

ISSUES IN

Finance

Credit, Crises and Policies

EDITED BY

Stuart Sayer

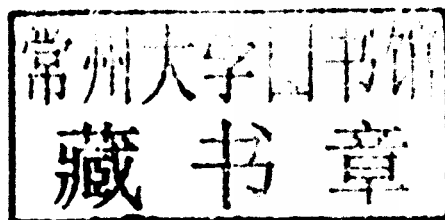


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ISSUES IN FINANCE: CREDIT, CRISES AND POLICIES – AN OVERVIEW

Stuart Sayer

The last 3 years have been interesting times for economists and economics. In much the same way as doctors and medicine can be stimulated by and thrive on the outbreak of a major epidemic, economists and economics can be spurred by crises and recession. The latest financial crisis, which began in 2007 in the US subprime market, spread to broader credit and funding markets and led into a severe recession, is no exception. Macroeconomics, which in some quarters had come to be seen as boring, following years of relative stability, no longer seems so dusty and dull.

The revival of interest in macroeconomics and its interplay with finance and credit is arguably for the good. Far from being boring, there are many deep, challenging and important questions, for which we have yet to find adequate answers. The macroeconomic cognoscenti have long been aware of this and were continuing to work away at these questions throughout the period of relative quiescent and stable macroeconomic performance preceding the recent crisis. It is largely this work that is reflected in the surveys gathered together in this book. Most of the research surveyed was carried out and even published prior to the onset of the crisis in 2007. Moreover, this volume is by no means a comprehensive survey of the rich stream of relevant research being conducted throughout the 1990s and 2000s. There are plenty of other topics and research papers that might have been included, for example, the series of papers by John Moore and Nobuhiro Kiyotaki on liquidity, credit, systemic risk and cycles (for example, Kiyotaki and Moore, 1997, 2002, 2005).

Despite the evidence provided by this literature, some eminent commentators argue that much, if not all, of the mainstream macroeconomics and finance academic scribblings (particularly of the ‘fresh-water’ variety) from the last three decades should be consigned to the dustbin of history. While there are lessons to be learnt from the current financial crisis and recession, this reaction is extreme and in danger of throwing out the baby with the bathwater. It may be conceded that some strands of the macroeconomic and finance literature suffered from a form of ‘irrational exuberance’ of their own, encouraging an unwarranted belief in the efficiency of more or less frictionless markets populated solely by rational actors, but there is plenty of work (including much of that surveyed in this book) which

does not suffer from this form of strong fundamentalism. Economics, including macroeconomics and finance, has made considerable progress over the last three or four decades. Much would be lost if we were to simply cast this aside. For any reader who doubts that, it can be salutary to take a look at the macroeconomic and finance literature of the 1950s and 1960s.

Although it is far from my intention to whitewash mainstream economics and exempt it from any responsibility for the recent turmoil in markets, it is worth noting that the broad body of academic economics is all too readily misinterpreted and misrepresented in the media and the political arena. Paul Samuelson's remark on the selection of economic advisers, although made in the early 1960s, still seems relevant: 'The leaders of the world may seem to be led around through the nose by their economic advisers. But who is pulling and who is pushing? And note that he who picks his own doctor from an array of competing doctors is in a real sense his own doctor. The Prince often gets to hear what he wants to hear'. (Samuelson, 1962). As the literature surveyed in this book indicates, there were and are doctors who might have helped to prevent or at least mitigate our current sickness, and can suggest treatments that could help to prevent a recurrence.

The opening chapter by Ines Drumond provides a timely survey of the literature assessing the pro-cyclicality of Basel II and, in this context, also gives a valuable short review of the important theoretical literature on the bank capital channel.

Michael McAleer, in the first of two "Ten Commandment" contributions, which are fast becoming something of a trademark¹, provides guidance on optimizing value at risk, in a context of market risk management such as the Basel II Accord, arguing, *inter alia*, that the Basel II Accord appears to encourage excessive risk taking. In a second closely related piece, McAleer, along with co-authors Juan-Ángel, Jiménez-Martín and Teodosio Pérez-Amaral, provides a further Ten Commandments aimed at providing a simple explanation and set of prescriptions for managing value at risk under Basel II.

