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**MACROPRUDENTIAL FINANCIAL
REGULATION AND MONETARY
POLICY**

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Abstract

Much recent financial system analysis has featured considerations towards a new global financial architecture. A major policy issue is whether it is desirable for supervisory and regulatory authorities to take a more micro- or a more macro-oriented approach to control financial markets activities. The paper argues that the micro-macro interface of financial regulation has been given, so far, too little attention by the designers of the 'new global financial architecture'. This particularly applies to the New Basel Capital Accord (NBCA) that is supposed to form the backbone of future banking regulation and supervision. The lack of macroprudential orientation of the NBCA may result in undesirable macroeconomic repercussions such as the amplification of the business cycle. The paper takes a closer look at the micro-macro relationship of prudential banking regulation and its potential interrelatedness to monetary policy.

1. Introduction

The reform of financial regulation and supervision has become a very prominent topic on the international policy agenda due to the growing importance of efficiently operating and stable financial markets. Not surprisingly, banking regulation and supervision have the center role in this discussion. Only recently has the Basel Committee on Banking Supervision (BCBS) started a second round of consultation on its new capital adequacy framework for banks and securities firms. At the heart of the Committee's endeavor, termed as New Basel Capital Accord (NBCA), is a three-pillar-approach aimed at improving considerably financial intermediaries' credit risk management. The three pillars are as follows: minimum capital requirement, a supervisory review process, and the effective use of market discipline, each of which is designed so as to serve the proposal's main purpose, namely narrowing further the gap between regulatory and economic capital by 'sharpening the industries' risk awareness'. Though the newly proposed framework is, to some extent, breaking new ground, the NBCA while solely relying on microeconomic reasoning runs the risk to fall short of providing a firm state-of-the-art safeguard for financial system stability (and efficiency) as a whole. The most serious shortcoming of the new proposal is its neglect of the potentially adverse macroeconomic side-effects caused by risk-sensitive bank capital, which forms the centerpiece of the NBCA. Given the banking industries' heavy leaning towards the so-called point-in-time view, which governs virtually all lines of banking business and banking activities, particularly banks' credit risk assessments, adverse macroeconomic repercussions of considerable size occurring over the course of the business cycle are, indeed, very likely to grow under the regime of more risk-sensitive capital adequacy requirements. Accounting and auditing standards in the banking sector, known for following particularly strong versions of 'point-in-time' rules, make the occurrences of those undesirable macro-effects even more likely.

The BCBS has so far shown little interest in extending its considerations beyond its traditional limits by taking a closer and thorough look at the so-called 'micro-macro interface of prudential banking regulation' and its potential interrelatedness to monetary policy (Crockett, 2000). The purpose of this paper is to address these very macroprudential issues of financial regulation left out, at least for the time being, of the BCBS's reframing of its bank capital adequacy requirements.

The work is divided as follows: Section 2 briefly explores the economic rationale for a macroprudential approach to financial markets regulation and supervision. In Section 3, the basics of the macroprudential approach to financial regulation are laid out against the backdrop of the micro-oriented making of contemporary banking regulation. Section 4 aims to bring to light the adverse implications of the NBCA at the macroeconomic level. The NBCA's lack of macroprudential orientation is being seen as one of its major deficiencies bearing the potential to seriously undermine the new capital rule's overall fitness to perform as backbone of future banking regulation. Options available to financial architects (and regulators) to make up for the NBCA's

faulty design (or constructional flaws) by bringing its structure closer in line with the principles of macroprudential regulation and contemporary monetary policymaking are being discussed. Section 5 concludes.

2. Economic Rationale for Macroprudential Regulation of Financial Markets

In general, regulation is justified by the existence of market failures such as asymmetric information, negative externalities and market power. It is said that these very market imperfections and market failures particularly apply to financial markets preventing them from operating as full-fledged competitive (or auction) markets. Obviously, the existence of market failures per se does not make financial markets special. There are great many markets operating under approximately the same imperfect conditions as do financial markets. However, what is really unique about financial markets is that they are exposed to these market failures, particularly to asymmetric information, too a much larger extent and too a much higher frequency than any other type of markets, particularly of commodity-like markets. This and the potential to trigger systemic crises have often been cited as providing ample justifications to call for a special regulatory treatment of financial markets (see *Llewellyn, 1999*, for an excellent account on the economic rationale of financial regulation). As a result, the economics of financial market regulation, in particular bank regulation and supervision has taken within general regulation economics a development of its own (see, for example, *Dewatripont – Tirole, 1994; Freixas – Rochet, 1997*).

As known, regulation policy has a very clear objective, namely to ensure market efficiency by correcting the very market failures and imperfections which cause the inefficiencies in the first place. As to financial markets imperfections, however, regulation and supervision policy is aimed at different targets, all of which though are somehow related to the ultimate goals of regulation economics. In plain terms, the objectives of financial regulation are twofold: first, ensuring overall financial markets stability, and second, protecting consumers, that is, providing a safety-net to protect small depositors and small investors from bank failures. These goals are to be achieved primarily by maintaining high levels of safety and soundness standards within the financial industry. Securing the solvency of each and every (deposit) bank figures very prominently in this regulatory context. However, enhancing financial market stability and protecting small investors do not come as a free lunch. There is, as so often, a trade-off at work allowing for a financial stability increase (or a higher financial security level) only at the expense of efficiency losses (for a thorough discussion of the ‘stability-efficiency’ trade-off, see *Diamond – Rajan, 1999B*). For this reason, finding the socially optimum mix of stability and efficiency is the central theme of financial regulation economics, applied as well as theoretical.

Though being still far away from its ultimate goal, financial regulation has made, in theory as well as in practice, remarkable progress over the last twenty years or so (for an overview see

Bhattacharya – Boot – Thakor, 1998). However, this should not let us become too forbearing when it comes to assessing the effectiveness and consistency of the current financial regulation regimes. To be sure, there are serious shortcomings and failures in the contemporary financial regulation design which may not only restrict the effectiveness of the prevailing regulatory regimes considerably but also bear the highly undesirable potential to add substantially to the worsening of unfolding financial crises. Above all, the economics and politics of financial regulation and supervision have, for long, been based solely on microeconomic reasoning. Only after facing global financial disruptions in the aftermath of seemingly regional crises such as the Far-East and Russia debacle respectively have both, regulators and politicians become increasingly aware of the macro-aspects involved in financial regulation. They finally came to realize that there was also a macroprudential side to financial regulation in form of system outcomes, critically determined by the collective behavior of individual financial institutions which obviously ran counter to financial regulation's prime goal, namely to safeguard the stability of the financial system as a whole.

Obviously, macroeconomic policy co-ordination failures (i. e. suboptimal exchange rate policies, suboptimal monetary and fiscal policies etc.) have a role to play as systemic financial crises unfold, but so has irrational, herdlike group (or macro-) behavior mainly due to common risk misperceptions on the part of great many market participants. In a sense, macroeconomic stabilization policies and macroprudential financial regulation and financial markets oversight do share similar roots.

To be more specific, failure or misfeasance of individual financial institutions or persons bear the seeds for financial crises only when a disinformation process sets in and seizes the minds of great many, mostly unsophisticated market participants thereby blowing these isolated events out of proportion. In this context, rational players such as professional investors may even be forced not only to go with the herd, but also to front-run it so as to be sure to escape the stampede safely at any instant. In doing so, seasoned investors often convey the impression to unsophisticated outsiders that it is the 'perfidious pros' themselves trying to pull the trigger. This, of course, is not to say, rational players have never ever deliberately provoked the burst of a bubble just for doing the obvious, that is, 'ripping off the brainless herd'.

