CRR/CRD IV: the trees and the forest

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1. Introduction

The new Capital Requirements Regulation (CRR)/Capital Requirements Directive (CRD) IV regulatory system for banks in the EU[2] is aimed at improving the resilience of the European banking system, by far the largest in the world (table 1). The Regulation and the Directive transposed into European law, as of January 2014,[3] the framework (Basel III) developed by the Basel Committee on Banking Supervision (BCBS).[4] A parallel process of transposition has taken place in the U.S., with the issue of the U.S. Basel III Final Rule.[5] The key features and requirements of the BCBS framework are respected on the two sides of the Atlantic; however differences emerge, as shown in Masera (2013). The new enlarged Basel rules[6] are part of an overall process of regulatory revision, aimed at overcoming the weaknesses of Basel II and Basel 2.5, which contributed to the global financial crisis of 2007-2009.

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[2] The CRD IV package entered into force on 28 June 2013 (CRR) and 17 July 2013 (CRD IV). See Regulation (EU) No. 575/2013 and Directive 2013/36/EU.
[3] 2014 is the start of the phase-in of the new requirements. Full implementation takes place in 2018.
[4] See BCBS (2011).
[5] Federal Deposit Insurance Corporation (FDIC) (2013).
[6] Beyond capital requirements, liquidity and corporate governance standards are also covered.

Table 1 – *Size of EU, U.S. and Japanese banking sectors (2010)*

	EU	USA	Japan
Total bank sector assets (€ trillion)	42.9	8.6	7.1
Total bank sector assets/GDP	349%	78%	174%
Top 10 bank assets (€ trillion)	15	4.8	3.7
Top 10 bank assets/GDP	122%	44%	91%

Note: Top 6 banks for Japan.
Source: Liikanen (2012) report and European Banking Federation (2011).

2. The shortcomings of Basel II/Basel 2.5 and CRD II/III and the need for a holistic repair approach

Major shortcomings of the Second Capital Accord are summarised below.[7] Designated capital items were not uniformly defined and often were not loss-absorbing. The Risk-Weighted Assets (RWA) standard was strongly procyclical. The framework was conceived fundamentally with reference to idiosyncratic risk (macroprudential risk and systemic risks were not adequately recognised). The risk-weighting process was easily circumvented, notably though Credit Default Swap (CDS) derivatives and (synthetic) securitisations with assets shifted off-balance-sheet (wrong incentive problem). Leverage became exceedingly high in many systemic banks. The issues of liquidity management and excessive maturity transformation were not addressed. The interaction between internal capital adequacy (Internal Capital Adequacy Assessment Process, or ICAAP) and supervisory review (Supervisory Review and Evaluation Process, or SREP), with a view to ensuring effective early intervention measures, was not adequately modelled. Supervisory activity was often framed according to a principle-based approach, with little attention to on-site surveillance. The capital requirements were non-proportional and incentivised lending to flow outside the regulated banking system. Regulatory recognition was granted to credit ratings by private agencies, which were subject to inherent conflicts of interest.

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[7] For a detailed analysis see, for instance, Masera (2012c) and Herring (2013).

Corporate governance and compliance were not adequately dealt with. The standard created incentives to move assets from the banking book to the trading book to reduce risk weights and failed to recognise the market risks embedded in derivatives and in trading operations (notably prop trading). Systemically important banking firms became accustomed to the expectation of public support in case of crisis (FDIC and Bank of England, 2012). This created a conundrum of moral hazard issues. A first instance of such a problem is represented by a well-known feature of insurance contracts: the insured party has an incentive to engage in reckless behaviour, because potential damages are covered by the insurer. This difficulty is enhanced because the de facto insurance of systemic banks (too-big-to-fail) has not been accompanied by any payment of insurance premiums (implicit guarantees) (Tsesmelidakis and Merton, 2013).

Other important drawbacks of Basel II and CRD I/II lay in the incorrect analysis of risk and of risk modelling. The Basel approach did not take into account the relationships between exogenous, endogenous and systemic risk. Exogenous (fundamental) risk is the risk driven by "news" - unanticipated changes in economic fundamentals. Endogenous risk is the "unexplained" volatility due to non-fundamental factors such as: perverse incentive structures, serially correlated belief structures and risk control methodologies, trend and herding behaviour. Systemic risk is the risk encountered when stress exceeds the coping capacity of the system, which enters a state of overload leading to breakdown.[8] In this situation of widespread market failures, irrational behaviour can occur and amplify the likelihood of breakdown of the financial network.[9]

Endogenous risk is consistent with rational behaviour, as explained by two main - and not inconsistent - theoretical models: (i) Kurz's theory

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[8] For an analysis of endogenous and systemic risk, reference is made to Danielsson and Shin (2003), Dwyer (2009), European Central Bank (2009), Cleeland (2011), Danielsson *et al*. (2011) and Brunnermeier *et al*. (2012).

[9] The global financial system is a highly complex network characterised by tightly coupled components that can interact in unexpected and contagious ways. The very high interconnectedness of the system is largely the result of the huge growth in derivatives markets. As will be indicated, the Basel standards were one of the main causes of the proliferation of derivatives.

of rational belief (1997), based on a general equilibrium model of market overshoot, where the distribution of serially-correlated belief systems is the primary driver of market volatility (a "technical" approach); and (ii) Danielsson and Shin's studies on endogenous risk (2003; 2011), where market volatility is shown to depend also on the outcome of interaction between market participants (a "fundamental" approach). Existing models which treat risk as a fixed exogenous process produce inaccurate predictions. In times of crisis, endogeneity becomes of paramount importance if agents become more homogeneous in their strategies, precisely because they use similar, faulty, risk modelling. As the crisis develops, the processes driving the underlying data undergo structural breaks. The assumption of stationarity of the underlying stochastic processes is violated. Additionally, data used to estimate forecasting models before the crisis become an unreliable basis to assess risk.[10] Both approaches have evident implications for the regulatory framework. It must be stressed that the concept of endogenous risk considered so far does not require the assumptions of irrational markets and behavioural economics.[11] This is an important difference with respect to the approach expounded by Haldane and Madouros (2012). Under severe stress, the two paradigms converge.

What is posited is that the Efficient Market Theory does not always hold. Strong efficiency assumes that there is well-defined, stable mapping which converts fundamental news (such as GDP growth, fiscal and monetary policies, default rates etc.) into security pricing. In the endogenous risk framework the mapping can break down, because of the non-stationary, self-correlated re-pricing of fundamentals; in this framework non-linearities between causes and effects become predominant: securities prices are not set by risk neutral expectations of future anticipated flows. Strong interactions and converging behaviours of economic agents change the underlying statistical distributions. More

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[10] Recent instances where endogenous risk developed into systemic risk can be regarded as: the Market Crash of October 1987, the 1998 Long-Term Capital Management (LTCM) bail out and, above all, the 2007-2009 financial crisis.
[11] Some key references on these more radical approaches are given below: Minsky (1992), Kahneman (2003), Guesnerie (2005) and Shiller (2005).

specifically, in the framework of complex systems, there can be a shift from normal-shaped distributions to truncated power laws (heavy tail distributions/extreme value theory) (figure 1). These changes are especially relevant for the risk evaluation of financial structures based on derivatives. Basel rules lead to strong interactions and common responses of market participants, amplified by Value at Risk (VaR) models, which turn out to be incorrect. Black-Scholes and Gaussian copula functions, when used to model the risks of derivatives structures, and VaR techniques, which are behind the Basel standards, break down under stress and create additional stress.[12] As a result, volatility is magnified, leading to "tipping points" and to extreme events.

Figure 1 – *Power laws and heavy-tail distributions*
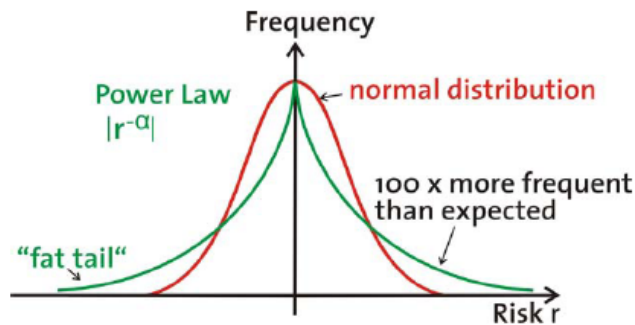
Source: Helbing (2010)

When in figure 1 the tipping point is reached, systemic risk is encountered. Beyond the cusp, financial interconnections and diversification change character; from a shock absorbing role, connectivity engenders risk amplification. Diversification can become

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[12] A more fundamental criticism of currently used statistical risk modelling is developed by Roncaglia (2012).

destabilising.[13] In this situation, widespread market failures are present. Measurable risk gives way to Knightian uncertainty (Knight, 1921). The Bagehot (1873) distinction between insolvency and illiquidity is blurred and the lender of last resort function of the central bank to provide base liquidity becomes fundamental to prevent systemic breakdown.

