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The global credit boom: challenges for macroeconomics and policy

Michael Hume and Andrew Sentance

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Michael Hume⁽¹⁾ and Andrew Sentance⁽²⁾

Abstract

The recent financial crisis has put the spotlight on the rapid rise in credit which preceded it. In this paper, we provide an empirical and theoretical analysis of the credit boom and the macroeconomic context in which it developed. We find that the boom was unusually long and associated with neither particularly strong growth nor rising inflation in the economies in which it took place. We show that this type of credit and financial cycle is hard to reconcile with existing economic theory and argue that, while the ‘global savings glut’ may account for the cycle’s initial phase, other factors — such as the conduct of monetary policy and perceptions of declining macroeconomic risk — were more important from the mid-2000s onwards. We conclude by identifying some of the challenges now facing macroeconomics and policy.

Key words: Credit, business cycle, financial crisis, monetary policy, asset prices, boom and bust.

JEL classification: E30, E50.

(1) Bank of England. Email: michael.hume@bankofengland.co.uk

(2) Monetary Policy Committee, Bank of England. Email: andrew.sentance@bankofengland.co.uk

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External MPC Unit, Bank of England, Threadneedle Street, London, EC2R 8AH

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Summary

The world economy moved sharply into recession over the second half of 2008. Every G7 economy experienced a fall in output in the second half of last year, continuing into early 2009, and many other economies across the world also experienced a contraction in economic activity. The driving force behind the downturn is the global financial crisis which brought to an end the worldwide credit boom that began in the mid-1990s.

Previous global bank lending booms in the early 1970s and mid-to-late 1980s were hump-shaped phenomena lasting between two and five years. The boom which started in the mid-1990s and ended only recently was different. It lasted twice as long, the increase in the bank lending to GDP ratio was more marked, and it was concentrated in the household sector in its later stages to an unusual extent. It also seems to have been focused on the advanced economies and US-led, with the boom in the US starting in the mid-1990s compared with start dates of 2001-2002 for most other economies. There was also a rapid expansion in the shadow banking and broader financial systems although, importantly, this was part of a trend which can be traced back to the early 1980s.

Associated with the rapid expansion of credit were a number of other macroeconomic phenomena. Many have featured regularly in previous cross-country empirical work. Real short- and long-term interest rates declined; there was a rapid increase in equity prices in its first phase and in property prices throughout; and in the advanced economies where the boom was concentrated real exchange rates rose and current account balances fell. However, somewhat paradoxically, it appears that output and inflation were generally stable in the advanced economies where the credit expansion was concentrated and increased in the emerging economies where it was not.

The coexistence of broadly stable growth and inflation and a long-lasting credit and financial cycle challenges the macroeconomic consensus. The assumptions of the prevailing Dynamic Stochastic General Equilibrium model – efficient markets, rational expectations and optimising agents – are hard to reconcile with these empirical features. And while elements of alternative Monetarist, Austrian, Post Keynesian and Behavioural thinking provide some insights into the



origins of credit and financial cycles they do not account for the credit boom's unusual duration or the absence of strengthening output growth and rising inflation in the advanced economies.

We show how the origins of the credit and financial cycle are connected with three macroeconomic features of this period: the emergence of significant global financial imbalances; the previous experience of steady growth and inflation in many advanced economies since the 1980s (known as the Great Stability or Great Moderation); and a new phase of globalisation of the world economy which saw the integration of China and many other low cost producers into the global economic system. We show that, while the “global savings glut” may have been an important driver of the credit boom in the late 1990s, other factors – such the conduct of monetary policy and perceptions of declining macroeconomic risk – were more important from the mid-2000s onwards.

We also propose two explanations for the “growth puzzle of the 2000s” – i.e., the coexistence of broadly stable growth and inflation and a long-lasting credit and financial cycle. First, the rise in credit and asset prices seems to have been driven by factors that had a relatively limited impact on demand and which generated relatively mild wealth effects on demand. Second, in those economies where demand did increase it did not translate into much higher output because a large portion spilled over into imports and deteriorating external balances. These demand spillovers were consequently reflected in strong export and output growth and the build up of external surpluses in Japan, Germany, China and other emerging market economies. So, while output growth was not particularly strong in the major advanced economies in the mid-2000s, this was still a period of strong growth in emerging markets and globally which led to upward pressure on energy and commodity prices.

This analysis suggests that there is plenty of scope for improving both macroeconomics and policy. We therefore conclude by identifying some of the challenges facing both. We discuss the need to: integrate endogenous credit and financial cycles into orthodox macroeconomic models; improve understanding of macro-financial linkages; recognise the limitations of economic theory; develop tools for macro-prudential regulation; and be realistic about the degree of macroeconomic stability that national monetary policy can achieve in a highly integrated global economy.



1 Introduction

The world economy moved sharply into recession over the second half of 2008, and so far it is not clear how deep or prolonged this recession will be. Every G7 economy experienced a fall in output in the second half of last year, continuing into early 2009, and many other economies across the world also experienced a contraction in economic activity.

The main driving force behind the downturn has been the global financial crisis originating from losses in the sub-prime US mortgage market and the associated shock to consumer and business confidence which followed the collapse of Lehman Brothers. The global financial crisis also brought to an end a long period of rapid credit growth which fuelled rising asset prices, in particular of property. The clear association between the financial crisis and the onset of recession has put the spotlight on the rapid expansion of credit which preceded both.

In most major economies, the conventional macroeconomic indicators used to guide macroeconomic policy – output and inflation – did not suggest that trouble was ahead. Indeed, when the crisis hit in 2007, the prevailing view of the period of economic expansion going back to the late 1980s and early 1990s was that it was a “Great Stability” or “Great Moderation” – a period of steady and sustained growth accompanied by low inflation. As a result, although there was concern over the growth of credit, asset prices, and global financial imbalances, policy-makers have been caught off their guard by the severity of the crisis and have had to take unprecedented and dramatic steps to stabilise the financial system and the wider economy.

The coexistence of stable growth and inflation and a long-lasting credit and financial cycle brought to an end by a global financial crisis challenges the macroeconomic consensus that has grown up since the emergence of inflation as a major economic policy problem in the late 1960s and early 1970s. That consensus stressed the importance of controlling inflation as an essential underpinning for broader economic stability. However, taking a longer historical perspective, the recent instability of the financial system is not unprecedented. It was an important feature of economic cycles in the 19th century and early 20th century. With hindsight, perhaps, it is not the return of financial instability that should surprise us but that it took so long.

This paper aims to identify some of the key challenges for macroeconomics and policy which are



posed by the global credit boom and the ensuing financial crisis. In doing so it suggests that attempts to identify a single cause of the crisis are misplaced. The crisis was the consequence of complex interactions between a range of factors and there is a risk that recent experience could be repeated if this is not the basis upon which policy reforms are made. However, it would be too ambitious to offer a menu of the precise measures which will be needed to prevent future crises. Instead we scope out the likely research and policy agenda.

The paper is structured as follows. First, we set out an empirical study of the credit boom and its associated phenomena. Second, we review theories of credit and financial cycles and show how none of them provide a complete explanation of what has happened. Third, we consider the global macroeconomic context in which the boom took place. Finally, we set out some of the key challenges now facing macroeconomics and policy.

2 Empirical Assessment

It is generally agreed that preceding the current financial crisis there was a financial boom of some sort. There is no such general agreement, however, about when the boom began, how long it lasted, how pronounced it was, whether it can be viewed as a single event or a succession of different ones, and how US-centred it was. The purpose of this section is to provide some perspective on these issues. We start by providing an assessment of the boom in traditional bank lending at both the country and global levels. We then broaden our analysis to the shadow banking and broader financial systems. Finally, following previous work that has shown clear links between credit and other business cycle phenomena, we identify some of the boom's associated macroeconomic features.

2.1 Bank Lending

We begin by considering bank lending to firms and households. This measure of credit has been the main focus of previous empirical studies of advanced economy credit booms such as Borio, Kennedy and Prowse (1994), Hofmann (2001), Borio and Lowe (2002), Mendoza and Terrones (2008), as well as numerous other papers on emerging market financial crises. The two most popular indicators analysed in these previous papers have been the bank lending to GDP ratio and bank lending per capita. There are merits to each but the former is the more popular when

analysing cyclical variations in advanced economies and is consequently the one we have chosen to focus on. To help cross-country comparability we follow Mendoza and Terrones (2008) and use the IMF's estimates of the banking sector's claims on the domestic private sector. This is available at an annual frequency in the IMF's IFS database for 33 advanced and emerging countries from 1965 to 2007.¹

Chart 1 shows our estimates of the aggregate bank lending ratios for the advanced, emerging and world aggregate measures computed using the IMF's purchasing power parity GDP weights for 2000. It shows the previous global credit booms in the early 1970s and mid-to-late 1980s as hump-shaped phenomena, lasting between two and five years. In this regard, the boom since the late 1990s is different. In the late 1990s, the world credit ratio seemed to be following the usual hump-shaped path with an up-leg of about three years' duration. It then began to tail off. But at the turn of the millennium it stopped conforming with the previous hump-shaped pattern by embarking on a second up-leg that continued up to 2007, the last year in our sample. The first leg appears to have been led, albeit briefly, by the emerging economies and the second leg both led and dominated by the advanced economies.

This broad-brush picture is confirmed by formal empirical methods. Recent work along these lines has usually involved first calculating the deviation of the bank lending ratio from an estimate of its trend using a statistical filter and then using thresholds to gauge whether a boom has taken place, when it started and ended, and when it peaked. We have taken a similar approach. However, unlike earlier studies our focus is on a boom that has only recently ended and so it was important for us to use a method of analysis that takes account of the end-point problems of statistical filters. For this reason we employed the expanding Hodrick-Prescott filter used in Gourinchas, Valdes, and Landerretche (2001). This extends the sample over which the filter is applied by one year as each successive year in the sample is added such that for any point in time the trend is estimated on the basis of the data up to, but not beyond, the point in time in question. While this does not remove the end-point problem of statistical filters it ensures that the recent boom is at least being compared with previous booms on an equal footing and that its results are not dependent on the future path of the bank lending ratio. However, it does not rule out the possibility that the results could change in the light of revisions to recent data.

¹Data for China are available only from 1980 and data for Norway end in 2006.

The thresholds used for determining the characteristics of booms in previous studies have varied, ranging from an arbitrary constant to a multiple of the standard deviation of the bank lending ratio. Given our focus on analysing the current boom and not earlier ones, instead of setting an arbitrary threshold, we chose to calibrate it so that it generated results consistent with historical accounts and previous studies. We found that this was best achieved using a hybrid threshold that was related to whichever was the smallest of the panel (split into advanced and emerging groups) and individual country standard deviations. The boom threshold was set at one standard deviation while the limit thresholds – which determine when the boom begins and ends – were set at half a standard deviation.

The results for booms ending before 2007 are shown in Table 1. Reflecting the way in which our thresholds were chosen the historically important booms are well identified. The early 1970s global boom is picked up, led by the US and the UK; the 1980s global boom also registers; and those in Japan and Sweden (and the rest of Scandinavia) are dated accurately from 1986 to 1989/1990; the German post-unification boom is evident; and the end years of the 1990s booms in Mexico, Thailand, Malaysia and Singapore all accord closely with the timing of their respective crises. Inevitably, there are some Type I and Type II errors: Korea is identified as being in a boom during the Asian economic crisis from 1997 to 2002; the 1980s boom in the UK appears too long (1981-1989); and the US boom of the 1980s seems to end too early (1987).² On balance, however, the approach appears reasonably efficient at identifying not only the vast majority of historically significant booms, but also their start and end dates.

The results for those booms that were ongoing in 2007 are shown in Table 2. Of the 33 countries in our sample 15 are found to have been in the midst of a boom that year. Even so, the world aggregate measure does not show that a boom was occurring at the global level. This seems to be because of the influence of Japan and Germany: excluding them suggests that a global boom was underway by 2005 and followed an earlier boom between 1998 and 2001.³ Relative to the historical record, the average length of the booms has been nearly twice as long; the increase in

²The Korean boom is consistent with the observed upward trend in the bank lending ratio over this period but it is driven by falling nominal GDP rather than rising bank lending; the early start of the UK boom can probably be attributed to the extensive financial liberalisation that took place throughout the decade by successive Thatcher governments; and the early end of the US boom most likely reflects the limitations of using bank lending as the principal indicator for an economy that relies heavily on capital markets. We found that by applying the same method to a broader measure of credit which includes capital markets extended the duration of the US boom in the 1980s by another year.

