

***BANK CAPITAL STANDARDS:
A CRITICAL REVIEW***

By

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*“Everything that can be counted does not necessarily count
and everything that counts cannot necessarily be measured”*

Albert Einstein

BANK CAPITAL STANDARDS: A REVIEW

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Abstract: The aim of this paper is to review the significant flaws in the Basel Accords, which undermine their contribution to stability in banking and financial markets. Four main lines of analysis are used: book vs. financial accounting and the cost of equity for banks; the study of risk and of risk modelling adopted by capital regulators and supervisors; the problem of incentives; the ever-increasing complexity of the capital standards. These four strands are inherently intertwined; for presentation purposes they are dealt in turn, to show in the conclusions their overall implications for adaptation of the Basel III framework, before its enactment.

Keywords: Basel III, risk modelling, procyclicality, financial guarantees, bank and sovereign debt interconnections.

JEL classification: E44, G21, G28, G32, G38, H81.

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1. A brief historical perspective

As a consequence of the 1929 Stock Market Crash and the subsequent Great Depression, the pendulum of financial regulation swung towards heavier and broader regulation, notably with: (i) greater emphasis on bank safety and protection of depositors and (ii) forced separation of the various functions and segments of the industry.

The Glass-Steagall Act (1933) epitomizes this trend: in particular, the Act created the FDIC (Federal Deposit Insurance Corporation) to insure bank deposits and introduced a clear separation between commercial banking and investment banking¹. The enactment of Glass-Steagall must be seen against the background of the very rapid fall of bank stocks from 1928 to 1932, the permanent closure of some 4,000 banks in 1933 and the evidence collected by the Pecora Commission of the wrongdoings of the large Wall Street banks. As indicated by Haldane and Madouros (2012), the regulatory separation was not necessarily against market trends. Many banks with price-to-book well below unity, facing possible runs on deposits and fears of default, regarded the break up unavoidable in order to refocus their business models and to restore a sustainable equilibrium between profitability and cost of finance: needless to say, the moral hazard consequences of public guarantees were not present.

Over time, the Glass-Steagall approach, and its practical application by Government Agencies, revealed a major drawback. It accepted reduced competition in many sectors of the financial industry, with a view to lowering the risk of insolvency, especially of banks.

Also as a result of technological and financial innovation and of rapid expansion of international banking activities, which spurred strong competitive pressures, the basic philosophy of rigid regulation of the financial industry was increasingly challenged. Many banks felt that their enterprise value would significantly increase in a less regulated environment. This trend must be set in the light of a broader “cultural” background which postulated the self -correcting nature of the

¹ The separation of commercial and investment banking in the U.S. was accompanied by legislation forbidding bank-insurance and bank-mortgage loan joint activities. Banks had to comply with rigid limitations on branching and could not compete for demand deposits through payment of interest.

financial industry in the framework of flexible, efficient and rational markets. Again, the Glass-Steagall benchmark provides a good example of the turning of the pendulum. The law was gradually eroded since the end of the 70's, mainly by carving out exceptions and loopholes.

A turning point came with the appointment in 1987 of Alan Greenspan to the FED chair, to replace Paul Volcker. In public and congressional statements Greenspan pressed for repealing Glass-Steagall. Treasury Secretary Robert Rubin indicated that Glass-Steagall was outdated. The formal end came with the Gramm-Leach -Bliley Financial Modernisation Act, signed into law on November 12, 1999.

The Government responsibility of protecting the interests of bank depositors and the soundness of banks was strongly reaffirmed in the new competitive environment. Without this commitment the Glass-Steagall framework might not have been repealed. However, continued provision of government insurance of deposits and full commitment to banks' safety, on the one hand, and greater reliance on the benefits of competition in the financial industry, on the other hand, could become two irreconcilable objectives.

The government, by providing deposit insurance, accepts a contingent liability, ultimately borne by the taxpayer. The supervisory authorities are agents which share the responsibility of banks' safety. Both are therefore concerned with banks' capital adequacy: equity represents a buffer against unexpected losses. In principle, the insurer/supervisor should set insurance premiums according to the effective risks of a bank's assets. Failing this, a wrong incentive/moral hazard problem inevitably arises. The bank has an incentive to mislead the insurer/supervisor about the risk-weighted value of its assets the lower is its capital base². In practice, real-time adjustment by the government of risk insurance premiums bank by bank, according to the probability of banks becoming insolvent proves very difficult. With a de facto fixed insurance rate, a solution to the incentive issue was sought by relying on capital charges set in relation to risk-weighted assets.

Financial regulators took a leaf from the markets: regulatory innovation – the Basel risk-weighted capital standards – seemed to provide the means to square the circle. This was the powerful, simple, logic behind Basel I, introduced by the Basel Committee on banking supervision in 1988. The Accord was endorsed by G10 governments and became an international standard.

The new approach had two other powerful advantages, which greatly contributed to its adoption on a world-wide basis. With international banking activity acquiring a greater and greater role in the global financial system, the issue of a level playing field for competition by international banks acquired paramount importance. As was argued, notably by Anglo-Saxon banks, if government implicit/explicit guarantees on bank deposits and other debt liabilities differed significantly in the various countries, banks would have an incentive to expand their risky activities in proportion to the effective level of the guarantees provided and inversely with the capital ratios of the banks. Competition would be distorted, especially if equity is more onerous than other bank liabilities. It was alleged that this was the case, especially with respect to the spectacular rise of Japanese banks in international markets. Common capital ratios set in relation to risks undertaken would effectively address the issue. The second advantage was its simplicity: less than thirty pages and very simple maths, which made it possible for any banker to fully understand and even to calculate directly the capital requirements of risk filters.

An important feature of the new regulatory approach should be underlined: the demise of reserve requirements on deposits to help insure the liquidity and the safety of banks, particularly during

² Up to the 1980s capital adequacy policy was based on leverage ratios, which could not distinguish between the assets (and the banks) according to their risks.

times of financial strain. The emphasis of the Basel standard was on capital adequacy; liquidity problems were regarded as less relevant. This was in turn explained by (i) the faith in the capability of central banks, as lenders of last resorts, to meet the liquidity needs both of individual banks and of the entire banking system, and (ii) their desire to favour the use of government paper as a perfectly safe and liquid asset. In sum, monetary base reserves, i.e. a constraint on the asset side of the banks, complementary to capital requirements on the liabilities side, were no longer viewed as a guarantor of liquidity and safety.

In order to assess the logic and the fundamental features of the Basel Accords, it is useful to start by addressing two intertwined issues, which can be regarded as the cornerstones of the capital standards: (i) book vs. financial accounting and (ii) cost of equity vs. debt financing.

2. Book vs. financial accounting and the cost of equity for banks

A fundamental question is whether equity requirements are “expensive” for banks³. The conventional view is that this is indeed the case. Equity is the most risky source of financing which embodies entrepreneurial risk, provides a first cushion against losses and, therefore, de-risks debt. In turn, equity holders expect to be properly remunerated for their risk positions, account being taken that their returns are uncertain. This traditional wisdom has been and is being challenged.

The issue has been debated for over half a century, i.e. after the path-breaking presentation (1958 and 1963) of the Modigliani-Miller (M&M) model. However, confusion and fallacious arguments continue, notably in respect of incorrect analyses which do not distinguish between equilibrium (*ex ante*) conditions, and disequilibrium/distress situations when equity issues are forced by regulation, very late in respect of market signals, such as the price/book ratio. As we know from M&M and modern finance theory, if taxes, costs of issuing different kinds of securities and all other market frictions are neglected, the capital structure of any firm, including a bank, does not affect its intrinsic (enterprise) value.

To clarify these points, we start by referring to two well-known accounting identities:

$$[1] \quad A = E + D$$

where A are the total assets, E is the shareholders' equity and D is the debt (debt securities plus deposits), and

$$[2] \quad ROE = ROA + (ROA - k_D) \frac{D}{E},$$

where ROE is the return on equity, ROA is the return on assets and k_D is the cost of debt (net of tax). Equation [2] refers to accounting returns and is based on the accounting balance sheet of the bank. More debt tends to increase earnings per share, provided that ROA is higher than i , but this is only the beginning of the story.

³ Attention should also be devoted to contingent capital, i.e. subordinated debt that converts automatically into equity after some triggering event. The bank therefore recapitalizes automatically when it enters into financial distress. For an innovative example, engineered by Barclays, see Nixon (2012).

We turn now to *ex ante* (financial) accounting: equation [3] represents the financial balance sheet of the bank.

$$[3] \quad EV = V_E + V_D$$

where EV is the enterprise value, V_E is the value of equity and V_D is the value of debt.

We must now make reference to expected costs/returns; we consider the weighted required cost of capital:

$$[4] \quad k = k_E \cdot \frac{V_E}{EV} + k_D \cdot \frac{V_D}{EV}$$

where k is the weighted required cost of capital (WACC), k_E is the cost of equity required by shareholders and k_D is the rate of return required by lenders (bond and deposit holders). The cost of capital must be based on market rather than accounting data.

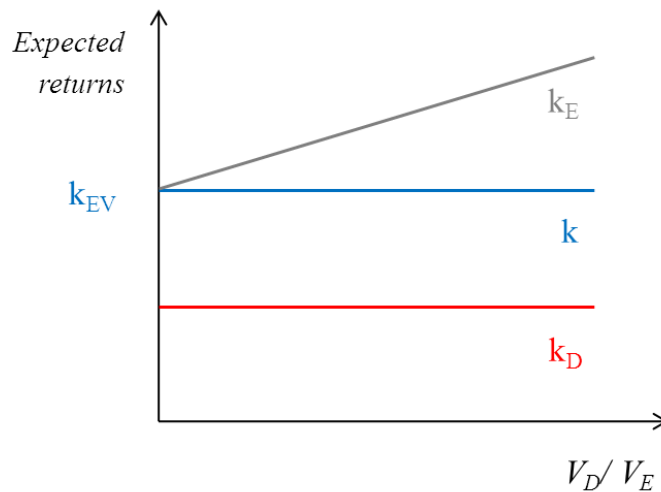
When we refer to financial accounting, it becomes clear that increasing leverage implies higher risk (volatility of earnings) and, therefore, higher requested returns to equity holders: the equilibrium *ex ante* return to equity holders (cost of equity to the bank) is a function that depends both on the risk of banks' assets and the degree of leverage.

In the extreme case of the M&M world, the equilibrium cost of equity of the banking firm can be calculated as follows:

$$[5] \quad k_E = k_{EV} + (k_{EV} - k_D) \cdot \frac{V_D}{V_E},$$

where K_{EV} is the cost of equity of an unlevered bank, as shown in the figure below (Chart 1).

Chart 1 – The cost of capital in the perfect M&M world



If we substitute equation [5] in equation [4], we obtain

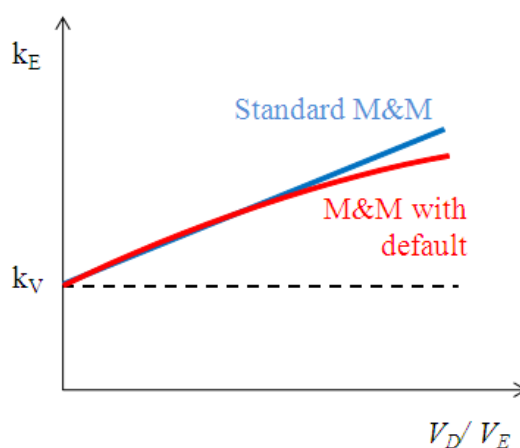
$$[6] \quad k = k_{EV} .$$

The cost of capital is given by the cost of equity of an all equity financed bank, and does not change whatever the leverage. Also the cost of debt is constant, because distress and agency costs are assumed away. The equilibrium cost of equity rises linearly with leverage, because shareholders have to bear an increasing financial risk. In sum, in the perfect M&M world, the value of a fully levered banking firm remains the same even if the firm moves to 100% equity financing, in spite of the fact that, *ex ante*, k_D is always lower than k_E .