The newly emerged discipline of behavioral finance provide ample theoretical and empirical evidence for the prevalence of herding and other peculiarities in financial markets and their role in causing overall financial instability (a useful account of herding and its role in finance gives *Devenow – Welch, 1996*; *Shleifer, 2000*, is an excellent survey on behavioral finance in general). Herding, for example, arises under real world conditions primarily because of information cascades causing serious investment-related risk misperceptions in the market place. Information

cascades are said to play the pivotal role in both, creating and destroying speculative financial bubbles (Shiller, 2000).¹

Another very important aspect emphasizing the significance of macroprudential regulation is the (alleged) tendency of banks to lend excessively during upswings and over-restrictively during downswings thereby amplifying significantly the business cycle. In the eye of macro-oriented financial regulation, upturns represent the most critical part of the whole business cycle for the banking industry's overall stability since it happens to happen mostly during this phase of the cycle, it is said, when banks overstretch their credit risk exposure beyond reason. This proposition rests on the argument that banks are particularly prone in the course of upswings to underestimate credit risks leading to the accumulation of the very portion of problem loans which no sooner becomes apparent than the downturn sets in. With larger-than-expected bad loans in their balance sheets, banks now tend to overestimate credit risks causing them to switch rapidly from an excessive to an overly restrictive lending policy. While cleansing their credit portfolios from loans turned sour banks continue to remain overly cautious and stay that way until the economy rebounds and gains steam again. Excessive credit growth is now ready to start over again.

To date, empirical evidence seems to strongly corroborate the view that banks' credit policy is overly pro-cyclical (see Figure 1; for a thorough account of the respective literature see *De Lis – Pagés – Saurina, 2000*).

¹⁾ In order to convey a first impression of how information cascades work their way through the minds of capital markets players we cite in extenso *Magill – Quinzii's* excellent narrative of the rise and fall of speculative bubbles (*Magill – Quinzii, 1996*): "Aware of the potential of the innovation or the new discovery (or more generally a new phenomenon that has occurred) to create possibly far-reaching gains in the future, knowledgeable (professional) investors enter the market and begin to drive up prices. As the prices rise, the optimism of these initial investors in the success of the new venture is reinforced by their apparent unanimity. This process continues for a while, creating an initial phase of gradually rising prices. When the rise in initial investors in the success of the new venture is reinforced by their apparent unanimity. This process continues for a while, creating an initial phase of gradually rising prices. When the rise in prices has continued for a sufficient time to give the impression of being an ongoing process, the information that the market has acquired an upward inertia spreads among a broader segment of investors. Eager to exploit the newly discovered potential for capital gains and recognizing that the greatest gains are made by those who enter early, new investors precipitate themselves onto the market. The more investors are attracted to the market, the more the price rises and the more expectations of rising prices become self-fulfilling. Agents' expectations of rising prices begin to feed on themselves and gradually become disconnected from the rational valuation made by an agent buying for keeps. It is during this phase that the assumption of common knowledge of rationality breaks down: agents recognize that there are other agents in the market who are not pricing the asset by its fundamental value, but rather are basing their valuation on the continued upward inertia of the market. After this process has continued for a while – the length of this phase can vary greatly depending on the potential pool of investors – an increasing number of agents (in general professionals) begin to have doubts about the continued upward inertia of the market: as they progressively place themselves on the selling side of the market and as the number of buyers dwindles, the process of rising prices gradually comes to an end. As soon as there is a general perception that the market has lost its upward inertia, no agent has a reason to be a buyer. The bubble bursts and as all agents seek to get out of the market, the price comes tumbling down, until it settles once again to a level which corresponds approximately with agents' perception of its fundamental value."

The reasons for the existence of excessive credit-procyclicality are manifold and still a matter of debate and ongoing research. However, there appears to be a consensus that the overly procyclical lending pattern of banks roots deeply in non-neoclassical managerial habits which have recently become one of the subject matters of behavioral finance (see for example *Rajan*, 1994, and particularly *Borio – Furfine – Lowe*, 2001, for a thorough treatment of the banks' build-up of, as it is termed, systematic credit risk component during economic recoveries). This line of reasoning pinpoints the banks' overall preference for point-in-time risk assessments (or risks assessment myopia) to be the main culprit for overly procyclical lending. Disaster myopia, herding behavior, perverse incentives and principal-agent problems are among the other, closely interrelated factors frequently cited as being the driving force behind the short-sightedness of banks' credit risk management (see i. e. *Herring*, 1999; *Shleifer*, 2000). Referring to the highly questionable accounting and auditing standards in the banking industry, *De Lis – Pagés – Saurina* (2000) state "that bank managers are very difficult to persuade to follow more prudent credit policies during an economic upturn, especially in a highly competitive environment. Even conservative managers might find market pressure for higher profit very difficult to withstand. This is compounded by the fact that for many countries loan loss provisions are cyclical, increasing during the downturn and reaching their lowest level at the peak. To a large extent, this reflects an inadequate ex post accounting of credit risk. As a result, book profits follow the opposite pattern. Many credit risks mistakes are made during the expansionary phase of the economic cycle although they only become apparent ex post in the downturn."

That is to say, many banks, particularly in the time of plenty, appear to deliberately fail to act as prudent and responsible in their conduct of day-to-day risk operations as is mandated by the prudent man's rule. In addition, occasional observation suggests that during good times credit managers tend to take prudential credit policy guidelines as a whole less seriously than during bad times. In so doing, they contribute additionally to the build-up of unhealthy credit risks in the upswing which then affect adversely banks' soundness ex post in the downswing.

The various mechanisms under discussion to promote procyclical bank lending are quite similar in working to the financial-instability hypothesis first introduced by *Kindleberger* (1996) and *Minsky* (1982). The financial-instability hypothesis states that there be a tendency for 'excessive' accumulation of debt in boom times, when borrowers appear able to bear higher levels of expenditure and debt. This 'excess' is then corrected during recessions through deflation and economic crisis. The result is an increase in business cycle fluctuations.

Beyond that, a growing theoretical literature has emerged over the last decade dedicated to explore in depth how genuine and persistent credit cycles come about (see for example *Kiyotaki – Moore*, 1997; *Rajan*, 1994). The so-called 'financial accelerator effect' assumed to be one of the pivotal mechanisms for translating credit market imperfections to broad and persistent lending cycles has recently attracted much attention among macroeconomic theorists (see *Bernanke – Gertler – Gilchrist*, 1999). Apart from that, misalignments in asset prices may also lead to

inadequate lending and borrowing decisions and to financial fragility (see *Cecchetti – Genburg – Lipsky – Wadhwani, 2000*).

To conclude, a consensus based on empirical and theoretical findings appears to have emerged that a re-orientation of financial markets regulation and oversight towards a more macroprudential view is needed to counter successfully macroeconomic repercussions and welfare losses associated with financial system fragility caused by the excessive procyclicality of bank lending. A macroprudentially based system of financial regulation and supervision, if properly and responsibly designed, is expected to be best capable of counterbalancing the excessive procyclicality of bank lending (see *Borio – Furfine – Lowe, 2001*, for a clear exposition of this claim).