³The US was almost unique in experiencing a boom between 2003 and 2005.

the bank lending ratios has been greater; but the peak deviations have been broadly comparable. It also appears that the US may have played a leading role, with its boom starting in 1995 compared with mean and median start dates of 2001 or 2002, as shown in Chart 2. The deviation in the US is estimated to have been larger than for the rest of the world, but not the average for other advanced economies, reflecting the upward influence from a number of euro-area countries, possibly owing to them having experienced falling interest rates associated with their membership of the single European currency (Spain, Ireland, Finland, and Greece). All in all, it seems reasonable to conclude that the defining characteristics of the expansion in bank lending are that it has been unusually long, US-led, and concentrated in the advanced economies.

2.2 *The Shadow Banking System*

While the previous focus on bank lending has the advantage of being applicable to a large set of countries covering both advanced and emerging economies stretching over a long period of time it does not give consideration to the broader financial expansion that seems to have taken place. Financial market commentators and participants regularly point to this having been an important, if not the most important, feature of the past decade. One aspect of this phenomenon is the so-called shadow banking system – largely unregulated financial institutions such as investment banks, hedge funds, SIVs, conduits, and monolines – which increased the availability of non-bank credit to households and firms.

The OECD publish total economy financial balance sheet data which can be used to gauge the overall size of the shadow banking system of the advanced economies.⁴ Chart 3 shows that for both the US and the rest of the OECD the shadow banking system represents an important source of credit for households and firms, amounting to nearly 120% of GDP in the US and more than 60% of GDP elsewhere in the OECD. However, while in the US there has been a rapid increase in non-bank credit to households and firms since the mid-1990s it has been broadly stable elsewhere. This suggests that the growth of the shadow banking system has been largely a US phenomenon.

⁴No equivalent data are available for the emerging economies. However, the advanced economies remain dominant when it comes to capital markets. In 2007, the G7 group of leading industrial economies still accounted for 64% of global capital markets and the IMF's group of advanced economies accounted for 81%. Source: IMF Global Financial Stability Report, October 2008, Data Appendix Table 3: Size of Capital Markets.

However, this only measures the importance of the shadow banking system in terms of what has been happening to the asset side of the financial sector's balance sheet. There are many banks that have continued to supply loans but with an increasing reliance on wholesale funding markets as opposed to traditional customer deposits. Growth of the shadow banking system when measured in this way has been more pronounced, especially in the OECD ex-US economies, as shown in Chart 4.

More intriguingly, the US data suggest that the growth of the shadow banking sector over the past decade merely extends a trend whose origins can be traced to the early 1980s. This picture of a much longer-lasting and broader financial expansion is even more evident when non-credit components of the financial balance, such as equity liabilities, are included, as shown in Chart 5. This is potentially significant as the total economy financial balance sheet is a superior measure of overall financial expansion as it is nearly four times the size of the combined traditional and shadow banking system balance sheets, as shown in Tables 1 and 2. The evolution of its financial sector component, in particular, would seem to be consistent with the view of some financial market practitioners, such as Soros (2008), who argue that the global financial system has been in the throes of a 'Super-Bubble' since the mid-1980s rather than since the late 1990s, as shown in Chart 6.⁵

2.3 Households and Firms

The OECD financial balance sheet data also provide the opportunity for more detailed analysis. Chart 7 shows a broader measure of credit – comprising credit from the traditional and shadow banking system credit and bonds issued in the capital markets – which indicates there has also been two phases to the credit expansion beginning in the mid-1990s. In the first phase, which runs from the mid-1990s to around 2000, both the US and rest of the OECD experienced a rapid increase in the credit ratio of firms, most likely linked to the dot-com boom. Over the same period, the household sector credit ratios increased only moderately. The second phase, which

⁵Note that even the total economy unconsolidated financial balance sheet understates the size of financial liabilities as it excludes derivatives. According to the Bank for International Settlements the gross market value of OTC derivatives in the G10 economies plus Switzerland stood at over \$20trn in June 2008 and the notional value of these derivatives totalled \$684trn. Since June 1998, these amounts have increased nearly tenfold which would appear to be consistent with a much broader financial boom having taken place. However, the relatively short history of these series on derivatives means that they are hard to interpret.

runs from around 2000 onwards, is dominated by an unprecedented rise in the US household sector credit ratio. This is mirrored neither in the rest of the OECD nor in the firm credit ratios.

However, the aggregate OECD ex-US data mask considerable variations across countries in the second phase, as shown in Table 5, where three things stand out. First, although the rise in household sector credit ratio after 2000 for the aggregate OECD ex-US measure was unremarkable there were numerous economies that witnessed sharp rises, some far greater than in the US. In fact, of a total of 20 countries a quarter witnessed faster increases in the household sector credit ratio than the US. Second, Japan and Germany are clear outliers. They are the only two economies to have witnessed a decline in the household sector credit ratio and, given their high GDP weights, they affect the OECD ex-US data considerably. Excluding these two economies suggests that the US experience was common across many other economies. Finally, a similar pattern, albeit much less pronounced, emerges for firms.

On the basis of this analysis it seems reasonable to conclude that the acceleration in private sector credit – a much broader measure of credit than bank lending – began with an expansion of firm sector credit but intensified after around 2000 with an unusually pronounced rise in household sector credit. This is most evident in the US but was also a feature of many OECD economies other than Japan and Germany.

2.4 Associated Business Cycle Phenomena

We now turn to the issue of other business cycle phenomena that have been associated with the growth of private sector credit. It is worth starting by considering the stylised facts. Much of the research in this field has originated from the Bank for International Settlements, which has campaigned to increase the weight given to credit by policy-makers over the past decade. Its most extensive work is that of Borio, Kennedy and Prowse (1994). Although the primary focus of their paper is an examination of asset price fluctuations across 13 major OECD countries it concludes “This study has argued that a distinguishing feature of the pronounced medium-term asset price fluctuations observed since the early 1980s has been the role of credit. The major expansion of credit in the wake of a substantial heightening of competitive pressures in the financial industry appears to have been a significant factor in facilitating and sustaining the upswing. It may also have exacerbated the downswing”. Hofmann (2001) turns this analysis on

its head by focusing on the determinants of private sector credit in 16 industrialized economies since 1980 based on a cointegrating VAR. He concludes that long-run developments in credit cannot be explained by the usual determinants of output and real interest rates unless a role for real property prices is also included. He also finds a significant two-way dynamic interaction between bank credit and property prices. Borio and Lowe (2002) assess the reliability of credit and asset price indicators as predictors of financial crises and find that “financial imbalances can build up in a low inflation environment”.

A more recent piece of work by Mendoza and Terrones (2008) has also made an important contribution by examining the behaviour of macroeconomic aggregates and firm-level data during credit boom periods in both industrial and emerging economies. Although its primary focus is on identifying differences between cyclical patterns in industrial and emerging economies some common patterns emerge, including that “credit booms across emerging and industrial economies are associated with a well-defined pattern of economic expansion in the build-up phase of the booms, followed by contraction in the declining phase. Output, expenditures, stock prices, housing prices, and the real exchange rate move above trend in the first phase, and drop below trend in the second phase, and the current account falls first and then rises. All of this happens without major changes in inflation”. Owing to the greater prevalence of credit booms in emerging markets, there have been a much larger number of studies that have investigated credit booms in emerging market economies, such as Gourinchas, Valdes, and Landerretche (2001), Cottarelli, Giovanni, and Vladkova-Hollar (2003) and International Monetary Fund (2004). They have generally confirmed similar, though more pronounced, patterns in emerging market credit boom episodes.

Chart 8 and Table 6 provide a snapshot of some of the global business cycle indicators highlighted in these studies. The first thing to note is that the experience of the past decade broadly aligns with the stylised facts. For the OECD economies where the boom was concentrated real short- and long-term interest rates declined; there was a rapid increase in global asset prices covering equity prices in the first phase and property prices throughout; the real exchange rate strengthened, albeit only a little; and the current account balance fell. It is also evident that the rise in credit was not associated with an increase in OECD inflation, either at an aggregate level, as shown in Chart 9, or on a cross-country basis, as shown in Chart 10.



However, the absence of rising inflation is perhaps not so surprising given the work of Borio and Lowe and Mendoza and Terrones. What is surprising is that there does not seem to have been an increase in output growth either. Average real output growth in the OECD economies between 1996 and 2007 was 2.8%, which is identical to the 20-year and 30-year average growth rates. Excluding the economies of Japan and Germany, which did not experience a credit boom, does not change the overall picture, as shown in Chart 11. That said, there is some association between output growth and changes in the credit ratio on a cross-country basis, as shown in Chart 12, although it is not striking if Japan is taken out of the picture. What is striking is that outside the OECD output growth has risen to an unprecedented extent. The move to stronger growth began in the late 1990s and has gained considerable strength over the past five years. It also led to the emergence of inflationary pressures in non-OECD economies, although this has been significantly affected by commodity price changes as opposed to underlying inflation pressures. In other words, somewhat paradoxically, it appears that output and inflation were generally stable in the advanced economies where the credit expansion was concentrated but increased in the emerging economies where it was not.

Having sketched out the main empirical features of the credit boom and its associated macroeconomic features the following two sections will attempt to account for them. Section 3 assesses existing theories of credit and financial cycles and Section 4 considers what role may have been played by the broader macroeconomic context in which the credit boom took place.

3 Theories of Credit and Financial Cycles

The empirical assessment highlighted that the past decade's credit boom was unusual in two respects. First, it was highly persistent, with booms in most countries lasting about twice as long as the average of booms since 1970. Second, it was generally associated with neither stronger output growth nor inflation in the economies in which it took place. The main purpose of this section is to establish how consistent existing economic theory is with these empirical findings. We first assess the orthodox macroeconomic business cycle model; we then consider the merits of the rival monetarist model; and finally we survey some prominent heterodox models.



3.1 The Dynamic Stochastic General Equilibrium Model

The state-of-the-art orthodox macroeconomic model is the Dynamic Stochastic General Equilibrium (DSGE) model. A fusion of the Real Business Cycle models of the 1980s and the New Keynesian sticky price models of the early 1990s, this model initially incorporated no role for credit and financial cycles at all. This changed following Bernanke, Gertler and Gilchrist's (1998) landmark paper which incorporated heterogeneous firms and a credit market motivated by asymmetric information into a Dynamic New Keynesian model. The result was a new collateral channel through which changes in asset prices could lead to pro-cyclical changes in credit with effects on investment demand. This so-called 'financial accelerator' has since been established as a standard feature in many DSGE models with researchers over the past decade having focused their efforts on extending the role of credit frictions to heterogeneous households and introducing a 'cost channel' through which the cost of external finance has an impact on firms' costs and prices. These models have been successfully calibrated to reproduce the business cycle characteristics extracted from VAR representations of historical data.

However, it is not clear that they can account for the more pronounced credit and asset price cycles that occur from time to time, including the one observed over the past decade. The financial accelerator may lead to credit acting as a powerful propagator of shocks but it does not result in credit being a driver of business cycle fluctuations. This is because the standard DSGE model incorporates three key assumptions: the efficient markets hypothesis; the rational expectations hypothesis; and optimising agents. These assumptions ensure that there is a strong tendency for the economy to converge towards its steady-state equilibrium; that macroeconomic fluctuations occur because the economy is subjected to real and monetary shocks and there are nominal and real rigidities that prevent agents from adjusting instantaneously to them; and that financial markets mirror economic fundamentals rather than act as independent source of shocks to which agents must adjust. The introduction of the financial accelerator, therefore, results in credit and financial cycles that are only pseudo-endogenous in that can only be as pronounced as the economic cycle underlying it.⁶

Serially correlated positive supply, monetary or demand shocks are the standard explanation for a

⁶It is possible to generate economic effects in response to a change in the structural parameters related to the financial accelerator in DSGE models but they are not generally viewed as quantitatively significant.

long-lasting expansion in credit and rapidly rising asset prices in DSGE models. However, these are hard to reconcile with the empirical features of the past decade because it is not clear how these shocks would have generated higher credit and asset prices but not higher output and inflation. It is for these reasons that many orthodox economists have argued that the origins of the credit and asset price cycle can be found in the process of globalisation. The two most popular explanations are the “global savings glut” theory associated with Ben Bernanke and the shortage of financial assets theory associated with Ricardo Caballero. According to these theories, robust supply-driven growth in emerging economies created an excess of savings over investment which has flowed to the advanced economies either as a consequence of policy choices (to support export-led growth) or because their financial systems are unable to absorb such high savings (the financial asset shortage). The result is capital flows into advanced economy financial markets, low advanced economy interest rates, and current account imbalances. At the global level the relatively modest impact on inflation despite stronger output growth is explained by the increased growth being supply-driven.⁷

However, while the process of globalisation is undoubtedly important – as will be emphasised in section 4 – it does not rescue the orthodox model in our view. First, it does not explain why the boom lasted so long. Efficient markets would normally have been expected to generate a rapid increase in asset prices when the positive supply shock emerged, not a gradually intensifying boom that transitioned rapidly into crisis. Second, it does not explain how such a pronounced credit and financial cycle coexisted with neither higher growth nor rising inflation in the economies where it took place. This sort of separation of the real and financial economies is incompatible with both the efficient markets hypothesis and the financial accelerator. Third, the increase in credit in the advanced economies far exceeded the net inflows of capital from emerging economies. This suggests that most of the credit expansion in the advanced economies was created domestically.⁸ Fourth, the link between credit and international capital flows appears to have been asymmetric. Our analysis of bank lending suggests that there were credit booms in many of the large emerging economies, such as China from 1997-2000, India from 1998-2007 and Brazil from 2000-2007 despite the outflows of capital which the emerging economies experienced. Finally, it does not explain why the boom came to an end. There is little evidence to

⁷The stability of inflation may have been further aided by the low level of interest rates operating through the cost channel mechanism highlighted previously.