Many of those who recognise the fundamental validity of the M&M messages would not, however, accept the general proposition that “capital is not expensive” for a banking firm⁴. This assertion is often used to buttress the theoretical and practical implementation of the Basel standards not only by regulators, but also by some eminent academicians.

To start with, even accepting the fundamental proposition of the M&M theorem (i.e. the weighted average cost of capital is constant), equity raising is not expensive for banks’ shareholders only if default risk is not considered and the cost of debt financing is assumed to be constant and, most importantly, risk insensitive⁵. These are very strong assumptions, especially for the modelling of banking business. If, more realistically, default risk is considered (and consequently the cost of debt financing increases with risk) the cost of equity does not increase linearly with leverage. More capital (less leverage) does not produce a proportional effect in terms of cheaper cost of capital (Chart 2).

Chart 2 - Equilibrium cost of equity: standard M&M vs. M&M with default risk



Banks, in equilibrium, from both a microstability and a macroprudential perspective, do require much stronger balance sheets and higher capital cushions than they currently have on average. This is perfectly consistent with allowing for the fact that capital can be an expensive source of finance under stress conditions and that the Basel accounting capital standards have imparted major procyclicality to the economic systems; at the same time, they created perverse incentives to “save” costly capital throughout their period of application.

It is wrong to apply the M&M equilibrium *ex ante* propositions to situations of stress, when shareholders factor in bankruptcy costs into the cost of equity. Under financial distress, as will be explored in the following paragraph, a highly levered/low profitability bank faces costs which make

⁴ This view is offered by Admati *et al.* (2011). The contrary view that capital can be expensive is generally accepted in the theory and practice of corporate finance [Vernimmen *et al.*, 2005].

⁵ Furthermore, M&M (1958) pointed out that the cost of equity may even start to decrease when the leverage increases significantly. They noted that this phenomenon may characterize “companies whose earnings prospects have fallen substantially since the time when their debts were issued”.

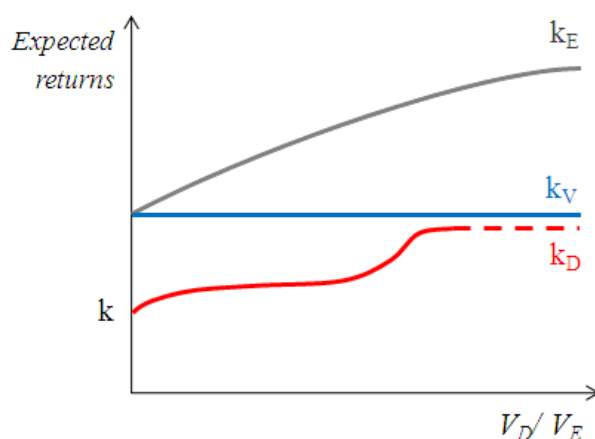
it increasingly difficult and expensive to raise new equity. If distress acquires a systemic character, many banks would find themselves in a similar position, and the aggregate supply of fresh equity may dry up. The path to a sounder balance sheet and higher sustainable profitability encounters a “traverse”, which cannot be overcome by obliging banks to increase immediately their accounting capital base, whatever the circumstances.

The emphasis on the broad applicability of the M&M propositions, which should lead banks and supervisors alike to ensure that, in equilibrium, banks have a sound balance sheet with a strong capital base, is correct and must not be forgotten. There are private and, especially, social advantages in well-capitalised banks, and capital need not be an expensive source of finance, when it is recognised that leverage implies higher risks and that shareholders must factor in the costs of bankruptcy into the cost of equity. But, as indicated, the M&M propositions have an *ex ante* nature and are concerned with having, not raising, equity, especially in a situation of distress. It is in good times, therefore, that banks should build up equity finance.

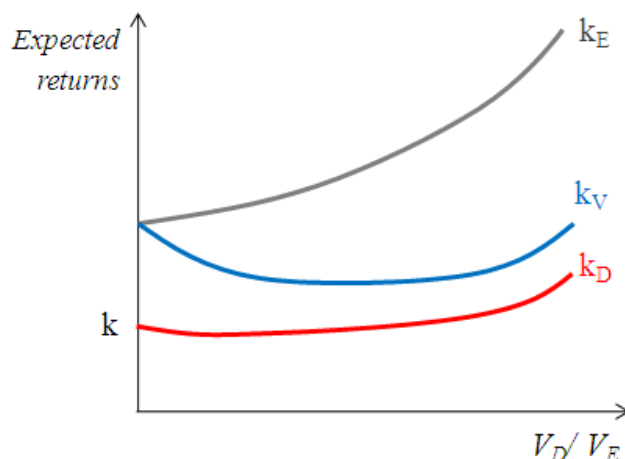
In a banking firm, deposits have special features, notably their monetary character, which differentiate them from ordinary debt securities, not only in terms of cost to the issuer, but also of arbitrage opportunities by the final investor [Masera and Mazzoni, 2012]. The special monetary role of deposits depends also on the fact that the government insures bank deposits, without charging appropriate insurance premiums. This makes the government (and its agencies) a creditor to the banks' shareholders [Miller, 1991], which - as was argued in the preceding paragraph - led to imposing “covenants”, notably capital requirements, and formed the basis for the Basel standards.

The government explicit or implicit (*too big to fail*) guarantees for banks make it impossible to assume that the preconditions of the M&M proposition are satisfied, as Miller himself (1995) clearly recognised. Therefore, if account is taken of these factors in the M&M world, a better representation of the cost of equity for banks is offered by Chart 3.

Chart 3 - Equilibrium expected returns in the M&M model, with government guarantees on deposits



More generally and more realistically, three other factors should be taken into account: information asymmetries, agency costs and incentives, financial distress. Trade-off models show that when these points are factored in, the capital structure has a – however limited – role in explaining the bank's value (Chart 4).

Chart 4 – Equilibrium expected returns in a “trade-off model”

In any event, the fundamental message of M&M remains true: the present value of tax and other savings arising from more debt are rapidly overcome by the increase in the present value of financial distress and possible bankruptcy cost (Vernimmen, 2005)⁶.

In sum, the 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 (1974) declination, 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 nets⁷. 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 SIFIs) and uninsured lenders believe that rescue nets will be activated at taxpayer costs: on the one hand, banks will increase their risk appetite, on the other hand providers of finance will not perform their disciplinary role.

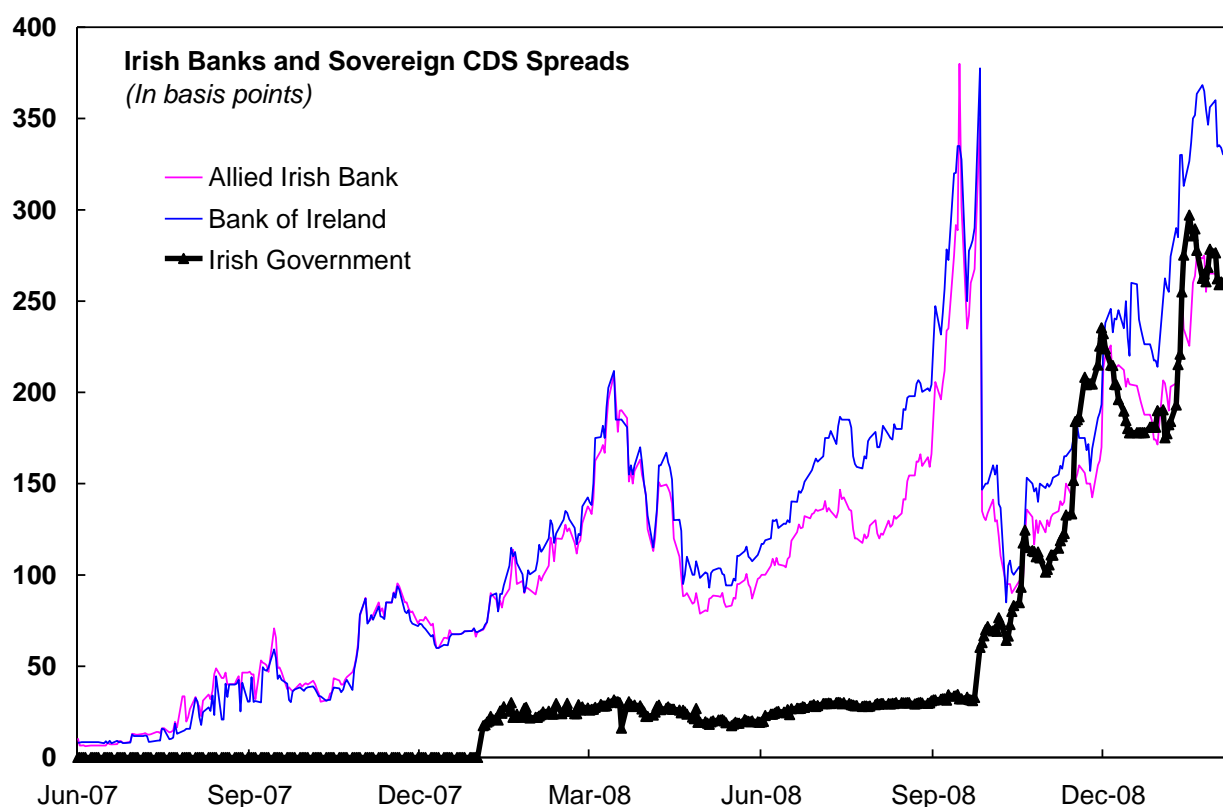
In particular, government interventions in favour of bondholders undermine market discipline and create wrong incentives. Debt holders, without implicit government guarantees and subject, at least for subordinated debt, to bail-in clauses would have aligned interests with those of deposit insurance funds 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 (see, for instance, Chart 5).

⁶ An analysis of these points is offered in Masera and Mazzoni (2013).

⁷ 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 as subsidies rates) is detailed in Masera and Mazzoni (2013).

Chart 5 - Transfer of Risk: Ireland CDS spreads of banks declined following guarantees in 4Q 2008 and sovereign spread increases



Source: Bloomberg L.P.

These distortionary factors are heightened, and create further distortion, because small bank failures can take place (especially in the United States), but the rescue of large systemic banks represented, after the Lehman collapse, the common government response. In the United States, the Dodd-Frank Act (2010) and the FDIC are committed to the resolution of banks, if taxpayers' money is at risk.

The analytical consideration developed in the framework of financial accounting have been extensively tested empirically by extracting information from market prices of debt, equity, CDS spreads and from credit ratings. Available evidence shows the relevance of the distortions created by opaque official guarantees for bank liabilities⁸. Correspondingly, government contingent liabilities can be estimated [Gray, 2012].

