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TOWARDS A MACROPRUDENTIAL POLICY IN THE EU: MAIN ISSUES

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Abstract

The aim of the paper is to analyze the state of the art of macroprudential policies (MAP) with a focus on the case of the European Union. To this end the institutional framework of MAP is introduced and discussed with regard to several issues: the relationships and/or the conflicts with other policies and among the different institutional bodies involved, their mandate, accountability and governance. The operative framework - intermediate and final targets and toolkit - is specifically analyzed with regard to the case of the European Union and the introduction, in 2011, of a macroprudential supervisory pillar based on the European Systemic Risk Board (ESRB). Finally the main features of the new European supervisory architecture are addressed: the organization of MAP within the Single Supervisory Mechanisms (SSM), the definition of the role of the European Central Bank (ECB) and of the ESRB as far as macroprudential policy is concerned. In the conclusions, we evaluate the new architecture which is quite complex and cumbersome, and the challenge that the SSM is facing: to achieve comprehensive, rational, effective and efficient supervision, avoiding overlapping of competences and clarifying the specific roles of different bodies while keeping away additional burdens for the institutions supervised.

Key words: macroprudential policy, systemic risk, supervision, EU supervisory architecture, ESRB, SSM, financial crisis.
Jel classification: G01, G18, G 21, G28

1-Introduction

The financial crisis has led to the reexamination of policies for macroeconomic and financial stability and the development of macroprudential policies (MAP) in a number of countries. The aim of this paper is to analyze the state of the art of macroprudential policies with specific reference to the case of the European Union and the supervisory architecture to be adopted with the introduction of the Banking Union.

To this end, we start by focusing on the institutional framework of MAP: relationships and/or conflicts with other policies (first and foremost monetary and microprudential), the agencies involved and their mandate, accountability and governance issues. We then move on to analyze the operative framework of MAP: definition of objectives (intermediate and final) and the most suitable set of instruments.

The second part of the paper deals with the introduction of MAP in the European Union and its initial operation, with the definition of intermediate and final targets and the toolkit of available instruments. As a consequence of the crisis, since 2011 the EU has been working towards greater integration of the supervisory function, as recommended by the de Larosière Report, with an institutional framework based on a microprudential pillar (with the establishment of the European System of Financial Supervisors - ESFS) and a macroprudential pillar (with the setting-up of the European Systemic Risk Board – ESRB). The MAP architecture based on the ESRB and the National Competent Authorities (NCA) is now undergoing a review process due to the introduction of the Single Supervisory Mechanism (SSM) and the new role of the ECB as the supervisory authority with responsibility for the micro and macro supervision of financial intermediaries in the Euro area (18+).

The final part of the paper sketches the MAP within the new and future European supervisory architecture.

2. Macroprudential policy at a glance.

Although macroprudential policy had already been the subject of study before the crisis [Borio 2003; Crocket 2000], since the collapse of Lehman Brothers it has been one of the main topics under discussion amongst academics and policy makers [Angelini et al. 2012, Borio 2010; 2013, Haldane 2013, Lim et al. 2011].

One first point under consideration is the definition of MAP itself [Caruana, Cohen 2014]: to establish a common language among policy makers, it seems best to use the definition drawn up by the FSB, IMF and BIS (2011): *"…a policy that uses primarily prudential tools to limit systemic or system-wide financial risk, thereby limiting the incidence of disruptions in the provision of financial services that can have serious consequences for the real economy"*

The main issues under discussion relate to the definition of the institutional and operational frameworks of MAP [IMF 2011]. The institutional focus is on MAP's possible interactions and/or conflicts with the effects of other policies, the architecture of the competent authorities and their mandates, governance and accountability; the operational focus concerns the definition of final and

intermediate targets, the most suitable toolkits, operational aspects and the evaluation of MAP's effectiveness [Gualandri, Noera 2014a].

The debate shows differences of opinion in several key areas [Panetta 2013]. First of all there are difficulties in precisely defining systemic risk, the main target of MAP, since it has a number of dimensions with no universally accepted measurement methods [Gualandri, Noera 2014b]: it may therefore be difficult to isolate the intermediate objectives and select the instruments best suited to target them. Moreover, macroprudential policy interacts significantly with other policies (monetary, fiscal, microprudential, competition and crisis management and resolution) [IMF 2013a]: findings in this area may be open to varying interpretations. Last but not least, the effectiveness of some of the instruments is only demonstrated by a limited number of cases where they have actually been implemented in practice, mainly in developing countries [Lim et al. 2011]. Just in a few occasions, they have been used in developed countries [Panetta 2013][1]. In 2011 a macroprudential pillar came into operation in the European Union, based on the European Systemic Risk Board (ESRB), alongside a microprudential pillar, based on the European System of Financial Supervisors (ESFS).

Below, we will first describe the institutional framework of macroprudential policy, before focusing on targets and instruments. First of all, we need to define the contents and perimeter of MAP, within the broader context of economic policy, focusing on possible interactions, complementarities and conflicts with other policies, mainly microprudential and monetary.

2.1 Micro and macro regulation

The best way to define the action and perimeter of macroprudential policy is by examining its differences from and complementarities with microprudential policy, since they share a large number of tools (apart from the suffix "prudential" itself). MAP concentrates on the interactions between financial institutions, markets, infrastructures and the general economy, with a system-wide approach, in order to limit systemic risk; from this point of view it may be considered complementary to microprudential policy, which focuses on the stability of the individual financial institution, taking the financial system overall and the general economy as a given [CGFS 2010]. Borio [2003; 2010] compares the two perspectives, identifying the main differences in terms of proximate and ultimate objectives, model of risk (endogenous vs exogenous), relevance of correlation and common exposure across institutions, and calibration of prudential controls (Table 1).

Possible interactions and/or conflicts between micro and macro policy are due to two main factors: *(a)* they have several instruments in common; *(b)* they both rely on similar transmission mechanisms [IMF 2013a, 2013b, 2013c; Vinals 2013].