The problems posed by endogenous risk in finance can be illustrated by comparing weather modelling and forecasting with financial risk modelling and forecasting. In both instances, when stress conditions are anticipated, precautionary safety measures are required. However, in the former case, the forecasts and the safety arrangements taken ex ante to improve the coping capacity of the system do not affect the meteorological outcome. In the financial world, traditional financial forecast models (VaR) and the capital standards can increase total risk, beyond the fundamental thresholds.[14] The risk forecast affects and determines the subsequent outcome: in the extreme case, prophecies can become self-fulfilling. As has been indicated, this is the result of inaccurate modelling of volatility, the non-stationarity of underlying stochastic models, the homogenisation of risk aversion and buying/selling strategies. The paradox is that, in conditions of stress, the attempt to increase the buffering capacity of the system by the raising of more and more capital by the banks can create more risk and precipitate a vicious circle of system destabilisation (Danielsson *et al.*, 2011; Masera, 2012a).

These problems are compounded as a result of two other technical weaknesses of the models underlying the Basel standards: portfolio invariance and a single global risk factor. To facilitate additivity, the risk-filtering processes of the capital requirements are subject to the restriction that capital depends only on the risk of each loan, without reference to the portfolio to which the loan is added. In other words, there is no

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[13] The counterintuitive links between homogeneity in behaviour of market participants, through portfolio diversification, and systemic risk are explored by Dicembrino and Scandizzo (2012).
[14] Capital bank regulation and the VaR approach also constrain risk-neutral financial institutions to act on a global basis as if they were risk-adverse and homogenises behaviours and beliefs. The inherent risk of tight coupling and contagion is heightened, with adverse macroeconomic consequences. See Barone-Adesi (2009), Aglietta and Scialom (2009), Shin (2010), Adrian and Shin (2013) and Tonveronachi (2013).

concentration penalty, since portfolio diversification is not taken into account. According to the Basel models, the portfolio invariance of a single exposure's contribution to VaR requires that: (i) dependence across exposures is connected to one global risk factor; and (ii) each exposure is small.[15] These assumptions could be justified because the standard was primarily conceived for global banks. But, the assumptions were and are violated for large international banks too, and in any case they are not applicable to small local banks.

An additional source of criticism hinged and hinges on the fact that the Basel Accords are fundamentally related to an accounting capital approach. This framework is in itself the source of economic debate.[16] In any event, it is clear that regulatory capital and accounting rules are deeply intertwined. Criticisms of the latter feed back on the former. This line of analysis cannot be pursued here: it is relevant to underline that a key economist and director of the Bank of England (Haldane, 2012) developed a cogent set of critical views on the accounting framework for banking firms.

More generally, beyond the weaknesses of the Basel II framework just outlined, it became evident immediately after the acute phase of the crisis and the massive bailouts that a holistic approach to the overall repair of the financial system was required. Key interactive building blocks were identified and were/are being addressed. The need for an integrated, unitary framework was explained and outlined in the de Larosière Report (2009). But an organic system was first developed in the U.S., with the Dodd-Frank Act (2010). In Europe, the response was partial and delayed (Masera, 2011). It is only with the banking union framework that an integrated regulatory and supervisory system will be realised (see section 5 below). This paper deals specifically with the regulation of banking firms, but the enlarged capital standard is a cornerstone of the overall repair process and should not be assessed in isolation, through a method of partial equilibrium.

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[15] For an analysis of these issues and the pitfalls of the Asymptotic Single Risk Factor model (ASRF), see Gordy (2003), Johnston (2009) and Gordy and Lütkebohmert (2013).
[16] See, for instance, Kane (2013) and Masera and Mazzoni (2014b).

Figure 2 – *CRR/CRD IV, macroprudential supervision, the Single Supervisory Mechanism, resolution framework and new accounting rules: a network representation*
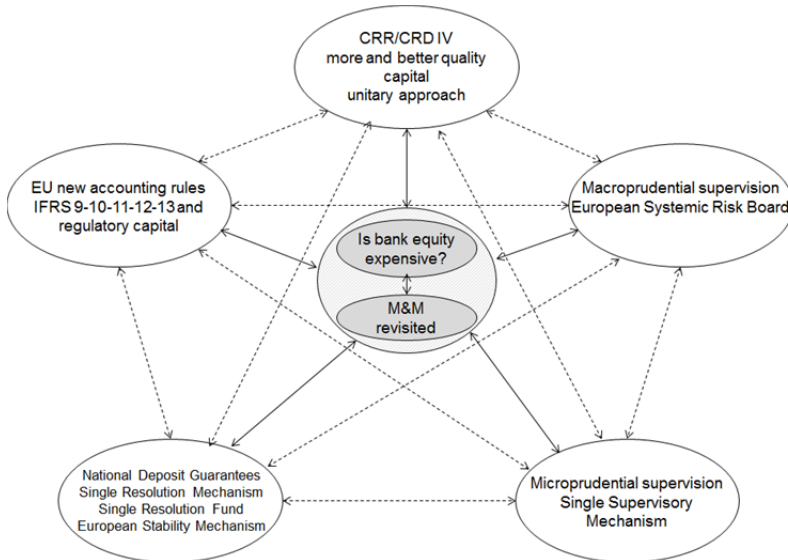

The graphical representation (figure 2) highlights that the banking union is a complex, large-scale, dynamic, interconnected system, which links all European banks. These frameworks can be best analysed as complex networks. The behaviour and the systemic stability of a complex network cannot be addressed with a sum-of-the-parts approach. Non-additive and non-linear effects can be of paramount importance: the dynamical rules governing the single nodes interact through the topology of the network (complex components and couplings). Global stability analysis is especially relevant in banking and finance, when allowance is made for exogenous and endogenous risk, possibly leading to systemic breakdowns, as indicated in section 2. While for small perturbations linear approximation can be used, large shocks require non-linear dynamic analysis. Formal modelling can be difficult, but it would be a

serious mistake to attempt simplification by modelling "local" stability of the single nodes, as originally underlined by Hayek (1942).[17]

As figure 2 indicates, a preliminary, fundamental issue in the analysis of banks' capital requirements hinges on the question whether capital/equity is an expensive source of banking financing. According to a modern rediscovery of the Modigliani-Miller (1958; 1963) propositions, capital is not regarded as a costly source of finance. This point is critically important to assess the workings of capital requirements and the supervisory process itself. In the frictionless, efficient and rational markets model underlying the Modigliani-Miller (M&M) propositions, accounting and financial values converge and the accounting debate just mentioned disappears. The irrelevance theorem is graphically synthetized in figure 3, which shows that a firm's capital structure does not influence its value. If *D/E* increases, the risk-adjusted required return of equity holders (r_E) rises and, therefore, the mechanical increase in earnings per-share is outweighed by the decline in the price/earnings ratio. Instead, the cost of debt remains constant, as is shown by the r_D horizontal line, because financial distress costs are assumed away. In this rarefied world, capital requirements are a privately inexpensive and socially beneficial form of regulation.

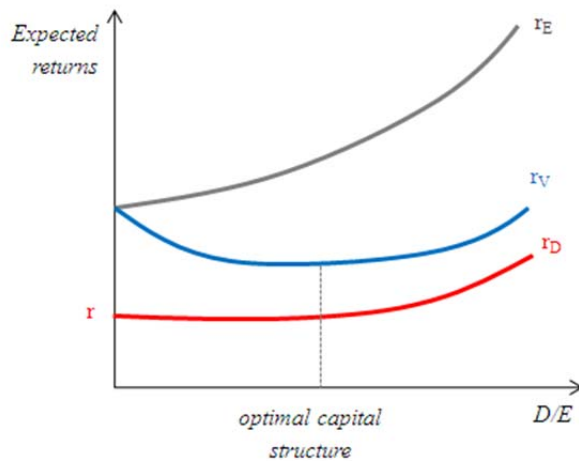Figure 3 – *Equilibrium expected returns in the standard M&M model*
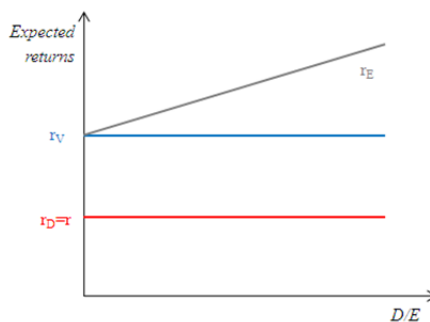
Note: *D* = book value of liabilities; *E* = financial value of equity; *r* = risk-free rate; r_E = cost of equity; r_D = rate of return on debt; r_V = weighted average cost of capital (WACC).