As indicated, the “incomplete” character of book accounting for banks is in itself a major flaw of the Basel standards. Two other drawbacks must be underlined, both leading to wrong-incentive problems. To start with, book capital is by definition the residual item of the accounting process of total bank assets and non-equity related liabilities. The current capital to assets ratio for most major banks ranges from 2 to 3 per cent. Accordingly, many degrees of freedom are present, including evolving standards and subjective interpretation of the regulatory authorities. Hence, accounting capital can be distorted by the banks and a very significant difficulty arises for supervisors in

⁸ The evidence accumulated on these points is overwhelming and comes from academic and official sources. Reference is made to Haldane (2010), Baglioni and Cherubini (2010), Estrella e Schich (2011), Moody's (2011), Noss and Sowerbutts (2012), Schich and Lindh (2012), Ueda and Weder (2012).

prompt evaluation of submitted figures, notably in respect of off-balance sheet and derivative items⁹.

The extreme complexity of the risk-weighting accounting process adds to the difficulty of reliable estimates of the true capital cushions against unexpected losses, also because a bank can self-finance “capital” increases by providing *ad hoc* loans.

In general, it is not true that increasing banks’ capital ratios in all states of the world has no impact on the overall cost of finance and could even be possible in the market.

We have underlined that, with implicit/explicit government guarantees for bank deposits, raising equity – especially if the equity market signals conditions of stress by pricing the stock (well) below book value – represents in general a transfer of wealth from existing equity holders to bondholders: “floating new shares then is like pumping gas into another man’s car” [Miller, 1995].

Imposing higher equity requirements under financial distress raises the cost of funding also because of the “debt overhang” [Myers, 1984] problem. New shares floated in the market by a bank with CDS prices and/or price to book ratios signalling a high level of financial distress, run against the adverse selection “lemon” syndrome [Akerlof (1970), Leland and Pyle (1977), Duffie (2009)].

A third issue is aggregation under conditions of systemic risk¹⁰ (the fallacy of composition problem). If systemic risk and uncertainty prevail, the private markets may be unable to provide the required aggregate capital increases for the whole banking systems. In this situation deleveraging cannot be avoided, which magnifies the procyclicality of the capital standards, and feeds upon systemic risk [Masera 2009, 2012].

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. 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;
- (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 unexpected losses and need not burden the intrinsic value, provided that capital levels are gradually built up, in normal times;
- (iii) 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 Basel conventional wisdom, the reference framework of M&M should help bankers understand that their acritical emphasis on ROE and on the cost of equity finance is wrong. But if the M&M propositions were correct and applicable to the real world,

⁹ The large discretionary powers offered by accounting standards refer, in particular, to: registration and specification of cash flows (itemisation); identification of cash flows (realization); valuation of the various elements, with specific reference to the models utilised (mark-to-model accounting) and to impaired loans. The relevant references are Bundesbank (2002), Haldane (2010), Black (2011) and Kane, (2013).

¹⁰ The relationship between fundamental, endogenous and systemic risk and its implications for the capital standards will be explored in the following paragraph.

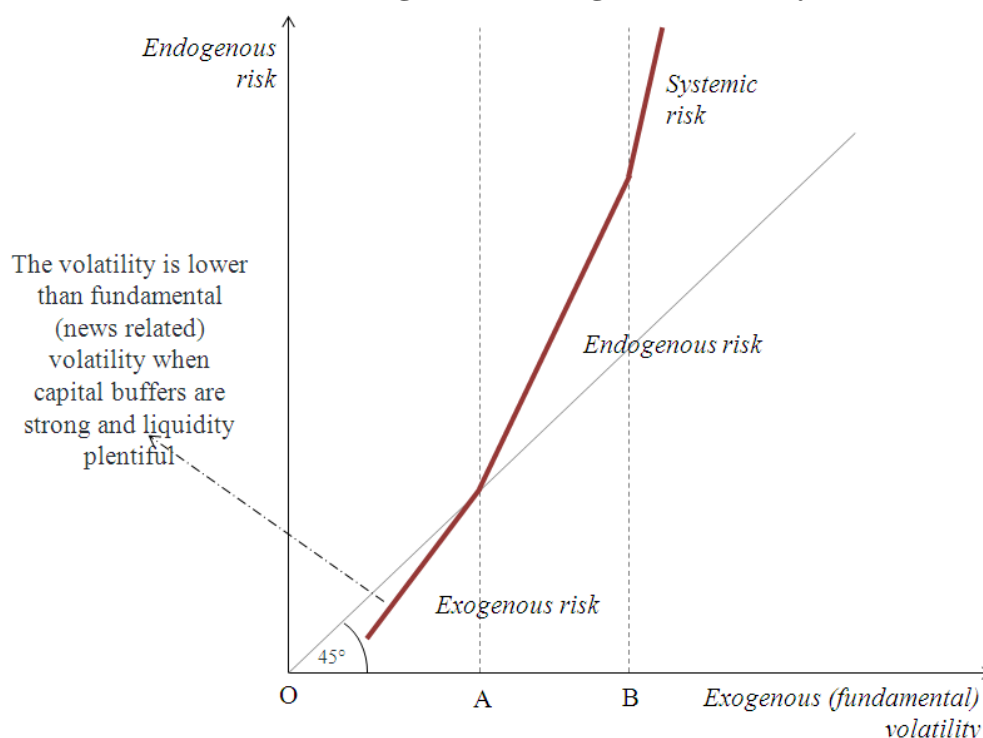
without appropriate corrections, value (market) accounting would have a superior signalling content compared to accounting aggregates. More specifically, the value of equity and the value of debt (account being taken of the government bail-out promises) are more sensitive indicators than book equity and debt also from a surveillance perspective [Masera and Mazzoni, 2013]. Even if reference is made to accounting aggregates, the price-to-book ratios should therefore play a primary role in bank supervision and, in particular, in the interaction of SREP (*Supervisory Review and Evaluation Process*) and ICAAP (*Internal Capital Adequacy Assessment*), i.e. according to the second pillar of the Basel approach.

3. Capital regulation and risk modelling

Perhaps the main reason why the implementation of the capital regulation did not foster financial stability lies in the incorrect analysis of risk and of risk modelling. The Basel approach does not take into account the relationship between exogenous, endogenous and systemic risk.

- exogenous (fundamental) risk is the risk driven by “news” - unanticipated changes in economic fundamentals (game against nature) - i.e. risk obtaining in perfectly efficient financial markets;
- 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. Market failures imply that uncertainty replaces risk. In this situation, irrational behaviour can occur and amplify the likelihood of breakdown of the financial network¹¹. A very simple graphical representation is offered in Chart 6.

¹¹ 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 are one of the main causes of the proliferation of derivatives.

Chart 6 – Endogenous vs. exogenous volatility

Points A and B along the horizontal axis are two points of discontinuity: the section OA depicts good and normal market conditions, where risk can be measured on the basis of “traditional” models, under the assumptions of efficient and rational markets. However, as will be shown below, in this state of the world regulated financial intermediaries act as shock absorbers, so that exogenous risk is underestimated, hence the total risk curve lies below the line of exogenous risk (fundamental volatility).

As we move from A to B, endogenous risk becomes relevant. Stress “conditions”, set off by fundamental factors, characterise financial markets. Point B identifies the setting of systemic risk and the shift from normal distribution to power laws (Chart 7).

The progressive growth of endogenous risk is consistent with rational behaviour, as explained by two main – not inconsistent – theoretical models:

(i) Kurz’s theory 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);

(ii) Danielsson & 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 estimate risk¹².

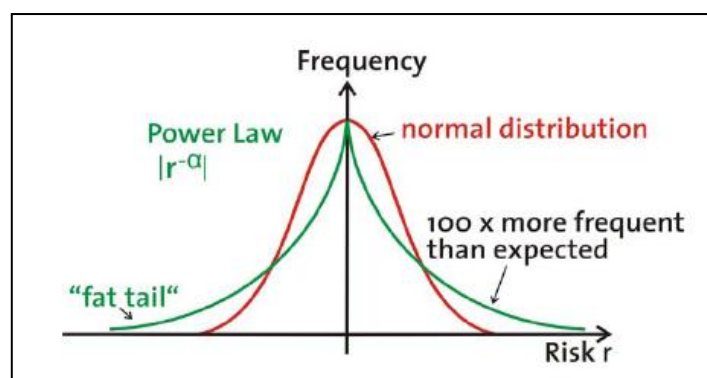
¹² Recent instances where endogenous risk developed into systemic risk can be regarded: the Market Crash of October 1987, the 1998 LTCM bail out and, above all, the 2007-2009 financial crisis.

Both approaches have evident implications for the regulatory framework, as will be indicated below. It must be noted that the concept of endogenous risk considered so far does not require the assumptions of irrational markets and behavioural economics¹³. 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 here 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...) 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: they also incorporate endogenous risk. In this framework, the extreme version of the M&M propositions no longer applies.

Strong interactions and converging behaviours of economic agents change the “fundamental” statistical distributions characterising markets under normal conditions. More 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) (Chart 7). 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 VaR models, which turn out to be incorrect. Black&Scholes and Gaussian copula functions, when are 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. As a result, volatility is magnified, leading to “tipping points” and to extreme events.

Chart 7 – Power laws and heavy-tail distributions



Source: Helbing (2010)

When in Chart 6 we move beyond B, systemic risk is encountered. In this situation, widespread market failures become present. Rational responses of market participants are highly correlated (the only thing that goes up in bear markets is correlation, as the old saying goes), but irrational behaviour also occurs. Measurable risk gives way to Knightian uncertainty. Credit and liquidity risks are intertwined. The Bagehot distinction no longer applies, and the lender-of-last resort function of the central bank to provide base liquidity becomes fundamental to prevent financial and

¹³ Some key references on these more radical approaches are given below: Becker (1968), Minsky (1992), Kahneman (2003), Guesnerie (2005) and Shiller (2011).

economic systemic breakdown. According to a famous quote attributed to Keynes, «markets can remain irrationally priced far longer than you or I can remain solvent».

As we have indicated, a flaw of the Basel standards lies in neglecting that: (i) endogenous risk in the financial system is of paramount importance, especially in conditions of stress; (ii) the same capital rules and imposed risk measurement models – notably *VaR* – on all banks worldwide multiply endogenous risk and can ultimately lead to systemic risk¹⁴ and market breakdown.

The problems posed by endogenous risk in finance can be illustrated by comparing weather and financial risk modelling and forecasts. 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 safety standards increase total risk, beyond the fundamental thresholds. The risk forecast affects and determines the subsequent outcome: in the extreme case, prophecies can become self-fulfilling. As was indicated, this is the result of:

- (i) inaccurate modelling of volatility;
- (ii) the non-stationarity of underlying stochastic models;
- (iii) 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 raising more and more capital of the banks creates more risk and can precipitate a vicious circle of system destabilisation [Danielsson *et al.*, 2001, 2011 and Masera, 2012]. As already indicated, equity finance can become expensive and, in the limit, impossible to find in the market.