In response to the crisis, policy-makers initially concentrated on redirecting typical microprudential instruments (capital and liquidity ratios, loan-to-value ratios, debt-to-income ratios, etc.) to limit systemic risk, the main macroprudential target. It is quite clear that conflicts may arise from the use of the same instruments for different targets.

[1]Dynamic provisioning measures have been in force in Spain since 2000; countercyclical capital requirements were recently adopted in Switzerland, and liquidity standards in line with the successive measures introduced by Basel 3 have already been adopted in New Zealand.

Table 1

Macro and micro prudential perspectives compared

	Macroprudential	*Microprudential*
Proximate objective	Limit financial system-wide distesss	Limit distress of individual financial institutions
Ultimate objective	Avoid output (GDP) costs	Consumer (investors/depositors) protection
Model of risk	Endogenous	Exogenous
Correlations and common exposures across institutions	Important	Irrelevant
Calibration of prudential controls	Top-down in terms of system-wide distress	Bottom-up in terms of risks of individual institutions

Source: Borio, C. [2003], *Towards a Macroprudential Framework for Financial Supervision and Regulation?*, BIS, February.

In bad times possible conflicts are more likely and mainly arise from the fact that macroprudential policy aims to introduce countercyclical policy, relaxing regulatory requirements (capital buffers) to avoid credit crunch, while microprudential policy works to keep capital buffers in place, to protect the health and financial stability of individual banks. On the other hand, as the present crisis testifies, the market itself may require higher capital buffers: the countercyclical action of MAP is therefore limited, as are the possible conflicts between the two policies. The situation is quite different when additional capital buffers are accumulated in periods of economic growth: in periods of recession, MAP may decrease these capital surcharges and maintain the minimum capital ratios required by microprudential policy.

In good times, the two policies may complement each other and work in the same direction: micro *"hand-in-glove"* with macro. Their joint action should be the accumulation of capital buffers to be run down in bad times, which will allow conflicts to be avoided when times turn hard (however, low rates of non-performing-loans – NPL - and good profits make it hard to generate a sense of urgency for this). Moreover in good times MAP could discourage behaviours which it is difficult for microprudential policy to target. One interesting example from the recent crisis is the excessive exposures in specific areas (mortgage lending and wholesale funding): the implementation of MAP with loan-to-value (LTV) ratios and net-stable-funding-ratio NSFR-type instruments respectively has the potential to limit the emergence of imbalances within individual institutions [Panetta 2014].

On the other hand, strong microprudential supervision is also essential for MAP, both to ensure information on risk assessment and to allow the effective enforcement of MAP across institutions.

Therefore there should be cooperation rather than contraposition between the two types of prudential policy, with the sharing of information, joint risk analysis and intensive dialogue. [CGFS 2010; 2012; IMF 2013b; 2013c; Panetta 2014, Vinals 2013].

2.2 MAP and monetary policy

One key issue for properly defining the scope of MAP is the clarification of its relationship with monetary policy. On paper, MAP and monetary policy have different objectives (with MAP aiming at financial stability and monetary policy targeting price and/or output stability); however, the actual implementation of the two policies brings overlaps in terms of instruments and even potential conflicts when it comes to setting priorities: for example, low policy rates are consistent with low inflation, but they may favour excessive credit growth and therefore the built-up of asset bubbles (IMF 2013b). Therefore, establishing dialogue and coordination between the two policies is essential (Vinals 2013).

In a nutshell, MAP may support monetary policy in two main ways:

- by addressing the undesired side-effects of monetary policy on financial stability and helping to counterbalance excessive credit growth favoured by low interest rates and high liquidity,
- by mitigating systemic risk and creating buffers against adverse financial shocks: in this way it helps monetary policy to respond to adverse financial shocks.

The policy design of MAP and the deployment of its tools depend crucially on how financial stability interacts with the macroeconomic targets pursued by the central banks. Before the 2007-08 crisis, under the dominant policy approach, virtually the only task of central banks was to assure the stability of the prices of goods [Bernanke et al. 1999; Goodfriend 2002], while the idea that monetary policy should also prevent both speculative bubbles and financial imbalances was not generally accepted [Borio, White 2004; Filardo 2004]. As a consequence, the theoretical and/or empirical literature concentrated on the former function, with little exploration of the latter. The financial crisis has made clear that monetary policy can substantially contribute to combatting financial distress, raising the issue of how to govern the interaction among monetary control instruments and macroprudential tools.

As a matter of fact there are both evident complementarities and potential *trade-offs* between MAP and monetary policy [Angelini et al. 2012]. For example, excessively loose monetary policy may contribute to the build-up of financial disequilibria: an over-expansionary monetary policy stimulates *moral hazard*, fuels excess credit expansion and, through low interest rates, encourages unsustainable leverage both within the financial system and in the real economy. By the same token, a well calibrated monetary policy can usefully lean against the financial cycle, combatting the accumulation of financial imbalances before they get out of hand, instead of being asked merely to repair the consequences of the shock ex-post, when bubbles burst.

Close cooperation between MAP and monetary policy may make a very substantial contribution to financial stability [Angeloni, Faia 2013; Angelini et al. 2011]. However, monetary and macroprudential instruments could turn out to substitute for rather than complementing each other, leading to the need not only for close coordination of policies , but also the careful calibration of any intervention: for example, an active monetary policy might reduce the capital adequacy measures needed to assure financial stability and vice versa [Cecchetti, Li 2008].

It is now generally accepted that monetary policy is very powerful in both encouraging or preventing the build-up of financial imbalances, as both the gestation and the repair of the financial 2007-08 crisis have clearly revealed [Onado 2009]. During times of economic growth, well focused, coordinated MAP

may help to mitigate the undesirable side-effects of monetary easiness on financial stability, avoiding the need to modify the accommodating monetary stance to early. In particular, if the imbalance originates within the financial sector, MAP may be of substantial support in addressing the shock (i.e. easing capital buffers), reducing the need for monetary policy to slash rates to zero and/or to activate unconventional monetary measures [IMF 2013a; Vinals 2013]. In other words, monetary and macroprudential policies tend to reinforce each other [CGFS 2010]. On the other hand, in the absence of MAP it is monetary policy alone that must safeguard financial stability and prevent/combat systemic shocks.