3. The Dichotomy of Micro and Macro in Prudential Regulation

According to *Crockett (2000)* “the macroeconomic objective can be viewed as limiting the costs to the economy from financial distress, including those that arise from any moral hazard by the policies pursued. One could think of this objective as limiting the likelihood of the failure, and corresponding costs, of significant portions of the financial system. This is often loosely referred to as limiting systemic risk. In contrast, the microprudential objective can be seen as limiting the likelihood of failure of individual institutions. Again, loosely put, this means limiting idiosyncratic risk. So defined, this objective is in turn probably best rationalized as a means of protecting depositors.”

Put differently, enhancing the stability of the financial system as a whole while simultaneously maintaining market efficiency is considered to be the prime task of macroprudential regulation and supervision whereas sustaining the soundness and safety of individual financial institutions is seen as main objective of the microprudential approach. In addition, it is a characteristic feature of micro-based financial regulation that any feedback of collective actions on the condition of individual institutions remains disregarded.

The microprudential approach is essentially based on the assumption that overall financial stability is best maintained as long as each and every financial institution remains sound, safe and solvent at any instant. It hardly comes as a surprise that this presumption is scorned by advocates of the macroprudential view as being a plain tautology and as such hardly usable for policy directives. Undoubtedly, overall financial markets stability can be sustained despite occasional closures of financial institutions due to management failure. It is even be argued that the possibility of occasional failures of banks and financial institutions reinforce rather than jeopardize the overall financial markets stability because of the ‘cleansing effect’ which is expected to emanate from isolated occurrences like these.

It follows that the macroprudential paradigm stresses the possibility that actions that may seem desirable or reasonable from the perspective of individual institutions may result in unwelcome

system outcomes. This is the logical contradiction in the microprudential vision as defined here. Microprudential regulation as it is pursued in many countries is very likely to create or at least contribute substantially to macroeconomic fluctuations which then feed back on individual financial institutions as adverse shocks erroneously perceived by regulators and banks alike as exogenous. Risk-based capital requirements, as recently proposed by the BCBS and the EU Commission, and deposit insurance are two examples which might fall under the scope of this fallacy of composition (Crockett, 2000; Hahn, 2000). We will revisit the former of the two core elements of micro-based contemporary banking regulation in the following section.

A further feature which draws a clear line between the micro- and the macro-dimension in banking regulation is the time horizon assumed to be appropriate for a thorough credit risk assessment. Aimed at stabilizing the financial system as a whole, macroprudential regulation necessarily favors a long-term and forward-looking view, particularly in conjunction with assessing the risk exposure of banks. Understanding the business cycle as a mean-reverting and partially predictable process, the macro-oriented approach states that taking a 'dynamic risk view' by seeing through the cycle to come be absolutely crucial for a thorough account of borrower creditworthiness and, as a result, for an optimal management of the overall risk exposure of banks.

This obviously runs counter to banks' attitude to base their (internal) credit risk assessment primarily on a borrower's current condition, usually with a time horizon of shorter than one year. Rarely do banks attempt to take a long-term view or incorporate downside scenarios into their risk assessment. Importantly, in so doing banks can be sure to act in full compliance with their micro-oriented supervisory authorities that also favor a short-term risk perspective. The 'static risk view' taken by micro-based regulation and banks can be best illustrated by referring to a stochastic process $x(t)$ that satisfies $x(t_1) = E_{t_1}[x(t_2)]$ for all $t_2 > t_1$, E standing for the expected value operator. This process, called a martingale, is characterized by the interesting feature that the expected future value equals the current value of the process, with no systematic drift at work. That is to say, the very latest piece of actual information on a real word activity (i. e. point-in-time risk associated with lending) governed by a martingale also represents the best forecast of the future development of this activity.

Favoring the 'static risk view', micro-oriented bank regulators and supervisors consider the comparatively short time horizon covered by banks' risk exposure projections as being of no particular regulatory concern. In case internal or external supervisors do realize that a bank has piled up too much risk during the past, for whatever reason, then, as pointed out by *De Lis – Pagés – Saurina* (2000), provision building is supposed to come to the rescue. That is, bank management is urged either by regulatory or by corporate statute to build extraordinary provisions (or raise additional equity) so as to counterbalance this higher-than-expected risk exposure. If extra-risks have been accumulated during a boom, which is usually the case, the counterbalancing operations will most likely have to be carried out through the following recession which is usually the time such extra-risks become apparent. It goes without saying that this micro-regulatory

scheme, as reasonable as it may appear from a pure microprudential standpoint, is fallacious when looked at from a macroprudential viewpoint.

The appropriate macroprudential recipe to counteract the very macroscopic fall-out of micro-based banking regulation held responsible for amplifying inadvertently the business cycle (or economic fluctuations) would be the implementation of built-in financial stabilizers similar in working to their fiscal counterparts. Unfortunately, there are only a few regulatory mechanisms conceivable which might make the banking industry comply with the principles of macroprudential regulation to a larger degree than they do under the current micro-oriented regulatory regime. The following section is devoted to this challenge of forward-looking financial regulation and supervision. For this venture it seems natural to use the recently released NBCA as a test bed.

4. Taking a Macroprudential View on the New Basel Capital Accord

4.1 Bank Capital Regulation – A Mixed Blessing?

As already pointed out, capital requirements take center stage in modern financial markets regulation and supervision. Together with deposit insurance, minimum capital standards form the backbone of contemporary banking regulation. There are many arguments in favor of regulatory bank capital, not all of which are yet well founded.

That capital adequacy requirements are a double-edged sword is acknowledged even by hard-nosed advocates of capital-based regulation. The trading-off of more overall financial stability for less liquidity (and efficiency) creation by banks is one of the undesirable implications of minimum capital requirements which are undisputed. Liquidity creation and optimal risk allocation are generally viewed as being the prime macroeconomic functions of financial intermediaries in a world of imperfectly operating financial markets.

But even the presumption that minimum capital standards are very supportive in strengthening the soundness of individual banks (i. e. by restricting excessive risk-taking) is seen by many regulation economists as neither theoretically nor empirically convincing. *Rochet* (1992), for instance (as one example among many), argues quite forcefully that, from the viewpoint of prudential regulation, minimum capital standards may even turn out to be counterproductive in by nourishing rather than limiting the banks' appetite for excessive risk-taking. The author stresses that even a solvency regulation with 'correctly computed risk weights' may not be sufficient for taking care of moral hazard. As remedy *Rochet* suggests that a minimum level of capital independent of the size of the banks' assets be introduced.

A strong point in favor of bank capital regulation is made by *Dewatripont – Tirole* (1994) by considering this problem from the viewpoint of optimal corporate governance. Their main argument runs as follows: In general, depositors are not in the position to monitor bank efficiently

because they are small and uninformed. Depositors need an agent, a representative who takes care of their interests by monitoring banks as their proxy. Public regulators appear to be best qualified for being delegated with this task. In this setup minimum capital standards serve as threshold to decide whether shareholders or depositors are supposed to become the controlling party. The authors show that the optimal control scheme demands that in the event of poor performance (capital falls short of solvency requirement) a more interventionist regime (the depositor's representative) be in charge, otherwise the shareholders keep the say.