⁸For the US the increase in credit amounted to five times net foreign inflows over the period 1998-2007. See section 4.1 for details.



suggest that the positive global supply shock was in the process of reversing and neither globalisation nor its associated international flows suddenly stopped in 2007. Consequently, the orthodox account of the crisis is left having to explain many of the most important features of the past decade as a series of exogenous shocks. This does not seem to be much of an explanation at all, especially when these exogenous shocks are also hard to identify.

3.2 Monetarism and the Market for Assets

DSGE models typically have a very simplified monetary transmission mechanism. They neglect money and credit and focus heavily on the role of interest rates instead, which in many cases is summarised by the central bank's official interest rate. There is, however, a long tradition of alternative, monetarist, thinking in which money and credit are seen as much more important. Friedman and Schwartz (1963) and Cagan (1965) provide extensive accounts of how financial crises are episodic and largely exogenous phenomena which have cyclical consequences operating principally via declines in deposit-currency ratios and their effects on the stock of money. It is not unreasonable to think that the breakdown of the asset backed commercial paper (ABCP) markets in August 2007 was the shadow banking system's equivalent of banking panics from an earlier era which then spread to encompass the entire financial system. On this view, the shadow banking system's inability to acquire high powered or commercial bank money when holders of ABCP failed to rollover their funding might be seen as crucial. But even if the monetarists are right to suggest that in earlier crises there was no deterioration in credit quality and so the banking panics were largely exogenous this does not seem to be a reasonable view to take this time. Not only does the magnitude and duration of the preceding credit boom point to the likelihood of a steady deterioration of credit quality over time but the source of the crisis is easily traced to delinquencies and defaults on sub-prime mortgages.

Nevertheless, the monetarist ideas on which these accounts are based have evolved considerably since they were first developed. Later versions include models where money, credit, and asset prices are explicitly modelled as part of the monetary transmission mechanism. For example, Brunner and Meltzer (1988) present an extended IS-LM model in which money and credit are part of the "market for assets" in which agents are continually rebalancing their portfolios in response to exogenous shocks and changes in monetary policy. In this way asset prices are the principal mechanism by which short-run equilibrium is achieved. They emphasise that their



analysis “makes credit responses an integral part of the asset market adjustment. There are no credit market effects independent of monetary effects. The issue of whether credit or money matters for output or asset prices has no meaning”. What this implies is that credit and asset price shocks are potentially just as valid sources of business cycle fluctuations as are real and monetary shocks. Their effects, however, vary depending on the nature of the shock considered.

It is, for example, possible to generate credit and asset prices cycles in this model via shocks to expectations and financial innovation. In the context of the global credit boom, three properties from the Brunner-Meltzer model are worth considering. First, in response to a fall in interest rates the effect in this model is to increase both money demand and the asset price level but with an ambiguous effect on credit demand.⁹ This would suggest that a factor other than loose monetary policy may be needed to explain credit and asset price cycles. Second, in response to an increase in the expected return to real assets both the asset price and the demand for credit increases but with an ambiguous effect on money demand.¹⁰ This would seem to support the case for seeing credit as a facilitator of asset price cycles driven by expectations. Third, in response to an increase in credit supply, perhaps following some form of financial innovation, the effect is to lower interest rates and increase both asset prices and money demand. In all these cases the extent to which output and inflation respond depend on interest rate and wealth effects on aggregate demand.¹¹

However, while this model can account for a pronounced credit and financial cycle in the short run it is hard to reconcile it with the long-lasting credit expansion that has just been observed without resorting to the possibility of serially correlated real and monetary shocks. Neither does it explain why, given that the cycle did last for such a long time, the effects on output and prices were so modest. Finally, in common with other traditional macroeconomic models, it suffers from inadequate micro-foundations. This means that it is vulnerable to the Lucas critique and is of little use when assessing the role that policy might have played in generating both the boom

⁹The ambiguous credit demand response arises because the fall in interest rates will tend to have a positive effect but the rise in asset prices will tend to have a negative effect by lowering the cost of equity financing and thereby the need for bank credit. Some readers may wonder how powerful this is given the possibility of collateral effects along the lines of the financial accelerator used in DSGE models. It is noted later that speculative asset price expectations may be an additional reason for thinking that credit demand may increase in response to a rise in asset prices. See footnote 12.

¹⁰The ambiguous money demand response arises because the increase in the expected return to real assets will tend to have a negative effect but the increase in asset prices will tend to have a positive effect.

¹¹Output and inflation respond with a lag owing to price and wage rigidities. As they adjust the movements in the market for assets will reverse either partially or in full, depending on the nature of the shock.

and the crisis. Nevertheless, we do think its more detailed analysis of the market for assets provides important insights into the processes by which the credit and financial cycle might have been partly an endogenous phenomenon.

3.3 The Austrian, Post Keynesian, and Behavioural Schools

We now consider a number of prominent heterodox business cycle theories that have been developed over the course of the past 100 years. In many ways they are more consistent with the empirical literature on credit and financial cycles than the orthodox model and, in some cases, the monetarist model too. But they pose bigger challenges to conventional macroeconomic ideas. We begin by presenting a general account of credit and financial cycles as documented by historians of panics and crashes; we then identify three heterodox ‘schools’: Austrian; Post Keynesian; and Behavioural.

Economic historians have documented episodes of asset price speculation driving both credit and business cycles for a long time. One of the earliest examples of this approach is that of George (1879) who noticed cyclical advances in land values that resulted from speculation regarding their future path based on expectations of rapid economic progress which later turned out to be unwarranted. He concluded that the advance of land values was “the primary cause of recurring paroxysms of industrial depression” which “cuts down the earnings of labour and capital and checks production”. Seventy-five years later, Galbraith (1954) provided a descriptive account of how the 1929 stock market crash contributed to the Great Depression and this approach was generalised by Kindleberger (1978) who chronicled manias, panics and crashes over many centuries and countries, stretching back to the South Sea and Mississippi Bubbles of 1719-1720.

An important part of Kindleberger’s analysis was how he showed that Minsky’s (1975) stylised model of financial instability had applied time and time again in these cases. The “anatomy of a typical crisis”, according to Minsky and Kindleberger, is broadly as follows: The boom begins with a big shock, or what is referred to as a “displacement”. The boom is then fuelled by the supply of credit because banks are competing with each other for market share. A euphoric phase follows when investors buy assets, not with a view to making direct use of them or for the income they might generate, but to profit from capital gains. This transitions into mania whereby, having observed others profiting hugely from the boom, additional investors become frantically



involved.¹² This is facilitated by a further supply of credit both to new and existing customers as the banks observe that the net worth of investors participating in the boom has increased along with their own profits. Eventually, as buyers become less eager and the sellers become more eager a period of financial distress follows. With asset prices now declining, highly leveraged investors may become bankrupt. There may then be a specific event, such as the failure of a major bank or firm, which signals a more dramatic price reversal. Kindleberger and Aliber (2005) have since updated the analysis to include the *Kipper- und Wipperzeit* monetary crisis of 1619-1622, the Tulip Bubble of 1636-1637, and more recent cycles such as in Japan in 1980s and Asia in the 1990s. It finds that the same patterns as those that were set out in the original Minsky-Kindleberger thesis are repeated. In each case an increased supply of credit is identified as an important facilitator of the boom.

In our view, while it is of interest that many of the events of the past decade seem to have echoes of previous experiences the accounts of the economic historians do not amount to a theory of credit and financial cycles and so do not increase our understanding of recent events. But there are a number of heterodox theories which do, including the Austrian School, which was among the first to put credit at the heart of a business cycle theory.¹³ The capital theory originated by Menger (1871) and the theory of money and credit developed by Mises (1912) were the micro-foundations upon which Hayek's (1929) 'Austrian' business cycle model was built. It is the injection of credit by the central bank, resulting in the market rate of interest falling beneath that of the natural rate of interest, which initiates the boom.¹⁴ Desired investment rises and desired saving falls with the difference between the two being met by the increase in credit. This puts in motion an inter-temporally unstable process because the investment is not being financed by genuine savings reflecting a willingness to postpone consumption. The boom is therefore inevitably followed by bust.

Intriguingly, in Austrian theory, the boom need not be associated with inflation because the upward pressure on prices following a credit-financed increase in demand may be offset by the downward pressure on prices from the rise in supply capacity associated with the higher level of

¹²This aspect of Minsky's financial instability hypothesis shows how, as a special case within the Brunner and Meltzer model, expected higher returns to real assets may trigger a self-fulfilling upward spiral in which the usual negative effect on credit demand from rising asset prices is dominated by speculators who make credit-financed acquisitions of real assets in anticipation of capital gains.

¹³See the appendix on "A Brief History of the Role of Credit in Business Cycle Theory".

¹⁴The concept of the natural rate of interest was first proposed by Wicksell (1898) and in Austrian theory it is equivalent to the rate of interest that would prevail in the absence of credit creation.



investment. It is only later when these investments turn out to have been undertaken on a false premise of rising future consumption that it becomes clear that the long-run the effect on the economy's capacity to produce has been negligible. This important characteristic of the model is highlighted by Robbins (1934) who traces the origins of the Great Depression to the preceding non-inflationary credit boom of the late 1920s. Modern-day Austrians, such as Roger Garrison, were also among the first economists to argue that the credit-based boom of the 1990s would prove to be unsustainable and that attempts to prolong the boom would only serve to increase the severity of the eventual downturn. However, in our view, the Austrians were right for largely the wrong reasons. Their theory explains neither the recent boom's unusual length nor the absence of stronger output growth. Moreover, its concentration in the household sector could be viewed as contradicting Austrian theory.

The Post Keynesian model developed in Minsky's (1986) "financial instability hypothesis" was intended to provide a more rigorous theoretical explanation for the phenomena documented by the economic historians.¹⁵ Minsky was an American Post Keynesian economist for whom financial institutions and structures were central to understanding business cycle dynamics. He argued that capitalist economies are inherently, or endogenously, unstable and that the neoclassical model is fundamentally flawed in assuming that in the absence of exogenous shocks the economy will converge to steady-state equilibrium (the neoclassicists assume, in Minsky's words, that the economy is 'coherent'). Business cycles should instead be thought of as "due to the internal processes of our type of economy. The dynamics of a capitalist economy which has complex, sophisticated, and evolving financial structures leads to the development of conditions conducive to incoherence – to runaway inflations or deep depressions".¹⁶

The origin of this financial instability depends on an endogenous transition in financing from hedge to speculative and Ponzi structures. The first of these consists of units that can pay both principal and interest out of cash flows; the second, of units that can pay only interest; and the third, of units that can pay neither. Minsky's first theorem is that when hedge finance dominates,

¹⁵There are numerous divisions within the Post Keynesian school. In this paper when we use the term Post Keynesian we refer to the American Post Keynesian version developed by Hyman Minsky. For an introduction to Post Keynesian thinking and some of the divisions within it see Davidson (2005). A fully-specified European/UK Post Keynesian model in which the banking sector plays an important role in economic fluctuations can be found in Godley and Lavoie (2007).