In addition, especially in view of the specific features of the Eurozone, with a single monetary policy and countries asymmetrically exposed to shocks, MAP tools could be implemented selectively in different countries in order to address country-specific sources of shock [Angelini et al. 2012].

2.3 Architecture and governance

The cornerstones of MAP's institutional setting are the lean architecture of the authorities in charge, the clarity of their mandates and governance able to guarantee independence, accountability and credibility. In addition, transparency and an effective communication policy are also important aspects of the conduct of MAP [IMF 2013b, CGFS 2012].

The first question is: who should run MAP? Institutional arrangements may vary across countries, due to national factors: financial structure, historical and political reasons, and considerations relating to the political economy. Possible solutions are:

- Ad hoc new agency
- Central bank
    - ✓ Dedicated committee within the central bank structure (UK and EMU)
- Joint committee/council comprising the central bank and other agencies(US)

Each solution has advantages and disadvantages (Table 2): the fundamental point is that someone must be in charge of MAP, with a clear mandate and objectives. Regardless of who takes charge of MAP, the key requirements are considered to be independence, strong accountability, adequate powers and strategy of information, as stated by the Committee of Global Financial Stability (2012) (Table 3). From these points of view, a key role for Central Banks seems to be the most efficient solution, with the added benefit of complementarities between macroprudential and monetary policies. This is one of the main reasons why central banks have a strong interest in the establishment of a macroprudential framework and in the effective working of MAP. Obviously, coordination between monetary and macroprudential policies must be pursued, provided possible conflicts with monetary policy are minimized or avoided, in order to preserve the independence and credibility of monetary policy.

Table 2

MAP policy: governance issues

Who should run MAP?

New (*ad hoc*) Agency	Pros A new authority established from scratch would be free from any conditioning and/or conflict of interest due to other institutional tasks Cons may lack both credibility and leverage over the supervisors and central banks who will take the relevant decisions.
Central Bank	Pros • leading role in macroeconomic surveillance and the interpretation of aggregate risks, because it has the data and skills to perform system-wide analyses • expertise in market intelligence gathering from its market participation roles • independence, which enables it to impose policy interventions that are unpopular in the short term. Cons • possible conflicts with monetary policy function • it possesses only a few of potential macro-prudential tools, such as reserve requirements. Most of the toolkit is with the bank regulator→ cooperation with other agencies is required
Joint Committee (Central Bank; Bank Regulator; Market Regulator)	Pros : • the three agencies are the primary sources of information for MAP Cons • coordination problems

Table 3

Committee for Global Financial Stability, *«Operationalizing the Selection and Application of Macroprudential Instruments»,* (2012).

Principle 5*: Macroprudential policy should be the responsibility of an independent central agency, formal committee arrangement or similar institutional framework. It should be conducted either as part of the central bank or involving the central bank in a key role, appropriately reflecting national circumstances.*

Principle 6*: Macroprudential authorities should be charged with a clear mandate and objectives and given adequate powers, matched with strong accountability.*

Principle 7*: Macroprudential policy communications strategies need to convey financial stability assessments clearly, link them logically to policy decisions, and manage public expectations about what can be achieved with macroprudential policy.*

3 Targets of MAP

3.1 General targets

The macroprudential perspective is based on the ultimate aim of limiting the costs to the economy arising from financial crises [Crocket 2000]. The key issue is therefore to maintain the stability of the financial system as a whole, avoiding the occurrence of systemic risks. From the operative point of view, two different approaches in targeting MAP may be identified [Haldane 2013, Caruana, Cohen 2014]:

(1) a narrow target, of protecting the financial system by increasing its resilience against shocks caused by the real economy. In this case macroprudential policy may be seen as a reinforcement of microprudential policy by the enforcement of regulators with additional powers;

(2) a more ambitious target: the protection of the real economy from shocks endogenously generated within the financial system. In this case, MAP is required to prevent and correct externalities and thus temper the financial cycle. In this case, MAP is considered as an additional and completely legitimate arm of macroeconomic policy: this implies an active approach (*leaning against the financial cycle*) to limit/prevent the build-up of risks and financial imbalances [CGFS 2010], by taming the financial cycle[2].

Up to now, the feedback that has emerged from the adoption of the two approaches in the field is too limited to offer clear inputs for policy makers [Caruana, Cohen 2014]. However, there is strong evidence that macroprudential tools do strengthen the resilience of the banking system, while their effectiveness is more mixed in mitigating the upturn of the financial cycle. Other factors appear to be important in this area: the joint working of MAP with other policies (monetary and fiscal), financial structures and the functioning of a variety of instruments.

3.2 Intermediate targets

Intermediate targets focus on key sources of financial vulnerability which are the justification for MAP itself. Therefore, the correction of these externalities can be seen as MAP's intermediate target. The most important externalities are:

- ✓ *Leverage*: in this case the externalities relate to strategic complementarities. They arise when financial institutions take excessive, correlated risks

[2] One example is the double mandate entrusted to the Financial Stability Committee of the Bank of England [2013], with a clear ordering of ultimate targets: first of all financial stability, with economic growth and stable employment as secondary objectives. Through the implementation of this approach, liquidity requirements were decreased in the UK in 2012, as an anticyclic action to stimulate the granting of loans by banks to foster economic growth. The mandate of the ESBR also commits it "*to ensuring financial stability and mitigating the negative impacts on the internal market and the real economy"* Regulation (EU) No 1092/2010 of the European Parliament and of the Council of 24 November 2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board, point 10.

- ✓ *Liquidity and market risk*: where externalities are related to fire sales. They arise from the generalized sale of financial assets, which triggers an asset price collapse, with detrimental effects on balance sheets

- ✓ *Interconnectedness*: with externalities related to interlinkages within the financial system, caused by the propagation of shocks from systemic institutions or through financial networks

From the operative point of view, the ESRB [2013b] identifies five intermediate targets for MAP, on specific market failures documented in the literature; specific macroprudential instruments or toolkits are therefore defined for each target.