Despite its mixed reputation regulatory bank capital is viewed by many financial regulators as the most effective regulatory means available to keep financial firms in solvent and stable conditions by ensuring that banks have enough capital to support the risks they are taking (note, usually capital is held to protect against unexpected losses, and provisions are built to provide cover against expected losses). Capital requirements are supposed to deter bank managers not only from holding overly risky assets in the first place, but also from gambling irresponsibly with the depositors' money. In addition, bank capital targets are generally assumed to be an (comparatively) easy-to-enforce policy instrument in the hands of regulatory authorities enabling them to put a cap on the industry's sometimes fatal desire for excessive risk-taking. Currently both, the Basel Accord and the EU Capital Adequacy Directive (CAD) require that a bank hold capital of at least 8 percent of its risk-weighted assets. Since their very introduction in the early 1990s, however, the regulatory capital standards as implemented by the BCBS and the EU respectively have been accused of being severely flawed. Particularly the way how asset risk exposures are measured has made regulators and bank managers alike very unhappy. Most rise to regulatory and managerial discomfort gave the narrow range of banking risks (basically credit risk) covered by the Accord and the Directive, respectively. Accordingly, credit risks can only be accounted for by means of four risk buckets (!), each with a different weight to reflect the degree of credit risk. A further point of criticism is the 'one-size-fits-all' philosophy of the current capital rule with all loans subject to the same 8 percent ratio. In addition, the regulatory capital regime in use is additive across all loans irrespective of the degree of diversification in the loan portfolio.

It is worth noting that in their original version, both regulatory regimes took account of credit risk exposures only. Not before the mid 1990s was the Basel Accord (and the respective EU Directive) extended to include risk-based capital requirements for the markets risks in bank trading accounts (trading book).

4.2 Risk-Based Capital Reconsidered

In launching a complete overhaul of their capital adequacy standards in the late 1990s, the BCBS and the EU Commission have taken steps to put the measurement of banks' risk exposure on a firmer conceptual footing. In so doing, narrowing further the gap between regulatory and economic capital requirements is at the very center of their considerations. In their lately released documents both, by leaving the 8 percent solvency ratio unchanged the BCBS and the EU

recommend that, in the future, for sophisticated banks, internal credit rating models be allowed for the measurement of a wide range of banking risks including not only credit risk but also legal, reputational, operational and settlement risks. For those banks which do not have a full-fledged internal rating model at their disposal or simply lack the sophistication of mastering such devices properly a more sophisticated standardized approach with a richer set of refined risk weights is proposed (for details see *Basel Committee, 2001*).

Although the BCBS document (not so the EU paper) alludes to proprietary risk measurement models that seek to calculate the full risk-return trade-off for a loan portfolio as an attractive (and sophisticated) tool to estimate a bank's specific risk exposure, both regulatory authorities remain very skeptical as to the overall fitness of these models to accurately gauge the various bank risks. The poor quality of the available database is one of the reasons why regulators view credit risk models as not yet ready for practical use. This does not apply to model-based capital requirements for market risks (or for the trading book), indeed. The BCBS and EU amended their regimes in 1996, since then banks have been allowed to use their own internal models to compute a ten-day Value-at-Risk (VaR) with a 99 percent confidence level when certain modeling standards set by the regulators are met. For the sake of completeness, under the current conditions banks are required to multiply their VaR number by a factor ranging between 3 and 4 in order to provide cover against catastrophic losses, that is, losses beyond the 99 percent measure.

Obviously, VaR models are not full-fledged portfolio models because they focus on the risk dimension only. Returns are left unmodeled. The full-fledged portfolio theory optimization approach addresses the full risk-return trade-off of assets. Application of the portfolio theory technique to the loan portfolio, however, has first to overcome a number of problems such as the nonnormality of loan returns and the unobservability of market-based loan returns as a result that most loans are non-traded. In the last couple of years some progress has been made in advancing the portfolio theory technique to cope with these typical problems of loan portfolios. The portfolio models applied to loans so far have been particularly helpful in learning more about the overall risks associated with loan portfolios. The importance of these models is in the link they show between default correlation and loan portfolio and risk on the one hand, and portfolio diversification and loan portfolio risk on the other hand (*Saunders, 1999*). The experiences made with these models so far are quite promising indicating that gains through loan portfolio diversification may be substantial. An important, though not entirely surprising implication of these models provides additional evidence for the view that the current BCBS/EU 8 percent risk-based capital ratio, which ignores correlation among loans in setting capital requirements, may be seriously flawed. Portfolio models suggest that loan portfolios in which individual loan default risks are highly correlated have higher capital requirements than loan portfolios of the same size, in which default risk correlation are relatively low. Unfortunately, as compared with the current capital adequacy rule the NBCA does not improve on this particularly important aspect at all. Default

correlation among loans have not been incorporated in calculating regulatory capital adequacy under the new accord as suggested by modern credit portfolio theory.

The new proposals on banks' capital requirements have provoked a wide range of reactions, most of which are affirmative. Most practitioners, bankers and regulators alike, welcome the new standards as major improvements upon the current regulatory capital setup and applaud the NBCA as a bold move from a regulatory approach to a more supervisory treatment (*Mishkin, 2000*). But there are also a few critical voices, among them, not surprisingly, some macroprudential, who argue that the reform give too little attention to the macroeconomic downside of risk-based bank capital. If banks are prone to procyclical risk misperception as discussed in the preceding section and suggested by behavioral finance, risk-based bank capital requirements will indeed reinforce the business cycle to a much larger degree than the current less risk-oriented bank capital rule. Being less binding during upswings due to banks' point-in-time risk measurement risk-sensitive capital is very much poised by boosting 'banks' natural inclination' to overlend in times of plenty. Recessions reverse this procedure with risk-sensitive capital strengthening the banks' bias towards underlending.

4.3 Setting the Stage for a Macroprudential Remedy of the NBCA – Let's talk about Macroprudential Monetary Policy

Suppose the following presumptions are raised and, more importantly, are valid:

- a) In general, banks are only capable of measuring credit risks sufficiently well on the basis of short time horizon assessments (i. e. 'point-in-time' rather than 'through-the-cycle' credit risk measurement).
- b) In general, because of a) banks tend to underestimating risks during expansions and overestimating risks during recessions.
- c) In general, risk-sensitive minimum capital (i. e. 8 percent of risk-weighted assets) tends to be below its 'true value' during upswings and above its 'true value' during downswings. In addition, the positive spread between the actual and the regulatory solvency ratio tend to be larger during upswings than during downswings.
- d) In general, bank capital works as a constraint on banks' ability to fund loans. This, in combination with b) and c), lead banks to lend excessively during upswings and over-restrictively during downswings thereby amplifying the business cycle and the procyclical price movements (Figure 1 and 2).
- e) In general, undercapitalized banks characterized by a small positive spread between actual and minimum solvency are more responsive to monetary policy than overcapitalized banks.

To be sure, there is convincing theoretical and empirical evidence in favor of each of these presumptions but, admittedly, not a single one can be viewed as sure-fire, either theoretically nor empirically. Particularly strong support in favor of the aforementioned set of conjectures, for

example, comes from the recent ‘credit crunch’ literature (see for example *Berger – Udell, 1994; Hancock – Wilcox, 1998*). Empirical research has shown that low bank capital and the introduction of risk-based capital requirements are most likely to have been the main causes for the severity of the 1990 to 1992 credit crunch in the U.S.