In the first of two surveys on sovereign debt problems, Kathrin Berensmann takes a comparative look at a range of selected proposals to introduce statutory procedures for sovereign insolvency. The second related survey, by Sönke Häsel, focuses on collective action clauses in international sovereign bond contracts, reviewing why market practice was slow to adopt collective action clauses, despite their promotion by academics and international agencies.

Tensie Steijvers and Wim Voordeckers explore the developing empirical literature on collateral and credit rationing, a literature that appears to have been fuelled by the growing importance of collateral in bank lending. As the authors describe, the work to date tends to produce divergent results, but their review points to a number of potentially valuable refinements, which should help to add greater clarity and precision to future research on this topic.

Monica Paiella reviews the time-series and microeconomic evidence on the relationship between stock and house prices and consumer spending. She finds that the evidence indicates that the relationship between wealth and consumer spending is strong, though there are some differences over its size and nature, as well as important cross-country differences.

Lastly, Steve Ambler provides a valuable survey of the costs and benefits of price level, as opposed to inflation, targeting. *Inter alia*, he considers how price-level targeting can affect the short-run trade-off between output and inflation variability by influencing inflation expectations and how an explicit price-level target can improve economic performance for a central bank that is unable to commit to future policies.

As all the chapters in this book indicate, the economics literature of the last three decades does have much to say that is relevant to understanding events in and post 2007 and to the design of new and more robust regulatory and policy frameworks for the future. Despite the gibes of some commentators, there is a valuable and recent literature on which to build.

Note

1. See McAleer (1997, 2001, 2002, 2005a, 2005b).

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BANK CAPITAL REQUIREMENTS, BUSINESS CYCLE FLUCTUATIONS AND THE BASEL ACCORDS: A SYNTHESIS

Ines Drumond

1. Introduction

The Basel Committee on Banking Supervision (BCBS) released, in 2004, the new Basel Capital Accord (usually referred to as Basel II) to address some of the major shortcomings of the previous Basel Accord of 1988 (Basel I), thus fostering stability in the financial system. One of the central changes proposed by Basel II is the increased sensitivity of a bank's capital requirement to the risk of its assets: the amount of capital that a bank has to hold is to be directly connected to the riskiness of its underlying assets. This aspect of the new regulation has raised some concerns, at both academic and policy-making levels, because it may accentuate the procyclical tendencies of banking, in the presence of an imperfect market for bank capital: if, during a recession, bank borrowers are downgraded by the credit risk models in use, minimum bank capital requirements will increase. To the extent that it is difficult or costly for banks to raise external capital in bad times, this co-movement in bank capital requirements and the business cycle may induce banks to further reduce lending during recessions, thereby amplifying the initial downturn.

Banking regulation and, in particular, the procyclical effects of Basel II have gained special interest with the current financial crisis that began in 2007 in the US subprime market, then spreading to broader credit and funding markets. As pointed out by Rosengren (2008), banks play a critical role during periods of financial crisis because they are highly leveraged and regulated institutions, and to maintain their capital ratios after experiencing a large negative capital shock they must significantly shrink assets, which, in turn, tends to amplify the effects of economic shocks. Thus, the growing acceptance among investors that banks need to recapitalize led the crisis to deepen further and rendered it more difficult for policy makers to maintain macroeconomic stability.

The recent events and continuing instability in financial markets all over the world have led the procyclicality issue to enter the agendas of several political

international fora, such as the G7, the G20 and the European Union. In particular, according to the Action Plan agreed in the G20 Washington Meeting, in November 2008, the International Monetary Fund, the Financial Stability Board and other regulators and bodies should develop recommendations to mitigate procyclicality, including the review of how bank capital may exacerbate cyclical trends. The BCBS is now developing supervisory and regulatory approaches to mitigate procyclicality in the financial system and the Economic and Financial Affairs Council (ECOFIN) on July 2009 invited the European Commission to come forward with proposals, in coordination with the developments ongoing at international level, with a view to reducing potential procyclical effects and developing countercyclical measures. As mentioned by Wellink (2009), we cannot change procyclical behaviour, as it is the result of animal spirits, but we can seek to dampen the channels through which it manifests itself.