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[17] On these points see Xiang and Chen (2007).

Let it be noted that, quite apart from the considerations on the acceptability of the extreme M&M assumptions, and notably the absence of bankruptcy costs, government guarantees (implicit and/or explicit) in themselves make capital expensive, as Miller himself (1995) clearly recognised: "If the government is indeed insuring bank deposits either explicitly or implicitly via the too-big-to-fail doctrine, then it effectively stands as a creditor vis-à-vis the bank's owners […] raising new equity […] may just transfer wealth from the old shareholders to the bondholders". Additionally, the M&M propositions are ex ante equilibrium propositions, which are concerned with having equity, not with raising equity, especially in a situation of distress. Raising equity, particularly if the equity market signals conditions of stress by pricing the stock (well) below book value, also represents a transfer of wealth: "Floating new shares then is like pumping gas into another man's car" (Miller, 1995). The standard M&M approach gives way to a "trade-off model" (figure 4).

Figure 4 – *Equilibrium expected returns in a "trade-off model"*

Note: D = book value of liabilities; E = financial value of equity; r = risk-free rate; r_E = cost of equity; r_D = rate of return on debt; r_V = weighted average cost of capital (WACC).

Government "promises" inevitably give rise to agency and distress problems. This, by itself, makes the general statement that "bank equity is not expensive" incorrect and, therefore, misleading. The financial approach, especially in terms of the Merton declination,[18] permits to identify and account for the put options implicit in government guarantees. It also helps explain why the accounting framework is "incomplete": current accounting standards do not allow for the recording of the capital (or interest rate) subsidies to banks represented by official safety nets.[19] The accounting oversight is partially explained because contingent liabilities are not, in general, recorded in government accounts.

Other things being equal, the safety nets reduce the cost of overall funding and distort market discipline (the third Basel pillar). Their opacity and uncertainty of application make it difficult to offer a precise accounting representation, but this should not lead to their disregard. Moral hazard inevitably arises if banks (especially Systemically Important Financial Institutions or SIFIs) and uninsured lenders believe that rescue nets will be activated at taxpayer costs: on the one hand, banks will increase their appetite for risk; on the other hand, providers of finance will not perform their disciplinary role. In particular, government interventions in favour of bondholders undermine market signals and create wrong incentives. Debt holders, without implicit government guarantees and subject, at least for subordinated debt, to bail-in clauses would have aligned interests with those of deposit insurance funds and, hence, ultimately with the taxpayer. Holders of debt do not profit from risky investments undertaken by the bank, as shareholders and bank managers do, but they share the losses if excessive risk taking takes its toll. The distortions are amplified if government finances are not credible as providers of safety nets, as has been the case in the Eurozone monetary union. If a bank is in distress, equity can become expensive to raise and

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[18] See Merton (1974) and Tsesmelidakis and Merton (2013).
[19] The only reference can be found in the itemisation of costs borne by banks in respect of deposit insurance. The itemisation of the four modalities of official guarantees (on deposits, on bonds, possibly on equity and the last resort credit lines offered by the central bank at subsidised rates) is detailed in Masera and Mazzoni (2014b).

may not even be available from the market. In this scenario, a possible fallacy of composition situation is encountered with significant implications from a microsupervisory point of view and from a macroprudential perspective.[20] This possible dilemma is, therefore, clearly also relevant for two other building blocks identified in figure 2: the macroprudential European Systemic Risk Board (ESRB) perspective and the microprudential Single Supervisory Mechanism (SSM) responsibility. The early recovery/resolution mechanisms should offer available and superior alternatives to disorderly insolvency and bailouts, helping to address the key moral hazard problems.

Even if the general statement that bank equity is not expensive can be misleading, some key points of the M&M analysis retain full validity and should be underlined:

> (i) value creation of the banking firm lies primarily on the assets side of the balance sheet: i.e. on the underlying real earning stream. For given required returns to financial investors set by market conditions, the capital structure of the bank is not of critical importance: what matters is that the expected profitability should be higher than the overall cost of finance: "the low stock price in relation to book value that is so frequently taken (by banks) as a sign of a "capital shortage" is simply the market's way of saying that the return on capital is too low to justify further investment" (Black *et al.*, 1978);
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> (ii) in equilibrium, banks should be characterised by a strong capital base in terms of both total and risk-weighted assets. This would safeguard against

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[20] See Masera (2009; 2011) and Cour-Thimann and Winkler (2012). It should be observed that the U.S. addressed this problem by means of the Troubled Asset Relief Program (TARP), aimed at restoring financial confidence and stability and restarting economic growth. The U.S. Department of the Treasury, in close collaboration with the Federal Reserve, established several interventions to stabilise the financial system, and notably the banks. The initial overall Congress authorisation was for $700 billion, reduced to $475 billion by the Dodd-Frank Act (2010). Disbursements in the period October 2008 to October 2010 – when the authority to make new financial commitments under TARP ended – amounted to about $420 billion, of which $250 billion was committed in programs to stabilise banking institutions. Under five programs capital was provided to banks of all sizes and business models: capital was injected not as grants, but as investments. The results have been positive, with taxpayers earning returns from banking investments made under TARP. See http://www.treasury.gov/initiatives/financial-stability/about-tarp/Pages/default.aspx.

unexpected losses and need not burden their intrinsic value, provided that capital levels are gradually built up, in normal times;

(i) the final message lies in the emphasis on financial vs. accounting values. More specifically, accounting equity should always be compared to its market value. When the price-to-book goes and stays below unity, value is destroyed (Miller, 1995). Barring distortionary government interventions, equity values consistently below book value indicate that consolidation and restructuring are required, possibly through resolution. "Simple market based measures of banks' equity dominate accounting measures in their crisis predictive performance" (Haldane and Madouros, 2012).

This final point deserves further consideration: it brings to the fore a logical flaw of the capital supervisory framework. According to the conventional Basel wisdom, the reference framework of M&M should help bankers understand that their acritical emphasis on Return on Equity (ROE) and on the cost of equity finance is wrong. But if the M&M propositions were correct and applicable to the real world, value (market) accounting would have a superior signalling content compared to book aggregates. More specifically, the value of equity and the value of debt would be more sensitive indicators than book equity and debt also from a surveillance perspective (Masera and Mazzoni, 2014b).3. The EU transposition philosophy of the Basel Accords: the "one-size-fits-all" approach

Since their inception in 1988 (Basel I), the capital standards have been conceived by the BCBS to apply to internationally active banks and to create a level playing field for their global operations. In Europe, the transposition of the capital adequacy requirements to national legislation (Council Directives 89/299/EEC and 89/647/EEC and CRD I, II and III) has always made reference to all banks (as well as investment firms). This approach was confirmed in the implementation (July 2013) of the Basel III international standards through the CRR and the CRD IV.

The rationale for the "one-size-fits-all" approach to the new capital standards has been restated as follows:

"[…] while the Basel capital adequacy agreements apply to "internationally active banks", in the EU it has always applied to all banks (more than

8,300) as well as investment firms. This wide scope is necessary in the EU where banks authorised in one Member State can provide their services across the EU's single market and as such are more than likely to engage in cross-border business. Also, applying the internationally agreed rules only to a subset of European banks would create competitive distortions and potential for regulatory arbitrage. The EU has had to take these particular circumstances into account when transposing Basel III into EU law".[21]

The EU arguments carry weight and have not been fundamentally challenged in the past 25 years. Attention may however be drawn to possible flaws/drawbacks. Even if we accept that large, systemically relevant and highly diversified banking organisations may require a complex system of regulation,[22] it does not follow that application of the highly complicated Basel III framework to all EU banks minimises competitive distortions and regulatory gaming.[23]

Until a correctly functioning, credible mechanism for early recovery and resolution is in place,[24] notably for large banks, it can be argued that competitive distortions are primarily related to: (i) the operation of public guarantees in favour of systemically important banks,[25] too important to fail, with no taxpayer cost principle (social losses and private gains); and (ii) SIFIs proactive use of sophisticated financial structures to arbitrage capital rules.

