Document de Travail
Working Paper
2009-29

A systemic approach to financial regulation: a European perspective

Michel Aglietta et Laurence Scialom

A systemic approach to financial regulation

A European perspective

Michel Aglietta and *Laurence Scialom*

Univ of Paris West   Univ of Paris West
and CEPII

Abstract

The global financial crisis has pinpointed the relevance and the virulence of systemic risk in modern innovative finance. It is grounded in the propensity of credit markets to drift to extremes in close correlation with asset price spikes and slumps. In turn, such a propensity is nurtured by the heuristic behaviour of market participants under severe uncertainty. While plagued by disaster myopia, market participants spread systemic risk. Such adverse conditions have been magnified by financial innovations that have made finance predatory and capable of capturing regulators to annihilate prudential policies.

Malfunctioning in finance is so deep and disorders are so widespread that sweeping reforms are the order of the day, if financial stability is viewed as a primary public concern. In this paper we argue that macro prudential policy should be the linchpin of relevant reforms. Being a top-down approach, it impinges both upon monetary policy and micro prudential policy.

Central banks should pursue a dual objective of price and financial stability. Bank supervisors should broaden their oversight on a much larger perimeter, encompassing all systematically important institutions. Counter cyclical capital provisions should be required and linked to the control of aggregate credit supply. Leveraged institutions without deposit base should be subject to incentives for a much stricter liquidity management. To stem regulatory capture, prompt corrective action should be enlarged in its scope and adapted to mark-to-market financial intermediaries.

Implementing macro prudential policy entails institutional changes. Central banks, bank supervisors and other financial regulators need to work much closer than beforehand, because the spread of systemic risk is not deterred by institutional and geographical frontiers. The changes to make are particularly stringent in Europe, where national parochialism makes the resolution of orderly cross-border bank crisis all but impossible.

Introduction: plea for a renewed foundation of prudential policy

During the 2007/08 financial turmoil, micro-prudential regulations have revealed their weaknesses, ineffectiveness and pernicious effects, partly because of their pro-cyclicity. This diagnosis was known for years but ignored (Danielsson J and alii, 2001). Right now it is largely shared in the academic community and amongst regulators.

The change in mood was revealed at the G20 London Summit. Because systemic risk arose in the last few months, it had become impossible to uphold that credit markets are efficient and self-regulating. The question to agree upon was no longer: is regulation relevant? But: what are the goals? What should be the scope? What is the divide between national responsibilities and international rule-making? A compromise was reached in London between the Anglo-Saxon light-touch approach and a more heavy-handed view in the French-German tradition. The main problem now is the willpower to implement the decisions against the formidable bank lobbies that had completely captured the regulators in the present decade.

From our point of view, this reorientation towards systemic concerns and the correlative addition of a higher level of regulation is essential but not enough. The philosophy of micro-prudential regulation too needs an overhaul. Since the Eighties, capital requirement has been the cornerstone of bank regulation. The rationale for this prudential choice is to preserve bank solvency to protect the interests of creditors –especially small depositors which are deprived of the expertise, incentives and ability to efficiently discipline bank managers (Dewatripont M and Tirole J. 1993).

Although widely used in banking regulation, such approach is subject to a well-known paradox, already observed in liquidity management. Indeed, any item in bank balance-sheets, which serves as a buffer (liquid assets or capital) against adverse and unforeseen shocks, ceases to achieve this shock absorber function whereas the regulator sets a quantitative rule imposing a minimum amount for this position. Only equity capital in excess of regulatory capital requirement constitutes a true buffer absorbing unexpected losses. When it is exhausted, additional losses eat into the regulatory capital and induce a credit rationing or another pro-cyclical balance sheet adjustment.

Moreover, since the Eighties, it has been largely admitted that the key determinant of the size of capital buffer should be the riskiness of the assets with a crude valuation of risk with Basel 1 and a more sophisticated one with Basel 2. One of the key foundations of such a prudential design is that the roots of the potential solvency problems are strictly located on the assets side, because deposit insurance schemes protect banks from depositors' runs. The reasoning leads to a sharp distinction between solvency and liquidity.

Unfortunately for the framework based on this divide, market finance has upset the segmentation between banks and non-banks. A shadow banking system has arisen in the wake of financial innovations. It depends entirely on market liquidity for its funding. In this grey zone between financial intermediation and pure market finance, credit and illiquidity risk are closely intertwined. The combination of a sharp deterioration in creditworthiness and a large maturity mismatch provokes a drying-up of market liquidity, since market-wide events are perceived simultaneously by all market participants. Distress sales of shadow banks ensue that fuel price slumps in equity markets. The latter shrink the capital cushion of the embattled firms and entails an adverse reappraisal of their risks (Adrian T and Shin H.S, 2008).

With mark-to-market accounting, changes in asset prices rapidly impair the net worth of all the participants in the financial system. Consequently, in times of stress, a tightening in market liquidity quickly translates into changes in the banks and market intermediaries' equity base. There is a dynamic interaction between the liquidity and solvency of financial institutions, because if market participants have misgivings about the solvency of their counterparts, they cut off their access to funding and so themselves cause the solvency problem that they fear. Market and funding illiquidity are highly interconnected and self-reinforcing. It follows that solvency problems cannot be anymore interpreted as being exclusively due to the asset side.

All market participants know these new interrelationships between market illiquidity and funding illiquidity [1] and the blurred frontier between illiquidity and insolvency in a market-based financial system.

The current crisis seriously challenges the traditional approach of financial regulation and thus questions the purpose and design of Basel 2. That is not really surprising insofar as the intellectual foundation of capital regulation remains weak and the purpose of capital regulation is unclear. There are potentially three rationales for capital regulation: it provides a buffer against insolvency, it affects incentives for risk taking and it provides a room for an early intervention by the supervisor. As pointed out by Hellwig (2008), these rationales can contradict each other. For instance, if the purpose of capital regulation is to provide room for early supervisory intervention before the bank net worth becomes negative, there is no reason why risk weights of assets should matter. What is essential is to be sure that the ratio of capital/total assets defining the threshold of intervention cannot be manipulated. On the contrary, if capital regulation is conceived as an incentive device, the risk-based capital is appropriate and constitutes a risk management tool.

As Gordy and Howells (2004, p.1) state "the primary objective under Pillar 1 (of Basel II) is a better alignment of regulatory capital requirements with 'economic capital' demanded by investors and counterparties". This remark seems conducive to an approach of capital regulation as an incentive device. But regulatory and economic capitals fundamentally differ in their logic. Economic capital is a matter for shareholders. It is usually defined according to value-at-risk (VaR): the capital required to cover a level of loss that can only be overstepped with a given probability. It is implicitly assumed that shareholders are the ones that choose such probability in order to maximize the market value of the bank.

On the contrary, regulatory capital is a matter for taxpayers. It is the minimum capital required by the regulator to keep the financial system stable. It takes account of endogenous spill over effects between banks. Specifically bank regulatory capital must integrate the negative externalities generated by the insolvency of an individual bank in the whole banking system. Therefore forcing convergence between economic and regulatory capital may undermine overall financial stability. The first step in this direction was made in the 1996 amendment to the original Basel 1 agreement. This amendment aimed at determining regulatory capital for market risk on the basis of quantitative risk models built by the banks themselves. This move to self-regulation [2] was the result of an intense lobbying by major banks in the first half of the Nineties and was extended to credit risk in the pillar 1 of Basel 2.

---

[1] Funding illiquidity occurs when solvent financial institutions have difficulty borrowing immediate means of payment to meet liabilities falling due.
[2] Nevertheless, the regulator keeps the power of validating the bank's internal models and imposing its specifications and requirements for the acceptance of the model

Thus, since the mid-Nineties, the design of capital regulation has been widely influenced by a trend to regulatory capture, justified by the sophistication of financial instruments and risks assessment.

The Basel 2 agreement is based on a flawed sophism of composition: promoting the soundness of individual banks in disseminating the "best practices" of optimal risk management is supposed to ensure *ipso facto* overall financial stability. Ergo, Basel 2 is a purely micro-prudential device and is risk sensitive.

Such an approach of financial regulation is tantamount to assume that systemic risk does not exist. Endogenous risk is entirely ignored. As Danielsson points out (2009): "The law of finance are not the same as the laws of nature The engineer, by understanding physics, can create structures that are safe regardless of what nature throws at them, because the engineer reacts to nature but nature does not generally react to the engineer." Unfortunately, that is not the case in finance. Measurement of financial risks is subject to a sort of renewed Lucas critique, because of endogenous risks. The actions that an individual institution takes to preserve its soundness can undermine the global financial stability and such feedback effect is amplified by the Value at Risk constraints under which all active participants of the market operate. Basel 2 has created new risks: the risk of models and the risk of a false sense of security that has been so widespread in the present decade before the crisis.

Systemic risk has struck with vengeance. It makes the objective of overall financial stability paramount. A new layer of financial regulation, let us call it macro prudential, must be built and its relation to more traditional micro prudential policy conceived in a top-down approach. Dealing with this question is what this paper is all about.

In section I the basic concepts that underline the framework of macro prudential policy are developed: the financial instability hypothesis, the destructive dynamic of systemic risk and the reason why the innovation of structured credit has exacerbated the latter. Section II researches how the containment of systemic risk requires countercyclical prudential policy to control credit expansion in the financial cycle. It features how macro prudential policy could be implemented in a top-down approach, under the leadership of central banks. The perimeter of banks subject to the macro approach should be enlarged to encompass all systematically important institutions, be they in the regular or in the shadow banking system. Both macro capital requirements and liquidity management tools should be used to implement the dynamic macro control at the micro level. Section III links macro and micro prudential policy so as to avoid regulatory capture. It assesses the performance of prompt corrective action in the US banking system and advocates its generalization to the enlarged banking system subject to macro prudential policy. Section IV discusses how the propositions of implementing macro prudential policy might be adapted in Europe along the lines of the de Larosière report.

Foundation of macro prudential policy

The dynamics, which exacerbated and spread the present crisis, amount to systemic risk. Finance is exposed to such a destructive dynamic because credit markets are not alike other markets. They are subject to the financial instability hypothesis [Minsky, 1986].

The financial instability hypothesis

In a regular market, the quality of what is exchanged is known to all participants before the exchange takes place. The motivation of the exchange is the acquisition of a use value. It depends only on the exogenous preferences of the consumer that are integrated in her utility maximization function. They are independent from the preferences of the seller. It follows that the determinants of the market supply and demand functions, other than the market price, are exogenous and uncorrelated. Furthermore, the demand of a particular commodity for consumption purpose is intrinsically limited by decreasing marginal utility. Its substitutes have the same characteristics. Since the price of the commodity and those of its substitutes influence supply and demand in opposite directions, an exogenous shock that displaces one curve is absorbed by a variation in prices that re-establish equilibrium. This is the standard supply and demand law of motion.

Credit is not an exchange market of use value; it is a market of promises. Nonetheless the standard law of motion can apply whether credit is demanded to acquire a use value and is granted on the basis of the expected future income of the beneficiary. However, the rationale is entirely different while a purely finance motive dominates the market. Credit is demanded to acquire assets for wealth accumulation. The motive is solely the expected appreciation in the price of the asset that determines the self-increase in its money value. This motive is an abstract power of command over money. It is limitless because there is no ceiling in the hope of the price appreciation of a saleable asset. Besides, the suppliers if credit look at the asset the same way because they take it as a collateral for their loans. They have the same perception of the asset market. They hope that the loan-to-value ratio of their claim will diminish with the rise in asset price, thus lowering the default probability of their loans. Hence, they have all interest to grant more loans in the euphoric stage of the financial cycle.