A simple way to illustrate these points is offered below through (accounting) leverage and *VaR*. We recall the stylised accounting balance sheet (Eq. 2), to define leverage (*L*)¹⁵:

$$[7] \quad L = \frac{A}{E} = 1 + \frac{D}{E} .$$

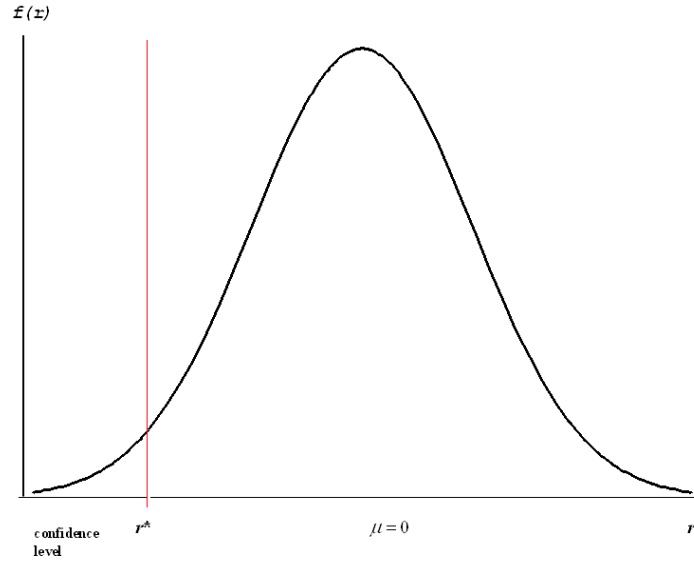
Next, we define *VaR* as the maximum loss that a bank with assets *A* can withstand with its equity before going bankrupt, given a confidence level (*c*):

$$[8] \quad VaR_c = |-r * A| = E_c$$

where *r* is the return on assets (Chart 8).

¹⁴ The counterintuitive links between homogeneity in behaviour of market participants, through portfolio diversification, and systemic risk are explored by Dicembrino and Scandizzo (2012).

¹⁵ Technically, equation [7] expresses leverage as a multiple, i.e. the inverse of the leverage ratio.

Chart 8 – VaR estimation

where:

$$[9] \quad \Pr(r < r^*) = \int_{-\infty}^{r^*} f(r) dr = 1 - c.$$

By normalising the probability distribution, assuming the validity of the *central limit theorem* and by shifting from probabilities to critical values, the *VaR* can be expressed as:

$$[10] \quad v_c = \frac{E_c}{A} = \frac{VaR_c}{A}.$$

From the above, assuming normality, we can calculate the level of leverage that is consistent with non-bankruptcy, at the level of confidence c , as requested by the Basel standard:

$$[11] \quad L_c = \frac{A}{E_c} = \frac{A}{VaR_c} = \frac{1}{v_c}.$$

The required level of leverage, at the confidence level c , is measured by the *VaR* per unit of assets. The *Risk Weighted Assets* (RWAs) (unexpected loss) of the bank under consideration can be defined as¹⁶:

$$[12] \quad RWA(A) = VaR$$

and therefore minimum required capital is given by:

$$[13] \quad E = mRWA$$

where m is a capital coefficient coherent with the Basel capital requirements¹⁷.

¹⁶ Equation [12] below is an approximation which focuses on market risk.

¹⁷ As is evident from Equation [14], the supervision of the ratio V_E/RWA , given m , would fundamentally consist in reference to the P/B ratio.

From [11], [12] and [13] we obtain:

$$[14] \quad E = mVaR.$$

In sum, the equity required by the capital standard is proportional to negative volatility in the short run. When financial stress prevails, the growth rate of capital is linked to the growth rate of volatility, while endogenous perceived risk becomes preponderant.

The Basel rules impose similarity, by giving to all banks fundamentally the same models of risk, and by requesting common binding constraints on equity against RWAs. The *one-standard-fits-all* approach of capital regulation does not allow banks to have independent risk appetites and positions. More specifically, the *VaR* approach constrains also risk-neutral financial institutions to act as if they were risk-averse and homogenises behaviours and beliefs. The inherent risk of tight coupling and contagion is heightened with adverse destabilising macroeconomic consequences¹⁸.

In good times and when capital buffers are high, volatility is lower than warranted by fundamental developments, since banks act as shock absorbers. At the onset of a crisis due to adverse fundamental developments, the opposite occurs. Banks become risk amplifiers and endogenous risk prevails, as indicated in Chart 2. The Basel III standard tries to overcome the deficiencies of the RWA approach by adding requirements in terms of leverage. This amplifies the complexity of the regulatory system and can lead to further inconsistencies.

According to the risk weighting approach (RW), we have:

$$[15] \quad \min E_{RW} = mVaR$$

with arbitrage taking place by transforming risk buckets with CDS.

According to the non-risk weighted approach (NRW), we have:

$$[16] \quad \min E_{NRW} = nA$$

with arbitrage taking place by adding risk per unit of A¹⁹.

These problems are compounded as a result of two other fundamental 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 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 small²⁰. These assumptions could be justified because the standard was primarily conceived for global banks. But, the assumptions were and are violated also for large international banks, and in any case they are not applicable to small local banks. This is a fundamental inconsistency of the EU transpositions of the Basel approach, which is being carried

¹⁸ These points are explored in the following papers: Barone-Adesi (2009), Aglietta and Scialom (2009), Shin (2011), Masera (2012).

¹⁹ On these points, see Blundell-Wignall and Atkinson (2010), and Masera and Mazzoni (2011).

²⁰ For an analysis of these issues and the pitfalls of the ASRF (Asymptotic Single Risk Factor Model), see Gordy (2003) and Johnston (2009).

over to the new Capital Requirements Regulation (CRR) and to the Capital Requirements Directive IV (CRD IV)²¹.

4. Endogenous risk and liquidity/solvency

When endogenous risk sets in, credit and securities markets²² drift together. Liquid assets (including government paper in the Eurozone) can suddenly become illiquid. Solvency and liquidity risks become intertwined, also as a result of mark-to-market accounting rules. Often assets are valued independently of the maturity of the debts that finance them. Fair value accounting requires that market prices represent the reference point for valuing securities and liquid assets. The rule works well in normal times, when exogenous risk prevails. In stressed periods, the current accounting standards can become destabilising. Distressed sales of (il)liquid assets in exchange for monetary base lead to asset value scaling down and higher capital requirements. Often, in parallel, given the objective difficulty of challenging pricing by traders, abuse can occur and uncertainty on banks' balance sheets is magnified²³.

In this situation, supervisors should be empowered to give indications to bank auditors on pre-determined non-market parameters (mark-to-model, indexes, ...) to value complex illiquid assets, in terms of the interaction process between the SREP and the ICAAP (*Internal Capital Adequacy Assessment Process*) (Masera, 2011).

In order to disentangle liquidity management from the capital/solvency control mechanism, and with a view to improving the coping capacity of the system through two reinforcing pillars, a renewed consideration of monetary base reserves is advocated.

Let us focus on a traditional commercial bank. We use the same prototype balance sheet symbols, where D stands now for deposits, which are subject to reserve requirements. From the definition of leverage we have:

$$[17] \quad L = 1 + \frac{D}{E}.$$

We assume that:

$$[18] \quad R = \rho D$$

where $R = \text{Base Money Reserves (BMR)}$, and therefore:

$$[19] \quad L = 1 + \frac{R}{\rho E}.$$

²¹ EC COM 2011 452 final EC COM 2011 453 final.

²² The complex interactions between fundamental and market liquidity under stress are explored by Daníelsson and Penaranda (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 Cao (2011).

²³ An analysis of liquidity risk in its various facets is developed in Masera (2009). The unique features of monetary base reserves are outlined.

As [19] shows, two control variables are now available: reserves (in terms of nominal amount and required ratio to deposits²⁴) and capital.

The point made here is that reserves are certainly liquid assets that satisfy the orthogonality condition. Their opportunity cost to the banking system is not market determined, as in the case of equity, but can be set by the central bank. The coping capacity of the system depends on two buffers, without putting all the burden on accounting capital²⁵. Under extreme stress, fiscal and monetary authorities can better coordinate their stability interventions.

More specifically, and especially within a framework of separation between commercial and investment banks, the *VaR* induced macro procyclicality of leverage under strict Basel rules can be dampened, and capital and reserves can be used as two complementary instruments for prudential policy. This is shown below through a prototype model applied to bank A. The bank's assets are now specified as follows:

$$[20] \quad A = R + S$$

where S = risky assets (i.e. loans, trading book securities, etc.). On the liabilities side, the amount of capital is a positive function of the bank's RWA. This means that capital increases when: (i) the investments in risky assets, S , increases; (ii) the risk of risky assets, σ_s , increases:

$$[21] \quad \frac{\partial E(S, \sigma_s)}{\partial S} > 0$$

and

$$[22] \quad \frac{\partial E(S, \sigma_s)}{\partial \sigma_s} > 0.$$

From previous identities it is easy to show that, for a given level of a bank's asset size, a higher amount of R (i.e. a higher ρ) reduces the capacity of the bank to invest in risky assets:

$$[23] \quad S = A - R$$

and

$$[24] \quad \frac{\partial S}{\partial \rho} = \frac{\partial S}{\partial R} \times \frac{\partial R}{\partial \rho} < 0.$$

It follows that:

$$[25] \quad \frac{\partial E}{\partial \rho} = \frac{\partial E}{\partial S} \times \frac{\partial S}{\partial \rho} < 0.$$

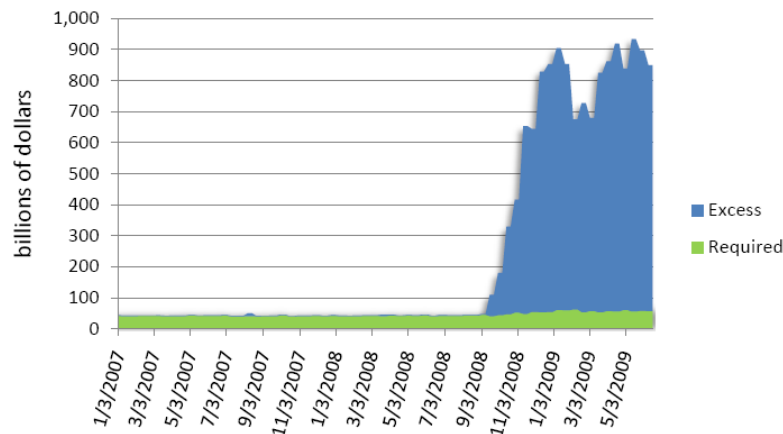
²⁴ I do not enter here into the distinction between required and excess reserves. As Chart 7 indicates, the latter are now predominant. Interest can be paid by the central bank on both aggregates. This can help avoid excessive burdens on banks' income accounts. Reserves and capital are used as joint financial buffers in many emerging economies. The Asian experience is reviewed in Borio and Shim (2007). Latin American developments are examined in Montoro and Moreno (2011).

²⁵ It may be of interest to note that in the US, during the 18th century, banking firms were characterised by both equity and reserves as a percentage of assets of around 30 per cent.

This means that for: (i) a given size of assets/liabilities and (ii) a given level of riskiness of a bank's assets, σ_s , a higher requirement in terms of R reduces (i) the investment in risky assets (S) and (ii) the level of bank's RWA and, consequently, the capital needed (E).