In any event, small, local commercial banks can hardly represent a challenge to level competition in the EU Single Market. In this respect, it should be underlined that the U.S. adopted a different approach with reference to community banks. Broad consensus emerged on the opposite argument, namely that the total cost of compliance to a highly complex

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[21] European Commission (2013a).

[22] This should not be taken for granted (Haldane and Madouros, 2012). More generally, the theory of complex systems does not lead to the conclusion that the best control mechanism should be a complex one.

[23] For a cogent criticism of regulators' treatment of banking firms as homogeneous entities see de Larosière (2013).

[24] In Europe, the issue has reached the Directive stage (European Council, 2013 and Directive 2014/59/EU), while in the U.S. the framework was defined in the Dodd-Frank Act (2010).

[25] On these points see, for instance, Masera and Mazzoni (2011; 2014a), Blundell-Wignall and Atkinson (2011), Schich and Lindh (2012), Ueda and Weder di Mauro (2012) and Tsesmelidakis and Merton (2013).

system of rules as a percentage of revenues creates competitive disadvantages against small banks. The costs of adaptation and observance of highly complex risk sensitive standards require increasing human and capital resources in each bank, which creates artificial economies of scale and scope. Competition is distorted. Incentives are created for larger firm size in banking: large groups are better able to absorb the costs of regulation. This makes banking markets more concentrated (International Monetary Fund, 2012).

Large banks are not only able to absorb the costs, but also to circumvent the regulations through active use of derivative-based financial structures. The Basel Accords must not become, in their evolution, an ever more complex and detailed Gosplan, whereby the Basel Committee centrally determines thousands of risk parameters and sophisticated statistical and mathematical mappings of assets into capital requirements. As to the former, adverse incentives are simultaneously created for banks, which can game the rules by investing in and activating sophisticated and innovative financial structures. The financial system is a network of promises. Derivatives and, in particular, credit derivatives can be used to shift the promises, thereby voiding the Basel rules. The spectacular rise of CDS markets is largely the result and the consequence of the capital rules. The gaming exercise is easier for very large sophisticated international banks, while it may prove impossible for smaller, regional banks. The Basel "one-size-fits-all" approach therefore creates distortions in the system. Moreover, the attempt by regulators to respond to market circumvention by creating new regulatory structures is a Sisyphean task: regulators necessarily take a long time to reach consensus on a worldwide and "one-size-fits-all" basis, and are therefore unable to keep up with the arbitrage activities undertaken on a time-to-market basis by the single, more advanced and sophisticated banking groups.

As to the mapping process, banking regulators attempt to regain control by recourse to increasingly complex structures and models. But, as indicated, most models are inherently fragile under stress and flawed by the implicit assumptions of normality, stationarity of probabilistic structures, portfolio invariance, a single global risk factor, and by neglect

of endogenous risk and inadequate recognition of the non-orthogonality of government paper in risk measures. By imposing similar worldwide models and behaviours on banks, endogenous risk is amplified and can lead to systemic distress. The gaming exercise represents, in conclusion, a second powerful argument that explains the artificial incentives to greater size and complexity of banks.

A final set of arguments, which militates in favour of a simplified, less onerous set of rules for small, local banks hinges on their special role in the financing of Small and Medium-sized Enterprises (SMEs). There can be no doubt on the need to progressively implement in the EU a system of credit intermediation less concentrated on bank flows, but this is a medium term process and, in any event, small banks have a comparative advantage in terms of costs and information gathering in the financing relationship vis-à-vis very small enterprises. It is somewhat paradoxical that these arguments carried great weight in the regulatory debate for community banks in the U.S., where SMEs are less important and bank intermediation less relevant than in the EU.[26] There is ample evidence that, in general, banks can represent a rational solution to the joint problems of moral hazard and strategic default, because of their efficient role as borrowers' monitors. Banks pool and screen loan contracts thereby reducing costs and efforts of direct investors. In particular, well run small local banks have a comparative advantage over large and complex financial groups in information gathering and delegating monitoring in respect of SMEs. A significant link exists between the size of banking firms and its supply of credit to households and SMEs, also as a result of easier access to "soft" information.[27] If exceedingly complex rules create distortions/difficulties in this vital component of the EU economies (and notably in Southern Peripheral Countries) during a prolonged phase of economic recession/weakness,

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[26] See Liikanen (2012), Choulet (2012), Getter (2012) and EC Facts and Figures about the EU's SMEs (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/index_en.htm).
[27] For a survey of the vast literature and the presentation of interesting models that develop the original Diamond (1984) approach, see Lin and Sun (2011).

SMEs' difficulties feed back into small banks, with a perverse negative loop.

It is not suggested that small banks should have different risk weights compared to large and systemic banks: this would open the door to regulatory arbitrage. The point is rather that total capital, liquidity and other regulatory requirements contained in CRR/CRD IV should be proportional to the size and systemic risk footprint of banks of differing dimension, complexity and business model. In particular, the equity saving advantages of advanced-model banks should be called into question, because they clearly introduce competitive distortions in favour of large banks. The U.S. model of transposition of Basel III, which fully incorporates the so-called Collins Amendment (Section 171 of the Dodd-Frank Act, 2010), provides an operational example of just how these aims can be achieved.[28]

It should be underlined that these arguments are fully accepted at EU level with reference to the conducting of microsurveillance by the ECB. It is clearly indicated in the Council Regulation EU No. 1024/2013 that, within the framework of an effective well-functioning single internal market for financial services:

> "(17) When carrying out the tasks conferred on it, and without prejudice to the objective to ensure the safety and soundness of credit institutions, the ECB should have full regard to the diversity of credit institutions and their size and business models, as well as the systemic benefits of diversity in the banking industry of the Union. (18) The exercise of the ECB's tasks should contribute in particular to ensure that credit institutions fully internalise all

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[28] To recall, in the implementation of the new minimum capital ratios all U.S. banking firms calculate the numerator using the restrictive definition of capital. The vast majority of banks will apply the standardised approach to compute the RWA denominator. Advanced banks calculate both their standardised and advanced approaches risk-based (AIRB) capital ratios, however the (more onerous) standardised approach will be used to establish the minimum capital floor (Masera, 2013). CRR/CRD IV does not follow this approach; thus, the degree of freedom left to banks to adopt more or less complex models does neither effectively address the issue of competitive distortions, nor the implicit risk of relying on banks' internal loss estimates. For these and other reasons Tarullo (2014) suggested rethinking the unitary approach to bank regulation and discarding the IRB approach to risk-weighted capital requirements.

costs caused by their activities so as to avoid moral hazard and the excessive risk taking arising from it".[29]

4. Key features of CRR/CRD IV

Implementation of CRR/CRD IV is from 1 January 2014. The new requirements will be phased in over a 6-year horizon, to contain negative impacts on real economic activity. Available experience derived from the implementation of previous standards shows, however, that market operators force an early adoption of the target, "equilibrium", requirements. This is especially true if stress conditions are anticipated. Required adjustments are significant. The EC (2013a) estimated the Common Equity Tier 1 (CET1) shortfall that would have to be covered to satisfy the new minimum own funds to be in the order of €460 billion for full implementation and given assets. This is indicative of the dilemma that many banks face between increasing capital and/or reducing assets and their risk content.

CRR/CRD IV is based on the three standards (capital, liquidity and corporate governance) that will be briefly outlined in this section.[30] The enlarged framework of reference is synthetized in figure 5.

4.1. The capital regulation

Capital must be fully loss absorbing, notably in times of crisis and of unexpected losses. It should also be easily observable by market participants. Minimum own funds are the amount of capital a bank is required to hold, compared to the amount of assets. Two types of capital are considered: Tier 1 (T1) and Tier 2 (T2), which add up to total capital. T1 can be viewed as going concern capital, which allows a bank to conduct its activities and helps prevent insolvency. Common equity is the purest form of Tier 1 capital. Other strictly-selected highest quality

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[29] On these points see Lamandini (2013).
[30] The integrated new legislative framework is composed of well over 1,000 pages.