Further, it is useful to note here that there is no need for the existence of a credit channel in the narrow sense in order to carry the point to come. All that is needed for the argument to hold is that a weak form of credit-cycle as encompassed in conjecture (d) is present.

For the sake of the argument, let’s say, as assumed, that the given set of conjectures is a pretty good description of the real world, then it seems the macroprudential remedy of the NBCA is straightforward. Obviously, the effectiveness of regulatory and monetary policies can be improved by the discretionary macroprudential use of the required regulatory solvency ratio for the whole banking industry. Since financial markets stability is assumed to be primarily imperiled by forces which also add to the imbalance of economic activity and price stability, that is, excessive procyclical bank lending caused by systematic risk misperception, imposing such a linkage is natural. After all, securing financial system stability comes only second to price stability in the policy agenda of most central banks. Given the importance of capital adequacy rules as a means of enhancing monetary control of bank loan growth, it is even more legitimate to claim that the industry-wide risk-sensitive capital ratio be put under the discretion of the monetary authorities. Independent central banks experienced in taking a long-term view in their policymaking appear to be best capable of using the overall solvency ratio as a forward-looking discretionary instrument in the sense of a ‘managed built-in financial stabilizer’.

Of course, this goes substantially beyond the discretionary powers suggested by the NBCA to be given to financial regulators in the future. According to the NBCA, financial regulators are to be provided with the discretionary right to raise the regulatory capital requirement above the industry-wide 8 percent level for individual banks only if the very bank’s management has repeatedly failed to fully comply with the prudential core standards as set out by the Accord. The NBCA does not allow for a general toughening or easing of the mandatory capital ratio on the ground of financial system stability concerns.

However, having the capital ratio rule for the whole industry as additional policy instrument at their disposal monetary policymaker would be way better equipped to successfully conduct stabilization policies over the business cycle (i.e., ensuring price and financial system stability over the business cycle). Macroprudential monetary policy could then squeeze the ‘amplitude’ of the ‘credit-cycle’ more effectively by raising not only its short-term interest rate but also the overall capital rule above the 8 percent minimum level during the boom – by it signaling to the financial industry that systematic risk is on the rise – and by lowering the margin, in accordance with its interest rates if necessary, close to the 8 percent mark (or even below) during the following bust. Counteracting the banking industry’s tendency to excessively amplify the business cycle by overlending during the

upswing and underlending during the downswing would then result in a twofold achievement, namely in less cyclical price movements and simultaneously in a higher degree of financial system stability due to more timely risk awareness and less moral hazard within the financial industry. It is easy to see that this line of reasoning is similar in structure to the corporate governance based argumentation of Dewatripont and Tirole (1994).

Let's walk through an example in order to let the argument shine. With the economy changing from bust to boom inflation is usually going to build up after a while and so does the lending and risk-taking of banks. Taking for granted that excessive lending during the boom due to disaster myopia, herding etc. on the part of banks' management is the main culprit for increasing financial system fragility and for adding substantially to the procyclical price movement, regulatory authorities are called upon, according to the macroprudential view as developed above, to act in accordance with monetary authorities. When the central bank decides to raise its short term interest rates, expectations of rising interest rates charged by banks for providing loans eventually slow demand for loans down. On the other hand, in order to maintain a high level of financial system stability throughout the cycle, in the given context regulatory authorities are required to raise bank capital adequacy for the whole financial sector when the boom starts driving bank credit growth excessively. Banks now subject to higher capital costs indicating a higher level of systematic risk will sooner or later cut down on lending at an overly fast pace leading not only to a slower growth of aggregate credit supply but also, due to a more appropriate risk assessment, to a slower pile-up of problem loans. This joint action will have to be reversed no sooner than it becomes clear to the financial and monetary policymakers that the economy is bound to perform below its potential. Thus, by taking joint actions excessive bank lending is more likely to get squeezed from forces working on either side of the market and, as a result, overall lending is more likely to be less cyclical and less risk-loaden.

Not surprisingly, the design of modern monetary policy has a lot in common with that of macroprudential financial regulation and supervision as laid out in the preceding sections. Since the rational expectation revolution in the seventies the subject matter of monetary economics has changed from a mostly backward- to a predominantly forward-looking orientation of monetary policymaking. Monetary policymakers had come to realize that not only expectations formations of the private sector became basically forward-oriented but also the various transmission mechanisms called for forward-lookingness since most of the monetary policy instruments available to central bankers play out only over time, often involving lags measured in quarters rather than weeks or months. Thus, the quality of monetary policymaking highly depends on the policymakers' capability (or talent, or good luck) of anticipating correctly future cyclical movements which may jeopardize its ultimate objective, that is, ensuring price stability (or in the case of inflation targeting, avoiding in- or deflationary buildup). Macroprudential financial regulators are often challenged to cope with situations which, to a high degree, resemble those monetary policymakers have to deal with on a regular basis. Above all, financial regulators and supervisors have to learn to foresee as accurately

as possible the perils ahead which might put the financial system as a whole under fatal stress. This requires that financial regulators and supervisors have to catch up to the level of sophistication of contemporary monetary policymaking do they want to improve on maintaining not only the soundness of individual financial institutions but also the stability of the financial system as a whole. As indicated, macroprudential regulators may enjoy the advantage, however, to greatly benefit, in their discretionary policymaking, from central bankers' monetary analysis and expertise, for the forces which make economic activity depart from its potential and thereby causing de- or inflationary pressure are assumed to be essentially the same as those most likely to lead banks and other financial institutions astray in their risk-taking over the business cycle.

To conclude, a very strong case can be made in favor of putting monetary and macroprudential regulatory stabilization policies under the roof of independent central banks with a strong and credible commitment to price stability policies. Ironically, macroprudential supervision and monetary policy share, for sure, a common fate in that both are held to labor under severe handicaps, that is, both are often forced to operate on the ground of highly preliminary evidence when decisions have to be made.

5. Conclusion

In accordance with the newly emerged consensus in financial regulation economics, we consider the occurrence of financial system instabilities (or the maintenance of overall financial stability) to be at least as much a macro- as a microprudential phenomenon. This is contrary to the New Basel Capital Accord (NBCA) which still favors the micro-oriented regulatory and supervisory view. At the center of the NBCA is the sharpening of the point-in-time risk awareness of banks and securities firms. This is primarily done by introducing higher risk measurement standards for the calculation of the mandatory 8 percent minimum solvency ratio. However, higher risk sensitivity of regulatory capital may have a downside when governed by the 'static or point-in-time risk view' favored by banks and micro-based financial supervisory authorities. Risk-sensitive capital holding may then reinforce the banks' tendency to underestimate credit risks during booms and overestimate risks during recessions. As a result, procyclical bank lending due to procyclical risk misperception is likely to increase thereby jeopardizing the overall goal of financial regulation and supervision, that is, ensuring financial system stability. Further, excessive procyclical lending is also assumed to add to the imbalance of economic activity and hence to the procyclical overall price movement.

The paper suggests that the overall minimum solvency ratio be put under the discretionary powers of policy authorities used to taking a dynamic and forward-looking systematic risk view. By signaling to the financial industry in time that systematic credit risk is about to change regulatory authorities are in the position to make up for the welfare and efficiency losses caused by the systematic risk misperception of banks over the business cycle. Further, given the importance of capital adequacy rules as a means of enhancing monetary control of bank loan growth, it is

suggested that the discretionary use of the industry-wide risk-sensitive capital ratio be handed over to independent central banks with a strong and credible commitment to price stability policies. Experienced in taking a long-term view in their policymaking central banks appear to be best qualified to use the overall minimum solvency ratio as a forward-looking discretionary instrument in the sense of a ‘managed built-in financial stabilizer’.