¹⁶Minsky (1986) sets out his theory in contrast to the dominant neoclassical theory of the time. Modern economic theory, as reflected in DSGE models, continues to see the business cycle as being driven by exogenous shocks and so his criticisms are still relevant. However, the propagation mechanisms are more explicit in today's orthodox models than they were when Minsky was writing.

the economy will be stable, but that when speculative and Ponzi financing dominate the economy will be unstable. His second theorem is that over periods of prolonged prosperity the financing structure will, as a natural consequence of the incentives financiers face, endogenously transition from a stable to an unstable regime.

The Post Keynesian model is possibly unique in suggesting that credit and financial cycles emerge from an entirely endogenous process in response to continuous financial innovation and periods of economic stability which encourage greater risk taking. It is also designed to generate credit and financial cycles which may ultimately lead to either inflation or depression. The Minsky model is therefore highly compatible with the empirical features of the past decade. But there are a number of problems with it too. It does not explain how an unprecedented period of economic stability could coexist with an unprecedented financial boom for quite so long. The transition from stability to instability appears to have been implausibly slow and the absence of higher output growth and inflation is left unexplained. It also suffers from a lack of micro-foundations. It therefore has many useful insights but would need further development to account for all the characteristics of the business cycle just observed.

The Behavioural approach is, essentially, a version of the economic historians' account of asset price cycles but with the micro-foundations of irrational behaviour made more explicit and based on evidence from psychological experiments. Credit does not attract any special treatment in these accounts but it is still seen as an important facilitator, with lenders being subject to similarly irrational behaviours as the investors who borrow to buy assets. Examples of irrational behaviours include anchoring, persistent biases, overconfidence and herding.¹⁷ Recent analysis of financial cycles that use behavioural models to explain bubbles include Shiller (2000, 2008) and Akerlof and Shiller (2009). In these accounts it is shown how precipitating factors, such as the invention of the internet and the low level of nominal interest rates, led to the NASDAQ stock market bubble of 1999-2000 and the US real estate bubble of 2000-2006. Popular financial market writers, such as Taleb (2004, 2007) and Soros (2008), have endorsed views of investor irrationality that are compatible with the existence of financial cycles of the sort described by the Behavioural School. But while their theory might be an explanation for why credit and asset price cycles occur, in common with others, it does not help to shed light on why the recent cycle lasted for so long and did not translate into stronger growth and rising inflation.

¹⁷For a collection of writings on behavioural economics see Camerer, Loewenstein, and Rabin (2004).



4 The Global Macroeconomic Context

The previous section illustrated how existing economic theories fail to provide an adequate account of many of the key empirical features of the recent credit and financial cycle. While the monetarist and heterodox models – especially that of Minsky – provide important insights they do not offer a complete explanation of events. This suggests that it is necessary to look elsewhere for an explanation of what has happened. One possibility is that the cycle was heavily influenced by the unusual global macroeconomic context of the past decade. There are three important macroeconomic features of the development of the world economy since the mid-1990s that stand out: the emergence of significant global financial imbalances; the previous experience of steady growth and low inflation in many advanced economies since the 1980s (known as the Great Stability or Great Moderation); and a new phase of the globalisation of the world economy which saw the integration of China and many other low cost producers into the global economic system. In this section, we discuss how these developments – and the conduct of monetary policy – might explain both the intensity and persistence of the global credit boom and its coexistence with stable growth and inflation in the economies where it took place.

4.1 *Global Financial Imbalances*

In the wake of the Asian financial crisis of 1997-8, there was an abrupt fall in investment in many of the economies affected by the crisis. That, together with the competitive advantage of these economies in export markets and a period of strong world economic growth, contributed to a build up of substantial current account surpluses in these economies over the following decade. Between the late 1990s and the mid-2000s, substantial surpluses built up in China, other Asian economies and subsequently in other developing economies which benefited from rising oil and commodity prices – notably the Middle East. The counterpart of these surpluses were deficits in a number of major advanced economies, the most striking of which was the United States. In 2007, total current account surpluses in non-OECD economies totalled \$894bn, of which the surplus of China alone was \$372bn – over 40% of the total. In the same year, the US current account deficit totalled \$731bn. Spain (\$125bn) and the UK (\$105bn) were other notable deficit countries.¹⁸

The traditional macroeconomic interpretation of a situation like this would be that the deficit

¹⁸Data taken from the latest OECD Economic Outlook (2008), Annex Table 52.



countries must have experienced relatively strong demand growth which has supported strong export performance in the surplus countries. This is consistent with Eichengreen (2007), who argues that global imbalances and the ex-post excess of savings over investment in Asia and its opposite in the US can best be seen as being driven by domestic US policies. Over a period of time, exchange rates might be expected to adjust to eliminate these imbalances and promote more balanced growth. However, the policies pursued by most Asian economies (including China) blocked this process of adjustment. These policies were generally characterised by the maintenance of competitive bilateral exchange rates against the dollar, the accumulation of foreign exchange reserves (principally in US dollars), export-led growth, and current account surpluses.¹⁹

In the mid-2000s a number of other explanations came to be advanced for the emergence of global imbalances which focussed more heavily on the flow of savings from Asia and other emerging market economies as a key driving force. Perhaps the best known of these explanations is Bernanke's (2005) "global saving glut" thesis in which it is argued that the excess of ex-ante global savings over investment centred in Asia and oil-exporting economies led to both downward pressure on global real interest rates and the widening of global imbalances. A variant of the savings glut story is that of Caballero, Farhi and Gourinchas (2006) and Caballero (2006) in which the coexistence of global imbalances and low interest rates stems not from a savings glut so much as from a shortage of financial assets. According to this theory, following the Asian financial crisis in 1997-98, these economies' capacity to generate financial assets had diminished, with the consequence that Asian central banks stepped in to provide a financial intermediary role whereby domestic savings were exported. It is further argued that the US is uniquely placed to supply these financial assets given its large and mature capital markets and the reserve currency status of the dollar.²⁰

Could the emergence of this "savings glut" account for the credit boom in the US and other major advanced economies? The financial flows themselves cannot account for the growth of

¹⁹The exact motivation for the emergence of this policy mix is controversial, but Dooley, Folkerts-Landau and Garber (2003, 2004) talk of a revived Bretton Woods system anchored on the dollar, pointing to an export-led development strategy of the emerging Asian economies. Another variant along similar lines are those who suggest a "precautionary reserves" motive could lie behind emerging Asian economies maintaining undervalued exchange rates to provide insurance against a "sudden stop" reversal of capital flows. See, for example, Miller and Zhang (2007).

²⁰Dooley, Folkerts-Landau and Garber (2004) make a similar point regarding the uniqueness of the US but their emphasis is on the openness of the US economy to Asian exports compared with those of other advanced economies, notably in Europe.

credit which was on a totally different scale to the financial flows represented by the net inflows of capital. For example, the US current account deficit deteriorated from about 1.5% of GDP in the mid-1990s to average 4.5% of GDP in the period 1998-2007. Credit growth over this period averaged around 14% of GDP each year – almost 5 times as big as the extra 3% of GDP flowing in from overseas to match the current account deficit. It is possible to envisage the financial system intermediating to amplify the impact of financial inflows on credit growth, though we would need a separate explanation why such a strong multiplier effect emerged in the late 1990s and 2000s.

A more complex chain of causality is suggested by Bean (2008) and others, who argue that an increased demand from Asian and other overseas investors for “safe” assets in Western economies – particularly US government bonds – prompted a “search for yield” which led investors and financial institutions to pursue more risky investment strategies. According to Bean, “The present financial crisis has many parents, encompassing both market failures and supervisory shortcomings . . . But these are just the collective match that ignited the conflagration. You need fuel to make a fire too. And that was provided by the ex-ante excess supply of global savings over investment, which pushed real interest rates on safe assets to historically low levels, reinforced by loose monetary policy. That in turn encouraged a ‘search for yield’ and a compression of risk premia as financial institutions sought returns high enough to meet end-investors’ unchanged expectations.”

But while this might appear superficially plausible, this line of argument does not sit comfortably with some. It is certainly true that yields on US government bonds did fall over this period, and that on average they were lower in real and nominal terms than in the 1980s and early 1990s. US 10-year bond yields fell in nominal terms from 6.5-7% in the mid-1990s to 4.5-5% in the mid-2000s. But, as Shiller (2007) argues, the resulting level of nominal and real interest rates was not especially low by historical standards. He calculates that the US long-term government bond yield averaged 4.71% over the period 1871-2007 and that the ex-post real rate averaged 2.4% over the same period. Shiller compares this to an observed index-linked bond yield of 2.32% in August 2007. Our own calculations also imply an average real long-term bond rate of 2.3% over the period 1998-2007, while the credit boom was inflating.²¹

²¹Using data from the latest OECD Economic Outlook, US long-term interest rates (10-year benchmark bond yields) averaged 4.9% over the period 1998-2007 relative to 2.6% CPI inflation.



Econometric estimates also cast doubt on the significance of capital inflows in depressing long-term US bond yields. Warnock and Warnock (2005) argue that in the absence of any foreign inflows in the twelve months ending May 2005 the US ten-year Treasury yield would have been 150bp higher than otherwise, controlling for a range of other macroeconomic influences. Had foreign flows been in line with their historical average of 2% of GDP, ten-year yields would have been over 100bp higher. Focusing on the effect of foreign official flows, these are also found to have a sizeable, although somewhat smaller, effect of 60bp. These are significant changes, but not historically large in terms of the long-term shifts we have seen in terms of US bond yields over the last 100 years. For example, the data presented in Shiller (2007) shows the real ex-post long-term bond yield fluctuating between around -2.5% and +2.5% between 1950 and the late 1970s and then fluctuating between +3 and +12% in the 1980s and early 1990s. Against this background, the modest downward pressure on bond yields from capital inflows does not seem sufficient to properly explain the scale and persistence of the credit boom observed from the late 1990s onwards.

There are a number of other problems with the “savings glut”/“search for yield” explanation of the global credit boom of the 1990s and 2000s. First, when the returns on safe assets fall, it is not obvious that investors should shift their portfolios towards riskier assets. The positive correlation between risk and return is a well established property of finance theory which goes back to Markowitz (1952, 1959) and was developed by Tobin (1958) and Sharpe (1963). So we need an explanation of how a sophisticated and diverse community of financial professionals believed these rules had somehow been suspended in the late 1990s and early 2000s. A more rational response to a fall in real yields would be for investors who faced a fall in returns to increase their savings to match their required income. Indeed, this income effect predominated in the 1970s, when inflation eroded the real value of savings and created negative real returns causing a rise in the personal savings rate in the UK and some other economies (Taylor and Threadgold, 1978).

Second, while the “savings glut” hypothesis might have played a part in the evolution of current account imbalances in the immediate aftermath of the Asian crisis, it appears a less obvious explanation of developments in the 2000s. Between 1997 and 2000, there was a significant shift in the current account position of non-OECD economies, which moved from a deficit of \$55bn dollars to a surplus of \$165bn. At the same time, OECD economies moved from a surplus of \$36bn in 1997 to a deficit of \$341bn in 2000, with a large part of the deterioration accounted for



by the United States.²² Though these imbalances did not widen further when the world economy slowed sharply in 2001 and 2002, there was then a further accumulation of surpluses outside the OECD economies in the mid-2000s, matched by a further widening in the deficits in the US and a number of other major advanced economies.

This further widening of imbalances in the mid-2000s looks much more like a consequence of the credit boom than a driver of it.²³ It was underpinned by very strong export-led growth in China and other Asian economies, accompanied by a steady rise in oil and other commodity prices – which boosted the surpluses in the Middle East and Africa. From very close to balance in the early 2000s, the economies of Africa and the Middle East were running surpluses totalling \$336bn in 2007. This “second leg” to the development of global imbalances appears to be more readily explained by strong growth of demand across the global economy, rather than a “global savings glut” emerging from Asia. One of the consequences of this period of strong global demand was upward pressure on oil and commodity prices, shifting the terms of trade in favour of economies which were major producers of these globally traded products.

4.2 The “Great Stability”, Globalisation and Monetary Policy

However, if the growth of global financial imbalances in the mid-2000s was more a consequence than a cause of the global credit boom this raises the question of what the main drivers of the rapid expansion of credit were. As we have already observed, output growth rates for the OECD economies as a whole were not particularly strong over this period and inflation was subdued – until the impact of oil and commodity price inflation was felt in 2007/8, as shown in Chart 13. But there were a number of other macroeconomic phenomena – including the “Great Stability” and globalisation – which could have played a role. In this section we consider the contributions made by these factors and the conduct of monetary policy to the credit and financial cycle of the mid-2000s.