The first intermediate objective is to *mitigate and prevent excessive credit growth and leverage***.** The underlying market failures are mainly linked to: credit crunch externalities, with a sudden reduction in the availability of credit to the non-financial sector; endogenous risk-taking with incentives that generate excessive risk-taking during a boom and, in the case of banks, a deterioration of lending standards; risk illusion with collective underestimation of risk; bank runs with the withdrawal of wholesale or retail funding in case of actual or perceived insolvency; and interconnectedness externalities due to the contagious consequences of uncertainty about events at an institution or within a market.

The second is to *mitigate and prevent excessive maturity mismatch and market illiquidity***.** In this case, externalities mainly derive from: fire sales, which may lead to a liquidity spiral whereby falling asset prices induce further sales, deleveraging and spillovers to financial institutions with similar asset classes; bank runs; and market illiquidity due to the drying-up of interbank or capital markets in response to a general loss of confidence or very pessimistic expectations

The third intermediate target is to *limit direct and indirect exposure concentrations*. In this case externalities stem from interconnectedness: fire sales with forced sale of assets at a dislocated price as a result of the distribution of exposures within the financial system.

The fourth is to *limit the systemic impact of misaligned incentives with a view to reducing moral hazard*. The externalities are moral hazard and 'too big to fail', with excessive risk-taking due to expectations of a bailout in view of an individual institution's perceived importance to the system.

The final intermediate target is to *strengthen the resilience of financial infrastructures***.** The underlying externalities are interconnectedness, fire sales, risk illusion and incomplete contracts, with compensation structures that provide incentives for risky behavior.

4 The MAP toolkit

The choice of toolkit depends on the intermediate objectives set, with tools chosen on the basis of their effectiveness and efficiency [ESRB 2013b; CGFS 2012]. In this section we present possible taxonomies of instruments and then introduce the toolkit defined by the ESBR.

4.1 The taxonomies of instruments

Defining a taxonomy of MAP tools and financial system vulnerabilities is no easy matter, since a number of different classifications of MAP instruments are provided in the literature and were adopted in the few actual case histories [Angelini et al. 2011, Davis, Karim 2009, Panetta 2013, ESRB 2013b, BoE 2011, Borio 2010, Lim et al. 2011]. The following classifications are possible:

1. Instruments pursuing a *system wide approach*, vs a *sectorial/cross-section approach* [Borio 2010; Panetta 2013].

   System wide instruments are calibrated on aggregate variables (e.g. total credit) and aim to reduce the build-up of imbalances and risks for the financial system as a whole. In the case of generalized credit bubbles, for example, the key instruments are anticyclical capital buffers and liquidity requirements. *Cross-section* instruments aim to cope with risk arising in a specific sector of the financial system, for example mortgage lending: in this case parameters such as loan-to-value (LTV) may be introduced. They are also introduced to reduce the level of risk-taking of specific intermediates (systemically important financial institutions SIFI) [Davis, Karim 2009] with additional capital requirements; or the riskiness of markets for financial instruments, such as Over The Counter (OTC) markets, by modifying the market structure and the terms and conditions of transactions. For cross-section instruments, one key aspect is the setting of the perimeter of the regulatory action, e.g. by defining what constitutes a SIFI or selecting the specific OTC markets to be regulated.

2. Instruments related to intermediaries' balance sheets, terms and conditions of financial transactions and market structures [BoE 2011].

   a) In the cases when they have recently been adopted, MAP tools have mainly concentrated on three balance sheet areas: credit, liquidity and capital [Lim et al. 2011, BoE 2011; ESRB 2013b].

      In the case of credit-linked instruments, the distinction is between; i) instruments intended to influence lenders' behavior - capital requirements, limits on leverage, variable provisioning, limits on foreign exchange net positions, credit ceilings, and loan-to-deposit (LTD) - ; and ii) instruments which influence borrowers' behavior by setting limits on parameters such as loan-to-value (LTV) and loan-to-income (LTI).

      The most important liquidity-related instruments are limits on net currency positions, maturity transformation limits and liquidity reserves.

      Capital-related instruments consist of capital requirements/anticyclical buffers and restrictions on dividend distribution.

   b) Instruments that influence the terms and conditions of financial transactions are mainly related to loans, and the most important aim is to reduce the size of mortgage loans as compared to the value of houses (LTV) or income (LTI). They also include the introduction of minimum margins or haircuts on guarantees and derivative transactions [BoE 2011].

   c) One of the instruments which act on market structures is the requirement to trade in organized markets/platforms and/or the presence of a clearing house. Other actions in this field concern the strengthening of information transparency to reduce uncertainty on exposures and specific interconnections. Interventions to limit the build-up of exposures between intermediaries are also included [BoE 2011].

3) Distinction between *price-based* and *quantity-based* instruments

Instruments may also be classified depending on whether they relate to a price or a quantity variable (or a combination of both) [Lim et al. 2011; Haldane, 2013].

Price-based instruments are mainly capital and liquidity coefficients and the taxation of specific financial transactions (e.g. the so-called Tobin tax). *Quantity-based* instruments include: limits on mortgage loans (LTV or DTI) and guarantee requirements for financial transactions (margins, *haircuts*, etc.).

4.2. The toolkit adopted by the ESRB

Both the ESRB and the British Financial Policy Committee (FPC) have chosen an initial set of macroprudential tools [HM treasury 2012, ESRB 2013b].