The present work surveys the literature in order to explore how the Basel II regulation on bank capital is likely to accentuate the procyclical tendencies of banking. We address this hypothesis – the Basel II procyclicality hypothesis – by bringing together the theoretical literature on the bank capital channel of propagation of exogenous shocks and the literature on the regulatory framework of capital requirements under the Basel Accords.

According to the literature on the bank capital channel, the introduction of bank capital requirements, for market or regulatory reasons, amplifies the effects of monetary and other exogenous shocks. This amplification effect usually rests on the argument that raising new capital can be difficult and costly for many banks, especially during economic downturns, thereby increasing the financing cost faced by firms that borrow from those banks. Firms with no effective alternative sources of credit tend to react to this increase in their financing cost by decreasing investment and output, thus amplifying the downturn. This thesis has been, to some extent, motivated by empirical evidence that bank capital affects banks' supply of loans and, consequently, real activity. Kishan and Opiela (2000, 2006), Van den Heuvel (2002b) and Gambacorta and Mistrulli (2004), for instance, show that the real effects of monetary policy are generally stronger when banks are small and low-capitalized. Hubbard *et al.* (2002), in turn, find that, even after controlling for information costs and borrower risk, the capital position of individual banks affects the interest rate at which their clients borrow. Additionally, there is a quite extensive empirical literature on the hypothesis that a 'credit crunch' – a significant leftward shift in the supply curve for bank loans – may have occurred in the USA during the early 1990s, simultaneously with the implementation of Basel I.¹

After synthesizing the theoretical literature on the bank capital channel, we focus on whether the introduction of Basel II capital requirements may add to this amplification effect. We first briefly review the key reasons for regulating banks, as well as the role of bank capital requirements in banking regulation, and then we concentrate on how the increased sensitivity of a bank's capital requirements to the risk of its assets, as envisaged by Basel II, may accentuate the amplification effect underlying the bank capital channel. We conclude that, although the theoretical models which revisit the bank capital channel under Basel II generally support the

procyclicality hypothesis, the magnitude of the procyclical effects is still subject to some debate and further attention should be drawn to the main drivers of Basel II procyclicality, namely (i) the composition of banks' asset portfolios, (ii) the approach adopted by banks to compute their minimum capital requirements, (iii) the nature of the rating system used by banks, (iv) the view adopted concerning how credit risk evolves through time, (v) the capital buffers over the regulatory minimum held by the banking institutions, (vi) the improvements in credit risk management and (vii) the supervisor and market intervention under Basel II. Furthermore, we also address how some of these issues have been highlighted by the current financial crisis and some of the measures that are being proposed to dampen procyclicality in banking regulation, as well as how these measures may be integrated in the bank capital channel literature to test their effectiveness.

The chapter is organized as follows. After this introduction, Section 2 synthesizes the bank capital channel theoretical literature. Section 3 takes a closer look at regulatory capital requirements. After briefly reviewing the key reasons for regulating the banking system and the role of regulatory capital requirements in this context, we focus on the Basel Accords and, in particular, on capital requirements for credit risk under Basel II. Section 4 discusses the Basel II procyclicality hypothesis, both at the empirical and theoretical level, also pointing out some corrective measures that may counteract the potential procyclical effects and some key areas for further research. Section 5 concludes with some final remarks.

2. The Bank Capital Channel: Related Theoretical Literature

At present, the theoretical literature distinguishes three channels of monetary policy propagation through financial imperfections: (i) the bank lending channel, arising from the fact that banks finance loans in part with liabilities that carry reserve requirements, (ii) the borrowers' balance sheet channel, focusing on borrowers' financial position and its effect on the external finance premium that borrowers face and, more recently, (iii) the bank capital channel, emphasizing that monetary policy affects bank lending through its impact on bank capital.²

The bank lending channel and the borrowers' balance sheet channel have been more extensively studied – see Bernanke and Gertler (1995) for a review. Instead, we focus on the bank capital channel models, summarized in Table 1 and classified according to (i) the motivation for bank capital holdings (market versus regulatory capital requirements), (ii) the nature of bank capital (issued capital and/or retained earnings) and (iii) the effects of exogenous shocks on lending and on the business cycle.