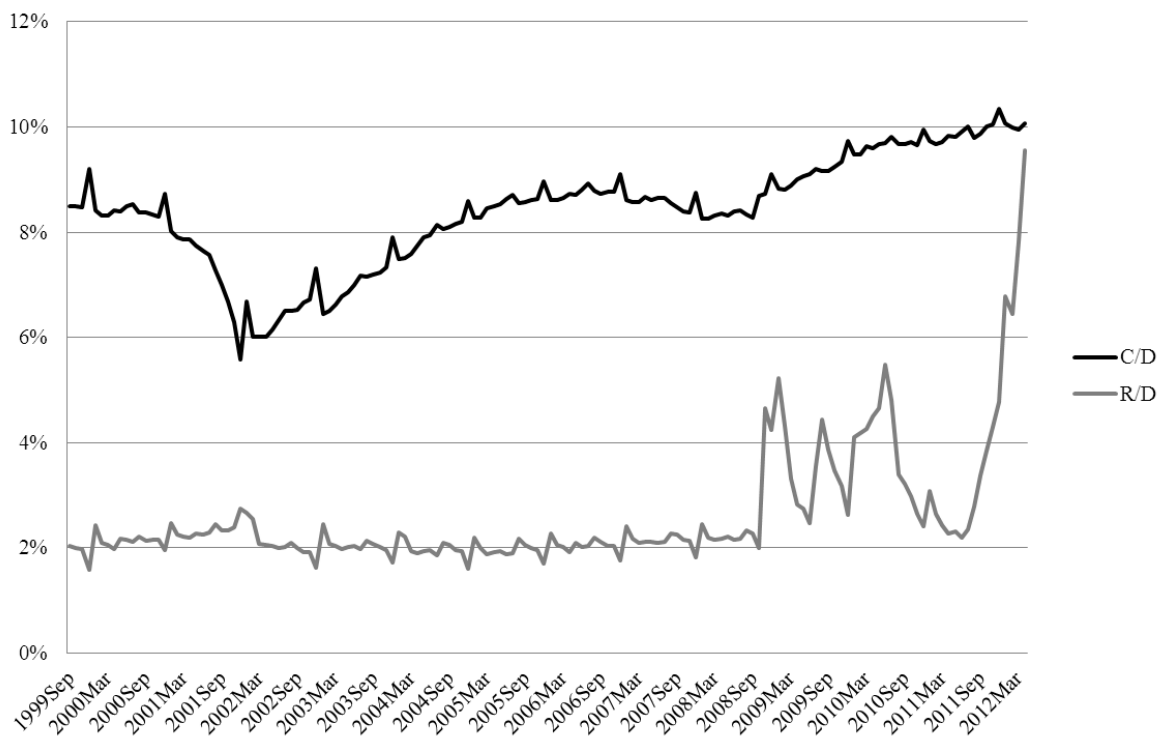
This simple argument shows that capital and reserve requirements can be used as two complementary prudential policy instruments and jointly contribute to assure investors and depositors confidence in banks. The advantage of this approach would also consist in providing a framework to stabilise the huge volume of excess reserves created by the Fed (Chart 9) and more recently also by the ECB (see Chart 10).

Chart 9 - United States: aggregate reserves of depository institutions



Source: Keister and McAndrews (2009)

Chart 10 - Euroarea: C/D (currency to deposit) and R/D (reserve to deposit) ratios (M3)



5. The problem of incentives

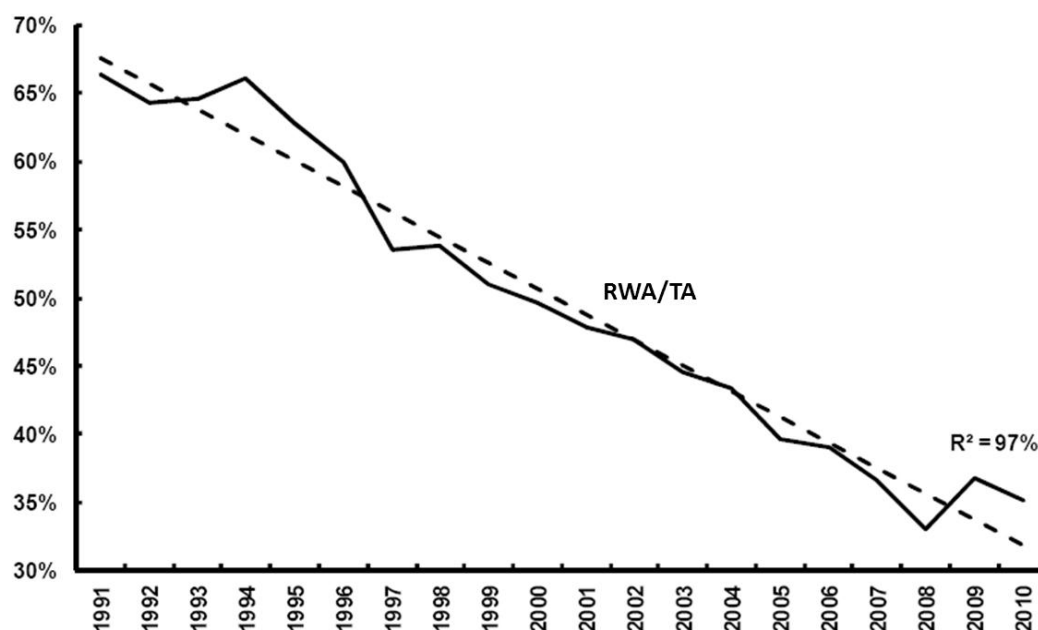
As was indicated, one of the consequences of endogenous risk is that bank capital can become expensive, especially under condition of stress. If this is the case and if banks can activate capital arbitrage, the system is confronted with a major “wrong” incentive problem. Risk weighted regulation leads to bank innovation, with a view to bypass the regulatory framework. Banks shift from support of the real economy, based on their intrinsic information advantages, to financial innovation which may have adverse macroeconomic consequences.

This is, indeed, the main experience of the past 25 years. Differential regulatory capital weights in the financial system, and the existence of non-capital regulated entities, created incentives for banks to capital arbitrage and to reconfigure credits as capital market instruments. The incentives were enhanced by the possibility to short credit (including sovereign exposures) and shift financial promises, through the use of credit derivatives. The OtT (*Originate to Transfer*) banking model and the securitisation models are an instance of this process aimed at circumventing RWA capital rules and passing the promises to the shadow banking system²⁶. The Basel regulatory framework does not correctly address this issue. Through ever changing and more complex OtC (*Over the Counter*) derivative structures capital requirements are lowered and a higher leverage is achieved. This will only be partially corrected in Basel III through reference also to the unweighted balance sheet. There is a clear causal relationship between the enactment of the Basel rules and that: (i) OtC derivative growth in the past 25 years has been spectacular and (ii) the banking community managed in all ways to prevent controls of OtC derivatives and the move to exchanges trading or Central Clearing Houses²⁷. The financial system is a set of financial promises. Credit default swaps are a fundamental instrument to shift financial promises and arbitrage RWA capital requirements [Blundell-Wignall and Atkinson (2010) and Mazzoni (2012)]. The impressive decline in the ratio of risk weighted assets to total assets for large international banks in the period of the implementation of the Basel Accords is documented by Slovik (2012) (Chart 11).

²⁶ On these points see Blundell-Wignall and Atkinson (2010), Zadra and Pacella (2012) and Conti (2012).

²⁷ At the end of the 90s, the issue of regulation of Over-the-Counter derivatives, and notably credit default swaps, was at the center of a major debate between Brooksley Born, Chairperson of the Commodity Futures Trading Commission (CFTC) and Alan Greenspan, Chairman of the Federal Reserve. In 1997-98 Greenspan and Treasury Secretary Robert Rubin strongly opposed giving the CFTC oversight of OtC credit default swaps as proposed by Born. Rubin, who had spent 26 years at Goldman Sachs before his government service, was considered by many to be possibly biased. It was Greenspan who played a fundamental role in convincing Congress to exclude OtC credit derivatives from regulation, in the Commodity Futures Modernisation Act of 2000, either as “futures” under the Commodity Exchange Act of 1936, or as “securities”, under the federal securities laws.

Chart 11 – Historical development of the Risk Weighted Assets to Total Assets ratio of systemically important banks



Source: Slovik (2012)

The endogenous innovative process of capital arbitrage and the opacity and mispricing of complex derivative structures make the assessment of total²⁸ risk very difficult to both insiders and supervisors of a bank. This, in turn, makes the adequacy of capital to ensure solvency *de facto* unknowable.

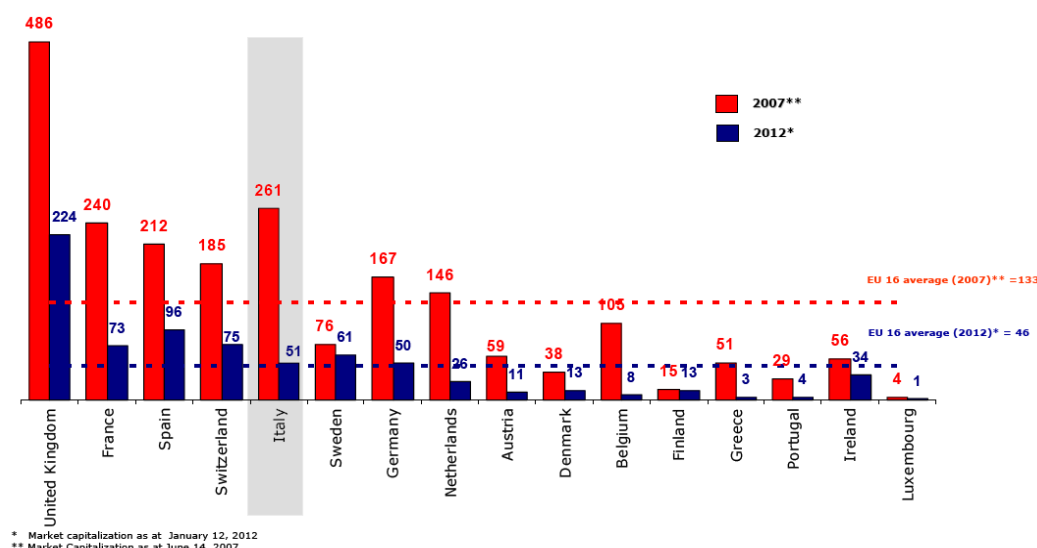
Large financial institutions maintain short term profit margins thorough opaque OTC markets at the cost of medium term risk. The size and opacity of the markets and the intertwining with the issue of Systematically Important Financial Institutions (SIFIs) enhanced moral hazard. Even government and supervisory official may feel forced to bailout institutions under stress with too complex system wide derivative operations. This blunts resolution frameworks and powers because of the fear of cascading panic and failures. Paradoxically, CDS on SIFI debts and ratings of Credit Agencies take this into account and reduce funding costs, thereby creating the incentive for more risk taking. The taxpayer is ultimately asked to pay the bill of this wrong incentive system.

In Europe, the promises of non-bail out of banks by monetary authorities are viewed by market participants as time inconsistent. With no recovery and resolution framework in place in the EU to cope with SIFIs banking crisis management and with the evidence offered notably by Ireland and Spain: on the one hand, banks' debt holders have little incentives to monitor the risk behaviour of banking firms; on the other, banks themselves act in the belief that governments and central banks will bail them out in case of crisis. The more widespread is the belief that creditors will be protected, the more relevant the issue of moral hazard becomes. Evidence of the importance of this point is offered directly by a recent paper by Schich and Lindh (2012). The two authors estimate the value of implicit government guarantees for bank debt in Europe and show the very significant funding cost advantages for the large banks that benefit from them, and the implicit distortion to competition and incentive to risk taking. Consistent result can be derived from the different market signals which can be obtained from empirical evidence of price-to-book (*Tobin's q ratios*), as

²⁸ OTC derivatives can shift from one type of risk to another, for instance from market to counterparty risk.

against CDS funding spreads of banks [Mazzoni, 2012a, 2012b]. The latter reflect the assessment of the default probability on debt, which takes into account the implicit bail out guarantees. The former gauge more directly the possibility of default, but they amplify volatility, because the price of bank stocks is especially subject to endogenous risk influence (Chart 12).