Figure 5 – *CRR (Single Rule Book)/CRD IV framework*
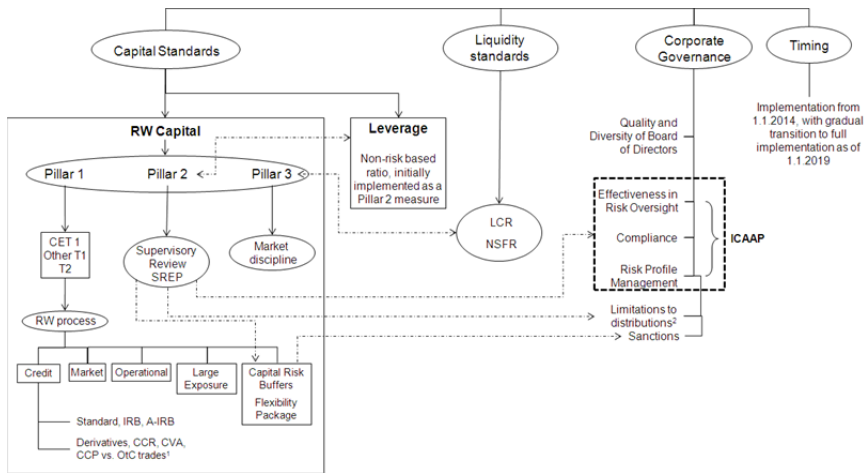
Notes: (1) The framework is completed by the EBA technical standards; (2) If a bank breaches the capital conservation buffer requirements, automatic limitations are made to buybacks, dividends and bonus payments.

components count as Additional Tier 1. T2 instruments are subordinated to general creditors; these debt instruments can be regarded as gone concern capital. The key innovation of CRR/CRD IV lies in the increase of both the quality and the quantity of capital. The CRR contains the **Pillar 1** basic capital requirements.

CRR/CRD IV continues to place primary emphasis on capital requirements measured as a percentage of RWA and retains the basic traditional formula: required capital/RWA>8%. However, the new legislation also makes reference to compulsory capital in terms of unweighted assets: the leverage ratio (figure 5). Eligible capital is more strictly defined, for given existing capital. The risk-weighted (RW) filters retain the principal characteristics of Basel 2.5/CRD III, except for two major changes already indicated in figure 5: capital risk buffers are introduced and credit risk is adapted to better cope with derivatives transactions.

One of the major deficiencies and drawbacks of CRD III was the inadequate treatment of risk in derivatives operations, notably with regard to counterparty credit risk. Building on the Regulation on Over-the-Counter (OtC) Derivatives and Market infrastructures (EMIR), the safety standards in respect to the derivative transactions of banking firms are improved. The new rules have an important bearing on risk modelling, which will adopt improved methodologies, with a clear distinction between OtC transactions (which are disincentivised) and trades which are cleared through a Central Counterparty Clearing House (CCP). Banks operating in the OtC market are exposed to a direct counterparty credit risk (CCR), i.e. the risk that the counterparty will default and will fail to pay contractual future payments. Modelling of CCR should, therefore, be taken fully into account when the fair value of derivatives positions is calculated: this adjustment is referred to as credit value adjustment (CVA). Prior to the 2007-2009 financial crisis, a common market practice was to neglect this crucial adjustment when modelling mark-to-market OtC derivative portfolios: cash flows were discounted at the (risk-free) Libor interest rate curve. The CVA is the difference between the risk free and the true portfolio values, i.e. the monetised value of the CCR. A common measure of CCR exposure is the maximum peak exposure (MPE), which represents the maximum loss in case of counterparty default at any point in the future. CCR is a primary concern of CRD IV, which imposes a mandatory CVA charge, thereby giving precise indications on the modelling process of this type of risk.

The new capital requirements rely on International Financial Reporting Standard (IFRS) 13 (Fair Value Measurement), which became effective in January 2013. Fair value is characterised as an exit price that would be received or paid in an orderly transaction. A key component of fair value is precisely the CVA. As indicated, reference to an exit price requires the move away from historically based to risk neutral parameters. Counterparty risk capital standards, through the introduction in general of CVA VaR, significantly increase capital held against bilateral credit exposures. Banks must evidently align front office, accounting and capital requirements. A major challenge is posed by stress conditions/scenarios and, therefore, by stress tests, when exposures and credit spreads widen

simultaneously. Traditional monitoring instruments are usually complemented by more sophisticated techniques, such as jump to default and cross gamma. In any event, the deficiencies of VaR approaches under endogenous risk can hardly be overcome (Masera and Mazzoni, 2013).

Derivative trades that are cleared through a CCP are collateralised daily, which reduces CVA charges. Each end-investor trades with a clearing broker, which in turn faces the CCP. The CAD IV approach takes into account that centrally cleared trades present lower risks, but it recognises that banks face, in any event, an exposure to CCPs. Risk modelling must, therefore, take this factor into account through: (i) risk weighting on exposure to the CCP (2% capital charge); and (ii) a contribution to the CCP default fund, based on a pro rata calculation of banks' percentage contribution to the fund itself.[31]

The quantification of the new risk-weighted capital requirements is presented in table 2. Attention is drawn here to capital buffers and to the EU flexibility package (which has no counterpart in international Basel III). Even excluding the impact of the EU flexibility capital surcharges, the minimum requirements for CET are increased from 2% in CRD III to some 20%, under stress. CRR/CRD IV introduces four capital buffers: (i) capital conservation, (ii) countercyclical, (iii) systemic risk; and (iv) global systemic institutions/other systemic institutions.

The capital conservation buffer is designed to ensure that banking firms build up excess capital outside periods of stress, which can be drawn down as losses materialise. The buffer is set at 2.5% of total exposures, comprised of CET1, and is established above the 4.5% regulatory minimum of CET1. If a bank breaks the 7% threshold, automatic safeguards are activated which limit dividends and bonus payments.

The countercyclical buffer is a prudential tool aimed at damping the procyclicality of the Basel Accords. Its purpose is to counteract the impact of the cycle on banks' lending activity; it requires a bank to have an additional amount of capital (CET1) during cyclical upswings, to prevent excessive lending. When the economy slows down or enters a recessionary

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[31] It has been argued that CCP idiosyncratic and systemic risks have been underestimated, which might feed back on banks (Blundell-Wignall *et al*., 2014).

phase the countercyclical buffer can be released. If a bank does not build up an adequate buffer, the same restrictions as in the capital conservation buffer are set in motion. This buffer is institution-specific and is set by designated Member State authorities. It should vary between 0 and 2.5% of RWAs, unless the designated authority considers, in light of internal economic conditions, that the buffer should exceed 2.5%.

Table 2 – *CRD IV/CRR: RWA capital requirements**

Basic requirements			Pillar 1 flexible requirements[1]				Pillar 2 flexibility		EU flexibility package (CRR)[5]		
									Member States[4]		Commission
CET 1	Addition al T1	T2	Counter-cyclical capital buffer	Capital conservation buffer	Systemic risk buffer[2.5]	Global systemically important institutions buffer[3] (G-SII)	Supervisory possibility of adding extra capital	Banks' own capital buffer	National macro-flexibility	Real estate and LTV criteria	Temporary (1 year) stricter requirements
									Includes more stringent capital requirements	Higher risk weights up to 150%	Includes higher levels of own funds
4.5	1.5	2	0-2.5	2.5	3-5	1-3.5	0-2	1-2	Quantitative surcharges are not defined ex ante		
4.5	6	8	10.5	13	18	21.5	23.5	25.5			

*The figures in rows 1 and 2 are percentages. The figures in row 2 represent the hypothetical maximum cumulative percentage.
Notes: (1) Member States retain flexibility with regard to capital requirements only; (2) This buffer is optional to cover structural or systemic risk (buffer rate 0-3% in 2014, 3-5% from 2015 onwards). Member States or a designated authority can set the rate subject to notification to the European Commission,the EBAand the ESRB. The buffer is intended to cope with ring-fencing of commercial banking activities (Vickers' UK model). A Member State can set the rate above 5%, but only after the authorisation of the European Commission; (3) This surcharge (applicable from 2016) is set to cope with the degree of G-SII-ness. For (non-global) EU SIIs, the surcharge is 0-2.5%; (4) Member States retain flexibility with regard to increasing requirements on capital, risk weights, large exposures and liquidity; (5) The systemic risk buffer and the EU flexibility package are not present in international Basel III and in U.S. Basel III (EU specificity).