Table 4

Taxonomy of the ESRB toolkit

Intermediate target	*Instruments*	*Whole System*	*Specific Sectors*	*Credit*		*Liquidity*	*Capital*	*Mkt Structure*	*Transaction Terms & Conditions*
				Caps on Debtors	*Caps on Creditors*				
Mitigate and prevent excessive credit growth and leverage	Countercyclical capital buffers	●					●		
	Sectoral capital requirements		●				●		
	Macroprudential leverage ratio	●	●				●		
	Loan-to-value requirements (LTV)		●		●				
	Loan-to-income requirements (LTI)		●	●					
Mitigate and prevent excessive maturity mismatch and market illiquidity	Macroprudential adjustments to liquidity ratios *(e.g. LCR: Liquidity Coverage Ratio)*	●				●			
	Macroprudential restrictions to funding sources *(e.g. NSFR: Net Stable Funding)*	●				●			
	Macroprudential unweighted limit to less stable funding *(e.g. Loan-to-Deposit Ratio)*	●				●			
	Margin / haircut requirements	●						●	●
Limit direct and indirect exposure concentration	Large exposures restrictions		●		●				
	CCP clearing requirements	●						●	●
Limit misaligned incentives / reduce moral hazard	SIFI capital surcharges		●				●		
Strenghten the resilience of financial infrastructures	Margin and haircut requirements on CCP clearing							●	●
	Increased disclosure								●
	Structural systemic risk buffers		●				●		

In the case of the ESRB, the number of instruments has been whittled down to 15 from the 45 originally identified. Among them are anticyclical capital buffers as introduced by Basel 3 (up to a maximum of 2.5% of RWA, as decided by national regulators), leverage ratios and capital requirements for specific sectors. Also included are limits on LTV and LTD, LTI requirements and liquidity ratios

(Basel 3 *net stable funding ratio* – NSFR). In the EU, MAP tools are established by two items of legislation, the CRR and CRD IV[3].

In Table 4 we present the toolkit adopted by the ESRB, in relation to the intermediate targets identified earlier. Using the taxonomies defined above, instruments are classified in relation to their different mechanisms of impact (via aggregate variables or on specific sectors) and the specific area targeted (credit, liquidity and capital). Market structures and transaction terms and conditions are also considered.

4.3 Instrument calibration: rules vs discretion

One critical issue in operating macroprudential policies is the proper calibration of instruments. It is part of the very nature of macroprudential policies to be preemptive, i.e. to be effective ex-ante [Goodhart, Perotti 2013].

Preemptive instruments may be either static (i.e. activated when some fixed critical threshold is reached) or time-varying (i.e. the threshold is not fixed but changes according to the general scenario). Both static and time-varying instruments may be either automatic or discretionary (triggered by MAP authorities case by case and requiring a formal decision process) [Davis, Karim 2009].

The rationale for static instruments arises from the difficulty for MAP authorities of spotting financial distress in advance: since events of this kind are rare, past experience is a poor guide, because historical data has only limited statistical significance [Agur, Sharma 2013]. In view of the difficulty of calibrating both the timing and the intensity of intervention, some authors recommend reliance on fixed rules and automatic thresholds when applying instruments, because full knowledge of the way authorities will respond influences the expectations of economic agents and exerts preemptive discipline on their behavior [Davis, Karim 2009]. This is the approach generally adopted by microprudential supervision. The problem with fixed rules is that they tend to act pro-cyclically, amplifying undesired side effects on financial activity and creating incentives to circumvent regulations [IMF 2013b].

On the other hand, the alternative of adopting time-varying instruments introduces the issue of the degree of discretionality left to MAP authorities. At one extreme, with fixed rules and static instruments, discretionality is zero and the key factor is the quantitative calibration of the thresholds.

[3] CRD IV includes a Countercyclical Capital Buffer (Art. 130, 135-140), a Systemic Risk Buffer (Art. 133-134) and a Capital surcharge on systemically important institutions (Art. 131). The CRR includes (under Art. 458): minimum Capital Requirements, Large Exposure limits, the Capital Conservation Buffer, Sectorial Risk Weights (in the residential and commercial property sectors) and Intra-financial Sector Exposures. It also imposes Liquidity Requirements (LCR and NSFR) and requirements on Public Disclosure. On this subject see Costancio 2014.

The opposite extreme, in theory, is full discretionality, with action depending exclusively on the authorities' judgement.[4]

However, there are also contraindications to the adoption of time-varying instruments: when discretionality is wide, the regulator is exposed to a very high degree of external pressure (from the political system; from lobbies etc.), with the risk either of generating lengthy and overstretched decision processes (weakening the timeliness and effectiveness of action) or, even worse, of paving the way for "capture of the regulator".by the regulated [Agur, Sharma 2013]..

A solution at some point on the scale between zero discretionality (implied by fixed rules) and full discretionality (i.e. no rules) appears to be preferable. A solution of this kind could be based on a fixed time invariant baseline policy, supplemented, at the authorities' discretion, with time-varying instruments contingent to the general scenario [Agur, Sharma 2013, IMF 2013b). Being fully state-contingent and mechanical, the baseline policy provides the financial system with the guidelines it requires, while the time-varying discretionary measures allow the authorities to adapt this policy both to different cyclical phases and to the system's structural evolution [Vinals 2013].

5 MAP in the EU

In 2011 a two-pillar Pan-European supervisory system was put in place in response to the key critical points in the EU's supervisory architecture (or rather is lack of any such architecture) revealed by the crisis: microprudential supervision based on the European System of Financial Supervisors (ESFS) with a key role for the three European Supervisory Authorities (ESAs) - the European Banking Authority (EBA), the European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA) – and macroprudential supervision based on the European Systemic Risk Board ESRB (Table 5).

The establishment of the ESRB an institutional framework for a European macroprudential policy has been accompanied by the definition of two operative levels: the ESRB itself and the National Competent Authorities, (NCAs). The ESRB is assigned the legal responsibility for identifying, preventing and mitigating systemic risk in the EU and also for issuing warnings. It defines inputs and guidelines for the prevention of systemic risks, to be introduced in the various countries on the basis of a "comply or explain" mechanism. Its powers are limited to warnings and recommendations, with the same mechanism applied. The ESRB, actually quite a large body, has no power to use macroprudential instruments directly, since the responsibility for the activation of MAP, and therefore for the calibration and timing of instruments, lies with the NCAs, while the task of the ESRB is to define the governance and operative frameworks within which the NCAs operate. The flows of information the ESRB needs to fulfill its tasks are provided by the ECB and the three ESAs [ESRB 2011a].