Chart 12 - Banking capitalisation by European Country: 2012* versus 2007**
(EU15+Switzerland; all European listed banks; bn. €)



Source: *European Banking Report* (ABI, January 2012).

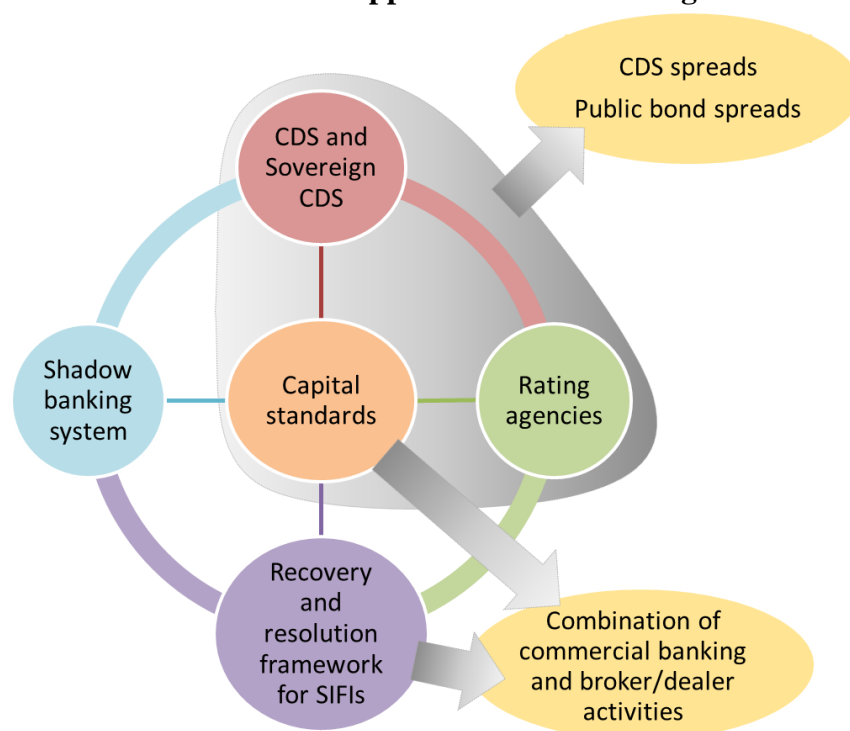
In this perspective, the timing of CRDIV implementation, in advance of a credible resolution framework raises logical as well as operational difficulties in the EU. The higher are RWA equity requirements, without debt bail-in procedures, the higher is the effective cost of new equity finance and the stronger is the incentive to game the rules, also by more risk taking.

This is the main reason why solution of the moral hazard problem is fundamental for the stability of the banking system. Without adverse incentives, prompt corrective action, triggered also by debt write-down tools, on a going concern basis, would be activated both by price-to-book ratios and by price-to-redemption ratios of subordinated debt. The Basel emphasis on accounting capital distracts attention from the market price of equity as an early, highly sensitive, indicator of *Prompt Corrective Action* (PCA)²⁹ in an effective early remediation regime.

All this brings to the fore the need for a holistic approach to financial regulation, as envisaged in the Dodd-Frank Act and in the de Larosi re Report (Chart 13)³⁰. Reform of the capital standards must take place simultaneously on the four centrepieces indicated below to address the solidity of the financial system: (i) proportional capital requirements on banks and other market operators (notably the shadow banking system); (ii) derivatives from customised unregulated operations to exchange trading or to clearing; (iii) credit rating agencies to overcome their current inherent conflicts of interest; (iv) recovery and resolution frameworks, based on risk related fees.

²⁹ The PCA is not actively considered in the EU, while it plays a fundamental role, notably to check supervisory forbearance [Masera, 2011]. The on-going discussion in the US on this matter is summarised in the Report to Congress on PCA by the Financial Stability Oversight Council (FSOC, December 2011).

³⁰ On these points, see also Kregel (2011).

Chart 13 - The need for a holistic approach to financial regulation

The non-proportionality of the Basel Accords and derivatives markets interact in making the cornerstone of regulation a source of instability. CDS buyers acquire protection with a substitute for bank capital because issuers of this protection do not, in general, set aside adequate capital in the unregulated markets where they operate. The intertwining of SIFIs and unregulated derivatives is a feature of both the 2007-2009 crisis and of the Eurozone crisis (sovereign CDS).

In sum, the mechanistic RWA approach is subject to intrinsic arbitrage and undermining through derivative structure, and notably through credit derivatives. CDS markets offer the possibility to short credit and to shift *ex ante* specified risk buckets defined by the capital standard as a basis to hold required capital. A perverse incentive system is set up to minimize regulatory costs and to reduce the burden of capital charges.

According to this approach, the Basel mark 1,2,3 standards can be seen as Maginot lines created on the basis of past strategic models, which are rapidly bypassed through new derivative strategies: the standard itself spurs arbitrage innovation.

The story does not stop here. As already indicated, the higher capital charges on banks create a second line of perverse incentives for market operators, i.e. to move outside the regulated system and to “shadow” market and securities operations. Also from this point of view, derivatives play a fundamental role. The very distinction between markets and intermediaries becomes blurred: a centralised derivative market has functions and characteristics of an intermediary and requires capital cushions.

If endogenous risk is taken into account and shocks impact on traders’ actions, which in turn affect market outcomes, the system wide impact of the initial exogenous shock becomes very large and the “equilibrium” of the system evolves over time. If market operators are bound by similar VaR models, the market inefficient outcome is the result of the regulatory approach itself, which leads to dysfunctional price determination mechanisms, market failure, financial and economic dislocations: a doom feedback loop, leading to systemic risk. In these conditions, the rational

responses of economic agents to the initial exogenous real/financial stress become highly correlated and amplify the initial shocks (Danielsson *et al.*, 2001).

Contagion triggered by losses leads to distressed sales; illiquidity and insolvency become closely intertwined. Demand schedules are not monotonic. Risk controls force selling, even if fundamental and mark-to-model “value” estimates suggest buying strategies. Also here, derivatives and financial innovation create complex structures, very difficult to evaluate, which amplify asymmetric information and make the product difficult to penetrate and assess.

In this framework, the traditional benchmark orthogonality of (risk-free) short-term government paper is no longer valid. As indicated, the only true perfectly liquid asset is the monetary base.

6. The complexity and effectiveness of Basel III

Basel II did not go into effect, because its evident flaws required major corrections³¹. Basel III was the response; the new standard is much more complex and broader in scope than its predecessor (Charts 11, 12, 13). Haldane and Madouros (2012) show this very clearly, also by reference to many indicators, including the number of pages, formulas and parameters to be calculated. According to the two authors, the overly complicated Basel regulations are prodrome of surveillance failures. Complexity generates uncertainty, uncertainty leads to inadequate supervisory action, and dampens confidence. Two points must be stressed: the analytical foundations of the statistical models are questionable and the regulatory increments to the backbone of the rule book are an inevitable feature of the current system. For instance, in the EU, beyond national adaptations to the Basel guidelines, the European Banking Authority (EBA) is committed to preparing over 30 regulatory technical standards (RTS) and 13 implementing technical standards on the CRD IV regime. RTS will underpin the moving standard requirements on a continuing basis. In sum, the sheer complexity may imply the ineffectiveness of the standard [Hoenig, 2012].

Beyond this argument and the related issue of the cost/benefit analysis of ever more complex and detailed rules, a broader set of critical interconnected considerations can be developed.

The ever growing complexity of the rule-book takes place within the principle of “one size fits all”. This is contrary to the very premise of the capital standards, which were meant primarily for large, internationally active banks.

The costs of adaptation and compliance require ever increasing human and capital resources in each bank. This creates artificial economies of scale and scope. Competition is distorted. Incentives are created for larger size in banking: big banking groups are better able to absorb the cost of regulation. This makes banking markets more concentrated [IMF, 2012].

In any event, the costs and complexity of Basel III rules create evident distortions to the operation of small and community local banks. These banks, however small, continue to play, especially in Europe, a crucial role in supporting SMEs and households. The compliance costs of Basel III would impose a burden which would ultimately be borne also in terms of employment and growth. Smaller banks should, therefore, be exempted from the application of the new system. These points have been made by many authors, also from within the official sector (see below).

³¹ The implicit flaws of Basel II had been evidenced, without the benefit of hindsight, by Danielsson *et al.* (2001). Re-reading of this paper is well worthwhile even now.

Additional complementary arguments help explain the ineffectiveness and the distortionary effects of the standard, account been taken of the analytical considerations developed in the previous paragraphs of this paper.

Large banks are not only able to absorb the costs, but also to circumvent the regulations through active use of more and more sophisticated derivative-based financial structures. The Basel Accords can be compared in their evolution to an ever more complex and detailed Gosplan, whereby the Basel Committee centrally determines: (i) thousands of risk parameters and (ii) sophisticated statistical and mathematical mappings of assets into capital requirements.

But, as to the former, adverse incentives are simultaneously created for banks, which can game the rules by investing in and activating more and more 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 consequences of the capital rules. The gaming exercise is notably 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 Sysiphus work: 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 banks.

As to the mapping process, banking regulators attempt to regain control by recourse to increasingly complex structures and models. But, 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, neglect of endogenous risk, inadequate recognition of the non-orthogonality of government paper in risk measures. The irony is that by imposing similar worldwide flawed models and behaviours on banks, endogenous risk is amplified and can lead to systemic distress. The Basel standards become therefore, from a macroprudential perspective, a factor of instability, feeding and amplifying the boom-bust cycles.

The gaming exercise represents, in conclusion, a second powerful argument which explains the artificial incentives to greater size and complexity of banks.

This is not the end of the story. As has been indicated, large banks benefit from implicit and explicit “too big to fail” government subsidies. Guarantees imply very large funding cost advantages for beneficiary large banking groups, thereby enhancing competitive distortions. In the UE perverse links are also created between the value of bank and sovereign debt.

All these arguments are self-reinforcing in drawing attention to the competitive distortions created by the Basel standard and to the need to revise its complexity and to introduce in advance or in parallel, not later: (i) effective resolution standards for large banks and (ii) a response to the Volcker rule problems (see below).