While the finance motive is dominant, the aggregate supply and demand of credit are tightly and positively correlated, since they both depend positively on the expected price rise of the credit-financed asset. Therefore the expansion of credit validates the rise in the expected asset price. Because credit supply moves in sympathy with credit demand, the cost of credit is subdued. Both curves undergo a rightward shift with the rise in asset price in a roundabout process, whereby all interactions are self-reinforcing (figure 1).. This mechanism has no self-adjustment; it is driven to the extreme. A swelling speculative asset price bubble has a hidden financial fragility in the balance sheets of both borrowers and lenders as a counterpart. It is nothing but an intrinsic market failure.

Financial fragility: disaster myopia and erosion in security margin

The financial instability hypothesis, now called the Minsky moment, stipulates that the euphoric stage of a financial cycle generates behaviour that renders the financial system fragile. The deterioration in credit conditions is concealed to market participants, due to the asset speculative bubble. The behaviour responsible for the unstable process is called *disaster myopia* [Guttentag and Herring, 1986]. It is typical of economic agents under uncertainty who are unable to understand, let alone measure, the endogenous spill over of risk stemming from their interdependencies.

As long as asset prices are fast-rising, endogenous credit risk amongst all lending institutions, or a large subset of them, looks low, all the more than it erupts rarely. It is a tail risk with

catastrophic losses while it strikes. Confronted with such a profile, actors of finance hold the risk as nil, because the perception of this immeasurable risk is below their heuristic threshold. Fragility creeps into the system because market participants perceive large opportunities of capital gains and undervalue risks, resorting to ever higher leverage to maximize their profit. Correlatively security margins against an abrupt reversal of asset prices are going inconspicuously thinner to the point of disappearing [Kregel, 2008].

Therefore disaster myopia feeds a vicious circle to the apex of a speculative bubble. This roundabout process has been hugely magnified by the crazy development of the market-based credit system (table 1). In 2008, total US debt reached more than 350% of GDP, much higher than in 1929. While government debt was quite under control thanks to the fiscal conservatism of the Clinton years, private debt exploded. Every sector contributed. However, the swelling up of the financial sector is properly staggering. It is the leverage counterpart of the predatory behaviour permitted by financial engineering, very loose financing conditions and unconcerned regulators. Indeed, profits in finance as a share of total corporate profits waxed from 10% in 1980 to 40% in 2007, while finance makes 5% of employment of the whole corporate sector! Meanwhile, its share of equity value jumped from 6 to 19% of the corporate sector, albeit Stock market main indexes had been multiplied by more than 10.

Table 1. Gross debt/GDP by institutional sectors (%)

| Sectors	1980	1990	2000	2008
Households	49	60	68	100
Non-financial corporations	53	63	80	75
Finance	23	48	77	121
Government	35	54	47	55
Total	160	225	272	351

Source : Fed, flows of funds

In the so-called "*subprime*" crisis a powerful procyclical dynamic was engineered by the intimate interaction of a host of financial innovations: mark-to-market of a wide range of financial assets that has enhanced credit against collateral, widespread use of credit derivatives that has allowed the securitization of about any type of credit, internal models of credit risk control based upon the *Value-at-Risk* (VaR) principle that has immoderately propelled leveraged trading portfolios.

Investment banks have captured the opportunity to link together those devices in order to generate a new "*originate and distribute*" model of credit that has hugely amplified the euphoric stage of credit expansion and asset price appreciation in the real estate sector. The "*originate and distribute*" model of credit generates incentives for risk undervaluation, asymmetric information, conflicts of interest that radically impair market discipline by investors upon the "shadow banking system" (investment banks, off-balance sheet ad hoc structures and hedge funds).

Figure 2 exhibits the procyclical roundabout process of mark-to-market leverage that spurred the portfolio of securitized credit in the ascending stage of the real estate cycle. Financial market intermediaries finance the purchase of credits to be structured with market borrowing (repos and commercial paper issuance). They prod the surge of credit to households by a host of banks and unregulated credit brokers. The originators sell the credits to the arrangers of

mortgage-backed securities (MBS) for a fee. The process can be replicated with any credit eligible to pooling and repackaging in asset-backed securities (ABS).

Figure 1. Endogenous interdependence in credit supply and demand
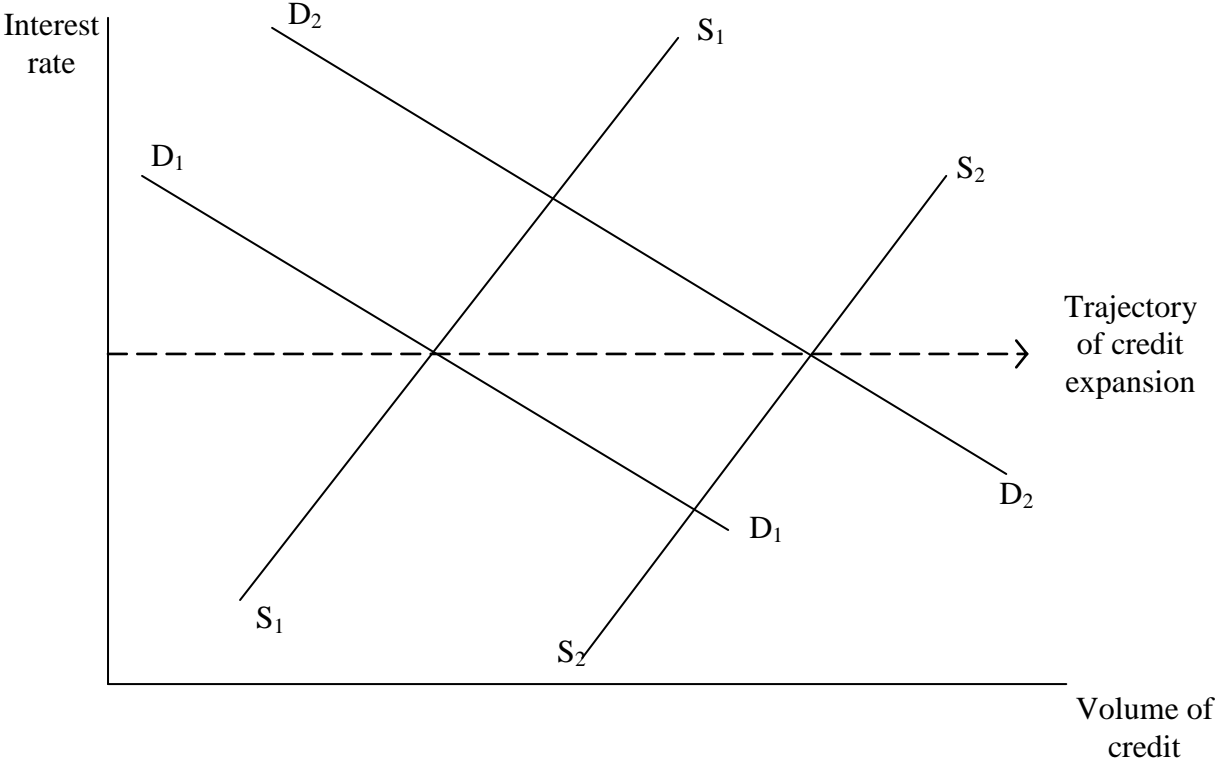
D_1D_1 and S_1S_1 : demand and supply of credit for an asset price P_1
D_2D_2 and S_2S_2 : demand and supply of credit for an asset price $P_2>P_1$

Figure 2. The vicious circle of the euphoric drive
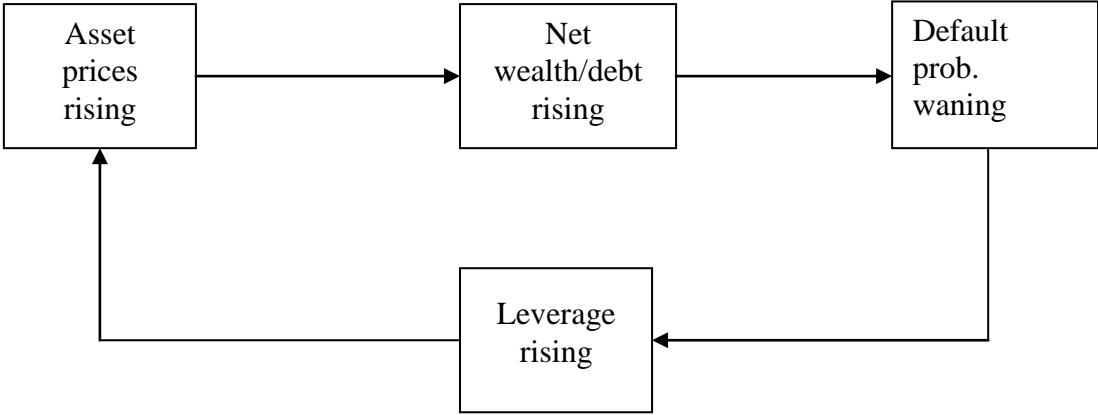
Feedback effects arise with asset price appreciation because higher asset valuation entails a larger capital in the marked-to-market trading portfolio of financial intermediaries for a given level of debt. The leverage ratio l = A (total assets) / E (equity) becomes suboptimal: $l<l^*$ (desired leverage). Furthermore the desired leverage is a decreasing function of the *value-at-risk*. VaR is determined in credit risk models as a decreasing function of the distance to default which is augmented with a higher asset value for given debt outstanding. Therefore VaR is reduced and $l^* =1/VaR$ is increased. Hence a rise in asset price boosts the leverage of investment banks and other market intermediaries compounding the shadow banking system [Adrian and Shin, 2008]. Practically the financial intermediaries can pledge a higher value in the repo market that entails a lower haircut, thus a higher borrowing for a given amount of capital.

Systemic risk: the deadly interaction of credit and liquidity risk

Systemic risk is a situation of widespread market failure, whereby the rational responses of individual economic agents to the financial stress they undergo are highly correlated and magnify the stress of everyone [Aglietta and Moutot, 1993]. Fire sales of assets, withdrawing of counterparty lines of credit, cash hoarding for shelter against impenetrable uncertainty, are all symptoms of systemic risk. This is a risk that is endogenous to the interconnections between market participants or to the exposure to a common macro risk factor that triggers contagious reactions.

In a systemic crisis there is a close interaction between procyclical leverage and maturity mismatch. The more funding liquidity of financial entities with illiquid and fast-losing value of assets, due to the burst of the speculative bubble, is dependent on market liquidity, the more distressed sales of liquid assets for cash impair their balance sheets.

With procyclical leverage the roundabout process described on figure 2 is reversed with devastating consequences. Mark-to-market accounting amplifies the vicious circle in synchronizing the fire sale of assets. Higher haircuts on credit lines and every incentive to reduce leverage proceed from much larger VaR induced by the slump in the asset price. In securitized credit the impact is exacerbated by the spike in the correlation amongst the pools of credits that are securitized in ABS and CDO. The whole destructive process is propagated by the many market imperfections in risk transfers: opaque over-the-counter transactions worsening illiquidity, asymmetric information precluding the ultimate risk takers to exert any counter evaluation and perverse incentives biased toward excessive risk taking by issuers and arrangers of structured credit.

The development of a systemic crisis involves externalities between financial firms that are either individually important in feeding counterparty risk, or are important as part of a mimetic group in reverting to extreme risk aversion or following a bear market trend. They are the channels leading to widespread market failure. Because of the mimetic disaster myopia that arises under blanket uncertainty and entails spill over of losses, the social cost of the crisis is much higher than the private cost. Therefore public intervention is not only legitimate; it is compelling to alleviate the devastating impact of the depressive debt deflation of the private sector on the whole economy.

