observing credit is certainly essential. But additional insight and information may be gained by looking at the maturity structure and funding of financial intermediaries. "Money" held and exchanged by financial intermediaries may prove especially important[9].

We have to live with this fundamental "duality" of maturity transformation which influences both financial stability and the transmission mechanism.. That same duality, make it very difficult to disentangle macroprudential policy from the implementation of monetary policy. Unfortunately, we have to give up that wonderful vision of a "jardin à la française" where prices would only matter for monetary policy and quantities for financial stability.

[9] what Shin calls " core liabilities"

References

Adrian and Shin (2009): “Prices and Quantities in the Monetary Transmission Mechansim” , Federal Reserve Bank of New York Staff Report no 396

Adrian and Shin (2010): “Financial Intermediaries and Monetary Economics” , Federal Reserve Bank of New York Staff Report no 398

Adrian and Shin (2012): “Which Financial Frictions ? Parsing the Evidence from the Financial Crisis of 2007-09” , Federal Reserve Bank of New York Staff Report no 528

Adrian, Moench, Shin (2010): “Financial Intermediation, Asset prices and Macroeconomic Dynamics” Federal Reserve Bank of New York Staff Report no 422

Bernanke (1988) : “ Monetary Policy Transmission : Through Money or Credit ?” Federal Reserve Bank of Philadelphia Business Review November/ December

Bernanke, Blinder (1988): “ Credit, Money and Aggregate Demand” NBER Working Paper no 2534

Borio and Disyatat (2011) : “Global imbalances and the financial crisis : link or no link” BIS Working Paper no 346

Brunner and Meltzer (1988) “ Money and Credit in the Monetary Transmission Process” Tepper School of Business

Brunnermeier, Sannikov (2011): “ The I Theory of Money” (June)

Brunnermeier, Eisenbach, Sannikov (2012) : “ Macroeconomics with Financial Frictions : A Survey” (March)

Cecchetti, Kohler (2012) :” When capital adequacy and interest rate policy are substitutes (and when they are not)” BIS Working Paper no 379 (May)

Clarida (2010): “ What Has – and Has not- Been Learned about Monetary Policy in a Low Inflation Environment” (October)

Frankel J.(2012): “ The death of Inflation targeting” Project Syndicate (May 16)

Goodhart (2007) : “ Whatever became of the Monetary Aggregates ?” (February)

Goodhart : “ The Continuing Muddles of Monetary Theory : A Steadfast Refusal to Face Facts”

Gorton, Metrick (2010): " Securitized Banking and the run on Repo"

Kashyap, Stein(2012) : " The Optimal Conduct of Monetary Policy with Interest on Reserves" American Economic Journal : Macroeconomics 2012, 4(1)

Kim, Shin, Yun (2012) : " Monetary Aggregates and the Central bank's financial Stability Mandate" (March)

King M. : " No Money, No Inflation- the role of money in the economy" Bank of England Quarterly Bulletin Summer 2002

King M.(2005) : " Monetary Policy : Practice Ahead of Theory" Mais Lecture (May)

Landau(2011) : " The Role of Central Banks- lessons"; remarks at the VIth International Symposium of the Banque de France (March)

Milne A.(2009) : " Liquidity, bank credit and money" (August)

Nelson E. (2011): " Friedman's Monetary Economics in Practice" Finance and Economics Discussion Series. Federal Reserve Board 2011-26

Stein(2010): " Monetary Policy as Financial- Stability regulation" (April)

Tucker P.(2007): " Money and Credit : Banking and the Macro economy". Speech at the Monetary and the Markets Conference (December)

Woodford M. (2011) : " Inflation targeting and Financial Stability" (November 10) revised text of a keynote address at the conference " The Future of Central Banking"