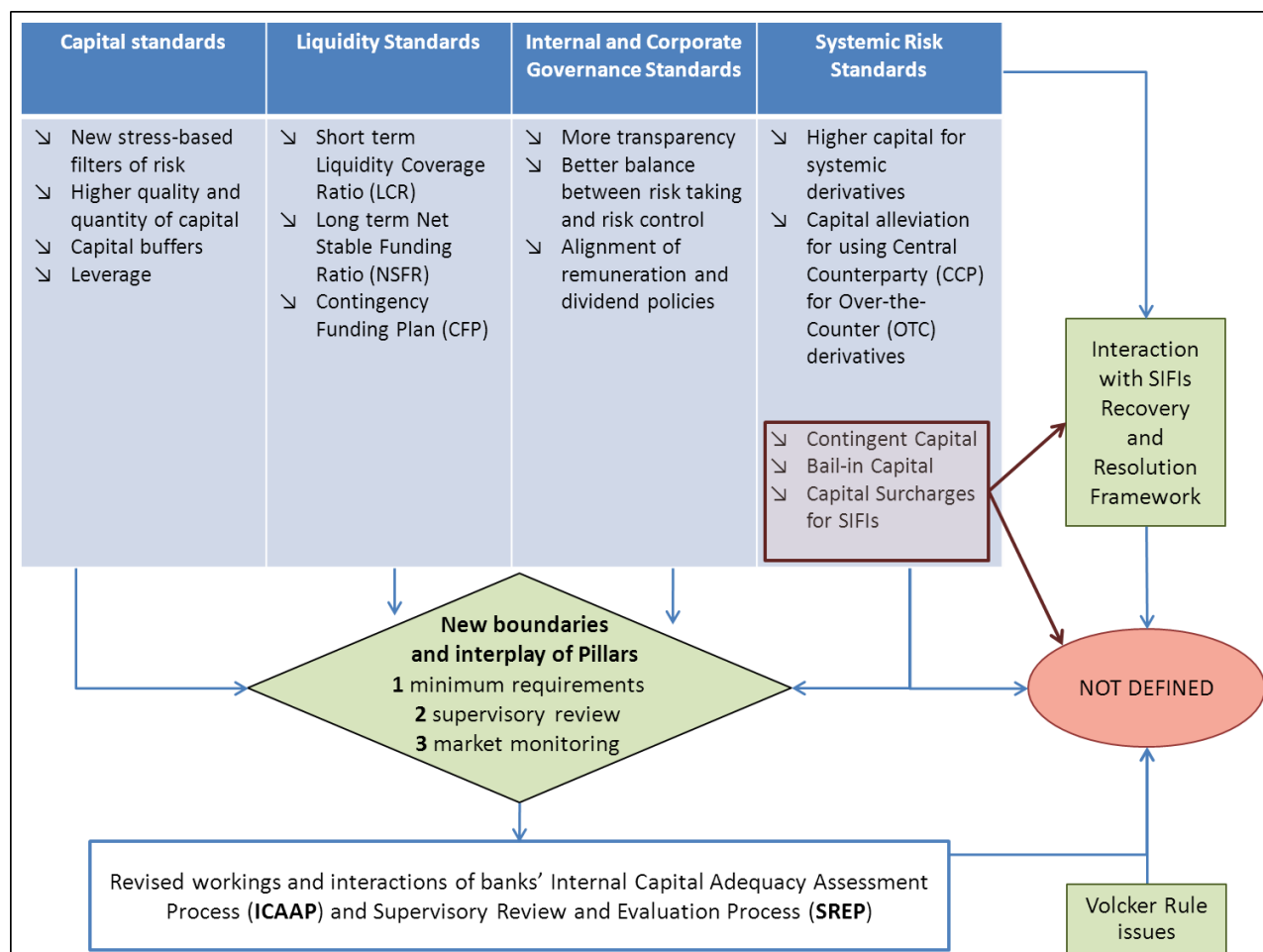
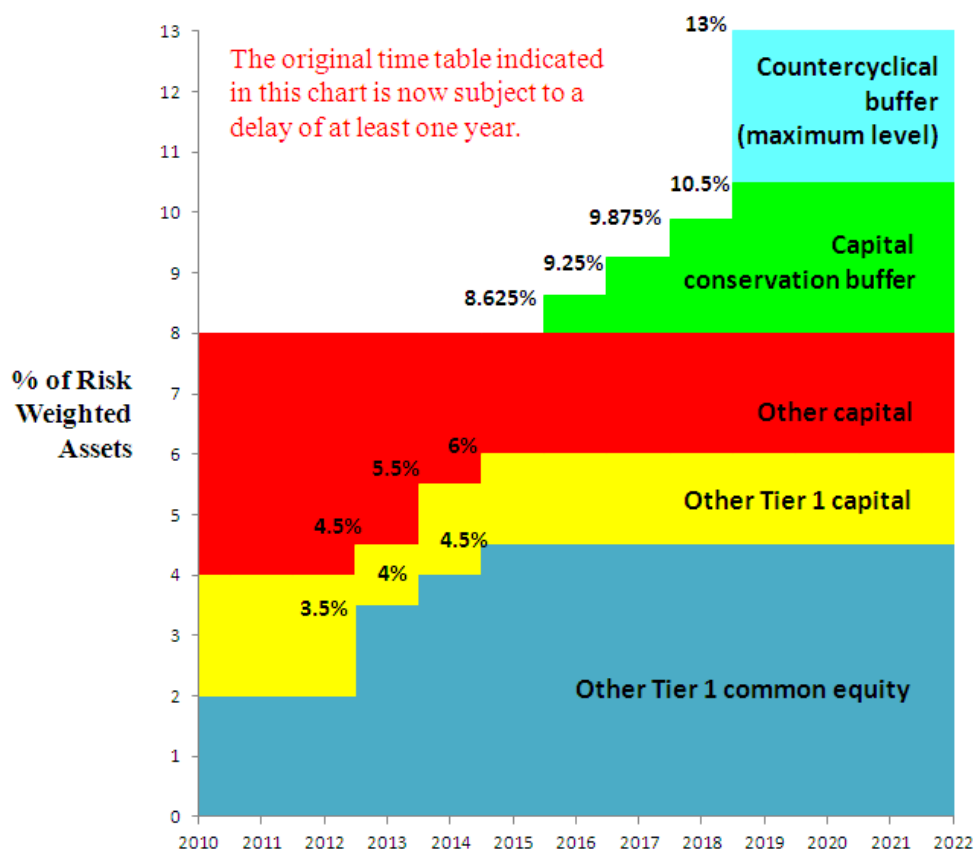
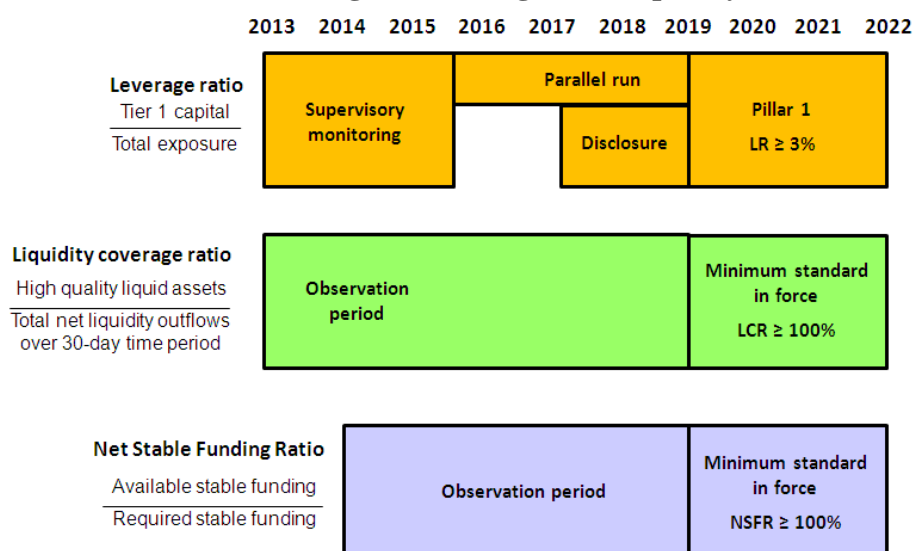
Chart 14 – The new enlarged framework of Basel III

Chart 15 - Basel III: timing of minimum capital requirements.**Chart 16 – Timing for Leverage and Liquidity Ratios**

7. Towards a new capital standard

It would be impossible, and inappropriate, to sketch here a blueprint for an alternative to the Basel regulatory standard. However, on the basis of the arguments developed in this paper, it may not be overly ambitious to indicate some guidelines to rethink the system. They are by no means novel, because many considerations concur with lines of action recently suggested, also from within the official sector³².

7.1. The key point is that capital rules should be less, simpler and incentive-consistent. Ever increasing complexity defies effectiveness and creates perverse incentives for individual banks and, collectively, for the banking system, with adverse micro and macroprudential consequences.

The centrepiece of the new system would be the leverage ratio, measured in terms of equity to assets, or tangible equity to tangible assets³³.

The leverage ratio is simple and less prone to the disruptive effects of procyclicality [D'Hulster, 2009]. It would be complemented in terms of supervisory activity for large banks by reference to risk weighted metrics. The culture and instruments developed in the past 30 years would be used as a backstop, to assess whether risk per unit of asset becomes excessive.

The reversal in hierarchy would have to be accompanied by another set of simplifying, internationally consistent, adjustments. Off-balance sheet exposures, notably with reference to derivatives, should be included in total assets. This would require a uniform treatment in accounting regimes. Under current rules, IFRS results in much higher total assets measures, compared to US GAAP. Netting conditions are stricter in the EU framework and, therefore, gross replacement values of derivatives are recorded in bank accounts, even if positions are held with the same counterparty under Master Netting Agreements. This distorts leverage comparisons between US and EU banks.

A strong capital base would be a feature of the proposed system. Capital cushions should be built gradually within a countercyclical framework. As has been argued, forcing banks to build up equity during periods of stress can be very expensive for the banks and prove counterproductive if the burden is borne by public budgets. Formally, budgets are not evaluated on market to market principles, but financial analysts pierce this veil and even amplify the perceived risks of the loop between sovereign and bank debts, also as a consequence of the flawed approach to liquidity in the Basel standards.

Without an effective and credible resolution framework in place, there is an inherent pressure to reward size, by charging lower debt margins from the biggest banks [Haldane, 2010 and Liikanen, 2012]. Instead, with moral hazard in check, supervisors and banks could align incentives and converge towards capital ratios higher than the Basel standards. Equilibrium leverage ratios could be set in the range 5-7%³⁴. There are social advantages in strongly capitalised banks: but, this objective must be obtained, as indicated, by aligning incentives, which requires, in turn, gradual abolition of the distortions resulting from direct and indirect government guarantees.

³² Reference is made, in particular, to Blundell-Wignall and Atkinson (2010, 2011), Haldane and Madouros (2012), Hoenig (2012), IMF (2012), Liikanen (2012), Schich and Lindh (2012), Slovik (2012).

³³ The latter ratio is selected by Hoenig (2012) as the point of reference for his proposed framework. The leverage approach is expounded by Carmassi and Micossi (2012).

³⁴ Or around 15-20 according to the definition of Equation [6]. According to the approach developed in this paper, leverage ratios would have to be set together with reserve (base liquidity) ratios, as indicated in § 4.

7.2. Less rules and less acritical reliance on sophisticated, but fragile, mathematical models – built in the framework of exogenous risk and of inadequate simplifying assumptions – would be accompanied by re-balancing and re-focusing microprudential supervision. Soft touch supervision, anchored to examining the validity of the risk models, must give way to a probing analysis of the characteristics and features of each bank³⁵. A close interaction should be developed in terms of the ICAAP and SREP processes. In this framework, all true advances, and large expenses, of risk assessment fostered by the Basel standards and by internal models of large banks would be exploited. The operational interplay between ICAAP and SREP would represent a prerequisite for the effective creation of prompt corrective action and early recovery and resolution frameworks³⁶.