However a better policy is the design of the financial system to make it robust to systemic risk. This is the purpose of macro prudential policy for the sake of financial stability. The

second section will deal with this matter. Nonetheless, a better understanding of the forces leading to financial crises is in order before one can pretend to design a relevant macro prudential policy.

Modelling disaster myopia and systemic risk due to bank behaviour

A hard question remains before making a foray into macro prudential policy. How does the dynamic portrayed on figure 1 gives rise to a catastrophic reversal? It needs a highly non-linear dynamic with strong collective interactions and threshold effects to get that result. The link between individual bank decisions and runaway aggregate credit growth lies in the strategic complementarity between banks using the same VaR models.

Because the securitization of credit made banks lured by the appreciation of asset prices, they perceived a very low credit risk, leading to collective *disaster myopia*: a massive underestimate of credit risk that feeds explosive credit expansion and financial fragility. More and more high-risk loans get inadequately priced and financed by short-term debt.

In order to explore the linkages between individual rationality and strategic complementarity under deep uncertainty, we adapt a class of models used in sociology to understand how public opinion emerges [Granovetter and Soong, 1986]. To keep the model workable without altering its logic, let us assume that all banks have the same size, so that global credit supply is proportional to the number of banks that have granted credit. Each bank has a heuristic threshold defined by the amount of loans granted by all the banks that have already supplied credit. Let $x(t)$ be the threshold for the banks that grant a loan in t. The distribution of the thresholds captures the difference in risk tolerance of the banks. It is described by the probability density function $f(x)$. Therefore the cumulative probability function $F(x)$ in t is the proportion of the banks that have granted a credit until t. It also depends on the lending interest rate r charged by banks. It follows that the dynamic of credit supply is given by the equation:

(1) $x(t+1) = F[x(t)]$ with $F'_x > 0$ and $F'_r > 0$

It is a self-fulfilling dynamic whose equilibria are given by:

(2) $x^* = F(x^*, r)$

If $F(0) > 0$, e.g. some banks start making credit on their own, the profile of cumulative distribution function guarantees one corner solution $F(1) = 1$ and at least one other stable solution as long as the interest rate is below a critical level r^* (figure 3). The points E_0, E_1, E_* on the first bisecting line are the amounts of credit at increasing interest rates $r_0 < r_1 < r_*$

Figure 3. Supply and cost of credit
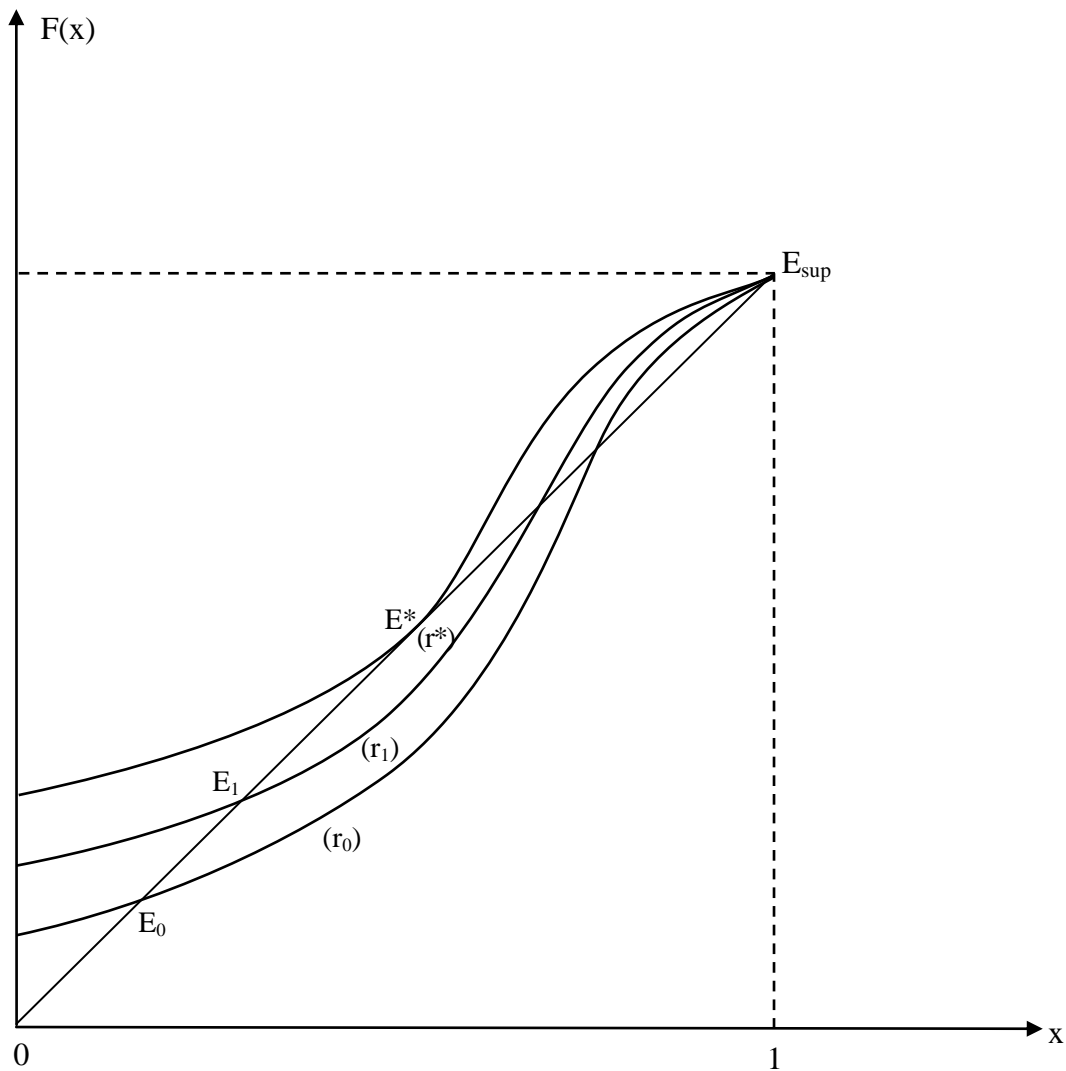
The self-fulfilling dynamic of bank interdependencies, which enrols banks with relatively less tolerance to originate credit, makes the volume of credit an increasing function of the lending rate up to r_*, where the regime of credit undergoes a discontinuity. The amount of credit explodes and jumps to the limit $x_{sup} = 1$.

To understand what happens beyond the critical rate, one must make allowance of the deterioration in the quality of credit that goes with the runaway growth in volume. The discontinuity is the appearance of systemic risk, due to the strategic complementarity in bank behaviour. However, the fragility of bank balance sheets is due to the deterioration in the quality of individual credits that have been originated.

Let us consider a group of debtors whose assets are posted as collateral for the loans (e.g. households acquiring real estate). The yield of the asset is a random variable ρ. Let us posit $\rho = \varepsilon \rho_a$ where ρ_a is the average expected yield and ε a random variable with probability density φ and cumulative function Φ. $E(\varepsilon) = 1$ so that $E(\rho) = \rho_a$

d is the rate of indebtedness and 1-d the net worth on household assets.

A debtor is insolvent if: $\rho < (1+r) d-(1-d)$ or $\varepsilon < \varepsilon_0$ with: $\varepsilon_0 = \dfrac{(2+r)d-1}{\rho_a}$

π being the probability of default tolerated by the bank, credit risk is such that:

$\Pr\{\varepsilon < \varepsilon_0\} = \pi$

Using the definition of ε_0, one gets the upper limit in household indebtedness:

(3) $\hat{d} = \dfrac{1+\rho_a \Phi^{-1}(\pi)}{2+r}$

The debt ratio is the higher, the more optimistic the expectations on real estate prices, the larger the volatility of the price, the higher the risk accepted by banks and the lower the cost of credit.

In a competitive banking system the interest rate on loans must be such that the marginal return of banks is equal to the marginal cost (i) of their financing:

$$1+i = (1+r)\int_{\varepsilon_0}^{\infty} f(\varepsilon)d\varepsilon + \int_{-\infty}^{\varepsilon_0} (\frac{\rho_a \varepsilon}{d} + \frac{1-d}{d}) f(\varepsilon)d\varepsilon$$

The first term on the right hand side is the contractual income on performing loans and the second term is the residual income on non performing loans.

Integrating by parts and taking account of the value of ε_0 drawn from the solvency constraint, one gets the equation: $i = r - \dfrac{\rho_a}{d}\int_{-\infty}^{\varepsilon_0} F(\varepsilon)d\varepsilon = r - \dfrac{\rho_a}{d}q$

Or $r - i = \dfrac{\rho_a}{d}q$

Where $q = \int_{-\infty}^{\varepsilon_0} F(\varepsilon)d\varepsilon$

(r-i) is the risk premium. It depends on $\rho_a q$ which is the amount of losses that are not overstepped more than $\pi\%$ of the time, e.g. the VaR at probability π. One can express the credit spread in substituting for the determination of d:

(4) $r - i = \dfrac{(2q+i)\rho_a}{1+(\varepsilon_0 - q)\rho_a}$

It is an increasing function of the marginal cost of bank finance and of the VaR. The impact of asset price yield ρ_a is ambiguous since it reduces the probability of default on a given loan but increases indebtedness of households according to (3).

One can see why the estimation of the solvency threshold over which banks stop supplying more credit is plagued by strategic complementarity. They all use risk control models based

on the VaR principle highlighted in equations (3) and (4). But the VaR of each bank is a declining function of the asset price, which in turn is rising with the credit supplied by all banks. It follows that a credit spree fuelling an asset price bubble lowers the VaR of all banks and waxes their perceived debt limits, e.g. their solvency threshold, due to their strategic complementarity. The only countervailing force is the riskless rate of interest. But it is likely to be subdued as long as the euphoric mood in the market persists.

The problem for the banks trapped in this vicious circle is that the limit of solvent indebtedness is likely to be overestimated and the relevant risk premium underestimated in structured credit. On the one hand, the originators make credit for commissions and sell the risk; on the other hand, the arrangers securitize credit off-balance sheets and assume that the risk has been sold off. It follows that the amount of non-performing loans and the likely loss on those loans become highly uncertain and massively underestimated. Banks have recourse to the pressure of competition to determine the maximum threshold x_{sup} of their credit supply. Therefore, the perceived debt limit drifts upwards, and the perceived risk premium downwards in a self-fulfilling dynamic.

Summing up the modelling of bank behaviour, it is driven by two opposite forces:

- The *heuristic threshold*, leading to disaster myopia, is illustrated on figure 3. It is an increasing function of the interest rate

- The *solvency threshold* is a decreasing function of the interest rate.

Two cumulative probability functions are associated with those thresholds:

- F_I is the proportion of the banks that have granted credit according to the filter determined by their lower threshold: $F_I(x,r)$ with $F'_{Ix}>0$ and $F'_{Ir}>0$

- F_S is the proportion of banks that have renounced to get more credit to borrowers they consider too risky according to their upper threshold: $F_S(x,r)$ with $F'_{Sx}>0$ and $F'_{Sr}<0$

The dynamic law of motion that determines the proportion of banks granting new credit in t+1 is compounded of the banks whose inferior threshold has been overstepped and the superior threshold has not yet been reached:

(5) $x(t+1) = F_I[x(t)] - F_S[x(t)] = G[x(t)]$

G is the difference of two cumulative functions of probability It must embody the logical restriction that a bank cannot stop making credit before having granted any, e.g. the upper threshold is above the lower one. The curves G(x) are parameterized by r. They are highly non-monotonic and non-linear. They drift upwards while r rises. Because G'r >0, the curves never cut for x<1.We suppose G(0)>0 and G(1)=0, since there is a finite limit where all banks stop making new credit. Therefore all curves reach this terminal point.