There are a number of different explanations for the “Great Moderation” or “Great Stability” – good policy; good luck (or helpful economic circumstances); and favourable structural change.²⁴

²²Data from latest OECD Economic Outlook, Annex Table 52.

²³This assessment is also consistent with a number of studies that use structural VARs to identify monetary and real shocks. See Bems, Dedola and Smets (2007), Bracke and Fidora (2008), and Fratzscher, Juvenal and Sarno (2007).

²⁴The “Great Stability” and “Great Moderation” are terms used to describe the combination of low inflation and reduced output volatility



All of these probably contributed to some degree. Good policy clearly played a part in so far as monetary policy in the 1980s and 1990s came to be directed more clearly towards achieving low inflation, reducing the potential for inflationary “boom-bust” cycles. In particular, the anti-inflationary credibility of central bank independence was extended across Europe in the late 1990s with the establishment of the ECB and the granting of operational independence to the Bank of England. The impact of globalisation in reducing the prices of global manufactured goods, coupled with the impact of the “Asian crisis”, also helped to hold down inflation when growth was strong in the late 1990s and mid-2000s. At the same time, US and European labour markets had become more flexible as a result of policy measures and the experience of high unemployment in the 1980s. This attenuated an important mechanism by which rising demand translated into wage and price inflation in the 1970s and 1980s.

These dampening influences on inflation were particularly noticeable in the response of the OECD economies to the growth of domestic demand and GDP in the late 1990s. We noted previously that output growth in the OECD economies was unremarkable compared with historical averages between 1996 and 2007. However, as Chart 14 shows, growth in the OECD economies in the five years 1996-2000 was nearly as strong as in the five years 1985 to 1989, and if Japan is excluded from the comparison, the growth of the OECD economies in the late 1990s exceeded the late 1980s. However, unlike the late 1980s, conventional measures of inflation did not pick up significantly, and other warning signs of future inflation – such as wage growth and the rate of increase in nominal demand – were not ringing alarm bells.

The global slowdown of 2001 and 2002 – which was prompted by the puncturing of the US “dot-com” bubble, sharp falls in equity prices world wide, and the global political turmoil which followed the 9/11 attacks on the World Trade Centre – therefore took place against a very different backdrop from previous global postwar slowdowns when inflationary concerns were to the fore. In the early 2000s, monetary authorities felt much more free to relax policy, and there were growing concerns that deflation, rather than inflation, could become a problem (Bernanke, 2002). The result was a period of loose monetary policy, particularly in the US where the Fed Funds rate was reduced initially to 1.75% by January 2002 and then as low as 1% in 2003. As intended, a serious recession was avoided and the only major economy to experience a

experienced in the UK, US and a number of other major economies from the late 1980s or early 1990s onwards. For a summary of the latest ideas and debates on this issue, see Young (2008). A summary of earlier literature can be found in Stock and Watson (2002).



contraction in calendar year GDP in the three years 2001 to 2003 was Germany (which experienced a drop of 0.2% in activity in 2003).

However, this period of monetary relaxation created a series of unintended consequences which were to have important consequences for the future development of the credit boom and the resulting financial crisis. Instead of the normal pattern, where a period of strong growth is followed by a recession in which financial excesses and imbalances are corrected, the monetary relaxation of the early 2000s created extremely attractive borrowing conditions for consumers and firms, providing additional impetus to the growth of the credit. Lending in the housing market grew particularly strongly, not just in the US, but in the UK, Spain, Australia and many other economies. According to some economists, this period of monetary relaxation, which was only gradually withdrawn during 2004 and 2005, was the main factor responsible for the housing market lending excesses in the United States, which then led to the sub-prime crisis in 2007/8.²⁵

By heading off recession and deflation in the early 2000s, this relaxation of monetary policy also helped to ensure that the volatility of key macroeconomic aggregates – notably GDP growth and inflation – remained subdued, perpetuating the view that macroeconomic risk had been reduced. The interventions of central bankers, most notably Alan Greenspan in the United States, were seen as crucial in maintaining this benign macroeconomic outcome. A perception began to develop in financial markets that effective monetary policy was providing an insurance against extreme macroeconomic risks – known as “The Greenspan Put”.

These developments were all crucial for the phase of the credit cycle which unfolded over the mid-2000s. A direct stimulus to lending was provided by very low interest rates, particularly in the United States. At the same time, the apparent reduction in macroeconomic volatility, and the increased confidence in the stabilising power of monetary policy, encouraged financial markets and investors to downplay macroeconomic risks, as Haldane (2009a, 2009b) has argued.²⁶ Coupled with failures of banking governance and regulation, as well as difficulties in evaluating increasingly complex financial products, this helped underpin investor demand for risky assets – such as for the CDOs containing sub-prime loans that eventually triggered the crisis.

²⁵Taylor (2007, 2009) makes this argument particularly forcefully. Ahrend et al (2008) also argue that a combination of loose monetary policy and financial innovation account for the strong credit growth and rising asset prices in the mid-2000s.

²⁶The importance of perceptions of macroeconomic risk for the valuation of asset prices may have been underestimated. Lettau et al (2007), for example, show that macroeconomic volatility regime changes can have sizeable effects on the valuation of equity prices.



The macroeconomic context of the period from the mid-1990s to the mid-2000s would therefore seem to have provided a fertile environment for the global credit boom which developed over the same period. While excess savings from Asian economies may have played a part in the first phase of this period of credit growth, a number of other macroeconomic factors were more significant in the 2000s. The interaction between the conduct of monetary policy and the development of an increasingly globalised economic system was particularly important. The absence of inflation in the aftermath of strong growth in the late 1990s allowed a relaxation in monetary policy in the early 2000s, particularly in the United States. Instead of being snuffed out by recession, the credit boom gained added impetus as a result. And the continuation of a period of sustained growth with low inflation into the 2000s reinforced the perception of reduced macroeconomic risks. This macroeconomic environment made it easier for banks and other financial institutions to make the misjudgements which have proved so costly for them and for the wider economy.

4.3 The “Growth Puzzle” of the 2000s

The discussion above leaves one puzzle, however. Though economic growth in the major advanced economies was strong in the late 1990s, this was followed by weak growth in the early 2000s. The second phase of the credit boom in the mid-2000s was not accompanied by particularly strong growth in the US, UK and other European economies. As we observed earlier, taking the period from the mid-1990s to 2007, the growth of output was broadly in line with past historical averages, despite the very rapid growth of credit. The fact that growth was not particularly strong also helps to explain the absence of significant inflationary pressures.

We see two main factors explaining this “growth puzzle”. The first is that much of the strong credit growth seems to have been used to finance the acquisition of assets, notably housing and innovative financial instruments, rather than expenditures. The reasons for the pronounced credit and financial cycle have already been explained. But the fact that demand did not increase as much as might have been expected requires further explanation. One reason is that the early 2000s was a period in which firms were heavily engaged in repairing their balance sheets in the aftermath of the dot-com boom. This meant that an important driver of the credit and financial cycle – easy financial conditions – had relatively little impact on capital expenditures. At the same time, there are a number of factors which may have acted to reduce the wealth effects from



increases in house prices to consumption demand, as discussed in Benito et al (2006). In other words, this was a credit and asset price cycle driven by factors that had a relatively limited impact on demand and which generated relatively mild wealth effects on demand.²⁷

The second factor is that, where demand did increase, a large portion spilled over into imports and deteriorating in external balances. We noted earlier that the US, UK and Spain had developed significant current account deficits by the mid-2000s, averaging 5.7%, 3.3% and 9.8% of GDP respectively in the years 2005-7. These deficits suggest a significant cumulative growth of demand in excess of output. Charts 15 and 16 suggest that this was a feature more generally across countries with there being a stronger association between changes in credit ratios and both domestic demand and current accounts than there is for GDP growth and inflation.²⁸ The origins of this high import leakage is most likely to be linked to declining competitiveness associated with upward pressure on nominal exchange rates arising from capital flows from slower growing advanced economies with lower interest rates, the pegged exchange rate policies of the emerging economies, and extensive trade liberalisation in the early 2000s including China's admission to the WTO and the Agreement on Clothing and Textiles.²⁹

These demand spillovers were consequently reflected in strong export and output growth and the build up of external surpluses in Japan, Germany, China and other emerging market economies. So while output growth was not particularly strong in the major advanced economies in the mid-2000s, this was still a period of strong global growth which led to upward pressure on energy and commodity prices. This then led to a further build up of external surpluses in the energy and commodity exporting economies.

²⁷From a monetarist perspective the stability of nominal demand in response to the increase in the money supply associated with the credit expansion implies that there was a corresponding rise in money demand. This too can be linked to the factors previously identified – i.e., balance sheet adjustment by firms and the origins of the reduced wealth effects from house prices to consumption.

²⁸This pattern is consistent with the New Keynesian model developed by Nickell (1990) where there is a three-way trade-off between unemployment, inflation and the trade balance. He calls this the economy's "fundamental supply constraint" and demand shifts move the economy along the constraint. Other things being equal, the coexistence of strong demand, stable inflation and low unemployment is only possible if it is accompanied by a deterioration in the trade balance.

²⁹Taken together the two factors we have identified – the channelling of a large part of the credit growth into asset markets, notably housing, and demand spillovers driving external imbalances – are consistent with previous work by Aizenman and Jinjark (2008) showing a link between current account balances and real estate markets.

5 Challenges for Macroeconomics and Policy

The previous section identified a number of factors associated with the unusual global macroeconomic context of the past decade that seem to have been important in driving the recent credit and financial cycle and its associated macroeconomic phenomena. It also highlighted how the conduct of macroeconomic policy may have been part of the problem. This suggests that there is plenty of scope for improving both theory and policy. In this section we identify some of the challenges facing both. We discuss the need to: integrate endogenous credit and financial cycles into orthodox macroeconomic models; improve understanding of macro-financial linkages; recognise the limitations of economic theory; develop tools for macro-prudential regulation; and be realistic about the degree of macroeconomic stability that national monetary policy can achieve in a highly integrated global economy.

5.1 *Endogenous Credit and Financial Cycles*

Incorporating endogenous credit and financial cycles into the orthodox model will not be easy. The alternative accounts for credit and financial cycles – Monetarist, Austrian, Post Keynesian and Behavioural – differ in their explanations for why they are more endogenous than the orthodox DSGE model suggests. The degree of endogeneity is related to the initial conditions that lead to the boom, ranging from portfolio rebalancing and credit shocks (Monetarist); an inter-temporarily inconsistent monetary policy stance (Austrian); continuous financial innovation and macroeconomic stability (Post Keynesian); or irrational responses to precipitating factors (Behavioural). But all have a large endogenous component and this difference can be traced to them all having fundamentally different assumptions to the orthodox model.

In our account of the DSGE model we identified three key assumptions underpinning the result that a credit and financial cycle can emerge only in response to technology, monetary or demand shocks: the efficient markets hypothesis; the rational expectations hypothesis; and optimising agents. We propose that the main technical challenges facing macroeconomics are likely to be connected with modifying these assumptions:

A more realistic model of the financial sector. DSGE models typically contain virtually no financial sector at all, often with all financial information deemed relevant being captured by a



single interest rate. The market for assets approach used by monetarists shows how this may overlook important mechanisms through which portfolio rebalancing may impact asset prices and the real economy. But in addition to this, by adopting the efficient markets hypothesis as an assumption, the orthodox model rules out the possibility of truly endogenous credit and financial cycles. This seems extreme given recent developments. The possibility that financial markets may generate their own shocks, perhaps as a consequence of innovations, perhaps as consequence of anticipated structural change, needs to be taken more seriously. There is already a body of literature showing how endogenous credit cycles can arise in response to asymmetric information problems.³⁰ The challenge now is to develop models such as these and then integrate them with macroeconomic theory.

Knowledge-based shifts in expectations. That agents form their expectations in a rational way seems reasonable. But to assume that this means that agents are aware of the economic model that the economist has built and, further, that the model being built is the correct one seems too simplistic. Economists have for some time been willing to accept that even if expectations are formed rationally the information on which they are based is often very imperfect. For example, Evans and Honkapohja (2001) have assessed the conditions under which an economy with agents who learn adaptively will converge upon the rational expectations equilibrium. More recently, Frydman and Goldberg (2007) take a more radical path and show how imperfect knowledge, not only of the real economy but also of how other agents form their expectations, rules out pre-determined outcomes in the face of persistent structural change. These and the many other contributions could be usefully extended and used to help shape policy frameworks that are most likely to be conducive to economic and financial stability.³¹

An important role for institutions. The use of optimising agents in orthodox models neglects the important role that institutions may play. Modern economic growth theory has recognised the importance of institutions for economic development and now may be the time for macroeconomics to move in this direction. The current crisis has shown, for example, how financial institutions created remuneration policies that may have rewarded risk taking

³⁰See, for example, Martin (2008) and the references therein.