Since the ESRB was created, two of its main areas of intervention have related to the organizational features and governance of MAP in the member countries [ESBR 2011b, 2012], and to operative

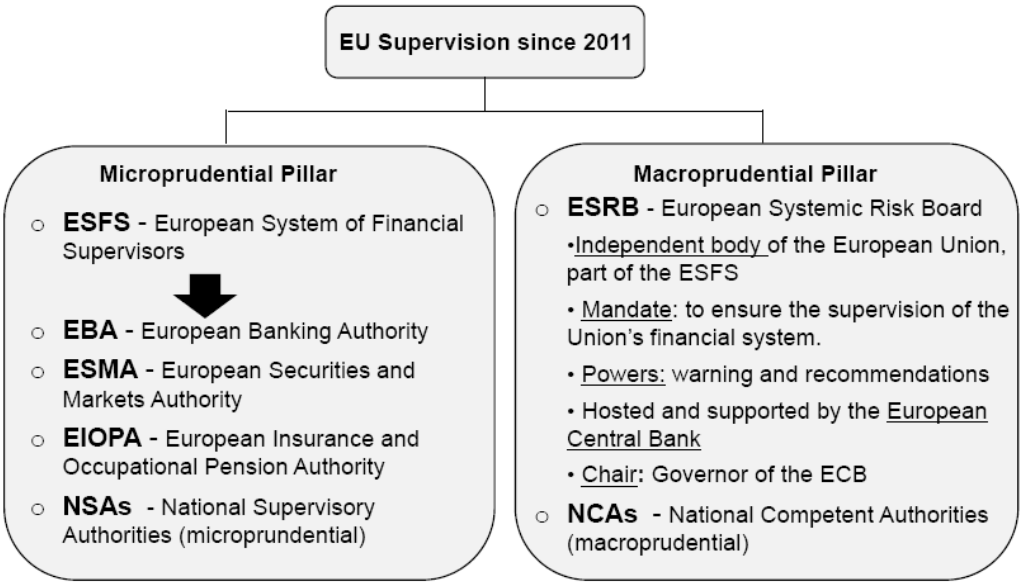
[4] An example is the dynamic provisioning adopted by Basel 3 as a anticyclical buffer, which is triggered discretionally by the authorities, who also decide the value of the extra coefficient (between 0 and 2,5% of RWA) on the basis of the credit/Gdp ratio trend.

frameworks, with the definition of intermediate targets and the related toolkit as described in the previous section [ESBR 2013b].

Table 5

MAP policy: governance issues

EU Institutional Framework



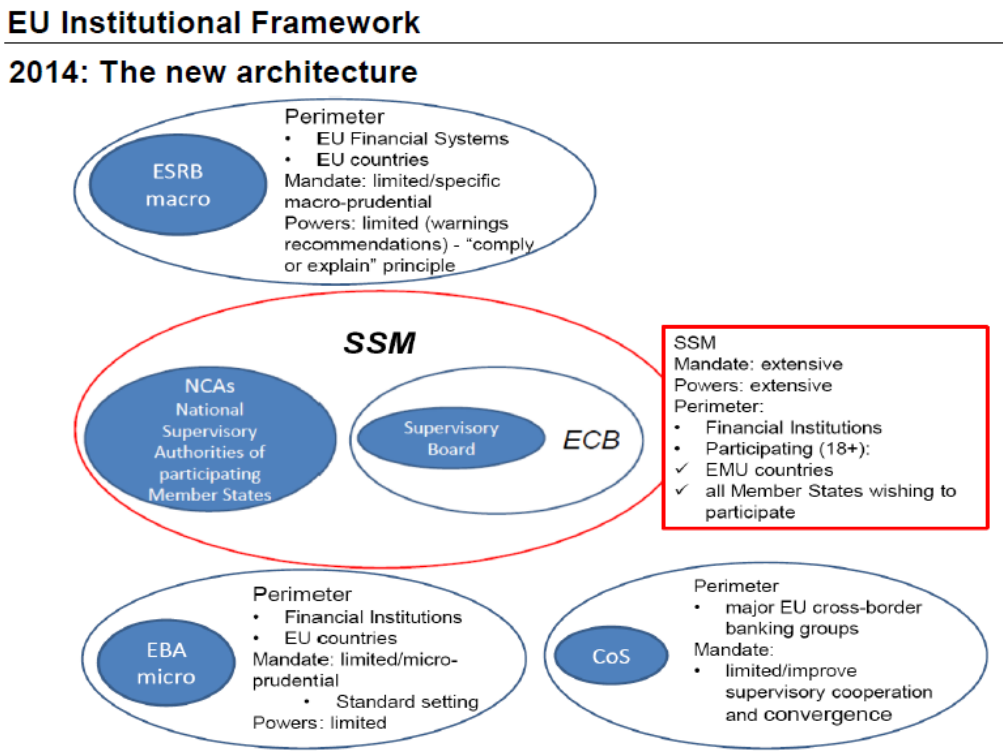
In many EU member countries, the process for the definition of the MAP framework has already been put in place, in accordance with ESRB Recommendations [ESRB 2011b, 2013b]. In the UK, the development of MAP is at an even more advanced stage [BoE 2011, 2013, HM Treasury 2012]. In the second quarter of 2014, within the Euro area macroprudential policy tools (all capital-related measures) had been activated by four countries – Belgium, the Netherlands, Slovenia and Estonia [Costancio 2014].

The institutional framework in operation in the EU since 2011 is undergoing significant evolution in preparation for the introduction at the end of 2014 of the Banking Union and the Single Supervisory Mechanism (SSM) which is to have responsibility for micro- and macro-surveillance of Euro area financial intermediaries (and also of those of other EU states further to specific requests, under agreement with the ECB, the so-called 18+).

The emerging European supervisory architecture is quite complex and fragmented, with the risk overlapping competences, grey areas, and the need for rationalization to ensure that it is able to function efficiently and effectively (Table 6). In the SSM, since November 2014, the responsibility for micro- and macro-supervision has been allocated to the ECB, but only for the Euro area (18+) and financial intermediaries. The SSM comprises the ECB and the national competent authorities (NCAs) of participating EU countries. The NCAs, the three ESAs, the ESRB, and the College of Supervisors

(CoS) for cross-border groups, have different tasks and perimeters of jurisdiction. As far as macroprudential policy is concerned, NCAs define and implement national MAP regimes, while the ECB has direct MAP powers for adjustment of the policy adopted by the NCAs, in coordination with the ESRB. The redefinition of the role of the ESRB is one of the main issues, since its mandate may only relate to macroprudential policy (with the NCAs), but it extends to the whole financial system and all EU member states, a perimeter larger than that of the ECB itself [ESBR 2013a].