The equilibria in global credit supply are thus determined by the fixed points of the dynamic process:

(6) $x^* = G(x^*,r) = F_I(x^*,r) - F_S(x^*,r)$

An equilibrium is stable if -1<G'(x) <1. Graphically x* is the abscissa of the intersection of the G(x) curve and the 45° line. There is a value of x* for each level of the interest rate. The higher the interest rate, the higher x*, but also the steeper the curve at the point of intersection with the first bisecting line. It follows that there is a critical interest rate r* where G'(x*)=-1. Above that rate, G'(x*)<-1. The regime of credit undergoes a drastic regime change: *instead of being stable around x*, it becomes chaotic.*

The equilibria are illustrated on figure 4 for two values of interest rate r_0<r* and r_1>r*>r_0. They show that the supply of credit is a rising function of the interest rate.

Figure 4. Credit supply with double threshold
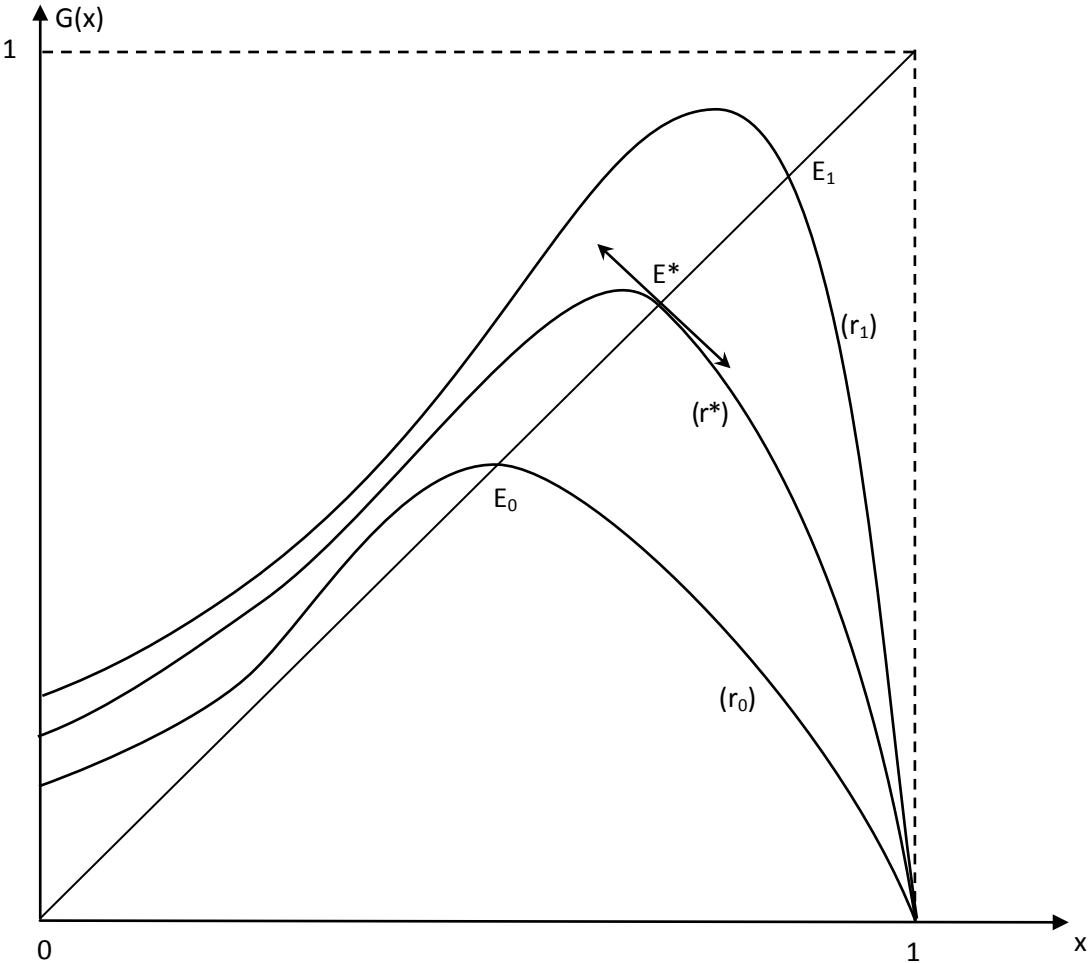
The story of the discontinuity in structured credit, which has precipitated the huge financial crisis, can now benefit from the teachings of the model. From the fall of 2006 onwards the price of real estate assets started declining while the money market interest rate was substantially climbing under the threat of inflation. Equation (3) shows that the perceived debt limit of solvent debtors was diminishing and equation (4) that the likely loss was increasing, driving the risk premium upwards. The interest rate on credit crossed the critical rate because its two components, the cost of marginal financing of the banks and the credit spread were

both driven upwards. The regime of credit shifted inconspicuously from stable to chaotic and Armageddon struck.

The model that has shown how systemic risk can arise endogenously is based on strategic complementarity between banks. It captures endogenous risk in the behaviour of individual banks, due to counterparty relationships and to common dependency of bank credit risk devices to asset prices. Therefore the conclusions that are drawn from the model can provide insight to macro prudential regulation. This is a type of regulation that will restrain the momentum of aggregate credit expansion in setting up capital and (or) liquidity requirements that induce banks to interiorise the externalities due to their strategic complementarity.

Macro prudential policy: a breakthrough in prudential regulation

At the London Summit, the Communiqué of the G20 has hinted at the need of macro prudential policy. The financial appendices are more explicit in setting the objective of preventing systemic risk and instructing the newly upgraded Financial Stability Board (FSB) to make a technical proposition for paraphernalia to that aim.

The G20 Communiqué reveals a compromise between the Anglo-Saxon light-touch approach to financial regulation and the more heavy-handed view in the French-German tradition. Because systemic risk arose in the last few months, it has become impossible to uphold that credit markets are always efficient and self-regulating. The question to agree upon is no longer: is regulation relevant? But: what are the goals? What should be the scope? What is the divide between national responsibilities and international rule-making? The main problem now is the willpower to implement the decisions against the formidable Wall Street bank lobby that has completely captured the regulators in the present decade and thus threatens legitimate democratic institutions.

Central banks should control credit aggregates for the sake of financial stability

Why were central banks insensitive to the build-up of financial imbalances stemming from the credit dynamic sketched in the first section? The answer is "price stability". Contrary to the financial instability hypothesis, the belief underpinning central bank policy in the last three decades has been the inherent stability of efficient financial markets. According to this conception, exogenous shocks are taken care of by financial market adjustments like in any other markets. Only disruption in the money supply can trigger inflation, and only inflation can have a long-lasting disorderly impact on financial markets.

Not only is this assertion contradicted historically by repeated episodes of financial crises in deflationary regimes, but it is logically inconsistent. Price stability is a necessary condition of financial stability because high inflation is volatile and spreads uncertainty, as monetarists forcefully claim. It does not follow that it is a sufficient condition, as soon as the hypothesis of perfect capital markets is rejected. It can even be argued that low and stable inflation is propitious to aggressive risk taking that fosters financial instability. Indeed, price stability cum deep-rooted financial globalization entail low credit cost, high leverage and booming asset prices. As demonstrated in the first section, these are the ingredients of financial instability. It is not enough to deal with financial shocks equipped with the Greenspan put: do

nothing in the upturn stage of the financial cycle, be prepared to bail out the system in the downturn. The doctrine failed miserably in the present crisis, as Alan Greenspan himself acknowledged on October 23, 2008 in his testimony before the Commission set up by Congress.

The inescapable conclusion is that central banks should pursue a dual objective of financial and price stability and should be empowered with enlarged responsibilities to deliver [Borio and Lowe, 2002]. Dealing with financial stability is opening a new territory in central bank mandate at the junction of monetary policy and financial regulation. It is well-known that it is impossible to achieve two objectives with a single instrument. It is why Alan Greenspan was so reticent in using the interest rate to prick asset price bubbles. To handle financial instability, other tools must be forged. According to the financial instability hypothesis, excessive credit expansion is the driver of cumulative financial imbalances that impair security margins and lead to systemic risk. It is why the BIS repeatedly showed that controlling global credit expansion throughout the financial cycle is the key to mitigate its perniciousness [Borio, 2004]. Whether interfering directly with asset prices is feasible or not, moderating excess credit growth is undoubtedly a central bank job. At this point two questions arise: how can excess credit growth be measured? Which instrument should be used to do the job? BIS research has answered the first question [Borio, Furfine and Lowe, 2001]. The second question is left to the FSB. It pertains to the new framework of macro prudential policy.

One can sum up the conclusions of BIS research for the purpose of monetary policy. Excessive credit growth must be measured against a benchmark. The latter is a long-run trend in inflation-adjusted credit growth, which is co-integrated with long-run real GDP growth. This is the credit expansion that sustains a steady state regime, consistent with a given rate of GDP growth. Excessive credit growth in the upward stage of the financial cycle is defined as the cumulative positive gap between actual credit expansion and the cumulative expansion that would have occurred if credit growth had followed the benchmark track.

To take care of the rise of the shadow banking system, the measure of aggregate credit growth can be completed with new findings about liquidity and leverage [Adrian and Shin, 2008]. They pertain to the behaviour of financial intermediaries and impact the risk-taking channel of monetary policy. It is best dealt with liquidity management.

One such linkage conforms to the vicious circle described on figure 2. It is related to excess credit growth via the rise in risk tolerance in the upward stage of the financial cycle, inducing the perception of lower default probabilities and higher leverage. A second impact is due to the search-for-yield pressure of low interest rates. It induces a distortion in the structure of balance sheets provoked by the liquidity mismatch. A third effect operates through the compression of risk premia, while the volatility of asset prices diminishes and the rhetoric of "the great moderation" is in full swing [Borio and Zhu, 2008].

The risk-taking channel is particularly powerful in the transmission of monetary policy, when it boosts the aggregate supply of credit and therefore relaxes spending constraints, because it increases the perception of higher liquidity in financial intermediaries [Adrian and Shin, 2008c]. Such a perception depends on the intensity of the link between funding and market liquidity. It is heightened at its maximum in the shadow banking system, which has no deposit base. The perception of liquidity is the higher, the easier it is to borrow short term against pledgeable assets and the easier it is to transfer assets for cash without loss to third parties [Kiyotaki and Moore, 2005]. A sentiment of higher liquidity leads to waxing leverage, a

liquidity multiplier to credit growth. Adrian and Shin have highlighted that the shadow banking system pushed at its utmost the risk-taking channel of credit growth, boosted by the liquidity multiplier, in the years preceding the present financial crisis. While leverage is negatively correlated or non correlated with total asset value in deposit commercial banks, it is positively and strongly correlated in every investment bank, included the investment arms of universal banking groups.

Tools of macro prudential policy: countercyclical capital against systemic risk and restraints on liquidity management

It has been argued here above that moderating excess aggregate credit growth and regulating liquidity are the operating objectives of central banks in implementing a macro prudential policy to keep systemic risk in check. The proper tools must affect the balance sheets of financial intermediaries. They are microeconomic instruments to achieve macro economic objectives, since a macro constraint on credit growth must be distributed on suppliers of credit that indulge in leverage.. A top-down approach is in order. Two questions immediately arise: what is the perimeter of financial entities that should be subject to this new layer of financial regulation? What are the specific instruments to be used and how are they related to the operating objectives?