³¹An interesting recent example in this regard is Christiano et al (2008). They show how integrating credit growth into monetary policy may result in improved performance when the economy is subjected to shocks which lead agents to form expectations which turn to be too optimistic.

behaviours.³² And the institutions themselves may not have taken into account the negative externalities associated with some of the financial innovations that led to an increase in the supply of credit. Likewise, the strains subsequently placed on the balance sheets of financial institutions and the reverberations this has had on the real economy illustrates the importance of thinking in terms of institutions being part of systems. The optimising agent approach may need to be significantly amended or even discarded to capture these effects.

It is only possible to speculate about which of these avenues will prove most fruitful in rectifying the problems of the orthodox model. But it seems reasonable in the light of recent events to think that our understanding of credit and financial cycles must be enriched somehow.

5.2 Macro-Financial Linkages

The experience of the past decade suggests that the links between the real economy and financial markets are very complex, often subtle, and can have an important influence on business cycle dynamics. The absence of stronger growth and rising inflation, for example, led policy-makers to the mistaken conclusion that economic and financial stability had been achieved. Another important challenge for macroeconomics must therefore be for these macro-financial linkages to be better understood. In this section we briefly consider three important areas in need of further research.

First, there is a need for the links between risk premia and macroeconomic stability to be better understood. The strong desire of policy-makers to deliver macroeconomic stability and of financial market investors to protect themselves against volatility is *prima facie* evidence of the importance of macroeconomic volatility to economic agents and the way they value assets. In addition, as Campbell and Hercowitz (2005) have argued, financial market innovations, by reducing perceptions of risk, may also have eased credit constraints on households and contributed to the decline in macroeconomic volatility. This may have led to a feedback loop in which macroeconomic stability and the credit and financial cycle became mutually reinforcing, at least for while.³³

³²For a discussion of remuneration policies in the banking system and the incentives they may have created see House of Commons (2009).

³³See Trichet (2008) for a more general discussion of the links between risk and the macroeconomy.

Second, it is important that orthodox theory can also account for the circumstances in which a credit and financial cycle might not lead to stronger output growth and/or rising inflation. Recent experience is the clearest example but the cross-country evidence suggests that non-inflationary growth booms that are ultimately unsustainable have been a regular feature of the past twenty years. The cost channel approach adopted in recent DSGE modelling could be explored further to see how the cost of external finance may impact on firms' pricing decisions and thereby mask underlying inflation pressures in a low interest rate environment. The extent to which widening current account deficits may hide inflationary pressures also needs to be better understood.

Finally, the asymmetry of the recent credit and financial cycle – in which the links with output during the boom appear to have been much weaker than they have so far turned out to be during the bust – also needs to be accounted for. It could be, for example, that it arises in the leveraging and de-leveraging processes whereby during the boom phase increasing leverage is demand-driven and linked predominantly to one source of borrowers but during the bust phase decreasing leverage is supply driven and so affects all borrowers. This would point to the need for balance sheet considerations more generally to be given greater prominence.

These linkages – and many others, such as wealth effects on demand – are well known and have been researched to some extent already. What has changed following the experience of the past decade is that they have shown to be more important than previously thought. The challenge will be to identify more precisely the circumstances in which these processes may be sufficiently powerful to produce an unusual business cycle that does not conform with the stylised facts.

5.3 The Limits of Economic Theory

Why was it that the macroeconomic features of the past decade – global financial imbalances, the Great Stability, and globalisation – were not recognised as potentially dangerous, or at least not to a sufficient extent? How was it that the conventional wisdom came to view credit and financial cycles as a matter of relatively minor importance despite the considerable empirical evidence to the contrary?

To answer these questions it is necessary to understand how ideas in macroeconomics evolve. There are many accounts of how particular events have shaped macroeconomic thinking. There



is, for example, little dispute that the Great Depression of the 1930s led to the abandonment of the classical view of the business cycle and provided the impetus for the Keynesian revolution that followed. And, as Skidelsky (1992) has shown, this period also demonstrates how for a theory to become part of orthodox thinking it may not even be sufficient for it to provide an explanation of economic phenomena; it must also have practical policy implications. The credit-based business cycle model of the Austrian school had been developed in the 1920s and had been remarkably prescient with its predictions of boom and bust. But it failed to become part of economic orthodoxy because its policy recommendation of letting the cycle run its course was unacceptable.

However, some economists view the Keynesian revolution as an exception. Stigler (1960) “assigns a minor, and even incidental, role to the contemporary economic environment in the development of economic theory since it has become a professional discipline”. He also suggests that “the unending train of ephemeral or local policy questions is of no more significance for economic theory than the corresponding types of economic developments”. If this is true then the answer to the questions posed above is straightforward: our economic knowledge had not yet progressed sufficiently for the dangers to be recognised.

But even Stigler, writing in 1960, acknowledged that the growing role of empirical research could increase the sensitivity of theory to events. The verdict of subsequent economists would seem to suggest that this has, on the whole, been the case. Gordon (1980) argues that in the post-war period many of the shifts in macroeconomic thinking can be traced to the influence of particular events. The small role that monetary changes played in explaining demand fluctuations in the 1940s and 1950s reinforced the Keynesian viewpoint of demand management; the increasing importance of autonomous monetary movements laid the groundwork for greater emphasis on monetary policy in the 1960s; and the widespread acceptance of monetarism that followed was the result of an unexpected acceleration in inflation in 1968 together with some noteworthy failures in fiscal policy. He concludes that “Economic ideas rarely lead economic events but usually follow them”.

However, there can be little doubt that, from time to time, advances in economic theory still do lead economic events. For example, while it may be correct to say that the acceleration in inflation in the late 1960s and early 1970s was important to the development of monetarism this



episode was also, according to Woodford (1999), “an interesting instance of a prediction on the basis of economic *theory* turning out to have been more reliable than simple extrapolation from historical correlations”. In other words, in this case the theory came first and the events it predicted swiftly followed. There are yet other times when the evolution of ideas can be restrained by technical limitations. For example, Taylor (1988) argues that the most important factor that hampered macroeconomics from embracing rational expectations more quickly in the 1970s was that it took almost a decade for econometric procedures to be developed to make rational expectations models operational.

In an appendix we document the changing role of credit in business cycle theory from the 18th century classical economists to contemporary DSGE models. It tells a complex story of an empirically important feature of business cycles which has been repeatedly pushed to the fringes of serious academic research as a consequence of events, advances in theory, and technical constraints. For example, from the late 1960s to at least the early 1990s, the business cycle problem with which policy-makers were confronted was not financial instability but price instability. The state and direction of academic research reflected this with economists largely content to assume away the problem of credit and financial cycles using the efficient markets hypothesis.³⁴ The development of DSGE models needs to be seen in this context. These models evolved following decades of research attempting to explain, quite literally, the business cycle characteristics of the 1970s, 1980s and early 1990s.

However, it is also necessary to account for why progress has been so limited in the past decade when inflation has been low and stable and there has been an increasing incidence of financial crises. We have already noted how the assumptions of efficient markets, rational expectations and optimising agents are hard to reconcile with pronounced credit booms. We suspect that, without there having been a pressing reason for overturning the orthodox model, these assumptions inadvertently acted as an obstruction to researching credit and financial cycles. With the benefit of hindsight, some of the heterodox ideas could perhaps have provided building blocks for making advances in this area. But they were dismissed because the assumptions underlying them were at odds with those of the prevailing orthodox model.

³⁴Interestingly, this has strong echoes of how economic thought developed in the 1950s and 1960s when, as Gertler (1988) argues, the significance of credit for the economy’s financial structure had been assumed away with the Modigliani-Miller theorem. This only changed following the development of asymmetric information models of credit markets.

All of this is likely to change following recent events. However, the lack of research on credit and financial cycles that took place over the past three decades highlights a more fundamental challenge for economists. If the mistakes of the past are to be avoided it may be necessary not only to amend current macroeconomic ideas in response to recent events but to be more conscious of this evolutionary tendency of macroeconomic ideas. Theoretical advances in one area, if they become a matter of ideology, do run the risk of slowing progress in other areas and possibly at great cost. The status of research that does not incorporate orthodox assumptions may therefore need to be elevated, at least in those areas where the orthodox model cannot be reconciled with the empirical evidence.

5.4 Broader Policy Challenges

The situation we have described is one where a credit boom developed momentum over a period of a decade or more, initially focussed on the United States but drawing in a large number of other countries as well. Given that the implosion of this credit boom has been so damaging for the global financial system and for the global economy, an important policy question is how such a situation might have been prevented. Although it is beyond the scope of this paper to make precise recommendations it is possible to identify broader policy challenges.

The most obvious point to make is that better surveillance of the financial system is needed – both at the national and international level. Though some institutions did issue warnings – most notably the Bank for International Settlements³⁵ – there was insufficient awareness of how vulnerable and unstable the global financial system was becoming in the mid-2000s. A greater degree of awareness of this vulnerability would have acted as a catalyst for action at an earlier stage and, hopefully, a more orderly resolution of the problems in the banking system.

Our analysis suggests that such a system of surveillance should recognise the danger signals posed by the emergence of large current account deficits. As we showed earlier, high rates of credit growth were associated with large or growing current account deficits in many of the countries concerned.

There are also important lessons here for financial regulators. As Turner (2009) and others have

³⁵See, for example, White (2006a, 2006b).

highlighted, there is a need for a stronger system of “macro-prudential” regulation – which seeks to address the vulnerability of the financial system as a whole, rather than focussing on specific institutions. Because the financial system has become highly globalised, a high degree of cooperation will be needed between financial regulators in different countries to operate such a system – as the recent G20 Summit Communiqué recognises. While the current financial crisis has given impetus to international policy coordination, it may not be so easy to sustain a high level of international cooperation when memories of the current crisis begin to fade.

What lessons might be drawn for the operation of monetary policy? As we have argued, monetary policy can play a role in bringing credit booms to an end. But deploying monetary policy is much easier when credit growth is also accompanied by strong output growth and inflationary pressures. For a combination of reasons, this was not the case in many countries in the late 1990s and early 2000s. Some have argued that this means that the objectives of monetary policy should be changed – with a greater focus on “leaning against the wind” when an asset or credit bubble is inflating by operating a tighter monetary policy than a conventional focus on price stability – such as an inflation target – would imply.

However, we see three problems with this approach. First, it is very difficult to operate because it is not always clear at what point in the growth of a credit cycle the monetary policy-maker should intervene. Second, it potentially creates confusion about the objectives of monetary policy by shifting the focus away from price stability as experienced by the general public towards a more complex set of objectives. This may undermine the credibility of monetary policy and its ability to anchor inflation expectations at a low and stable level. Third, and most crucially, however, this “leaning against the wind” approach takes no account of the globalised nature of the financial system.

In the recent episode, the global financial crisis has been driven primarily by developments in the US mortgage market and within global financial markets and institutions. It is hard to see that a different course for monetary policy in other countries – such as the UK, the euro area or Japan – could have made much difference on either front. Within such a globalised financial system, a policy which sought to “lean against the wind” risks having a deflationary bias at the national level – growth is held back in the upswing to head off a national credit bubble and yet the economy concerned is still at risk from a recession generated by a global financial crisis. The fact



that Germany and Japan did not participate in the credit boom has not shielded them from the effects of the current global recession. Indeed, the export and manufacturing orientation of their economies means they have been among the hardest hit, in the short term at least.

Could better global coordination of monetary policies have helped in these circumstances? It could certainly be argued that while monetary policy seemed appropriate for many countries individually, at the global level it was too loose. The global credit boom was a symptom of this, as was the inflationary pressure which emerged in energy and other commodity markets in the mid-2000s. But effective coordination is likely to be very difficult to achieve when it is most needed. It is true that the current recession, along with an increased recognition of global interdependencies, has led to a renewed interest in policy coordination. But this has been against a background of strong mutual interest in the common goal of lifting the world economy out of recession. It would be much harder to achieve an appropriately coordinated monetary response when the world economy was growing healthily and the sense of common purpose was absent.