The systemic risk buffer is optional to cover systemic and/or structural risks. It can be introduced by each Member State for the financial sector or one or more subsets of the sector with a view to preventing and mitigating long-term noncyclical or macroprudential risks. From 2015 onwards Member States setting this buffer (between 3 and 5%) must notify the European Commission, the European Banking Authority (EBA) and the ESRB. The Commission will provide an opinion. In the case of a negative opinion, the Member State has to "comply or explain". Buffer rates can be

set above 5%, but they must be authorised by the Commission through an implementing act, taking into account the opinions provided by the ESRB and by the EBA. The rationale for this buffer is to be ascribed to the intention expressed by some Member States to cope with the ring-fencing of commercial banking activities in complex banking groups (following Vickers' UK model).   This buffer (and its complicated introduction procedures) is not present in international Basel III and in the U.S. Basel III Final Rule. Also from this perspective, the U.S. standard does not rely on a simplistic "more RWA capital" approach. The issue of complex interactions between commercial and investment banking activities is dealt with in terms of the Volcker Rule. The detailed rules issued in December 2013 by the U.S. agencies (Federal Reserve System, 2013) bar banks from speculating with own funds (prop trading). With the Volcker Rule, the Dodd-Frank regulatory overhaul is largely complete.

A fourth buffer requirement is introduced to deal specifically with Global Systemically Important Banks (G-SIBs) and (with different ratios) with "other" systemically important banks at EU level: the global systemic institution/other systemic institution buffer. This surcharge should reduce the moral hazard of implicit government support and bailout by taxpayer money, and partially internalise the cost of systemically important banking organisations. G-SIBs are defined according to the Financial Stability Board(2013) list of global SIFIs (currently 16 out of 29 global SIFIs are European banking organisations).

CRR/CRD IV introduces two other "flexibility" provisions which can be used to enact more stringent capital requirements. Beyond Pillar 2 flexibility, a so-called EU flexibility package is foreseen (table 2). With complex procedures Member States and the Commission have the power to increase requirements on capital, liquidity, risk weights, large exposures and other prudential requirements. A key feature of CRR/CRD IV is represented by the focus on Pillars 2 and 3, which is predicated on the functioning of governance models and operation (see section 4.3 below).

Pillar 2 encompasses ICAAP and SREP. The internal capital planning exercise should identify and model the alignment of risk tolerance and appetite with capital resources, not only on a compliance basis, but also in terms of a dynamic forward looking approach. This is a

specific, direct responsibility of the board of directors. Competent and robust governance is therefore also key to ensuring a sound capital structure, a sustainable relationship between return on assets and the overall cost of capital and an appropriate internal incentive system. Rigorous surveillance must go beyond principles and adopt an evidence-based and risk-based specific approach. Supervisors should also verify that a culture of responsibility, compliance, appropriate conduct of business and respect of standards of integrity prevails in all banks.

Beyond risks quantified under Pillar I, the second Pillar is meant to ensure that a bank's capital is adequate to cope with all relevant risks (at a predetermined confidence level). Pillar 2A is intended to assess and quantify risks not fully captured or not considered by the regulators under Pillar 1. Pillar 2B refers to risks of a forward-looking nature to which a bank may become exposed. Also, capital requirements under Pillar 2 will be subject to quality enhancement.

Under Pillar 3, capital adequacy must be publicly reported with a view to providing transparent and exhaustive information on capital structure, risk exposures, risk management and internal control processes. The market should therefore be able to form a view on a bank's ability to withstand unforeseen losses, and price this information into equity, debt and deposits (above the insured threshold): market monitoring and discipline. The market pricing process is however distorted if explicit/implicit government/central bank guarantees are present, and if they lean towards systemically important banks (too-big-to-fail). The Pillar 3 process was, therefore, undermined in Basel II. The aim of CRR/CRD IV is to give an effective role to market discipline. This requires enacting a meaningful and credible resolution procedure, as foreseen in the Dodd-Frank Act in the U.S. and in the banking union/bank resolution framework in the EU.

As outlined in figure 2, CRR/CRD IV capital regulation introduces a capital prudential measure which makes reference to non-risk-weighted assets: the leverage ratio, which is defined as T1 capital divided by a measure of total assets. In the new EU regulatory framework, leverage plays an ancillary backstop function with respect to RW capital ratios. The EU philosophy is clearly explained as follows:

"In case the calculated risk weights contain errors, models contain errors or new products are developed and risk weights are not measured precisely yet, a traditional back-stop mechanism limits the growth of the total balance sheet to available own funds. Today, given the sophistication of risk-weight determination, the leverage ratio will be an additional checking tool for supervisors" (European Commission, 2013a).

In line with this approach, the initial implementation of the leverage rate is left to national supervisory authorities as a Pillar 2 measure, having as a point of reference the 3% level suggested by international Basel III. As data and evidence are gathered, a report will be prepared, including the proposal to make leverage a binding measure as of 2018. With the coexistence of leverage and RW capital requirements in principle the question of the relative prominence of one of the two requirements arises. The bindingness of the leverage ratio (l) or the RW requirements (β) depends on the respective levels of the two regulatory ratios and on the ratio of RW to total assets, which is partly endogenous. With l set at 3%, and β's taken from table 2, in the assumption that the procyclical and capital conservation buffers are enforced, it appears that in the EU β would always be binding.32

4.2. The liquidity standards

CRR/CRD IV introduces two new liquidity buffers:

(i) to reduce short-term liquidity risks a Liquidity Coverage Requirement (LCR) is created. Banks are requested to hold high quality "liquid" assets to cover estimated net cash outflows in stressed conditions over a thirty-day period, with a LCR ratio ≥ 100%. The new measure is intended to enhance the short-term resilience and the liquidity risk profile of banking firms;
(ii) to ensure stable funding over the medium term (over one year) a Net Stable Funding Requirement (NSFR) is introduced (long-term financial obligations must be adequately met with stable funding.

Both requirements met with considerable opposition, notably with reference to the definition of liquid assets and the role of short-term

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[32] In the U.S., the opposite could be true for very large banks if the proposed American Add-on is effectively introduced (Masera, 2013).

government obligations.[33] The final rules will be decided after an appropriate observation period.[34]

4.3. Corporate governance and remuneration policies

CRR/CRD IV introduces corporate governance arrangements and mechanisms and defines provisions relating to remuneration, notably in terms of transparency and disclosure for individuals earning more than €1 million per year. The main purpose of the CRR/CRD IV provisions on corporate governance is to reduce excessive risk taking by banking organisations. Diversity in board composition should improve risk oversight by boards of directors; quality and professional competence of board members should complement diversity. Remuneration policies should not give incentives to take excessive risks. More generally, compliance, risk management and audit functions should offer adequate checks and balances to risk taking. As already indicated, ICAAP and SREP should interact with a view to ensuring prompt corrective action.

Accordingly to CRR/CRD IV, the bank's Board of Directors will be responsible for: the overall risk profile and strategy, the adequacy of the risk management system, the close interaction with supervisory authorities and the quality and promptness of Pillar 3 disclosures. Banks must ensure that the risk management and compliance functions be independent from operational and management functions, and with adequate authority, quality and resources.

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[33] See, for instance, Brunnermeier *et al.* (2012), Masera (2012c) and Resti (2013).

[34] In the U.S., the Federal Reserve, Office of the Comptroller of the Currency (OCC) and FDIC issued in October 2013 a proposal to implement the LCR tailored to the systemic footprint of U.S. banking firms: for very large banks, the proposed LCR is a "super-equivalent" to the international Basel III standard add-on. At the other extreme, small bank holding companies and deposit institutions are exempted from the liquidity requirements (Tarullo, 2013).

5. The CRR/CRD IV capital rules in the banking union framework

In section 2 of this paper it had been anticipated that a meaningful analysis of the new capital regulation for banking firms cannot be conducted in isolation. Account must be taken of the implementation, the workings and the interactions with other key building blocks of the overall process for financial repair in the EU. The enactment of CRR/CRD IV takes place in parallel with the banking union exercise, which in its narrow definition makes reference to the unified microsupervision of EU banks, but more broadly should be used as a synecdoche for the four key components of the prudential banking repair process: capital regulation itself, macrosupervision, microsupervision and recovery and resolution (figure 6).