The rationale for bank capital holdings builds on the premise that banks hold capital for market and/or regulatory reasons. Market capital requirements, as defined by Berger *et al.* (1995), are associated with the capital ratio (i.e. the ratio of bank capital to assets) that maximizes the value of the bank in the absence of regulatory capital requirements, but in the presence of the remaining regulatory structure that protects the safety and soundness of the banking system. According to these authors, market requirements can be justified (i) by the costs of banks' financial distress,

Table 1. The Bank Capital Channel – Related Theoretical Models.

Capital requirements (CR)			Bank capital	Effect of exogenous shocks on lending and/or on the business cycle
Chen (2001)	Market	–	–	Amplified and more persistent ^a
Sumirand (2003)	Market	–	Retained earnings	Amplified with the introduction of a double CSV approach
Aikman and Paustian (2006)	Market	–	Retained earnings + endowment	Amplified and more persistent with the introduction of an asym. inform. problem between depositors and banks and between banks and firms
Meh and Moran (2007)	Market	–	Retained earnings	More persistent ^a
Blum and Hellwig (1995)	Regulatory	Binding	Fixed (no new equity issue)	Amplified with the introduction of binding CR
Thakor (1996)	Regulatory	Binding	–	↑ Risk-based CR ⇒ decrease in aggregate lending; expansionary MP when CR are binding may not increase lending
Repullo and Suarez (2000)	Regulatory	Binding	Retained earnings	Contractionary MP ⇒ ↓ bank lending relative to market lending
Furfine (2001)	Regulatory	Not binding	Retained earnings + issued equity	↑ Risk-based CR or a negative shock to bank capital ⇒ decrease in loan growth
Chami and Cosimano (2001)	Regulatory	Binding/not binding	Issued equity (but predetermined)	<i>Bank capital accelerator effect</i> : amplifies the impact of MP on the economy
Van den Heuvel (2002a)	Regulatory	Binding/buffer	Retained earnings	<i>Bank capital channel</i> (BCC): with CR, lending overreacts to a MP shock; the BCC amplifies the standard interest rate channel of MP
von Peter (2004)	Resembles a regulatory CR	Binding/not binding	Retained earnings	Negative shock ⇒ ↓ asset prices ⇒ ↑ firms default ⇒ ↑ loan losses ⇒ ↓ bank capital ⇒ ↓ credit supply (if CR are binding) ⇒ ↓ asset prices

Kopecky and VanHoose (2004)	Regulatory	Binding	Issued equity	↑ Risk-based CR reduce the effects of MP
Honda (2004)	Regulatory	Binding/not binding	Fixed	The more the banks are constrained by CR, the less effective MP is
Berka and Zimmermann (2005)	Regulatory	Binding	Issued equity	Negative aggregate shock ⇒ credit crunch; but negative ag. shock and procyclical CR (tighter during recession) soften the loan decrease
Cecchetti and Li (2008)	Regulatory	Binding/not binding	Moves with aggregate output (by assumption)	Confirms Blum and Hellwig (1995)'s results + optimal MP neutralizes the procyclical impact of binding CR
Bolton and Freixas (2006)	Regulatory	Binding	Issued equity	Potential amplifying effect of MP: tightening in MP ⇒ ↓ incentives to raise bank capital ⇒ further decline of lending
Markovic (2006)	Regulatory	–	Issued equity	Amplification of output response to a contractionary MP
Aguiar and Drumond (2007)	Regulatory	Binding	Issued equity	Introduction of CR amplifies monetary shocks through a liquidity premium effect on the external finance premium faced by firms
Jorge (2007)	Regulatory	Binding	Retained earnings	Due to CR, loans react with a delay to shifts in monetary policy
Van den Heuvel (2008)	Regulatory	Binding/not binding	Issued equity	↑ CR reduce welfare

^aWhen compared to a situation where information frictions between banks and depositors are absent. CSV, costly state verification; MP, monetary policy; CR, capital requirements.

which tend to increase if the bank capital ratio decreases, (ii) by the transaction costs of issuing equity, coupled with substantial financial distress costs from low capital, and (iii) by the existence of agency problems between shareholders and creditors.