References

- Allen, F., Gale, D., *Comparing Financial Systems*, MIT Press, Cambridge, MA, 2000.
- Asea, P. K., Blomberger, B., “Lending cycles”, *Journal of Econometrics*, 1998, (83).
- Banerjee, A., “A Simple Model of Herd Behavior”, *Quarterly Journal of Economics*, 1992, CVII.
- Basel Committee, *The Supervisory Treatment of Market Risks*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 1993.
- Basel Committee, *The Supervisory Treatment of Market Risks*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 1995.
- Basel Committee, *The Core Principle of Banking Supervision*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 1997.
- Basel Committee (1999A), *A New Capital Adequacy Framework*, Consultative Paper, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 1999.
- Basel Committee (1999B), *Enhancing Corporate Governance for Banking Organisations*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 1999.
- Basel Committee (1999C), “Capital Requirements and Bank Behaviour: The Impacts of the Basel Accord”, Basle Committee on Banking Supervision, Bank for International Settlements, Working Papers, 1999, (1).
- Basel Committee (1999D), *Credit Risk Modelling: Current Practice and Applications*, Bank for International Settlements, Basel Committee on Banking Supervision Publication No. 49, 1999, April.
- Basel Committee (2000A), *Range of Practice in Bank’s International Ratings Systems*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 2000.
- Basel Committee (2000B), *A New Capital Adequacy Framework: Pillar 3 Market Discipline*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 2000.
- Basel Committee, *The New Basel Capital Accord*, Basel Committee on Banking Supervision, Bank for International Settlements, Basel, 2001, January.
- Benston, G. J., Kaufman, G. G., “The Appropriate Role of Bank Regulation”, *The Economic Journal*, 1996, (106).
- Berger, A. N., Herring, R. J., Szego, G. P., “The Role of Capital in Financial Institutions”, *Journal of Banking and Finance*, 1995, (19).
- Berger, A. N., Udell, G. F., “Did Risk-Based Capital Allocate Bank Credit and Cause a ‘Credit Crunch’ in the United States?”, *Journal of Money, Credit, and Banking*, 1994, (August).
- Bernanke, B. S., Gertler, M., Gilchrist, S., “The Financial Accelerator in a Quantitative Business Cycle Framework”, in Taylor, J., Woodford, M. (eds.), *Handbook of Macroeconomics*, Amsterdam, 1999.

- Besanko, D., Kanatas, G., "The Regulation of Bank Capital: Do Capital Standards Promote Bank Safety?", *Journal of Financial Intermediation*, 1996, 5(2).
- Bhattacharya, S., Boot, A. W. A., Thakor, A. V., "The Economics of Bank Regulation", *Journal of Money, Credit and Banking*, 1998, (November).
- Bliss, R. R., Flannery, M. J., "Market Discipline in the Governance of U.S. Bank Holding Companies: monitoring vs. Influencing", *Federal Reserve Bank of Chicago, Working Paper*, 2000, (2000-03).
- Blum, J., "Do Capital Adequacy Requirements Reduce Risks in Banking?", *Journal of Banking and Finance*, 1999, (23).
- Blum, J., Hellwig, M., "The Macroeconomic Implications of Capital Adequacy Requirements for Banks", *European Economic Review*, 1995, (39).
- Boot, A., Thakor, A., "Financial System Architecture", *Review of Financial Studies*, 1997, (10).
- Boot, A., Thakor, A., "Banking Scope and Financial Innovation", *Review of Financial Studies*, 1997, (10).
- Borio, C., Furfine, C., Lowe, P., "Procyclicality of the Financial System and Financial Stability: Issues and Policy Options", *BIS Papers*, 2001, (1).
- Calomiris, C. W., *The Postmodern Bank Safety Net – Lessons from Developed and Developing Economics*, American Enterprise Institute, Washington, D.C., 1997.
- Calomiris, C. W., *Blueprint for a New Global Financial Architecture*, mimeo, Columbia Business School, 1998.
- Cecchetti, S., Genburg, H., Lipsky, J., Wadhvani, S., "Asset Prices and Monetary Policy", Report prepared for the conference 'Central Banks and Asset Prices', organized by the International Centre for Monetary and Banking Studies, Geneva, May, 2000.
- Clair, R. T., "Loan Growth and Loan Quality: Some Preliminary Evidence from Texas Banks", *Federal Reserve Bank of Dallas, Economic Review*, 1992, (third quarter).
- Clarida, R., Gali, J., Gertler, M., "The Science of Monetary Policy: A New Keynesian Perspective", *NBER, Working Paper*, 1999, (7147).
- Cochrane, J. H., "Where is the Market Going? Uncertain Facts and Novel Theories", *Federal Reserve Bank of Chicago, Economic Perspectives*, 1997, (November/December).
- Cochrane, J. H., "New Facts in Finance", *NBER, Working Paper*, 1999, (7169).
- Crockett, A., "The Theory and Practice of Financial Stability", *Princeton University, Essays in International Finance*, 1997, (203).
- Crockett, A., *Marrying the Micro- and Macroprudential Dimensions of Financial Stability*, Bank for International Settlements, Basel, 2000, September, mimeo.
- Davies, E. P., *Debt, Financial Fragility, and Systemic Risk*, Clarendon Press, Oxford, 1992.
- De Lis, S. F., Pagés, J. M., Saurina, J., *Credit Growth, Problem Loans and Credit Risk Provisioning in Spain*, Bank of Spain, 2000, October, mimeo.
- Devenow, A., Welch, I., "Rational Herding in Financial Markets", *European Economic Review*, 1996, 40(3-5).
- Dewatripont, M., Tirole, J., *The Prudential Regulation of Banks*, MIT Press, Cambridge, MA, 1994.
- Diamond, D. W., Rajan, R. G (1999A), "A Theory of Bank Capital", *NBER, Working Paper*, 1999, (7431).
- Diamond, D. W., Rajan, R. G (1999B), "Liquidity Risk, Liquidity Creation and Financial Fragility: A Theory of Banking", *NBER, Working Paper*, 1999, (7430).