Figure 6 – *The new Bank Capital Regulatory Framework and the other three interactive building blocks of the "banking union package"*
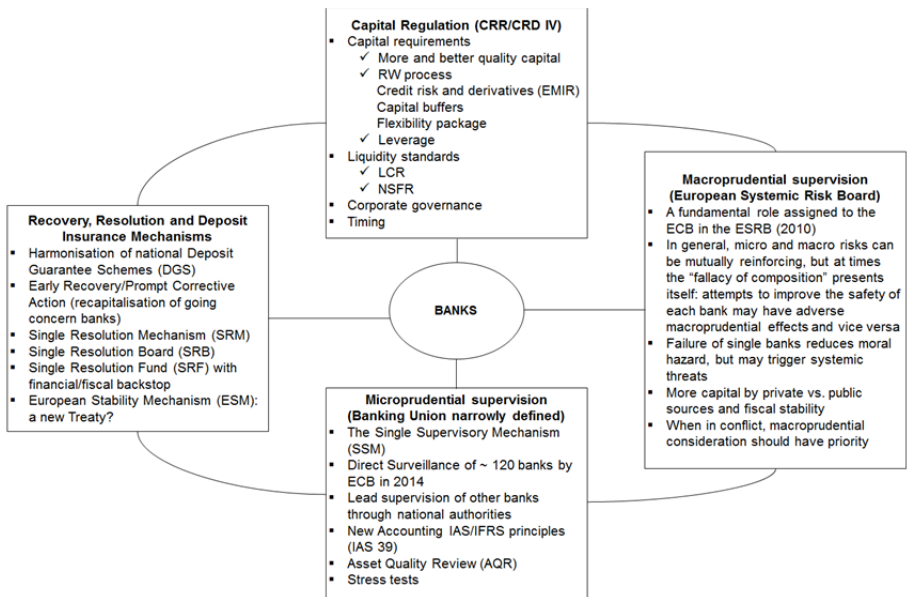
The design of the other three complementary building blocks of banking union is outlined in many pieces of EU legislation, some of which are still in the early stages of implementation:

- the ESRB was established on 16 December 2010 to oversee risks in the financial system as a whole (macroprudential oversight) and tasked with oversight of the financial system from a macro perspective, with a view to preventing/mitigating systemic risks. A key issue in this regard is posed by possible "fallacy of composition" situations: private virtue may become public vice. Actions that are correct at the micro level may be destabilising for the system as a whole. Macroprudential policy must take into account aggregate equilibria, which need not be factored in by microprudential supervision.[35] The Basel-related capital rules are intrinsically geared towards the solidity of individual banking firms. Attention must be therefore given to their implications for macrofinancial stability, which constitutes the interactive task of macroprudential oversight;

- the SSM – banking union strictly defined (Reg. 1024/2013, 15.10.2013 and Reg. 1022/2013, 22.10.2013) stipulates that microprudential supervisions of credit institutions is conferred on the ECB, according to art. 127 (6) of the Treaty on the Functioning of the European Union. Around 120 "significant" banks, representing €25 trillion, or approximately 85% of total banks' assets, are supervised directly by the ECB. The SSM covers, however, all banking entities (approximately 3,650) in the Euro area. National supervisors have responsibility for microprudential supervision of less important banks, but the operation of national authorities is integrated in to the SSM: the ECB is responsible for overall supervision and can take direct action on any bank. The ECB is, in particular, tasked with the supervision of all banks which have requested public financial assistance from the European Financial Stability Facility (EFSF) or the European Stability Mechanism (ESM);

- the Bank Recovery and Resolution Directive (BRRD) (May 2014) provides a framework (coming into force in 2015) to cope with ailing banks. Powers and tools are created to deal in an effective way with prevention, early intervention and, ultimately, resolution. Banks will have to draw up recovery plans, while authorities are requested to prepare resolution plans. The directive introduces the bail-in of investors' funds as a means to contribute to banks' recapitalisation (including mandatory and contingent convertible bonds), and requires banks to issue minimum amounts of

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[35] See de Larosière (2009), Brunnermeier *et al.* (2009), Hanson *et al.* (2011), Masera (2011) and Osiński *et al.* (2013).

liabilities subject to bail-in. A consistent "waterfall" is introduced to apportion losses in case of default. Obstacles to resolvability, also of a juridical nature, should be addressed. Models are outlined to deal with resolution funding, taking into account the harmonisation of EU rules on the over 28 existing Deposit Guarantee Schemes (DGS) (in some countries more than one scheme is in place).[36] The BRRD relies fundamentally on a network of national authorities and resolution funds to resolve banks. The funding issues are further (and differently) detailed in the Commission's proposal for a Single Resolution Mechanism (SRM) (July 2013), as a complement to the BRRD. The SRM is set up to centralise key competences and resources to deal with failures of banking firms. As the crisis in Cyprus in 2013 demonstrated, bank resolution conducted at national level has a crucial impact on the domestic real economy, exacerbates the negative loop between sovereigns and banks and does not prevent contagion. The SRM provides an integrated decision making structure, aligning SSM and resolution procedures: notably a Single Resolution Board (SRB) and a Single Resolution Fund (SRF). The latter is based on banks' risk-based contributions. The crucial question is the capability of introducing fees correctly graded according to the systemic risk footprint of each SIFI.[37]

Back-up financing arrangements are critical to the effective workings of the banking union as a whole. In principle, they are also a precondition for the proper functioning of the banks' balance sheet assessment, which is undertaken in order to enter into the SSM (operational from 4 November 2014). A process of "Comprehensive Assessment" (CA) of banking firms directly supervised has been launched by the ECB (October 2013). The CA has three stages to be completed by October 2014: a supervisory risk assessment, an Asset Quality Review (AQR) and a stress test conducted by the ECB in collaboration with the EBA.

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[36] A draft Directive aimed at harmonising EU DGSs is now in the phase of advanced negotiation (European Council, 2014). The DGS framework does not adopt a pan-European model with mutualisation features. According to the proposed directive, deposits are covered up to €100,000. Member States can set high target levels. Covered deposits are excluded from the bail-in regime. Ex ante financing arrangements are introduced with funds collected from banks' contributions, with the degree of risk incurred by the banks being taken into account.

[37] For an analysis of the new EU approach to the management of banking crises, see Enria (2013) and Micossi et al. (2014)

Key rules and procedures in case of bank resolution are laid down by the BRRD, while certain provisions for the SRM are still under negotiation. Resolution frameworks aim at private resource financing, but public backstop arrangements appear necessary, especially in crises of systemic relevance.[38] According to the BRRD, backstop financing would be based on a network of national authorities and resolution funds. Levies on banks would cover the costs of the Board and would eventually represent a principal source of backstop finance for the SRF, which would over time supersede national resolution arrangements. The fund would be financed by the contributions of all banks; contributions would be calculated according to the different size, type and business model of banking firms, to reflect idiosyncratic and systemic risks.[39] No new explicit role would be assigned to the ESM, which would remain as an ultimate backstop in case of a crisis of systemic nature.

6. Overall assessment and conclusions

This review of the EU legal transposition and adaptation of the third Basel capital standard highlighted the significant improvements made upon the second Accord. However, it also brought to the fore the weaknesses which, in the author's view, continue to characterise CRR/CRD IV.

6.1. Positive features

- The new system requires in equilibrium higher and better quality capital cushions against unforeseen losses incurred by banking firms. Reference is made both to RWA[40] and to leverage. This should help overcome the

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[38] On these points, see Rehn (2013).

[39] As already argued, this is the correct approach, which however differs from the philosophy of CRR/CRD IV that uses extra capital requirements to cope with systemic risk (Masera and Mazzoni, 2011).

[40] In calculating required regulatory capital, over-reliance on ratings provided by Credit Rating Agencies (CRAs) has been reduced, but without addressing the fundamental conflict of interest of issuer-pays models (Masera, 2012b).

excesses of capital gaming observed under Basel II.[41]

- The problem of procyclicality is addressed, but not solved! The required build-up of equity during a recessionary phase affected the path towards recovery in the EU.[42] In the U.S., in spite of the clear lead in upturn prospects, the implementation of the cyclical buffer has been delayed; in any event, only advanced approaches will be subject to this buffer.[43]

- EU banks have, on average, approximately doubled their CET1 in the past three years. They are on a much sounder footing, with good capital cushions against unforeseen losses. It is now crucial to strike the appropriate balance between micro and macroprudential objectives, with a view to supporting the weak recovery path, reducing macroeconomic risk and banking loan fragmentation, reviving banks' profitability (de Larosière, 2014).[44]

- The treatment of derivatives risk for banks has improved, and disincentives have been introduced for OtC transactions.

- New guidelines for corporate governance are set to insure a better risk management framework. Microprudential supervision is now based on forward-looking hands-on surveillance, as developed by the Bank of Italy. This new approach is likely to be consolidated under ECB guidance.