Maybe a more appropriate conclusion for monetary policy is the need for greater realism about what it can and cannot achieve. Monetary policy can deliver price stability over the medium term. But it cannot also single-handedly maintain the broader stability of the financial system or avoid all recessions. Economies experienced cycles and recessions going back to biblical times – long before inflation became a problem in the 1970s. Financial instability was an important driver of cycles before the Second World War. And the recent crisis provides a reminder that the instabilities of the earlier historical experience can re-emerge.

Another important conclusion for policy is that long expansions eventually come to an end. And they can be brought to an end by behaviours which are themselves encouraged by the experience of a long period of growth. The long expansion we saw in the 1950s and 1960s resulted in a sustained build-up in inflationary pressures which was responsible for at least two of the previous three UK post-war recessions. And we now recognise the financial excesses which built up in the recent period of sustained global economic growth ultimately sowed the seeds of the current recession. In a long period of economic expansion, policy-makers need to be alert to the imbalances and vulnerabilities which might bring a period of stability to an end. Even in a world in which inflation is generally low and stable recent experience suggests that financial instability is another powerful mechanism which can bring a long expansion to an end.



Appendix: A Brief History of the Role of Credit in Business Cycle Theory

Economic analysis of the link between credit and activity has a long history.³⁶ Early analysis has tended to be couched in terms of the quantity theory of money with the distinction between money and credit not always clear. For example, Hume (1752) argued “to endeavour artificially to increase such a credit, can never be the interest of any trading nation; but must lay them under disadvantages, by increasing money beyond its natural proportion to labour and commodities, and thereby heightening their price to the merchant and manufacturer”. Furthermore, in what provides a remarkable foretaste of the monetary shocks theory of the business cycle employing the distinction between the short and long-run Phillips curve Hume writes that “it is only in this interval . . . between the acquisition of money and rise of prices . . . that the increasing quantity of gold and silver is favourable to industry”. Smith (1776) and others made more detailed, but essentially similar, arguments in later versions of the quantity theory.

It was not until the Bullionist controversy of the 1810s following the suspension of gold convertibility in English banks in 1797 that the role of bank credit began to be looked at more seriously again. The equivalence between paper credit (bank checking accounts) and money was first recognised by Thornton (1802) and this paved the way for a channel by which bank credit creation could impact activity and prices.³⁷ The same debate re-emerged as the Currency and Banking School controversy in the 1840s following the Bank of England being given monopoly over note issue with the conventional view emerging that excessive note issue would lead to inflation and that in consequence there was a need for a gold standard of exchange. However, these controversies did little to raise the importance of credit itself as an independent driver of the business cycle relative to that of money. Over a hundred years later, writing about a meeting of the American Economic Association, Veblen (1904a) was still able to report that there was “a general reluctance to admit that credit is a price-making factor of considerable importance”.

However, Veblen (1904b) had by that time completed his *Theory of Business Enterprise* based on

³⁶This appendix draws heavily on Gertler’s (1988) *Financial Structure and Aggregate Economic Activity: An Overview for the period from the Keynesian revolution in macroeconomics to the mid-1980s*. It adds a brief account of pre-20th century thought and developments in the 1990s and 2000s.

³⁷Hetzel (1987) argues that Thornton was the first economist to assert that checking accounts formed part of the money stock and that Thornton “successfully integrated into his view of money all media of exchange based on credit creation”.



the experience of the US economy in the closing decades of the 19th century in which credit played a central role. In the Veblen model technological innovations led to businessmen acquiring credit for investment to the maximum extent. This, along with sectoral demand shifts, leads to a period of prosperity but, eventually, as prices increase the processes begin to reverse leading to crisis, depression and deflation. A little later, Schumpeter's (1911) *Theory of Economic Development* was published and presented a European perspective on the role of credit in the business cycle. Technological innovations also play a key role in this theory and the shift from prosperity and depression and deflation operates in a similar fashion to the Veblen model.

Nevertheless, these contributions and some others were insufficient to overturn the classical view of the business cycle in which credit played a much more limited role.³⁸ There was a time, during the Great Depression, when this might have changed. A relevant theory which emerged at that time was Fisher's (1933) debt-deflation hypothesis in which it is argued that "in the great booms and depressions ... the big bad actors are debt disturbances and price level disturbances" and that "over-investment and over-speculation are often important; but they would have far less serious results were they not conducted with borrowed money". Fisher's was not so much a systematic analysis of the relationship between credit and the economy but the particular circumstances that led to the Great Depression in the context of previous debt-deflation episodes in the United States and elsewhere. However, Fisher's reputation had been severely damaged by his optimistic pronouncements made immediately prior to the 1929 stock market crash and so his ideas were generally ignored at the time.³⁹ It was both too little and too late to halt the Keynesian revolution which was underway.

The dominance of Keynesian macroeconomics for the next three decades would lead to credit continuing to be de-emphasised in economics. While Keynes (1936) mentions the "state of credit" in *The General Theory* it merits only one page. The far greater part of the analysis concerns the demand for money and, in particular, the model of liquidity preference in the determination of the market rate of interest. Credit was seen as essentially passive, something that helped to grease the wheels of economic growth, although financial institutions were given an important role too.

³⁸The Austrian school had also by the late 1920s developed its distinctive credit-based business cycle model. We examine its model in more detail in section 3.3. An explanation for why the Austrian school remained outside the mainstream are explained in section 5.3.

³⁹In autumn 1929, Irving Fisher expressed the view that "Stock prices have reached what looks like a permanently high plateau". Quoted in Galbraith (1954).



This view of money and credit did not go unchallenged in the post-war period. Gurley and Shaw (1955) made an early attempt to shift the traditional emphasis away from money and liquidity preference and redirect it towards the process of financial intermediation more generally on the basis that the financial system had begun to innovate a much broader array of financial assets. In such a world what matters for macroeconomic behaviour is not money, or even bank credit, but overall financial capacity to obtain loanable funds. Gurley and Shaw argued that “The Keynesian model is inappropriate to financial aspects of growth analysis for two reasons. First, it does not permit direct debt to accumulate and affect financial determinants of spending. Second, it admits of only two kinds of financial asset, money and bonds, on the assumption that the stock though not the location of bonds is fixed. The model is not hospitable to the financial intermediaries whose development in recent decades has diversified indirect finance and marked commercial banking as a relatively declining industry”.

Although efforts were made to incorporate financial sectors in macroeconomic models, such as Brainard and Tobin’s (1963) model which considers the impact of subjecting non-bank intermediaries to monetary controls, the attempt to shift the focus away from money and towards credit then stalled. There are perhaps two reasons for this. The first was the results of empirical work, especially following Friedman and Schwartz’s (1963) extensive examination of the links between money and activity in the United States over a period of nearly a century, including during the Great Depression, and the shift towards monetarism that it helped to engender. Furthermore, additional empirical work by Sims (1972) and others using Vector Auto-Regression techniques appeared to confirm the monetarist argument by showing that lags of the money supply were helpful in forecasting output. The debate among mainstream economists therefore focused not on the merits of money versus credit but whether money was exogenous or endogenous.

The second reason was developments in the methods of macroeconomic analysis. In finance theory, the Modigliani and Miller (1958) theorem proved rigorously, under certain assumptions, the irrelevance of financial structure for the real economy. With the credit-based models of the time being predicated on very complicated processes they were simply not capable of being presented in the same way. In economic theory, the shift towards the use of representative agent models posed huge challenges to those supporting the credit view. It was, and remains, technically challenging to aggregate models using heterogeneous agents, which is a pre-requisite



for incorporating a motive for financial intermediation and credit effects.

Notwithstanding the technical challenges posed by the representative agent approach, further empirical work and advances in microeconomic theory helped to revive interest in the role of credit in the early 1980s. Empirical work by Sims (1980) and Friedman (1980, 1982) respectively cast doubt on the earlier work that showed that money was able to forecast output and suggested that the relationship between debt and output was more stable than the relationship between money and output. An influential piece of work at this time was that of Bernanke (1983) who turned to the familiar problem of explaining the Great Depression, arguing that monetary forces were a “quantitatively insufficient” explanation. Instead he emphasised non-monetary factors, in particular the choking off of flows of credit to households and firms from the whole of the financial sector.⁴⁰ In parallel, models of information problems in financial markets began to emerge. Building on Akerlof’s (1970) model of the “market for lemons”, Stiglitz and Weiss (1981, 1984) showed how informational asymmetries could lead to credit rationing and make it more difficult for firms to raise equity capital by issuing more shares. Over time, numerous other microeconomic models of financial intermediation have been developed.⁴¹

With the informational asymmetries in credit markets providing micro-foundations it was possible by the mid-1980s to move beyond the Modigliani-Miller theorem and to re-launch the credit view within the macro-economic mainstream. The initial response was simply to revive credit in traditional macroeconomic models, such as in Bernanke and Blinder (1988) and Brunner and Meltzer (1988). Although these early models could incorporate rational expectations they did not have micro-foundations of the sort employed in New Classical and Real Business Cycle models which had been developed over the previous decade in response to the failure of Keynesian economic models in the 1960s and 1970s. For example, in these models, nominal rigidities were assumed, but not derived from first principles, and as a consequence these models were not robust to the Lucas critique.

The second response was to adopt the New Classical and Real Business Cycle approach, including many of their assumptions such as the efficient markets hypothesis, rational

⁴⁰For a recent empirical analysis of the role of credit in the Great Depression which employs time series analysis of macroeconomic aggregates see Eichengreen and Mitchener (2003).

⁴¹See Bernanke and Gertler (1995) for a review of the literature on the role of credit frictions in the transmission of monetary policy.

expectations and optimising agents. It is this approach which has shaped current mainstream thinking over the past two decades. However, progress was hampered by the difficulty of incorporating a credit channel in models using representative agents. An important treatment that contributed to this changing was the model of Kiyotaki and Moore (1995) in which durable assets such as land, buildings and machinery serve as collateral for bank loans as a way of overcoming information asymmetries. They find that “The dynamic interaction between credit limits and asset prices turns out to be a powerful transmission mechanism by which the effects of shocks persist, amplify, and spill over to other sectors”. Building upon this, the ‘financial accelerator’ model developed by Bernanke, Gertler and Gilchrist (1998) incorporated credit market frictions into a Dynamic New Keynesian model for the first time by introducing heterogeneous firms. In this sticky price model, access to credit for the purposes of investment depends on the net worth, or collateral, of firms. It is found that “the financial sector has a significant influence on business cycle dynamics”.

Over the past decade, there have been numerous attempts to include within standard DSGE models additional mechanisms by which credit frictions impact on demand (e.g., effects on consumption as well as investment). Taken together, they show how the financial accelerator could potentially be a very significant propagation mechanism. Nevertheless, the re-introduction of credit into business cycle theory that has taken place over the past decade or so is an incremental step rather than a revolution in economic thought. The financial accelerator, which results in credit playing some role within this model of the business cycle, is an extension of the principle of building models with rigorous micro-foundations in which the economy fluctuates in response to the propagation of exogenous real and monetary shocks which are then reflected in credit and asset prices. The result is a pseudo-endogenous model of credit but not one that allows for pronounced endogenous credit and financial cycles to be a driver of the business cycle.

References

Ahrend, R., Cournède, B., and Price, R., (2008), “Monetary Policy, Market Excesses and Financial Turmoil”, *OECD Economics Department Working Paper No. 597*, March.

Aizenman, J., and Jinjark, Y., (2008), “Current Account Patterns and National Real Estate Markets”, *NBER Working Paper No. 13921*, April.

Akerlof, G., and Shiller, R. J., (2009), “Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism”, Oxford: Princeton University Press.

Akerlof, G., (1970), “The Market for Lemons: Quality Uncertainty and the Market Mechanism”, *Quarterly Journal of Economics*, Vol. 84, pp. 488-500, August.

Bean, C., (2008), “Some Lessons for Monetary Policy from the Recent Financial Turmoil”, Remarks at Conference on Globalisation, Inflation and Monetary Policy", Istanbul, 22 November.

Bems, R., Dedola, L., and Smets, F., (2007), “US Imbalances: The Role of Technology and Policy”, *International Journal of Money and Finance*, Vol. 26, pp 523-545.

Benito, A., Thompson, J., Waldron, M., and Wood, R., (2006), “House Prices and Consumer Spending”, *Bank of England Quarterly Bulletin*, Summer.

Bernanke, B., (1983), “Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression”, *American Economic Review*, Vol. 73, No. 3, pp. 257-276, June.

Bernanke, B., (2002), “Deflation: Making Sure “It” Doesn’t Happen Here”, Remarks before the National Economists Club, Washington, D.C., 21 November.