- Dixon, H. D., "Controversy: Should We Regulate the Financial System?", *The Economic Journal*, 1996, (106).
- Dow, S. C., "Why the Banking System Should be Regulated", *The Economic Journal*, 1996, (106).
- Eichengreen, B., *Toward a New International Financial Architecture: A Practical Post-Asia Agenda*, Institute for International Economics, Washington, D. C., 1999, February.
- Estrella, A., "A Prolegomenon to Future Capital Requirements", Federal Reserve Bank of New York, *Economic Policy Review*, 1995, (July).
- Evans, H., "Plumbers and Architects – A supervisory perspective on international financial architecture", *Financial Services Authority, Occasional Paper*, 2000, (3).
- Freixas, X., Rochet, J.-Ch., *Microeconomics of Banking*, MIT Press, Cambridge, MA, 1997.
- Friedman, B. M., "Monetary Policy", NBER, Working Paper, 2000, (8057).
- George, E. A. J., "Some Thoughts on Financial Regulation", *Bank of England Quarterly Bulletin*, 1996, (May).
- Giammarino, R. M., Lewis, T. R., Sappington, D. E. M., "An Incentive Approach to Banking Regulation", *The Journal of Finance*, 1993, (4).
- González-Hermosillo, B., Pazarbacioglu, C., Billings, R., "Determinants of Banking System Fragility: A Case Study of Mexico", *IMF Staff Papers*, 1997, 44(3).
- Goodhart, C., Hartmann, P., Llewellyn, D. T., Rojas-Suarez, L., Weisbrod, S., *Financial Regulation: Why, How and Where Now?*, Routledge, London, 1998.
- Gorton, G., Rosen, R., "Corporate Control, Portfolio Choice, and the Decline of Banking", *The Journal of Finance*, 1995, (5).
- Hahn, F. R., "EU-Konsultationspapier zur Überarbeitung der Eigenkapitalvorschriften für Kreditinstitute und Wertpapierfirmen – Kommentar aus makroökonomischer Sicht", *BankArchiv*, 2000, (September).
- Hancock, D., Wilcox, J. A., "The 'Credit Crunch' and the Availability of credit to Small Business", *Journal of Banking and Finance*, 1998, (August).
- Hart, O., *Firms, Contracts, and Financial Structure*, Clarendon Press, Oxford, 1995.
- Hauswald, R., "Financial Contracting, Reorganization and Mixed Finance: A Theory of Banking Systems", University of Maryland, Working Paper, 1995.
- Herring, R. J., "Credit Risk and Financial Instability", *Oxford Review of Economic Policy*, 1999, (3).
- Holmstrom, B., Tirole, J., "Financial Intermediation, Loanable Funds, and the Real Sector", *The Quarterly Journal of Economics*, 1997, (August).
- Holmstrom, B., Tirole, J., "Liquidity and Risk Management", *Journal of Money, Credit, and Banking*, 2000, (3).
- Jones, D., Mingo, J., "Credit Risk Modeling and Internal Capital Allocation Processes: Implications for a Models-Based Regulatory Bank Capital Standard", *Journal of Economics and Business*, 1999, (51).
- Jorio, Ph., *Value at Risk*, Mc-Graw – Hill, New York, 1997.
- Karacadag, C., Taylor, M. W., "The New Capital Adequacy Framework: Institutional Constraints and Incentive Structures", *International Monetary Fund, Working Paper*, 2000, (93).
- Kashyap, A. K., Stein, J. C., "What Do a Million Banks Have to Say about the Transmission of Monetary Policy?", NBER Working Paper, 1997, (6056).

- Kent, C., D'Arcy, P., "Cyclical Prudence – Credit Cycles in Australia", BIS Papers, 2001, (1).
- Kindleberger, C. P., A Financial History of Western Europe, George Allen & Unwin, London, 1987.
- Kindleberger, C. P., Manias, Panics, and Crashes – A History of Financial Crises, Third Edition, Wiley, New York, 1996.
- Kishan, R. P., Opiela, T. P., "Bank Size, Bank Capital, and the Bank Lending Channel", Journal of Money, Credit, and Banking, 2000, 32(1).
- Kiyotaki, N., Moore, J., "Credit Cycles", Journal of Political Economy, 1997, 105(2).
- Kupiec, P. H., O'Brian, J. M. (1995A), Recent Developments in Bank Capital Regulation of Market Risks, Federal Reserve Board, Finance and Economics Discussion Paper, 1995.
- Kupiec, P. H., O'Brian, J. M. (1995B), A Precommitment Approach to Capital Requirements for Market Risk, Federal Reserve Board, Finance and Economics Discussion Paper, 1995.
- Kupiec, P. H., O'Brian, J. M., The Pre-Commitment Approach: Using Incentives to Set Market Risk Capital Requirements, Federal Reserve Board, Finance and Economics Discussion Series, No. 14, March, Washington, D. C., 1997.
- Ledingham, P., "The Review of Bank Supervision Arrangements in New Zealand: The Main Elements in the Debate", Reserve Bank Bulletin, 1995, (58).
- Llewellyn, D. T., "The Economic Rationale of Financial Regulation", Financial Services Authority, Occasional Paper, 1999, (1).
- Llewellyn, D. T., "A Regulatory Regime for Financial Stability", Paper presented at the Oesterreichische Nationalbank, Vienna, 6th October 2000.
- Magill, M., Quinzii, M., Theory of Incomplete Markets, MIT Press, Cambridge, MA, Vol. I, 1996.
- Mayes, D., "A More Market Based Approach to Maintaining Systemic Stability", Financial Services Authority, Occasional Paper, 2000, (10).
- Mayes, D., Halme, L., Liuksila, A., Improving Banking Supervision, Macmillan, Basingstoke, 2000, forthcoming.
- Minsky, H., "The Financial-Instability Hypothesis: Capitalist Processes and the Behavior of the Economy", in Kindleberger, C. (ed.), Financial Crises, Cambridge, Cambridge University Press, 1982.
- Mishkin, F. S., The Economics of Money, Banking and Financial Markets, Fourth Edition, HarperCollins, New York, 1995.
- Mishkin, F. S., "International Capital Movements, Financial Volatility and Financial Instability", NBER, Working Paper, 1998, (6390).
- Mishkin, F. S., "Prudential Supervision: Why is it important and what are the issues", NBER, Working Paper, 2000, (7926).
- Padoa-Schioppa, T., EMU and Banking Supervision, Lecture held at the London School of Economics, Financial Markets Group, 1999.
- Peek, J., Rosengren, E., Tootell, G., Synergies between Bank Supervision and Monetary Policy: Implications for the Design of Bank Regulatory Structure, 1999, mimeo.
- Petersen, M. A., Rajan, R. G., "The Effect of Credit Market Competition on Lending Relationships", Quarterly Journal of Economics, 1995, (2).
- Rajan, R. G., "Why Bank Credit Policies Fluctuate: A Theory and Some Evidence", Quarterly Journal of Economics, 1994, (May).