- A major step forward should be represented by the envisaged interactive process between ICAAP and SREP. In the new framework, internal capital

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[41] On these points however, see Blundell-Wignall *et al.* (2014).

[42] The risk of jeopardising Europe's growth as a result of the timing and the modalities of introduction of capital requirements and buffers was analysed by the IMF (2012), with the indication that a large sample of European banks was expected to reduce assets by 7.3% ($2.8 trillion) from September 2011 to the end of 2013, and by de Larosière (2013). The very large expansion of the monetary base by the ECB up to mid-2012 did not result in increased lending to the real economy, notably to SMEs. In a recessionary phase, the sharp increase in capital/liquidity regulatory burdens necessarily affects banks' marginal incentive to lend. Positive interest rates on excess reserves have a similar adverse impact on the transmission of monetary impulses. Paradoxically these points are well illustrated by Oliver Wyman (2014), the principal advisor on the SSM to the ECB. This reinforces the argument that capital should be built up to the (high) equilibrium levels during good/normal times.

[43] For a critical assessment of the countercyclical capital buffer in the EU, see Repullo and Saurina (2011).

[44] The U.S. experience which relied on: (i) a successful TARP approach, (ii) sizable securitisation schemes of bank credit, supported by Government Sponsored Enterprises (GSEs), notably Fannie Mae, Freddy Mac and the Small Business Administration; and (iii) less onerous capital and liquidity requirements for smaller banks, should be taken into due account.

adequacy will be assessed by each bank's board of directors and risk management function, under varying severity of the anticipated economic environment. The risk strategy, appetite and tolerance of the firm will be defined and monitored. The parallel SSM supervisory review will evaluate the effective risk profile, with the power to intervene by activating recovery and possibly resolution procedures, also on a going-concern basis.[45]

- Better integration between supervisory and accounting approaches has been achieved in terms of the expected loss framework (IFRS 9 vs. the International Accounting Standard (IAS) 39 incurred loss model).

- Last, but perhaps most important, a holistic framework is being developed centred on banking union, based on the full support of the ECB to break the vicious circle between sovereigns and national banks (Draghi, 2012) and on the two key new building blocks: SSM and Recovery and Resolution Processes.

6.2. Critical aspects

- To start with, the ever-increasing complexity of the Basel III standard is in itself a source of concern, a fact also recognised by the BCBS, which created an ad hoc task force to address it. The EU transposition has added complications and further regulatory layers to the international standards, notably with reference to capital buffers and to the "EU flexibility package".[46] The U.S. authorities adopted instead a streamlined approach. The issue of complexity is intertwined with the EU unitary prudential approach, which creates distortions that work against small banks (and SME and household finance) and which should be reconsidered.

- A key critical consideration hinges on the continued neglect in risk modelling of the distinction between exogenous and endogenous risk. As indicated, RW capital rules can lead to strong interactions and converging behaviours, eventually leading to the breakdown of the VaR models and to tipping points.

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[45] PCA is key, because both bail-in and bail-out are always costly (Goodhart, 2013 and Goodhart and Avgouleas, 2014).

[46] In this crucial respect, the following famous Einstein quote should always be taken into account: "Everything should be made as simple as possible, but not simpler". Concerns surrounding the complexity of Basel III rules and the difficulty/cost of their enforcement have been expressed by Hoenig (2012), Haldane (2012), Montanaro and Tonveronachi (2012), Blundell-Wignall *et al.* (2014) and are behind the BIS discussion paper on these issues (BIS, 2013).

- It remains to be seen whether, in the interaction between SREP and ICAAP, close attention will be given, beyond book capital adequacy, to value accounting – notably price-to-book ratios – as a possible early signal of weakness (Masera and Mazzoni, 2014b).

- Serious drawbacks of the 2010-2012 version of the Basel III liquidity framework have been corrected (Resti, 2013), but liquidity rules require further adaption, notably in the Eurozone institutional framework. Covered bonds and certain ABS classes could be included as assets eligible for the LCR. More generally, the current approach does not recognise that monetary base is the only perfectly liquid asset, while in the Eurozone short-term government debt is not.[47] When endogenous risk sets in, credit and securities markets drift together: liquid assets, including government paper, can become illiquid. Solvency and illiquidity become intertwined.[48] A more effective approach to liquidity requirements would also rely on monetary base bank reserves, which represent the paradigm of liquid assets.

- The CRR/CRD IV regulatory framework assumes that capital surcharges act as insurance premiums to prevent/correct misalignments in incentive structures of systemic banks. Higher capital ratios improve loss absorption capacity, but are not the best instrument to achieve the target of incentive realignment. The opposite outcome may result, because of risk shifting behaviour (Masera and Mazzoni, 2011).

- In the EU, there is a clear need to develop deep and resilient market-related channels to finance investment, with a view to complementing bank credit (Green Paper on Long Term Investment – LTI[49] and the European Long Term Investment Funds framework – ELTIF[50]). But the issue of proportionality in capital regulation and the need for simple, transparent, high quality securitisations must be underlined (de Larosière Report, 2009 and Claessens *et al*., 2012).[51]

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[47] The zero risk-weight assigned to EU sovereign debt is not analytically correct and is difficult to reconcile with effective and realistic stress tests (Korte and Steffen, 2013).

[48] The complex interactions between fundamental and market liquidity under stress are explored by Danielsson and Peñaranda (2007). Participation externalities and regulatory constraints may create negative liquidity spirals (Pagano, 1989 and Morris and Shin, 2004). An empirical study of prolonged states of illiquidity (liquidity leaks) is conducted by Menkveld and Wang (2012). The failures of conventional regulatory policies to deal with the liquidity issues are explored by Van de Heveul (2007) and Cao (2011).

[49] European Commission (2013b).

[50] European Commission (2014a).

[51] This is the case also because, in reality, banks and market finance are not separated. The close connections between banking and shadow banking in the U.S. are demonstrated by Cetorelli (2013).

- The relationship between RW and leverage requirements should be balanced and complementary. This is the approach adopted in the U.S.. In the EU the balance is tilting towards the predominance of the RW requirements, with leverage playing an ancillary backstop function (Masera, 2013). But, the reliability and comparability of RWAs can be questioned (Blundell-Wignall *et al.*, 2014 and Masera and Mazzoni, 2014b).

All in all, much important progress has been made, but there is plenty of work ahead to improve, but also to simplify and streamline, the current capital regulatory framework.

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Acronyms

AB	Asset Backed Securities
AIRB	Advanced Internal Ratings-Based
AQR	Asset Quality Review
ASRF	Asymptotic Single Risk Factor Model
BCBS	Basel Committee on Banking Supervision
BRRD	Bank Recovery and Resolution Directive
CA	Comprehensive Assessment
CCP	Central Counterparty Clearing House
CCR	Counterparty Credit Risk
CDS	Credit Default Swap
CET1	Common Equity Tier 1

CRA	Credit Rating Agency
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
CVA	Credit Value Adjustment
DGS	Deposit Guarantee Scheme
EBA	European Banking Authority
EC	European Commission
ECB	European Central Bank
EFSF	European Financial Stability Facility
ELTIF	European Long Term Investment Funds
EMIR	European Market Infrastructure Regulation
ESM	European Stability Mechanism
ESRB	European Systemic Risk Board
Fed	Federal Reserve
FDIC	Federal Deposit Insurance Corporation
FSB	Financial Stability Board
GSEs	Government Sponsored Enterprises
G-SIB	Global Systemically Important Bank
GSII	Global Systemically Important Institution
IAS	International Accounting Standard
ICAAP	Internal Capital Adequacy Assessment Process
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IRB	Internal Ratings-Based
LCR	Liquidity Coverage Requirements
LTCM	Long-Term Capital Management
LTI	Long Term Investment
M&M	Modigliani-Miller
MPE	Maximum Peak Exposure
NSFR	Net Stable Funding Requirement
OCC	Office of Comptroller of the Currency
OtC	Over-the-Counter
PCA	Prompt Corrective Action
ROE	Return on Equity
RW	Risk-Weighted

RWA   Risk-Weighted Assets
SIFI   Systemically Important Financial Institution
SII   Systemically Important Institution
SME   Small and Medium-sized Enterprise
SREP   Supervisory Review and Evaluation Process
SRB   Single Resolution Board
SRF   Single Resolution Fund
SRM   Single Resolution Mechanism
SSM   Single Supervisory Mechanism
TARP   Troubled Asset Relief Program
T1   Tier 1
T2   Tier 2
VaR   Value at Risk
WACC   Weighted Average Cost of Capital