The sub-system to be regulated should compound all systematically important financial entities. They should be placed under the macroeconomic oversight of the central bank, though their microeconomic supervision might remain within the competence of supervisory bodies that are specific to each country. However, since firms belonging to the shadow banking system should be supervised as banks, the reach of the supervisory authorities should be enlarged. Furthermore a top-down approach can only be implemented if a permanent institutional arrangement is established between the central bank and the supervisory authorities, whenever they are separated from the central bank. In section 4, we describe how it can be done in the Euro zone to overcome the fragmentation in the supervisory process of cross-border banks, which has been lingering for too long.

Every financial entity, which generates or transmits endogenous risk in credit and derivatives markets, whether due to its size, its interconnections or its leverage, should be labelled a systematically important financial institution. Such an institution should be subject to countercyclical capital requirement against its contribution to systemic risk. This requirement is a proportion of the macro capital requirement deemed necessary by the central bank in the buoyant stage of the financial cycle to keep systemic risk in check. The overall capital requirement determined by the central bank is a function of aggregate excess credit defined above. What has to be done to implement the top-down approach is to estimate the contribution of individual institutions to systemic risk, resulting from the spill over effect of their own excessive risk taking. Financial entities can be individually systemic or can be systemic as part of a herd [Brunnermeier and alii, 2009].

Endogenous risk is due to contagion triggered by extreme losses hitting one firm via counterparty network and polarized distress sales, or is due to exposure to common macro risk factors. Because bank risk control models are inadequate to measure endogenous risk, it should be estimated by supervisors. Different methods can apply.

The more cumbersome method is structural. It involves the modelling of balance sheet interdependencies between a subset of interrelated institutions. The model can determine the chain impact of a shock occurring in one institution [Goodhart, Sunirand aznd Tsomocos, 2005].

Another method is *macro stress testing*. The supervisor sets the hypothesis for stress testing that the financial firms should use. They communicate their results to the supervisor who aggregates them and checks the bank results against a benchmark provided by their own independent evaluation. The gap triggers new demands to the banks that give rise to a second round of stress test in an iterative fashion, until the aggregate results fits with the evaluators' assessment, meaning that all interactions have been accounted for. In both methods the supervisor can draw the contribution of each firm to systemic risk from the pattern of risk induction due to the interdependencies. The methodology has been applied successfully in the stress test exercise run by the Treasury and the Fed between February and May 2009 to assess the required supplementary capital to keep the banks afloat and eventually restructure them.

The objectives of the stress tests are threefold. First, it is to improve the quality of capital to strengthen trust in bank balance sheets and provide an effective cushion against unanticipated losses. Instead of the loose tier1 capital of the Basel methodology, US regulators emphasize tangible common equity. They aim at forcing banks to hold an amount of tangible common equity at least equal to 4% of risk-weighted assets in 2010. Second, it is to narrow asymmetric information between banks and investors to improve both the opportunity to sell toxic assets and to convert some subordinated debt and preferred shares into common shares. Third, since the banks have been granted six months to reach the required amount of tangible common equity to match their likely losses, the government will be able to discriminate between banks. It will possess relevant information to decide in which banks it will step in with the conversion of its own preferred shares and restructure the more fragile banks with the possibility to change management.

A comprehensive macro stress test is a heavy operation. No less than 150 inspectors from the Fed, the FDIC and the Controller of the Currency have been mobilized to scan 19 banks holding two third of US bank assets. However the procedure of the stress tests has been impaired by the regulatory capture they were supposed to get rid of. Indeed, the result of the stress test revealed that the 19 banks needed $185bn of tangible common equity (TCE). After negotiating the results, the banks were able to lower the figure to $75bn and get six months grace to complain. City Group alone was assessed additional TCE as the result of the test and was able to negotiate $5bn! Such an outcome means that the strength of the bank lobby has remained intact with the rescue of the taxpayer without any counterpart. To present their argument the banks have grossly overestimated their future earnings, that were already assumed very high by the Fed for what should be a worst-case scenario, since the Fed assumed $362bn retained earnings for the 19 banks against about $150bn for IMF estimate. Furthermore, the fat earnings of the banks in QI 2009 were entirely due to the heavy subvention they benefited from the public sector for the sake of bailing out shareholders and unsecured creditors. This is obviously not a good start for an overhaul in financial regulation.

This total negation of the spirit of the stress tests dwarfed other shortcomings in the assumptions of the exercise. The macro hypotheses were far from a worst-case scenario since the actual rate of unemployment was already higher than the one assumed under the worst circumstances. Moreover the TCE requirement showing off the stress test was computed to meet a constraint of 4% TCE on total assets, which still keeps a very high leverage of 25. The IMF rightly assumes that a ratio of 6% leading to a leverage of 17 is more appropriate for the

post-crisis era. Computing the additional equity need for the entire US banking system the IMF reaches $275bn at 25 leverage, but $500bn at 17. Since the 19 banks make roughly half the size of the banking system, an additional $100bn equity is needed, on top of the $185bn projected by the stress test before the capitulation of the authorities to the bank lobby. All in all to consolidate the banks under scrutiny, the additional equity requirement should be $285bn instead of the mere $75bn the banks were able to get in their relentless lobbying to limit capital requirement.

A third method is a statistical shortcut called *CoVaR*. It measures how much the deterioration of the financial situation in one institution impinges upon the risk of extreme losses in others [Adrian and Brunnermeier, 2009]. It has been extended in a Co-risk analysis by the IMF staff in the 2009 global financial stability report (chapter 2).

More specifically, let posit a bank X and Z_i with i€I a subset of counterparties. The CoVaR of X on this subset is the sum of the VaR of the counterparties, conditional to the losses of X, be L(X), reaching its VaR. Hence:

$$CoVaR(X)=\Sigma VaR(Z_{i\in I} \mid L(X)=VaR(X))$$

The contribution of X to systemic risk on this subset is: (CoVaR(X)-VaR(X))/VaR(X)

To determine the countercyclical capital assigned to X, the supervisor can compute the contribution of X to systemic risk, using any of the three methods, and modulate it eventually with two indicators of exposure drawn from the balance sheet, once off-balance sheet items have been reintegrated: the maturity mismatch and the ratio of leverage. This capital requirement is a flat proportion of unweighted total assets. In no way it mixes with Basel 2.It should apply to core Tier 1 of all systemic financial entities and their subsidiaries.

Besides, it has been shown above that the illusion of liquidity in euphoria enhances both leverage and maturity mismatch. It is particularly troublesome with shadow banks that depend entirely on market liquidity for funding. Those entities should be provided with incentive or should be forced to manage their funding better.

The most sensitive exposures to liquidity risk are illiquid asset pools in mark-to-market trading accounts. Asset pools are backed by liabilities financing them. A blatant drawback of mark-to-market accounting is the valuing of assets independently of the maturity of the debts that finance them. A pool of illiquid assets will have the same mark-to-market value irrespective of the liabilities having a maturity of a week or T years. This is certainly not fair value! It is a predicament for excessive risk taking when interest rates are low and everyone is searching for yield.

A way to induce better liquidity management stems from the design of accounting norms closer to fair value, namely *mark-to-funding* accounting. Pools of illiquid assets should be paired with the liabilities financing them in the process of valuation. A pool of assets in a trading portfolio, financed by short term debts (less than a year), should be marked-to-market. The same pool, financed by T-year bonds, should be priced according to the discounted expected future average price of the assets on T years.

To avoid any manipulation by investment bankers and hedge fund managers, mark-to-funding should be computed by supervisors. The gap between mark-to-funding and mark-to-market of the same pool of assets measures the effective maturity of the pool. It will widen in market

stress conditions when market liquidity is drying up and distress sales of assets trigger a slump in value, which in turn magnifies balance sheet losses and reinforces illiquidity. With mark-to-funding, the price of assets with higher effective maturity will be immune to market liquidity drying up. Credit and liquidity risks will remain separated.

Having measured the effective maturity of portfolio trading assets, supervisors can provide incentive to better manage it. All they have to do is re-establishing marginal reserve requirements, which should have never been repealed, targeted on sensitive pools of assets: the shorter the effective maturity, the higher the marginal rate of reserve requirement.

Figure 5 sums up the top-down process of macro financial regulation, distinguishing the central bank and the bank supervisor levels.

Figure 5. A top-down approach in macro prudential policy
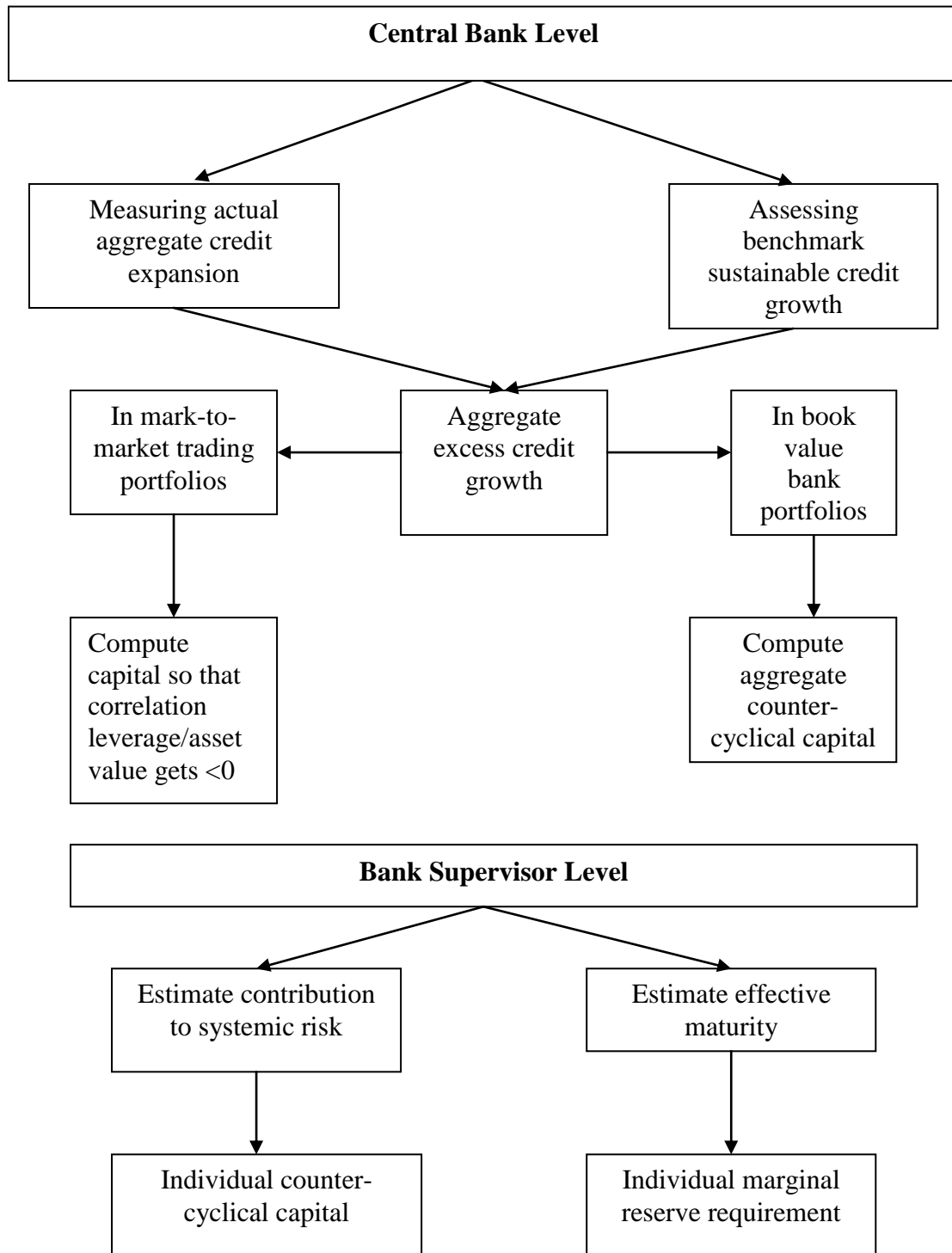
Prompt Corrective Action: the cornerstone of micro-prudential policy.