As reported in Table 1, Chen (2001), Meh and Moran (2007), Aikman and Paustian (2006) and Sunirand (2003) focus on this type of bank capital requirements. The first three of these models have been built upon Holmstrom and Tirole's (1997) formulation, featuring two sources of moral hazard. The first source affects the relationship between banks and borrowers: entrepreneurs (borrowers) can choose between different projects and have an incentive to undertake the riskier projects in order to enjoy private benefits. To deter entrepreneurs from going after those private benefits, banks require them to invest their own funds in the project. The second source of moral hazard influences the relationship between banks and households (depositors) and is the reason for the existence of market capital requirements: because banks may not dutifully monitor entrepreneurs, households only lend to banks that invest their own net worth (bank capital) in financing the entrepreneurs' projects. As delegated monitors for depositors, banks must then be well capitalized to convince depositors that they have enough stake in the entrepreneurs' projects.

In this context, Chen's model predicts that, because both bank capital and firms' net worth are used as collateral, a change in their level has a direct effect on bank lending and, thus, on aggregate investment: when bank capital decreases, banks find it difficult to seek alternative sources of finance and are forced to cut back lending to firms, which, in turn, affects negatively firms' investment. This effect tends to persist over time: less investment in the previous period causes entrepreneurs and banks to earn less revenue, which affects negatively their level of net worth. This further weakens the lending capability of banks and the borrowing capacity of entrepreneurs.

Meh and Moran (2007) go a step further and embed Holmstrom and Tirole's (1997) framework within a dynamic general equilibrium model, in which a contractionary monetary policy not only raises the opportunity cost of the external funds that banks use to finance investment projects but also leads the market to require banks and firms to finance a larger share of investment projects with their own net worth. Because banks and firms' net worth are largely predetermined, bank lending must decrease to satisfy the market requirements, thereby leading to a decrease in investment. This, in turn, affects negatively banks and firms' earnings and, consequently, banks and firms' net worth in the future, leading to the propagation of the initial shock over time. This model thus seems to capture the tightening in market capital requirements that occurred during the current financial crisis and which led banks to hold tier one capital ratios well above the regulatory minimum and to government intervention in many countries, through the adoption of recapitalization plans, to avoid a stronger credit crunch.

Aikman and Paustian's (2006) model, building on the earlier work by Chen (2001), predicts that financial frictions lead to a persistent (as in Meh and Moran, 2007) and amplified response of the macroeconomic variables to technology, monetary and bank capital shocks. The amplification effect rests on the existence of

external capital adjustment costs in the model: a contractionary monetary policy, for instance, reduces the net worth of both entrepreneurs and banks, and, as in Kiyotaki and Moore (1997) and Bernanke *et al.* (1999), induces a negative feedback effect from net worth to asset prices and then back from asset prices to net worth, which greatly magnifies the impact of the initial shock.

Following a different approach, Sunirand (2003) also supports the bank capital amplification hypothesis: by extending the financial accelerator model of Bernanke *et al.* (1999) to consider a two-sided costly state verification (CSV) framework, Sunirand is able to dissociate the amplification effect caused by the moral hazard problem between depositors and banks from the amplification effect caused by the asymmetric information problem between banks and firms. In the well known CSV framework, first introduced by Townsend (1979), the lender must pay a cost in order to observe each borrower's realized return. In Sunirand's model, banks act as delegated monitors on firms' investment projects, as in Bernanke *et al.*, and depositors perform the role of 'monitoring the monitor', as in Krasa and Villamil (1992).³ The two-sided CSV framework leads to a wedge between the internal and external cost of funds that motivates an endogenous role for firms' and banks' capital in the model. Sunirand then shows that embedding the informational asymmetry between households and banks into the financial accelerator model further amplifies and propagates the effects of a negative monetary shock on aggregate output and investment.