Table 6



6. Conclusions

The theme of macroprudential policy has been highlighted by the systemic nature of the crisis. As yet, we are only just at the first stage in the implementation of MAP in different areas and evidence of its performance is very limited. To give clear inputs to policy makers, further studies and feedback are needed with regard to the connections and/or conflicts of interest with other policies (namely, microprudential and monetary), the effectiveness of narrow vs broad approaches, the set of instruments chosen, the implementation of the decision process (rule vs discretion based) and the evaluation of the efficacy of the policies adopted. Moreover, policy makers need to know much more about MAP's nexus with and influence on the financial system and the real economy (Caruana Cohen 2014), bearing in mind that a country's financial structure could be a crucial factor in the effectiveness or otherwise of MAP.

Within this conceptual framework, the implementation of MAP in the Euro area - from theory to practice we could say - is quite challenging from many points of view, and the factors concerned require further investigation and consideration by researchers, central bankers and policy makers in the EMU.

One first aspect deals with the organization of MAP within the SSM and the definition of the role of the ECB with regard to macroprudential policy for banks in the Euro area (the decentralized vs the centralized model),in coordination with the ESRB.

The new European supervisory architecture is the result of an arduous path, which began with the Lamfalussy comitology process at the beginning of the new millennium and has been heavily influenced by national interests aiming to keept the supervisory function at the domestic level. The outcome was the fragmentation of supervision in a context of an integrated European financial market (especially in the Euro area). The asymmetry of the situation, quite evident and widely criticized, was a key factor in the spread of the subprime crisis in Europe. The introduction in 2011 of the two pillar supervisory system, in response to the subprime crisis, with the creation of the ESRB and the ESFS, was again a compromise and the result of the determination of leading European countries to not entrust the ECB with the tasks and responsibilities of the supervisory function. The sovereign debt crisis finally led to the Banking Union and a pan European supervisory architecture, the Single Supervisory Mechanism, involving only the national banking systems of the Euro area. As a result of this process, mainly driven by the urgency of the crisis and often influenced by national interests, the new architecture is quite complex and fragmented, with the risk of overlapping competences and grey areas: there is the need for rationalization to ensure that it is able to function efficiently and effectively (Table 6)

Given this framework, one important aspect concerns the implications for the role of the ESRB of the introduction of the SSM in the 18 countries of the Euro area. In fact the ESRB's mandate with regard to MAP is limited in scope, but covers all financial institutions across the whole of the EU. Since 2011, the working of the ESRB has been affected by two main factors: first of all it is quite a cumbersome institution, and secondly, since 2012 the definition of the SSM has been a priority, placing a question mark over the future role of the ESRB, as stressed by De Larosiere at a public hearing (May 24 2014). One possible solution is the strengthening of the ESRB, with a role independent of the ECB and the SSM. The opposite situation is to limit its role to coordination between the SSM, the Euro countries and other EU states, and the respective MAP authorities [Panetta 2013].

Another key aspect is the effectiveness of MAP in the Euro area. Since MAP tools mainly operate through the banking sector and the Euro area has a bank-based financial structure, where financial markets and non-bank intermediaries are less well developed than in the US or the UK, macroprudential policy may prove to be more important and powerful than in other countries with market-based economies [Panetta 2014]. Given the lack of synchronization between the general business cycles of different national economies and of specific sectors within the various countries, the NCAs implement country and/or sector-specific MAP. However, national regimes could have undesirable spillover effects on other countries, to be mitigated by the action of the SSM and the ESRB.

Finally the interactions of MAP with monetary policy and microprudential policy in the Euro area must be carefully considered, and their coordination strongly pursued. In the case of monetary policy, conflicts with MAP should be avoided by the creation of the Supervisory Board, an independent body within the ECB. MAP should be seen as a complement (maybe an alternative) to the "lean against the wind" stance of monetary policy [Panetta 2014], which implies a specific call for monetary policy to explicitly consider bank risk taking and financial stability.

A further point is that the financial cycle is not homogeneous across the various Euro area countries: macroprudential policies adopted at the national level could counterbalance the action of the single monetary policy. Frameworks for the interactions of MAP with microprudential policy, arising from the fact that the ECB is responsible for both, must be constructed by the Governing Council, which will have a prominent role in matters related to macroprudential policy while attempting to avoid possible tensions between the two prudential policies.

The new supervisory architecture in the Euro area is quite complex and cumbersome and is the outcome of the original sin of second best solutions: in the coming years the challenge facing this work-in-progress is to achieve comprehensive, rational, effective, efficient supervision, avoiding overlapping of competences and clarifying the specific roles of different bodies while avoiding additional burdens for the institutions supervised.

References

Agur, I. and Sharma, S.

2013 *Rules, Discretion, and Macro-Prudential Policy*, IMF Working Paper, 13/65, March.

Angelini, P., Neri, S. and Panetta F.

2011 *Monetary and Macroprudential Policy*, Banca d'Italia, Temi di Discussione n. 801, March.

Angelini, P., Nicoletti-Altimari, S. and Visco I.

2012 *Macroprudential, microprudential and monetary policies: conflicts, complementarities and trade-offs*, Banca d'Italia, Quaderni di Economia e Finanza, n.140, November.

Angeloni, I. and Faia, E.

2013 *Capital regulation and monetary policy with fragile banks*, in «Journal of Monetary Economics», vol. 60, 3, pp. 311-324.

Bank of England (BoE)

2011 *Instruments of macroprudential policy*, Bank of England, Discussion paper, December.

2013 *The Financial Policy Committee's powers to supplement capital requirements. A Draft Policy Statement*, January.

Bernanke, B., Gertler, M. and Gilchrist, S.

1999 *The Financial Accelerator in a Quantitative Business Cycle Framework,* in J. Taylor, e M. Woodford, (eds.*) Handbook of Macroeconomics,* North Holland.