Reorienting financial prudential policy towards systemic concern involves a top-down approach. The second section has highlighted capital and liquidity requirements that systematically important institutions should implement at the individual level to conform to macro prudential policy. However active supervision is also involved. Laxity in supervision largely contributed to the regulatory capture by investment bankers that led to the financial meltdown in the US and in the EC. Strong supervision should be inescapable to eschew the repetition of irresponsible bank behaviour. Only firm guidance by supervisors can persuade financial firms to adopt due diligence. The principle of *prompt corrective action (PCA)*, introduced in the US to discipline deposit banks, should be extended to all systemically important institutions. The FSB should promote its application beyond the US. PCA has a triple merit: being partly automatic, it avoids the pressure of bank lobbies; being progressive, it addresses the deterioration in bank balance sheets early enough to avoid involving the taxpayer most of the time; using simple tools, it is transparent and shielded from the bad faith of the supervisees.

A benchmark: the American PCA framework

US banking supervision, introduced in 1991 under FDICIA, is a landmark to be developed in a general framework to back up the macro-prudential reshaping of financial regulation.

The Act specifies five capital/asset ratios (from well capitalized to critically under-capitalized). The banks are classified according to these different categories and each class of capital/asset ratio is associated with both mandatory and discretionary provisions (table 2). When a bank is downgraded to a lower level of capital zone (from undercapitalized category), the regulatory constraint is consequently reinforced. Supervisors are authorized to close down a bank within 90 days after it has crossed the threshold of critical undercapitalization. At this point, the FDIC is vested with the powers of the receiver which is the liquidator or with the authority of a conservator that acts as an administrator in order to resolve the institution's crisis

FDICIA sanctions become compulsory only after discretionary sanctions have proven to be ineffective in recovering the bank's performance and re-establishing its capital at a suitable level. Thus, the mechanism of coercive intervention cannot be interpreted as a simple replacement of supervisory discretion by automatic rules. Compulsory sanctions provide a credible support that should reinforce, rather than weaken, the regulator's discretionary powers. Therefore the dual provisions, detailed on table 2, aims at achieving two main goals: on the one hand, they reduce moral hazard in bank behaviour; on the other hand, they discourage the regulator's forbearance. Requiring and enforcing resolution at a pre-specified low but positive capital level constitutes a closure rule.

Table 2. Summary of Prompt corrective action provision under the FDICIA

Zone	Mandatory provisions	Discretionary provisions
1.Well-capitalized		
2. Adequately capitalized	1 No brokered deposits except with FDIC approval	
3. Undercapitalized	1 Suspend dividend and management fees 2 Require capital restoration plan 3 Restrict asset growth 4 Approval required for acquisitions, branching and new activities 5 No brokered deposits	1 Order recapitalization 2 Restrict inter-affiliate transaction 3 Restrict deposit interest rates 4 Restrict certain other activities 5 Any other action that would better carry out prompt corrective actions;
4. Significantly undercapitalized	1 Same as for zone 3 2 Order recapitalization 3 Restrict inter-affiliate transactions 4 Restrict deposit interest rates 5 officers' pay restricted	1 Any zone 3 discretionary actions 2 conservatorship or receivership if the bank fails to submit or implement plan or recapitalize pursuant to order 3 Any other zone 5 provision, if such action is necessary to carry out prompt corrective action
5. Critically undercapitalized	1 Same as for zone 4 2 Receiver / conservator within 90 days 3 Receiver if still in zone 5 for quarters after becoming critically undercapitalized 4 Suspend payments on subordinated debt 5 Restrict certain other activities.	

Source : Benston G and Kaufman, 1998.

What should the trigger thresholds for early intervention be?

What could be the closure rule? Obviously, a risk-based capital measures cannot be elected as a trigger point for early regulatory intervention. In section 1 it was demonstrated how and why banks, especially shadow banks in managing their trading portfolios, desire very high leverage in the upward stage of the financial cycle. Swiss investment banks were champions of extreme leverage. It might be the reason why P Hildebrand (vice chairman of the governing board of the Swiss National Bank) notices their preference for very high leverage[3], aggravated by their certainty to benefit from the public safety net.

Looking at the balance sheets of Swiss banks, the inadequacy of Basel II capital standard is amazing. Gauged with risk-based capital, the two largest Swiss banks (UBS and Credit

---

[3] Before the onset of the so-called « subprime crisis», all of the world's top 50 banking institutions held, on average , only 4 percent of capital (tier 1 capital to total assets) and none of them held more them 8 percent (Source :The Banker, july 2008)

Suisse) were among the best-capitalised large international banks in the world. Against a simple leverage ratio, they were among the worst-capitalised. When leverage is interpreted strictly as the ratio of total assets to common equity, UBS reached a leverage ratio of 53 at the end of 2007. This is a very high number, even compared to US investment banks, which were heavily leveraged (Lehman at the same date got a leverage ratio of 30,7). Therefore, if UBS had been an American bank and if investment banks were enrolled under the same principles of supervision as deposit commercial banks, it would have been classified as critically under-capitalized.

It is not a unique case. Northern Rock also suffered from a similar gap between risk-based regulatory capital and leverage ratio, which has been ignored by the FSA. On June 29, 2007, FSA granted Northern Rock a Basel II waiver, which authorized it to adopt an advanced approach to manage its credit risk. The implementation of advanced approach permitted it to use its own estimation of default probability, loss given default, exposure at default, and make its own calculation of effective maturity to meet minimum capital standards. The savings in capital provided by this advanced approach allowed Northern Rock to increase its interim dividend by 30.3%. At the same time –at the end of June 2007- the leverage ratio was 58,2 ! Again, The US prompt corrective action system, if extended to the business of market finance, would have considered Northern Rock as critically under-capitalized and could have put it into receivership.

On the basis of these observations, Basel II measurement of capital adequacy cannot pretend to provide the trigger thresholds for early coercive intervention.

From our point of view, the macro-prudential measurement of capital adequacy is not a direct substitute either. Indeed, the ex-ante influence of the regulator on the future behaviour of banks is strengthened by the ex-ante knowledge of prompt corrective action associated to each threshold of intervention. The credibility of supervision is grounded on the predictability of the coercive action. The latter requires a non variability of the trigger points in the course of time. In particular, the closure rule should be pre-determined and non adjustable. That is not the case of the macro-prudential capital ratio which varies in the course of the cycle. So we can imagine a double criterion. Banks and other systemic financial institutions have to respect both their macro-prudential capital adequacy ratio (responsibility of the systemic regulator) and a simple leverage ratio defining in particular the closure rule (responsibility of micro-prudential regulator). A crude leverage ratio, i.e. a leverage ratio on common equity[4], provides a safeguard against the shortcomings of risk-weighted requirements. It protects individual banks against their underestimation of risk and the powerlessness of their models to capture endogenous risk.

The proposal presents at least three main advantages:

-        A simple leverage ratio is a trigger threshold for early regulator interventions, coupled with a special bank bankruptcy regime. Conceptually and operationally, there is a continuum between regular prudential policy -the gradual process of supervisory coercive actions with pre-specified sanctions associated with prudential triggers- and bank insolvency proceedings. The credibility and severity of the pre-insolvency measures (early interventions) protect the

---

[4] For a discussion on the need to adopt such a crude leverage ratio based on the most basic form of equity (held by the owner of the bank with voting power and hence who have the right to exercise control over the bank) excluding hybrid claims such as subordinated debts or preferred shares see: Genova Report, chapter 4 "counter cyclical regulation".

tax payer against the moral hazard generated by the financial safety net and arm the supervisors against regulatory capture

- The leverage ratio is easy to measure, publicly verifiable and hard to manipulate. It operates fully independently of any complex modelling assumption and calibration procedures and so it alleviates the risk of regulatory capture and of regulatory arbitrage.

- Although it is a matter for micro-prudential policy, it is nevertheless consistent with the systemic reorientation in financial regulation, if it has the potential to limit the build up in leverage that leaves the financial system vulnerable to a sudden reversal. The rationale for a simple leverage ratio is that it binds during the euphoric period of the cycle, constraining the banks either to raise new equity (costly but easy during the expansion stage of the cycle) or to restrain balance sheet growth. Of course, these two options are onerous in terms of profitability. It is exactly what should be done after the predatory rent that finance has levied on the economy. Besides, they can be justified and interpreted as a Pigovian tax.

Nevertheless, the cases of Citigroup, Bank of America and several other US banks, Northern Rock, the largest Swiss Banks and many German banks, underline a thorny problem. If the adoption of a simple leverage ratio as a trigger point of intervention might be a good solution for "traditional bank" with essentially a banking book, it does not constitute an efficient solution for the systemically important shadow banks. The proposal of extending PCA policy to these new market intermediaries involves a renewal of the gradual coercive device in a way that takes into account the lessons of the current crisis. Indeed, from about 2003 onwards, there was a significant increase in on-balance sheets items of many commercial and investment banks that were concentrated in trading books. Risk-adjusted measures of leverage hid such rise. The gap reflected the fact that capital requirements against trading books were very light compared with those for banking books, largely because VaR measures of risk were grossly underestimated. As a consequence, capital required on trading book was much too low.

Moreover, during the run-up to the crisis there was a rapid growth of off-balance sheet vehicles –SIV, conduits- which were highly leveraged but not included in standard measures of either simple or risk-adjusted leverage. In the first stage of the crisis, number of market participants purchased assets from or extended credit to the off-balance sheet vehicles that they had created and the money market funds that they managed, even though they had no contractual obligation to do so. Such decisions might reflect reputation concerns, but mainly the counterparty risk involved in a disorderly deleveraging of the conduits. Another important point, which has to be taken into account in PCA policy, concerns the increased aggregate maturity transformation not in the banking book of regulated banks, but in the shadow banking. For instance, SIVs and conduits have performed large-scale maturity transformation between short-term promises embodied in ABCP on their liability side and longer term assets held on the asset side. So, managed funds (mutual funds, SIV, money market funds and hedge funds) developed an increasing reliance on liquidity through marketability, believing that it does not matter to back long term to maturity assets with short term liabilities, provided the assets could be sold easily on liquid market. Such assumption has been dramatically invalidated by the crisis. Shadow banks are subject to bank-like runs on their assets which present a systemic potential. All these remarks plead for a significant adjustment of the PCA device.

A first main alteration would be to impose a gross leverage ratio, covering derivative contracts and thus including off balance sheet items. This proposal is justified by the large

scale re-intermediation of SIV and conduits during the crisis and by the correlative recognition that the risks supposed to be transferred had to be reintegrated, when the market liquidity vanished. On the spectrum between discretionary actions of the regulator and automatic ones, the PCA presents the advantage of tilting in favour of automaticity, even if, as we have underlined previously, such a policy cannot be assimilated to a rule policy. It combines discretion and automaticity, the closure rule giving a credible support to the whole progressive coercive process. The problem is that the extension of the PCA principles to systemic shadow banks probably would alter such perception of the automaticity-bias of the device. Nevertheless, the discretionary power of the regulators and its propensity to forbearance could be contained if the gradual coercive actions continue to be based on a set of simple, publicly verifiable and hard to manipulate, indicators providing early warning and simple signals of the various dimensions of banking risk (including transformation and liquidity risk, risk of large losses etc.). Thus this battery of indicators acting as trigger points for regulator intervention could include indicators on maturity mismatch, measures of liquidity risks in particular of the dependence on short term wholesale funding (core funding ratio) market indicators as funding spread or CDS spreads and the gross leverage ratio extending to off balance sheet items.