The new supervisory approach would make reference, selectively and pragmatically, not only to accounting capital aggregates, but also to market value signals. More specifically, attention would be given also to the financial balance sheet of the bank, and hence to price-to-book ratios³⁷ and market leverage ratios [Masera and Mazzoni, 2012]. Value creation of the bank as for other firms, lies primarily on the asset side of the balance sheets. Ultimately, what matters, also from the point of view of microsurveillance, is to assess that sustainable profitability is higher than the average cost of finance: the fundamental message of the M&M propositions.

7.3. In any event, the “one size fits all” approach should be modified. In particular, simple risk rules should apply to local and community banks. The perverse incentives of the Basel standards in favour of large complex banks would, therefore, be drastically reduced. To recall, three main distorting factors are at work: (i) economies of scale created by compliance costs; (ii) economies of scale and scope in circumventing rules through activation of complex derivative-based financial structures; (iii) implicit and explicit government subsidies related to the size and complexity of banking groups.

Especially in Europe, where banking credit flows are - in relative terms - twice as important as in the US, and where many countries are characterised by the importance of SMEs³⁸ and of local banking, it is not meaningful to adopt the common approach of Basel III to all banks. The nature of the business model should, instead, represent a fundamental benchmark to evaluate riskiness. The intrinsic stability of a well-run “traditional” bank model, based on core deposits, is not recognized. And yet this should be a clear lesson of the crisis. Thus, the banking model most conducive to financial stability, growth and employment in economies characterized by the importance of SMEs might be a casualty of the Basel framework³⁹.

It is paradoxical that the most articulate and the strongest position against the same approach across all banking firms come from the US: «applying an international capital standard to community banks is illogical» [Hoeing, 2012].

7.4. As was argued in § 4, under stress, credit and securities markets drift together. Liquid assets can suddenly become illiquid. Liquidity and solvency risks become intertwined. Negative liquidity spirals can transform lack of liquidity of a bank into failure.

³⁵ See Sarcinelli (2012) and Cannata (2013). This is the traditional approach of the Bank of Italy supervision.

³⁶ The adoption of internationally consistent effective resolution frameworks requires joint solution from an economic/financial and a legal perspective. See, for instance, Duffie (2009). These points are taken into account in the Dodd-Frank Act (2010) from the US point of view.

³⁷ See Masera (2011), Haldane and Madorous (2012) and Masera and Mazzoni (2012).

³⁸ In the EU, commercial banks provide 80% of finance to SMEs. The need for an adequate financial system architecture for SME financing is illustrated in Kim (2010).

³⁹ See de Larosi re (2010, 2011) and Masera (2011). In any event, for loans to SMEs a balancing factor should be introduced into the RWA calculation formulas [LTIC, 2011].

Basel III adds to the complexity of the regulatory framework by introducing constraints on liquidity and on maturity transformation. The approach to liquidity was, however, based on the faulty analytical premise that government paper is fundamentally a safe asset. New constraints *de facto* amplify the role of external ratings. More generally, complex interconnected systems should not rely on a single buffering factor. This is especially so in the international banking system, because – as has been shown – under severe stress, additional significant capital may not be forthcoming through the market.

A simpler, more effective, approach to liquidity would rely on monetary base reserves, through selective injections and monitoring of high powered money under lender of last resort schemes, as indicated in § 4. The overall coping capacity of the system would thus be based on two pillars: capital, on the liability side, and bank reserves, on the assets side of the balance sheet. Monetary base reserves represent the paradigm of liquid assets (book accounting and financial valuation coincide). Reserves are under the direct control of the central banks and can be interest bearing⁴⁰.

7.5. Attention is finally drawn to two prerequisites which should be addressed and agreed upon before enacting the revised capital framework sketched here but, more importantly, before activating the Basel III standard.

Reference has already been made to the need for recovery and resolution schemes capable of breaking the distortionary factors which characterise the current system [Forti ed., 2010]. A cogent summary of the main arguments is contained in the following quote: «developing a credible capacity to place a systemically important financial institution into an orderly resolution process is essential to subjecting these companies to meaningful market discipline. Without this capability, these institutions -- which by definition pose a risk to the financial system -- create an expectation of public support to avert failure. That distorts the financial marketplace, giving these institutions a competitive advantage that allows them to take on even greater risk and creating an unlevel playing field for other financial institutions that are not perceived as benefiting from potential public support» [Gruenberg, 2012].

In this crucial respect, Europe is falling behind the US. This is especially dangerous now that Eurozone is set to establish a “banking union” in 2013 [European Commission, 2012]: this is a positive step, but microsurveillance requires a satisfactory, credible solution to the issue of recovery and resolution of large banks.

The second prerequisite that must be addressed in order to have a satisfactory regulatory capital regime in place is represented by the solution to the issue of separation between trading and commercial banking activities. According to the Basel III system, differential capital requirements set on the basis of risk measurement models and metrics allow a satisfactory answer. Basel III does not endorse in any way the split approach. It is instead consistent with subsidiarisation, and well specified living wills. Paradoxically, it could lead commercial banks to increase funding in wholesale markets.

Various alternative approaches have been proposed to deal with the problem of separation, also at the official level: notably, the Volcker rule in terms of the Dodd Frank Act (2010), the Vickers Report (2011) and the Liikanen Report (2012).

A very clear, radical, view on this problem has been recently put forward: «I am convinced that much of [Basel III] complexity derives from the complexities and conflicts embedded in the combination of commercial banking and broker/dealer activities. The safety net's enormous subsidy encourages ever-greater risk taking as firms attempt to achieve a higher return on equity than would otherwise accrue from operating the payments system and serving as a financial intermediary. In other words, from what they would earn from commercial banking. The safety net's subsidy

⁴⁰ For a historical perspective of reserve requirements on banks and other depository institutions, see Feinman (1993).

facilitates the use of leverage and provides an incentive toward higher risks that are hidden in opaque instruments, in trading activities and in derivatives. It bestows an advantage to subsidized firms not afforded others. Solving this problem requires a fundamental restructuring that separates banking from trading activities» [Hoenig, 2012].

In Europe, the case for separation of activities has been forcefully made by the High-level Liikanen Group on Reforming the structures of the banking sector. In a recent paper, the Chairman of the Group makes two key points to explain the rationale for separation: «first, separation is a way of prohibiting banks with insured deposits from engaging in activities whose risks are potentially high and difficult to measure precisely, and which are not essential to deposit banking.

Second, separation of activities is the most direct instrument for tackling banks' complexity and interconnectedness. As banks become simpler in structure, recovery and resolution will be easier» [Liikanen, 2012]⁴¹.

In sum, any satisfactory capital regulation regime should be preceded by an operational answer to the two key issues just examined. Giving banks an incentive to internalise the social costs resulting from their contribution to systemic risk requires also to address the issue of adopting a consistent framework to separate trading activities from other operations of large banks. The conventional wisdom that more risk weighted capital requirements can cope with these problems does not represent a satisfactory answer.

Also from this perspective, it would be therefore wise to settle these two fundamental issues on an internationally consistent basis before enacting Basel III or, preferably, a revised capital framework along the lines suggested here.

8. Conclusions

The Basel capital standards should be reviewed and adapted to overcome major interacting fundamental flaws: (i) exclusive reference to accounting capital and inappropriate analysis of the cost of equity in disequilibrium; (ii) lack of recognition of inside risk (which multiplies the procyclicality of the RWA approach); (iii) inadequate treatment of liquidity (notably with reference to the risk characteristics of government debt); (iv) creation of wrong and perverse incentives; (v) complexity. The implications of these flaws are examined in this paper and it is shown that, under stress, bank capital can become expensive, contrary to the common wisdom expounded by central banks and to some academic thinking.

In particular, it is showed that, if the equilibrium return on assets of a bank (i.e. its enterprise value) is lower than the required return on equity, capital increases are not the real, lasting solution.

The reform of the capital standard envisaged here is based on simpler rules, with a reverse order between risk weighted and leverage requirements. Rules would be simpler, but they would have to be accompanied by more supervision of the single institutions. Supervision would imply a strong interaction between SREP and ICAAP, based on prompt corrective action and taking fully into account market signals, such as the price-to-book and the market leverage ratios. In this framework, banks and supervisors would fully benefit from the advances in risk culture and in risk control which represent a positive outcome of the Basel approaches.

There is a fundamental disconnect between wholesale, investment and corporate banking activities undertaken by very large banking groups, on the global scale and community banking with households and SME's, on a local basis. The capital standards must, therefore, be differentiated in a substantial way between large and small banks.

⁴¹ de Larosi re (2013) has, however, stressed the logical and practical difficulties of this separation.

Separation of the riskiest trading and proprietary activities from deposit banking is also regarded by many as a necessary condition to reduce the complexity and increase the effectiveness of Basel III. As indicated, the issues posed by the Volcker rule, the Vickers model and the Liikanen proposals should find an internationally agreed solution, which is a prerequisite for the satisfactory enactment of a new capital standard. The emphasis on risk weighted capital requirements must take into account that new capital can be costly under conditions of stress, but banks should gradually build up sizeable capital cushions. The reduction of government subsidies would go a long way towards creating the right incentives for the banks and allowing market discipline to play its role.

Corporate and Risk Governance (CRG) of the banks plays an essential role to ensure stability, efficiency and competitiveness of the individual firms and of the industry. CRG must be managed primarily inside the firm, with solutions and choices aimed at fostering sustainable wealth creation and consistent with regulatory and prudential constraints. The latter are justified and required by the externalities of the banking system. CRG should overcome the focus on short-term objectives, which neglect risk profiles. In a framework of long-term total value management, and in the context of close and prompt interaction of ICAAP and SREP, the objective of sustainable shareholder value creation can be made consistent with stakeholders value creation [Masera and Mazzoni, 2006]. CRG ought to ensure that risk taking and risk management have the same dignity and similar effective weight. Appropriate checks and balances must be set in place with a view to ensuring appropriate relationships between risk appetite, tolerance and governance. Risk assessment and control cannot neglect the distinction between exogenous and endogenous risk.

A necessary condition for the respect of the considerations developed here is that “incentives” be designed and operated to foster the achievement of the objectives outlined. Risk-weighted capital regulation tends to encourage innovation designed to circumvent requirements. This shifts banks’ focus from their core intermediation and allocation functions. Risk taking incentives set in place, by monetary and fiscal authorities have dangerous implications for banking stability, beyond the short term.

Introduction of recovery and resolution schemes for banks, based on prompt corrective action and fee-related systemic risk contributions, is therefore of crucial importance. These schemes should be supported by regulation of OTC derivatives, along the lines indicated by the Dodd-Frank Act and by the EU Commission. More generally, capital standard reform should take place in a holistic, simplified, framework. More emphasis on microsurveillance, less on ever more complex regulatory models and formulas. Financial regulation, microsurveillance and macroprudential policies should take into account that the risk forecasting models, adopted in the Basel standards, when used for regulatory purposes and under stress, can become unreliable.

The announced postponement by both the US and the EU of the implementation of the new capital standards is a positive step, not only from a cyclical perspective, but also to allow corrections of the flaws indicated in these paper. The Basel regulators should take the lead in rapidly assessing the “ferment of regulatory proposals” [Goodhart, 2012] to review in depth the capital regulation.

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