- Reisen, H., Revisions to the Basel Accord and Sovereign Ratings, OECD, Paris, 2000, mimeo.
- Richardson, J., Stephenson, M., "Some Aspects of Regulatory Capital", Financial Services Authority, Occasional Paper, 2000, (1).
- Rochet, J. C., "Capital Requirements and the Behavior of Commercial Banks", *European Economic Review*, 1992, (36).
- Rochet, J. C., Tirole, J., "Interbank Lending and Systemic Risk", *Journal of Money, Credit and Banking*, 1996, 28(4).
- Rochet, J. C., "Solvency Regulations and the Management of Banking Risks", *European Economic Review, Papers, and Proceedings*, 1999, (43).
- Santos, J. A. C., "Banking Capital Regulation in Contemporary Banking Theory: A Review of the Literature", BIS, Working Papers, 2000, (90).
- Saunders, A., *Credit Risk Measurement – New Approaches to Value at Risk and other Paradigms*, John Wiley, New York, 1999.
- Schaeffer, S. M., "Financial Regulation: The Contribution of the Theory of Finance", in Fingleton, J. (ed.), *The Internationalization of Capital Markets and the Regulatory Response*, Graham & Trotman, London, 1992.
- Scharfstein, D., Stein, J., "Herd Behavior and Investment", *American Economic Review*, 1990, (LXXX).
- Sheldon, G., "A Limit-Risk Capital Adequacy Rule: An Alternative Approach to Capital Adequacy Regulation for Banks with an Empirical Application to Switzerland", *Swiss Journal of Economics and Statistics*, 1995, 131().
- Sheldon, G., "Capital Adequacy Rules and the Risk-Seeking Behavior of Banks: A Firm-Level Analysis", *Swiss Journal of Economics and Statistics*, 1996, 132().
- Sheldon, G., *Kosten und Nutzen der Eigenkapitalvorschriften der Banken in der Schweiz*, Forschungsstelle für Arbeitsmarkt- und Industrieökonomik, Universität Basel, 2001, mimeo.
- Shiller, R. J., *Irrational Exuberance*, Princeton University Press, Princeton, New Jersey, 2000.
- Shleifer, A., *Inefficient Markets – An Introduction to Behavioral Finance*, Oxford University Press, Oxford, 2000.
- Soltila, H., Vihriälä, V., "Finnish Banks' Problem Assets: Result of Unfortunate Asset Structure of Too Rapid Growth", Bank of Finland, Discussion Papers, 1994, (23).
- Spencer, P. D., *The Structure and Regulation of Financial Markets*, Oxford University Press, Oxford, 2000.
- Stein, J., "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior", *Quarterly Journal of Economics*, 1989, (CIV).
- Suárez, J., Sussman, O., "Financial Distress and the Business Cycle", *Oxford Review of Economic Policy*, 1999, 15(3).
- Thakor, A. V., "Capital Requirements, Monetary Policy, and Aggregate Bank Lending: Theory and Empirical Evidence", *The Journal of Finance*, 1996, March.
- Walsh, C. E., *Monetary Theory and Policy*, MIT Press, Cambridge, MA, 1998.
- Welch, I., "Sequential sales, Learning and Cascades", *Journal of Finance*, 1992, (XLVII).
- Wojnilower, A., "The Central Role of Credit Crunches in Recent Financial History", *Brookings Papers on Economic Activity*, 1980, (2).

Figure 1: HP-Detrended GDP and Bank Loans
($\lambda = 1.600$)

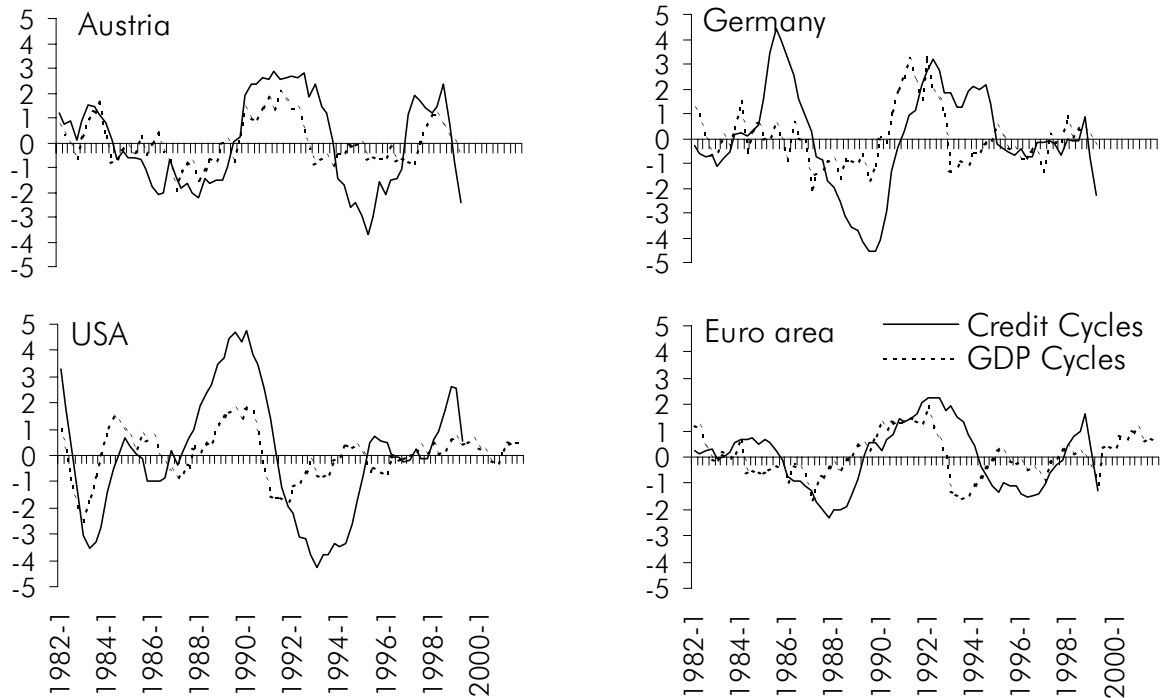
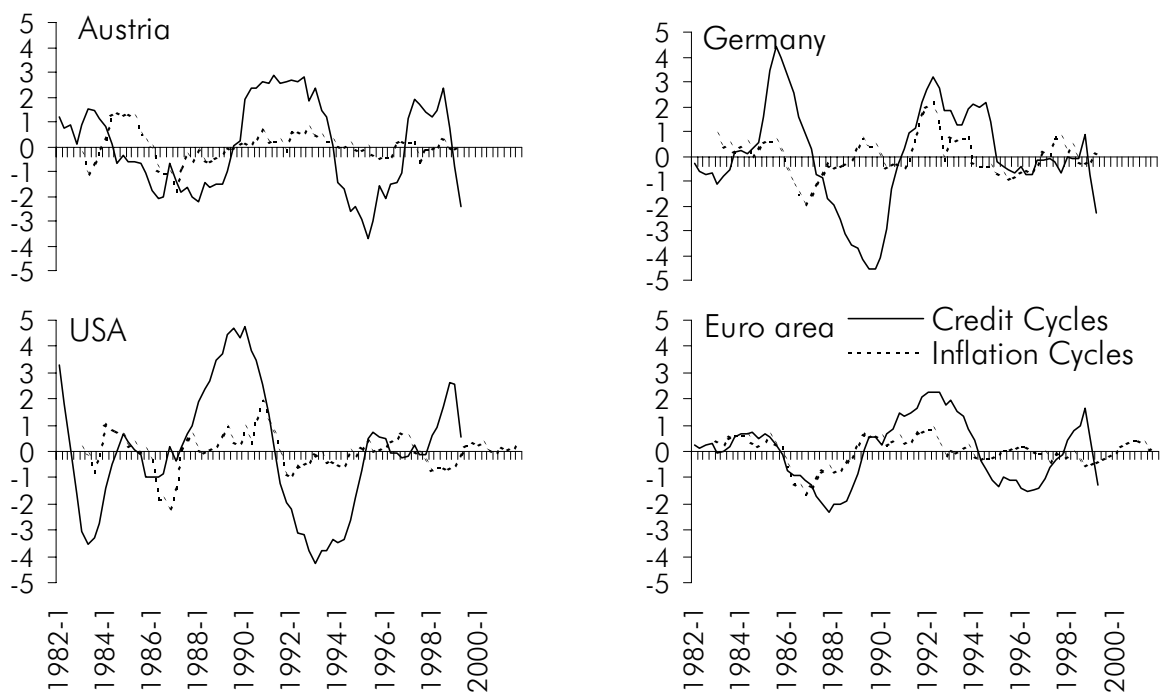


Figure 2: HP-Detrended Bank Loans and Inflation Rate
($\lambda = 1.600$)



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