As proposed by Hart O. and Zingales L. (2009) regulators should rely on a market-based trigger: the credit default swaps. Indeed, a credit default swap on a financial institution is a contract designed to payout if there is a credit event affecting the reference entity. Since the CDS is a sort of "bet" on the institutions' creditworthiness, its price reflects the default's probability on the debt. So, the data on CDS spreads for financial reference entities can alert the regulator and constitutes a trigger point for its coercive intervention: when the CDS price rises above a pre-defined critical value, indicating that the institution has reached an unacceptable threshold of financial weakness, the regulator would force the recapitalization of the financial institution until the CDS price and associated risk of failure go back to acceptable levels.

As we have seen previously, the current crisis illustrates a new dynamic interaction between liquidity and solvency of financial institutions. The new underlying interrelationships between market and funding illiquidity justify a special place for a core funding ratio in the set of indicators, designed by the regulator to implement its new form of Prompt Corrective Actions.

A core funding ratio acting as a trigger point for coercive intervention means that the regulator imposes a lower limit of stable liquidity on bank funding its long term assets (i.e. with a maturity of more than one year). It should discourage the exclusive funding with short-term market instruments that may be sensitive to changes in interest rates and are highly volatile with the vagaries of investor confidence. This would mean that banks and shadow banks may be highly encouraged to modify their funding profiles in a way preserving high quality and stable funding through the economic cycle. Core funding would include retail deposit, medium term notes and covered bonds, but would not integrate short term market instruments.

The extension of PCA framework to systemically important shadow banks also involves changes in the mandatory and discretionary coercive provisions associated with each downgraded category. For instance concerning the trading book, a rule imposing that issuers of securitised products retain on their books for the life of the instrument a certain proportion of the underlying risk (non hedged), the amount depending on the regulator's assessment of the bank -or shadow bank- situation, could to be introduced in the device. Gradual capital charges against illiquidity could also be included in the PCA mechanism.

Proposals for a renewed prudential architecture in Europe

While the proposed regulatory framework, combining a top-down approach in capital requirement and a PCA procedure in supervision, is relevant for all major jurisdictions in the world and should be addressed internationally with the mediation of the FSB, it cannot be implemented straightaway in the fragmented European organization that weakens supervision in Europe. Major institutional changes are badly needed.

The current EU prudential framework

The present EU supervisory arrangements focus mainly on the supervision of individual firms and place too little emphasis on the macro-prudential issues. Indeed, supervisory and regulatory design in the European Union is based on the principle of subsidiarity. Consequently, the tasks of banking and financial supervision have been left to national agencies without enough care for co-ordination. The present system is grounded on minimal harmonization of prudential rules[5], as required by the Commission Directive on financial regulation and the mutual recognition of national regulatory standards and practices. The single passport system is based on two related pillars:

- the principle of control by home country for domestic operation and overseas branches
- the host regulator responsibility for subsidiaries of foreign banks.

It follows that crisis management primarily depends on national authorities,, as well as the fiscal burden for bailing out the banks they regulate. The flaws in the loose co-ordination of domestic institutions are aggravated in the Euro zone. A monetary union with a plurality of national supervisors requires a tighter cooperation among them.

The level three Lamfalussy committees (Committee of European Banking Supervisors CEBS, Committee of European Insurance and Occupational Pensions Supervisors CEIOPS and the Committee of European Securities Regulators CESR) aim at fostering supervisory convergence and best practices, principally through the creation of non legally binding guidance. They are just advisory bodies to the Commission. This lack of legal power to take decisions explains why the level 3 committees have been unable to contribute to the effective management of the crisis. Yet ,in December 11 2007, the Italian finance minister Tommaso Padoa Schioppa, in a letter to all his European colleagues, called for institutional changes in the EU legislation to entrust the level 3 committees with the power to adopt binding decisions and to endow them with adequate financial and human resources to achieve their duties. This proposal was hardly discussed in the Ecofin Council…European policy makers only started to realise the full scale of the financial crisis by the end of September 2008. Before that time, they seemed to believe that the crisis was essentially a US problem. The Eurogroup meeting on October 12th was the first to propose a European response to the crisis, in the form of a concerted action plan of the eurozone to temporary guarantee bank refinancing and preserve big banks from collapse. The European Council, which met a few days later, announced the setting up of a high level group, under the auspices of the Commission, to strengthen the supervision of the financial sector. This Group, chaired by Jacques De Larosière, published its diagnosis of the shortcomings of the European prudential and regulatory framework and its proposals of reform on February 25, 2009, in the so-called De Larosière Report.

---

[5] As the De Larosière report points out, the present regulatory framework in Europe lacks cohesiveness. The main reason of this situation stems from the option provided to EU members in the enforcement of the Directive, which lead to a wide diversity of national transpositions.

A three-tiered approach of European prudential architecture

We largely agree on the main conclusions of the report which could constitute an adequate framework for implementing our regulatory and supervisory proposals.

The De Larosière Report comes up with a three-tiered approach:

> - A systemic regulator at the "top:" the European Systemic Risk Council (ESRC) located at the European Central Bank ;
> - Functional regulators in the "middle tier": European Banking Authority, European securities Authority and European Insurance Authority
> - Three functional regulators at the domestic level at the bottom.

At the top, in the proposed model of central bank-based systemic risk regulator, the current Banking Supervision Committee of the ECB would be replaced by the ESRC, which would benefit from the logistical support of the ECB. Two characteristics of the ECB call for this macro-prudential central role. First, the ECB has already a mandate to ensure the smooth functioning of TARGET payments system, which absorbs all financial shocks and provides timely information about inter-bank transfers. Second, the ECB, de facto, as la&rgely demonstrated during the present crisis, plays the role of lender and marker maker in last resort in the event of a common flight to liquidity. The ESRC/ECB, with access in real time to information generated in financial centres and transmitted to national central banks and domestic supervisors, will be in a position to trace fast changes in exposure of the main market makers with operations in several integrated markets. The assessment of the systemic risk posed by each firm would be based on individual characteristics, in particular assets quality and leverage, on measures of connectedness and opacity which characterise systemically important institutions and on statistical measures like CoVaR. As emphasized in the second section, overall systemic assessment should determine the regulatory constraints imposed on individual firms, each of them having to "pay" for its own systemic risk contribution (capital and liquidity charges). Moreover, the ESRC would work as a warning agency and in time of crisis would be in the best position to assist the ECB Board and Council of Governors to arrive at a diagnosis and work out a mode of intervention to deal with a liquidity crisis at the most appropriate time. It could also help the Council to coordinate rescue operations for major cross-border bank failures, involving more than one country and national central bank.

What about the middle level? Currently, the main means by which the EU Council deals with EU cross border financial groups are the supervisory colleges .They are established when a financial group operates in another member state through one or more branches, or subsidiaries. The college is chaired by the home country supervisor of the group's parents and functions on the basis of ad hoc mandatory written arrangements, agreed upon by the competent authorities to allow the home country to implement consolidated supervision of the group. As underlined by the CEPS Task Force Report (2008) theses colleges raise major issues:

> -   Although supervisors work in a college, their statute, mandate, accountability and enforcement powers hugely differ across E.U. countries. The home country regulator may not have the legal power in the host country to enact coercive measures. Moreover, the formal responsibility for financial stability is limited to each domestic area. Consequently, the home country regulator can

underestimate the financial damages generated in the host country by the financial distress of a financial group under its responsibility, particularly if the difficulties come from a subsidiary.

-        Another important issue concerns the quality and quantity of information shared in the college. The home country is supposed to have a full picture of the exposures and risks to the stability of the European financial system but is not obliged to communicate it to the host countries. In case of financial stress, the host countries could be badly informed and such a deterioration of the quality of information shared within the college could jeopardize the trust between the college members. In this case, the college can no longer acts as a college. The disastrous rescue of Fortis substantiates this fear.

To overcome those shortcomings, the De Larosière Report proposes the establishment of an integrated European System of Financial Supervision (ESFS) through the transformation of the level three Committees into three European Authorities: a European Banking Authority, a European Insurance Authority and a European Securities Authority. While, at the bottom, it can be argued that national supervisors are best-equipped to carry out day-to-day supervision and to be responsible for reporting to the European level, the ESFS is indispensable at the upper level. The ESFS is conceived as an integrated but decentralised network, which fully respects the subsidiarity principle. Indeed the powers of the new "Authorities" would be significantly reinforced, compared with the present level 3 Committees. They would be given the ability to carry out different tasks that are better performed at the European level. The main key competences of the Authorities would be the following:

- Adoption of binding supervisory standards,

- Oversight and coordination of colleges of supervisors and legal binding mediation between national supervisors,

- Licensing and supervision of EU wide institutions considered as systemic,

- Binding cooperation with the European Systemic Risk Council to ensure an adequate macro-prudential supervision,

- Coordinating role in crisis situations.

The required legal and institutional changes: bank resolution framework and deposit insurance schemes

Both at the middle and the bottom level, legal and institutional changes are also required. The implementation of prompt corrective action requires the adoption of specific insolvency law for banks at the domestic level. The main problem to achieve an efficient resolution of a pan-European bank solvency crisis is due to a lack of uniformity in the underlying legal structure for resolving bank failure. Until nowadays, European efforts to deal with weak banks have been focused on communication and coordination.. The European Community Directive on the Reorganization and Winding-Up of Credit Institutions, which deals with cross border aspects of bank failure in the European Union, is consistent with the "single passport"

principle. The Directive does not attempt to harmonize the bank insolvency laws of Member States, but it aims at allocating the powers linked to bank resolution according to the mutual recognition regime of both reorganization measures and winding-up procedures. If a bank is in trouble, the relevant proceedings will be initiated in the home country of the bank and the proceedings are to be recognised in all other Member States, where the bank has either branches or assets. Host Member States have no choice under the Directive, but to recognize and implement the procedure under the home Member State, no matter how much it differs from their national laws. Therefore the home country is given exclusive competence both for reorganization and for winding-up of credit institutions, contrary to the E.C. Insolvency Regulation which recognizes the "secondary territorial proceedings".

The Directive does not provide an adequate framework to deal with large cross-border banks or large cross-border financial conglomerates. A good understanding of this matter needs to clearly distinguish between subsidiaries and branches. The distinction has major consequences with regards to the prevention and management of problems in cross-border banks. The authorities treat subsidiaries of foreign banks as domestic institutions, which have their own legal entity. Thus, subsidiaries are subject to supervision in the country where they operate. On the contrary, branches are not considered as independent legal entities: branch and parent company are one and the same legal entity. As a consequence, in the event of a crisis in a foreign subsidiary, the host country supervisor is the home country supervisor of the subsidiary. It can take any measure available under its jurisdiction. This is not the case for branches. Bitter quarrels can arise if a bank must be rescued with public money, since national authorities are responsible fiscally for bailing out the banks they regulate. These differences of regulatory treatment between branches and subsidiaries are problematic in the sense that they create a prudential framework conducive to regulatory arbitrage and moral hazard in the' community of the supervisors. Thus, there is a crucial need to go beyond the mere allocation of powers between home and host countries in the resolution process of troubled European bank.