Notwithstanding the importance of market capital requirements on banks' behaviour, as the current crisis has shown, the majority of the theoretical bank capital channel literature focuses exclusively on bank capital requirements imposed by banking regulation. See, for instance, Blum and Hellwig (1995), Thakor (1996), Repullo and Suarez (2000), Chami and Cosimano (2001), Van den Heuvel (2002a, 2008), Berka and Zimmermann (2005), Bolton and Freixas (2006), Markovic (2006) and Aguiar and Drumond (2007). Blum and Hellwig (1995), who have pioneered this approach, argue that a rigid link between bank capital and bank lending imposed by regulation may amplify macroeconomic fluctuations, by leading banks to lend more when times are good and to lend less when times are bad. Assuming that banks cannot issue new capital and that firms do not fully replace bank loans by other sources of finance, the amplification mechanism works as follows. If many banks face low return realizations at the same time, they may all become simultaneously undercapitalized and then all may have to decrease lending (or to recapitalize) at the same time, in the presence of a regulatory capital adequacy requirement. This is likely to reduce firms' investment and, therefore, aggregate demand and firms' cash flows, which negatively affects the ability of firms to pay their debts and hence the return that banks receive on their loans. A given initial shock to asset returns may thus be amplified by a rigid application of a capital adequacy requirement (Blum and Hellwig, 1995, pp. 741–742).

An alternative explanation for the decrease in bank loan supply during bad times, under regulatory capital requirements, rests on banks' exposure to the interest rate risk. Take, for instance, the work by Repullo and Suarez (2000) according to which some long-term bank assets involve fixed interest rates whereas the returns of many

short-term bank liabilities are closely linked to market interest rates. A monetary tightening thus generates losses to the banks, thereby reducing bank capital, which, in turn, produces a credit crunch under regulatory capital requirements: bank lending and investment decrease, and the higher quality bank borrowers tend to shift to market finance. Van den Heuvel (2002a) also assumes that banks are exposed to interest rate risk, while not able to issue new capital. An increase in the interest rate after a contractionary monetary policy and, consequently, an increase in the bank's cost of funding leads to a decrease in the bank's profits, given the maturity mismatch on the bank's balance sheet, weakening the bank's future capital position and thus increasing the likelihood that its lending will be constrained by an inadequate level of capital. Therefore, new lending overreacts to the monetary policy shock, compared to a situation of unconstrained banks. Van den Heuvel refers to this channel operating via the supply of bank loans through its impact on bank capital as the bank capital channel. Its strength depends on the capital adequacy of the banking sector and on the distribution of capital across banks (because, as mentioned by Benink *et al.* (2008), there is no interbank market for bank equity): lending by banks with low capital is delayed and then amplified in reaction to interest rate shocks, relative to well capitalized banks.

Chami and Cosimano (2001), Berka and Zimmermann (2005), Bolton and Freixas (2006), Markovic (2006) and Aguiar and Drumond (2007) also consider regulatory capital requirements, but, in contrast with Van den Heuvel, assume that banks may issue equity. However, equity issuance may involve costs, as in Bolton and Freixas (2006), who introduce a cost of outside capital for banks by assuming information dilution costs in the issuance of bank equity: outside equity investors, having less information about the profitability of bank loans, tend to misprice the equity issues of the most profitable banks. In such a context, binding regulatory capital requirements may magnify the effects of a contractionary monetary policy, because this policy may cause a decrease (or prevent an increase) in bank capital, as bank loans become insufficiently lucrative when information dilution costs in bank equity issuance are taken into account.

Markovic (2006) also explores the asymmetric information relationship between banks and their shareholders, developing a model that extends Bernanke *et al.*'s (1999) work to account for three bank capital channels: (i) the adjustment cost channel, which builds on the allocation cost necessary to reduce the aforementioned asymmetric information problem; (ii) the default risk channel, which arises from the possibility of banks defaulting on their capital; and (iii) the capital loss channel, based on the assumption that, during a recession, banks' shareholders anticipate a future fall in the value of bank capital. All channels trigger an increase in the required return on bank capital by shareholders, and thus an increase in the cost of bank capital, during a recession. This higher cost is then transferred to firms, leading to lower firms' investment and output. All the three channels thus amplify the output response to a contractionary monetary policy.

In a slightly different perspective, Van den Heuvel (2008) quantifies the potential welfare costs of bank capital requirements by embedding the role for liquidity