Borio, C. 2003 *Towards a macroprudential framework for financial supervision and regulation?* BIS Working Papers n. 128, February.

2010 *Implementing a macroprudential framework: Blending boldness and realism*; BIS, 22 June.

2013 *Macroprudential policy and the financial cycle: Some stylized facts and policy suggestions*, IMF Rethinking Macro Policy II Conference, First Steps and Early Lessons, April, 16-17.

Borio, C. and White, W.

2004 *Wither Monetary and Financial Stability? The Implications of Evolving Financial Regimes*, BIS Working Papers, n. 147, February.

Caruana, J. and Cohen B. H.

2014 *Five questions and six answers about macroprudential policy*, in «Banque de France Financial Stability Review» No. 18, April 2014.

Cecchetti, S. and Li, L.

2008 *Do Capital Adequacy Requirements Matter for Monetary Policy?*, in «Economic Inquiry», 46, pp. 643-59, October.

Committee on the Global Financial System (CGFS), BIS

2010 *Macroprudential instruments and frameworks: a stocktaking of issues and experiences*, Report submitted by the Committee on the Global Financial System, Preparation of the Report was overseen by a Coordinating Group chaired by Lex Hoogduin of The Netherlands Bank, May, CGFS Papers No 38.

2012 *Operationalising the selection and application of macroprudential instruments*, Report submitted by a Working Group established by the Committee on the Global Financial System The Group was chaired by José Manuel González-Páramo, then European Central Bank, December, CGFS Papers No 48.

Constâncio, V.

2014 *The ECB and Macro-prudential policy: from research to implementation*, Speech by the Vice-President of the ECB, at the Third Conference of the Macro-prudential Research Network, Frankfurt-am-Main, 23 June 2014.

Crockett, A.D.

2000 *Marrying the micro- and macro-prudential dimensions of financial stability*, Remarks by, General Manager of the Bank for International Settlements and Chairman of the Financial Stability Forum, before the Eleventh International Conference of Banking Supervisors, held in Basel, 20-21 September 2000.

Davis, E.P. and Karim, D.

2009 *Macroprudential regulation. The missing policy pillar*, Keynote address at the 6th Euroframe Conference on Economic Policy Issues in the European Union, 12th June 2009, *Causes and consequences of the current financial crisis, what lessons for EU countries?*

De Larosière, J.

2013 Public Hearings in Financial Supervision in the EU, Brussel, 24th May 203, European Committee.

European Systemic Risk Board (ESRB)

2011a *Decision of the European Systemic Risk Board of 21 September 2011 on the provision and collection of information for the macro-prudential oversight of the financial system within the Union*, (ESRB/2011/6), (2011/C 302/04), in «Official Journal of the European Union», 13 October, 2011.

2011b, *Recommendation of the European Systemic Risk Board of 22 December 2011 on the macro-prudential mandate of national authorities,* (ESRB/2011/3), (2012/C 41/01), in «Official Journal of the European Union», 14 February 2012.

2012 *The macro-prudential mandate of national authorities Macro-prudential commentaries*, Issue No. 2, March 2012.

2013a *Reports of the Advisory Scientific Committee No 3/September, The consequences of the single supervisory mechanism for Europe's macro-prudential policy framework.*

2013b *Recommendation of April 4, 2013, on Intermediate objectives and instruments of macroprudential policy* (ESRB/2013/1), (2013/C 170/01), in «Official Journal of the European Union», 15 June.

Filardo, A.

2004 *Monetary policy and asset prices bubbles: calibrating the monetary policy trade-offs*, BIS Working Papers, n. 155, June.

Financial Stability Board, International Monetary Fund, Bank of International Settlements (FRB-IMF-BIS)

2011 *Macroprudential tools and frameworks: update to G20 Finance Ministers and Central Bank Governors*, February.

Goodfriend, M.

2002 *Interest rate policy should not react directly to asset prices*, in W. Hunter, G. Kaufman and M. Pomerlano (Eds), *Asset Price Bubbles: The Implications for Monetary, Regulatory and International Policies*, Boston, MIT Press.

Goodhart, C. and Perotti, E.

2013 *Preventive Macroprudential Policy*, in «Journal of Financial Management, Markets and Institutions», Vol. 1, pp.115-124.

Gualandri, E. and Noera, M.

2014a *Rischi sistemici e regolamentazione macroprudenziale*, in C. Bisoni, E. Gualandri, A. Landi and G. Lusignani (Eds.), *Scritti in onore di Marco Onado*, Il Mulino, Bologna.

2014b Monitoring Systemic Risk: a Survey of the Available Macroprudential Toolkit, CEFIN WP, n. 50.

Haldane, A.

2013 *Macroprudential Policies – When and how to use them*, IMF Rethinking macro Policy II Conference, First Steps and Early Lessons, April, 16-17.

HM Treasury

2012 *The Financial Service Bill: the Financial Committee's macro-prudential tools*, September.

International Monetary Fund (IMF)

2011 *Macroprudential Policy: an Organizing Framework*, Washington, March.

2013a *The interaction of monetary and macroprudential policies*, Washington, January.

2013b *Key aspects of macroprudential policy*, Washington, June.

2013c *Research Bulletin*, 14, n. 3, September.

Lim, C., Columba, F., Costa, A., Kongsamut, P., Otani, A., Saiyid, M., Wezel, T. and Wu, X.

2011 *Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences*, IMF Working Paper 11/238, October.

Onado, M.

2009 *I nodi al pettine*, Roma-Bari, Laterza.

Panetta, F.

2013 *Macroprudential tools: where do we stand*?, Banque Centrale du Luxembourg, Presentation at the 2013 Financial Stability Review, Luxembourg, 14 May 2013.

2014 *On the special role of macroprudential policy in the euro area*, Remarks by Mr Fabio Panetta, Deputy Governor of the Bank of Italy, at the Netherlands Bank, Amsterdam, 10 June 2014.

Viñals, J.

2013 *Making Macroprudential Policy Work*, Remarks by, Brooking Event, International Monetary Fund, September 16.

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