What appears to be required is a greater harmonization of the guiding principles governing resolution policies in the different European countries. Currently there are inconsistencies between national legislations, preventing an orderly and efficient handling of weak financial institutions. Some national insolvency laws give a greater priority to the protection of creditors, while others favour the protection of the institutions. In some countries, company law provisions prohibit in time of crisis the transfer of assets from one legal entity to another within the same group, even if this may be crucial for the safety of the group as a whole. It is why the adoption of a set of consistent crisis management and resolution tools, covering the different aspects of insolvency laws (transferability of assets, winding-up, and bankruptcy) across the different member states, should be an overriding priority. It should be the legal framework conducive to prompt corrective action.

As underlined by C Goodhart (2008): "a key feature of any insolvency regime must involve some expropriation of shareholder rights, and whatever the compensation arrangements for shareholders it is bound to generate either a claim that they were robbed on their property, or that the taxpayers were bilked, or, quite often, both at the same time. So the key for closure, and the treatment of shareholders, is a central issue.".

The US bank resolution policy cannot directly apply to E.U. However, it can constitute a benchmark. More precisely, the four rules pointed out by Eisenbeis and Kaufman (2005, 2006), as being the constituents of an efficient bank resolution, can be a fruitful basis of

thinking of the lowest cost to both the bank claimants and the macro-economy. The key principles are:

- Prompt legal closure at a pre-specified low but positive capital level (legal closure rule)

- Prompt estimate of the recovery values and assignment of credit losses ("haircut") to uninsured bank claimants, when the bank is insolvent

- Prompt reopening (next workday) particularly for larger banks with full access to bank services for insured depositors and borrowers.

- Prompt re-privatization in whole or in part with adequate capital.

The four rules are sufficiently general to be adapted to different institutional frameworks. Nevertheless, the European Union cannot adapt them easily, because the human right convention prohibits the expropriation of shareholders before bank net value becomes negative. It ensues that regulators cannot legally expropriate shareholders by closing a would-be insolvent bank at a pre-specified low, but positive capital level. However, this obstacle can be circumvented if the forbidden expropriation of shareholders is replaced by an extreme dilution of their ownership. It suffices to create a new debt contract with a covenant stipulating a compulsory conversion clause into ordinary shares, when the crude leverage ratio is low enough. This forced recapitalisation mechanism to be effective needs to impose on banks an issue rule for this new type of debt (called "recap-bonds"). For each euro of core tier 1 capital, banks could be required to issue a minimum of n euros of recap-bonds outstanding. This new bonds would be classified as hybrid claims. The yield spread between "recap-bonds" and senior bonds would constitute a market-generated indicator of the counterparty risk and so could become an early warning indicator of the risk of regulator mandated debt for equity swap. So this new device would be conducive to a strong improvement in the complementarity between market and regulatory discipline.

Similarly, the crisis has underlined the shortcomings of the current Deposit Guarantee Scheme Directive (DGSD), which appears insufficiently constraining for member states. It relies on the principle of a minimum coverage level, it does not determine whether the deposit insurance should be organised by a public or a private institution and the financing scheme (ex ante or ex post) is not prescribed. This lack of harmonization may stimulate regulatory arbitrage. It favours the flows of deposits from a banking system perceived as weak to a more protective deposit insurance regime. It permits different coverage level for customers in the same country, since overseas branches operate under a different deposit insurance scheme than their competitors. A recent proposal of the Commission would require that all member States apply the same amount of deposit protection for each depositor; Whether adopted, it would be a big step forward, albeit it is not a panacea because it still leaves a large degree of discretion to member states concerning the funding arrangements.

An inadequate funding system can lead to increased delays in resolving failed banks and to a loss of credibility in the Deposit Insurance Arrangements. There are two polar cases for funding arrangements: ex ante or ex post funding. Ex post or "pay as you go" funding requires member banks to pay premiums only after a failure. The motivation for such a funding device is to stimulate inter-bank monitoring. Nevertheless it presents strong disadvantages: it limits

the ability of the Deposit Insurance to promptly pay out insured depositors and it is pro-cyclical, because it levies contributions precisely at the time when banks undergo a period of financial distress and suffer tighter capital constraints. Moreover, failed banks do not contribute to the cost of deposit insurance. On the contrary, ex-ante funding refers to the accumulation of reserve prior to the distress episode. It could be designed to smooth out the amount of premiums paid by banks over the course of the business cycle. It could thus alleviate the pro-cyclical problem previously underlined. Furthermore, all the member banks participate to the funding, including those that subsequently fail. Therefore, pre-funded deposit insurance schemes, providing an equal protection to all customers in the EU, should be promoted as a complement to a greater harmonization of the guiding principles governing the bank resolution policies in the different European countries.

Conclusion: a comprehensive framework

Financial stability is all-encompassing. It should extend well over the deposit banking system. It should commit central banks, as well as bank supervisors and market regulators. It should be a permanent objective, especially in the stage of the financial cycle in which market participants act as if risk has disappeared. It is why we advocate a top-down approach in prudential policy, an approach that takes care of banking book and trading book alike, an approach that emphasizes capital requirement and liquidity management, an approach that is firmly prescriptive to eschew regulatory capture by financial lobbies.

Financial stability impinges upon the doctrine of monetary policy and consequently on the special position that central banks have gained in the power structure of government. Central bank independence is justified on the grounds that price stability is a single objective that is separated from all other political objectives, hence central banks do not interfere with political arbitrage. The theoretical underpinnings of such an ideology are the neutrality of money and the correlative efficiency of financial markets. They have been decisively undermined by the financial crisis, which has highlighted the devastating momentum of systemic risk. Financial stability cannot be properly handled without substantial adjustment in monetary policy.

Since financial stability is an objective that is not encapsulated in price stability, central banks lose the argument for the most fundamentalist view of independence. They are involved in political arbitrage; better doing it overtly than covertly. It is what the macro prudential regulation, outlined in this paper, is all about. In a top-down approach, central banks must shape tools for controlling cyclical credit growth in the aggregate and must work with supervisors to decentralize the counter cyclical restraints on all systematically important market participants. To enforce the rules, we advocate generalizing and adjusting the principle of prompt corrective action. Sweeping institutional changes must be made for that purpose. The legislator must grant enlarged power to central banks and must enhance institutional cooperation between all types of agencies with an interest in financial regulation. This is a particularly pressing task in Europe, where the institutional framework is disparate and where national fragmentation precludes an orderly resolution of the failure of cross-border banks.

References

Adrian T and Shin H.S. (2008a), Liquidity, monetary policy and financial cycles, *Current Issues in Economics and Finance*, vol14, n°1, Federal Reserve Bank of New York, January-February

Adrian T and Shin H.S. (2008b), Liquidity and Financial contagion, *Financial Stability Review,* Banque de France, February

Adrian T and Shin H.S. (2008c), Financial Intermediaries, Financial Stability and Monetary Policy, Jackson hall Symposium, 08-2008

Adrian T. and Brunnermeier M. (2009), CoVaR, Research Paper, Princeton University, January

Aglietta M. and Moutot P. (1993), le risque de système et sa prévention, *Cahiers Economiques et Monétaires,* Banque de France, n°41

Aglietta M and Scialom L (2003) The challenge of European Integration for prudential policy, *Financial Market Group, Special Paper*, n°152, London School of Economics.

Benston G. and Kaufman G. (1998), Deposit insurance reform in the FDIC Improvement Act : the experience to date. *Federal reserve bank of Chicago Economic Perspectives*, second quarter

Borio C. (2004), Market distress and vanishing liquidity : anatomy and policy options, *BIS working paper*, n°158, july.

Borio C., Furfine C. and Lowe P. (2001), Procyclicality of the financial system and financial stability: issues and policy options, BIS *Papers*, n°1, March

Borio C. and Lowe P. (2002), Asset prices, financial and monetary stability,: exploring the nexus, *BIS Working Papers*, n° 114, July

Borio C. and Zhu H. (2008), capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?, *BIS Working Papers*, n°268, December

Brunnermeier M and Pedersen L.J. (2007), Market liquidity and funding liquidity, *NBER Working Paper,* n°12939, February

Brunnermeier M, Crocket A, Goodhart C, Persaud A and Shin H (2009), The fundamental principles of financial regulation, Geneva Reports on the World Economy 11, CEPR, January.

CEPS Task Force Report, (2008), Concrete steps towards more integrated financial oversight, Centre for European Policy Studies, December 1

Danielsson J, Embrechts P, Goodhart C, Keating C, Muennich F, Renault O and Shin H.S. (2001), "An academic response to Basel 2", Financial Market Group, Special Paper, N°130, London School of Economics

Danielsson J (2009), The myth of riskometer, Vox, http://www.voxeu.org/index.php?q=node/2753

Danielsson J, Shin H.S. and Zigrand J.P. (2009), Risk Appetite and Endogeneous Risk, Mimeo, London School of Economics, February.

Dewatripont M and Rochet J.C. (2009), The treatment of distressed banks, in edited by Dewatripont M, Freixas X and Portes R, Macroeconomic stability and financial regulation Key issues for the G20, ebook, CEPR.

Dewatripont M and Tirole J (1993), *The prudential regulation of banks*, MIT press, Cambridge, Massachussets.

De Larosière Group, (2009), Report of the high-level group on financial supervision in the EU, Brussels, February 25.

Eisenbeis R and Kaufman G (2005), Bank crisis resolution and foreign owned banks, Federal Bank of Atlanta, Economic review, fourth quarter.

Eisenbeis R. and Kaufman G. (2006), Cross border banking : challenges for deposit insurance and financial stability in the European union, Federal Reserve Bank of Atlanta, Working Paper, 2006-15, October

Financial Service Authority (2009), The Turner Review: a regulatory response to the global banking crisis, March.

GoodhartC., Sunirand P. and Tsomocos D. (2005), A risk assessment model for banks, *Annals of Finance,* n°112

Goodhart C.A.E (2008), The regulatory response to the financial crisis*", Journal of Financial Stability,* 4.

Granovetter M. and Soong R. (1986), Threshold models of interpersonal affects in consumer demand, *Journal of Economic Behaviour and Organization*, n°7, North Holland,

Guttentag J and Herring R. (1986), Disaster myopia in international banking, *Essays in International Finance*, n°164, Princeton, September

Gordy, M., and B. Howells (2004), "Procyclicality in Basel II: Can We Treat the Disease Without Killing the Patient?", Federal Reserve Board.

Hart, O. and Zingales L. (2009): "To regulate finance, try the market" Foreign Policy: http://experts.foreignpolicy.com/posts/2009/03/30/to_regulate_finance_try_the_market

Hellwig M (2008), Systemic risk in the financial sector: an analysis of the subprime mortgage financial crisis, Max Planck Institute, November.

Hildebrand P (2008), Is Basel 2 enough? The benefits of a leverage ratio, Financial Market Group Lecture, London School of Economics, December.

Kiyotaki N. And Moore J. (2005), Liquidity and asset prices, *International Economic Rebview,* vol 46, n°2

Kregel J. (2008), Minsky's cushions of safety, *Public Policy Brief*, n° 93, Levy Economics Institute of Bard College

Leijonhufvud A. (2008), Keynes and the crisis, *Policy Insight*, n°23, CEPR

Minsky H.P. (1986), *Stabilizing an Unstable Economy*, Yale University Press

Ondo Ndong S and Scialom L, 2009, « Northern Rock: the anatomy of a crisis, the prudential lessons », in *Financial institutions and markets,* vol 2, 2007-08 The year of crisis*,* Edited by Robert Bliss and George Kaufman , Palgrave.

Scialom L (2007), Les propositions du European Shadow Financial Regulatory Committee sur l'Action Corrective Précoce en Europe – une analyse critique "amicable"*, Revue Economique*, Vol 58, N°5, septembre.