Bernanke, B., (2005), “The Global Saving Glut and the U.S. Current Account Deficit”, Remarks at the Homer Jones Lecture, St. Louis, Missouri, April 14.



Bernanke, B., and Blinder, A. S., (1988), “Credit, Money and Aggregate Demand”, *American Economic Review*, Vol. 78, No. 2, Papers and Proceedings of the One-Hundredth Annual Meeting of the American Economic Association, pp. 435-439, May.

Bernanke, B., and Gertler, M., (1995), “Inside the Black Box: The Credit Channel of Monetary Policy Transmission”, *The Journal of Economic Perspectives*, Vol. 9, No. 4, Autumn, pp 27-48.

Bernanke, B., Gertler, M., and Gilchrist, S., (1998), “The Financial Accelerator in a Quantitative Business Cycle Framework”, *NBER Working Paper No. 6455*, March.

Borio, C. E. V., Kennedy, N., and Prowse, S. D., (1994), “Exploring Aggregate Asset Price Fluctuations Across Countries: Measurement, Determinants and Monetary Policy Implications”, *BIS Economic Paper No. 40*, Monetary and Economic Department, Bank for International Settlements, April.

Borio, C., and Lowe, P., (2002), “Asset Prices, Financial and Monetary Stability: Exploring the Nexus”, *BIS Working Paper No. 114*, Monetary and Economic Department, Bank for International Settlements, July.

Bracke, T., and Fidora, M., (2008), “Global Liquidity or Global Savings Glut? A Structural VAR Approach”, *ECB Working Paper No. 911*, June.

Brainard, W., and Tobin, J., (1963), “Financial Intermediaries and the Effectiveness of Monetary Control”, *American Economic Review*, Vol. 53, No. 2, Papers and Proceedings of the Seventy-Fifth Annual Meeting of the American Economic Association, pp383-400, May.

Brunner, K., and Meltzer, A. H., (1988), “The Monetary Mechanism: Markets for Assets” in “Money and the Economy: Issues in Monetary Analysis”, Raffaele Mattoli Lectures, Cambridge: Cambridge University Press [Reprint: 1993].

Caballero, R., Farhi, E., and Gourinchas, P., (2006), “An Equilibrium Model of Global Imbalances and Low Interest Rates”, *NBER Working Paper No. 11996*, January.



Caballero, R., (2006), “On the Macroeconomics of Asset Shortages”, *NBER Working Paper No. 12753*, December.

Cagan, P., (1965), “Determinants and Effects of Changes in the Stock of Money, 1875-1960”, *Studies in Business Cycles No. 13*, National Bureau of Economic Research, Columbia University Press, New York and London.

Camerer, C. F., Loewenstein, G., and Rabin, M. T., (eds) (2004), “Advances in Behavioural Economics”, The Roundtable Series in Behavioural Economics, The Russell Sage Foundation, Princeton: Princeton University Press.

Campbell, J., and Hercowitz, Z., (2005), “The Role of Collateralized Household Debt in Macroeconomic Stabilization”, *NBER Working Paper No. 11330*, May.

Christiano, L., Ilut, C., Motto, R., and Rostagno, M., (2008), “Monetary Policy and Stock Market Boom-Bust Cycles”, *ECB Working Paper No. 955*, October.

Cottarelli, C., Giovanni, D., and Vladkova-Hollar, I., (2003), “Early Birds, Late Risers, and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and the Balkans”, *IMF Working Paper No. 03/213*.

Davidson, P., (2005), “The Post Keynesian School”, in Snowdon, B., and Vane, H. R., (eds) “Modern Macroeconomics: Its Origins, Development, and Current State”, Cheltenham: Edward Elgar.

Dooley, M. P., Folkerts-Landau, D., and Garber, P., (2003), “An Essay on the Revived Bretton Woods System”, *NBER Working Paper No. 9971*, September.

Dooley, M. P., Folkerts-Landau, D., and Garber, P., (2004), “Direct Investment, Rising Real Wages and the Absorption of Excess Labor in the Periphery”, *NBER Working Paper No. 10626*, July.

Eichengreen, B., (2007), “Global Imbalances and the Lessons of Bretton Woods”, Cambridge:



Massachusetts Institute of Technology Press.

Eichengreen, B., and Mitchener, K., (2003), “The Great Depression as a Credit Boom Gone Wrong”, *BIS Working Paper No. 137*, Monetary and Economic Department, Bank for International Settlements, September.

Evans, G. W., and Honkapohja, S., (2001), “Learning and Expectations in Macroeconomics”, Princeton: Princeton University Press.

Fisher, I., (1933), “The Debt-Deflation Theory of the Great Depression”, *Econometrica*, Vol. 1, No. 4, pp. 337-357, October.

Fratzscher, M., Juvenal, L., and Sarno, L., (2007), “Asset Prices, Exchange Rates and the Current Account”, *ECB Working Paper No. 790*, August.

Friedman, B., (1980), “Postwar Changes in the American Financial Markets” in *The American Economy in Transition*, edited by Martin Feldstein, pp 9-78, Chicago: Chicago University Press.

Friedman, B., (1982), “Debt and Economic Activity in the United States”, in *The Changing Roles of Debt and Equity Financing U.S. Capital Formation*, edited by Benjamin Friedman, pp 91-110, Chicago: Chicago University Press.

Friedman, M., and Schwartz, A. J., (1963), “A Monetary History of the United States, 1867-1960”. Princeton: Princeton University Press [Reprint:1993].

Frydman, R., and Goldberg, M. D., (2007), “Imperfect Knowledge Economics”, Princeton: Princeton University Press.

Galbraith, J. K., (1954), “The Great Crash 1929”, Reprinted in Penguin Books [Reprint: 1992].

George, H., (1879), “Progress and Poverty: An Inquiry into the Cause of Industrial Depression, and of Increase of Want with Increase of Wealth . . . the Remedy”, New York: Robert Schalkenbach Foundation [Reprint: 1960].



- Gertler, M., (1988), “Financial Structure and Aggregate Economic Activity: An Overview”, *Journal of Money, Credit and Banking*, Vol. 20, No. 3, August.
- Godley, W., and Lavoie, M., (2007), “Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth”, Basingstoke: Palgrave Macmillan.
- Gordon, R., J., “Postwar Macroeconomics: The Evolution of Events and Ideas”, *NBER Working Paper No. 459*, February.
- Gourinchas, P., Valdes, R., and Landerretche, O., (2001), “Lending Booms: Latin America and the World”, *Economia*, Spring, pp. 47-99.
- Gurley, J. G., and Shaw, E. S., (1955), “Financial Aspects of Economic Development”, *American Economic Review*, Vol. 45, No. 4, pp. 515-538, September.
- Haldane, A., (2009a), “Why Banks Failed the Stress Test”, speech given at the Marcus-Evans Conference on Stress-Testing, 9-10 February.
- Haldane, A., (2009b), “Rethinking the Financial Network”, speech delivered at the Financial Student Association, Amsterdam, April.
- Hayek, F., (1929), “Monetary Theory and the Trade Cycle”, London: Jonathan Cape [Reprint: 1933].
- Hetzl, B., (1987), “Henry Thornton: Seminal Monetary Theorist and Father of the Modern Central Bank”, *Federal Reserve Bank of Richmond Economic Review*, July/August.
- Hofmann, B., (2001), “The Determinants of Private Sector Credit in Industrialised Countries: Do Property Prices Matter?”, *BIS Working Paper No. 108*, Monetary and Economic Department, Bank for International Settlements, December.
- House of Commons (2009), “Banking Crisis: Reforming Corporate Governance and Pay in the City”, Treasury Select Committee, Ninth Report of Session 2008-09, London: Stationery Office.



Hume, D., (1752), “Of Money” in Haakonssen, K., (ed), “Hume: Political Essays”, Cambridge Texts in the History of Economic Thought, Cambridge: Cambridge University Press [Reprint: 2006].

International Monetary Fund, (2004), “Are Credit Booms in Emerging Markets a Concern?”, *World Economic Outlook*, pp. 148-166.

Keynes, J. M., (1936), “The General Theory of Employment, Interest and Money”. London and Basingstoke: Macmillan [Reprint: 1989].

Kindleberger, C., (1978), “Manias, Panics, and Crashes: A History of Financial Crises”, Wiley Investment Classics [Reprint: 2000].

Kindleberger, C., and Aliber, (2005), “Manias, Panics, and Crashes: A History of Financial Crises”, Fifth Edition, Basingstoke: Palgrave Macmillan.

Kiyotaki, N., and Moore, J., (1995), “Credit Cycles”, *NBER Working Paper No. 5083*, April.

Lettau, M., Ludvigson, S., and Wachter, J., (2007), “The Declining Equity Premium: What Role Does Macroeconomic Risk Play”, *The Review of Financial Studies*, Vol. 21, No. 4.

Markowitz, H. M., (1952), “Portfolio Selection”, *Journal of Finance*, Vol. 7, No. 1, March.

Markowitz, H. M., (1959), “Portfolio Selection: Efficient Diversification of Investments”, New York: John Wiley & Sons [Reprint: 1970].

Martin, A., (2008), “Endogenous Credit Cycles”, mimeo, August.

Mendoza, E. G., and Terrones, M. E., (2008), “An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data”, *IMF Working Paper No. 08/226*, International Monetary Fund, September.

Menger, C., (1871), “Principles of Economics”, New York: New York University Press [Reprint:



1981].

Miller, M., and Zhang, L., (2007), “Fear and Market Failure: Global Imbalances and Self Insurance”, *Inter-American Development Bank Working Paper No. 593*.

Minsky, H. P., (1975), “John Maynard Keynes”, New York: Columbia University Press.

Minsky, H. P., (1986), “Stabilizing An Unstable Economy”, New York: McGraw-Hill [Reprint: 2008].

Mises, L. (1912), “The Theory of Credit and Money”, Indianapolis: The Liberty Fund [Reprint: 1981].

Modigliani, F., and Miller, M., (1958), “The Cost of Capital, Corporation Finance and the Theory of Investment”, *American Economic Review*, Vol. 48, pp. 261-297, June.

Nickell, S., (1990), “Inflation and the UK Labour Market”, *Oxford Review of Economic Policy*, Vol. 6, No. 4, Winter.

Robbins, L., (1934), “The Great Depression”, New Jersey: Transaction Publishers [Reprint: 2009].

Schumpeter, J. A., (1912), “The Theory of Economic Development”, Oxford: Oxford University Press [Reprint: 1934]

Sharpe, W. F., (1963), “A Simplified Model for Portfolio Analysis”, *Management Science*, Vol. 9, No. 2, January.

Shiller, R. J., (2000), “Irrational Exuberance”, Princeton: Princeton University Press [Reprint: 2001]

Shiller, R. J., (2007), “Low Interest Rates and High Asset Prices: An Interpretation in Terms of Changing Popular Economic Models”, *NBER Working Paper No. 13558*, October.



Shiller, R. J., (2008), “The Subprime Solution: How Today’s Global Financial Crisis Happened, and What to Do About It”, Princeton: Princeton University Press.

Sims, C., (1972), “Money, Income and Causality”, *American Economic Review*, Vol 62, pp 540-552, September.

Sims, C., (1980), “Comparison of Interwar and Postwar Business Cycles: Monetarism Reconsidered”, *American Economic Review*, Vol 73, pp 305-318, June.

Skidelsky, R., (1992), “John Maynard Keynes: Fighting for Britain 1937-1946”, Basingstoke: Macmillan [Reprint: 2001].

Smith, A., (1776), “An Inquiry into the Nature and Causes of the Wealth of Nations”. Chicago: University of Chicago Press [Reprint: 1976].

Soros, G., (2008), “The New Paradigm for Financial Markets: The Credit Crisis and What it Means”, Chatham: Perseus Books.

Stigler, G. J., (1960), “The Influence of Events and Policies on Economic Theory”, *American Economic Review*, Vol. 50, No. 2, Papers and Proceedings of the Seventy-Second Annual Meeting of the American Economic Association, May.

Stiglitz, J., and Weiss, A., (1981), “Credit Rationing in Markets with Imperfect Information”, *American Economic Review*, Vol. 71, pp. 393-410, June.

Stiglitz, J., and Weiss, A., (1984), “Incentive Effects of Terminations: Applications to Credit and Labor Markets”, *American Economic Review*, Vol. 73, pp 912-927, December.

Stock, J., and Watson, M., (2002), “Has the Business Cycle Changed and Why?”, in M. Gertler and K. Rogoff, eds., (2003) NBER Macroeconomics Annual.

Taleb, N. N., (2004), “Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets”, London: Penguin Books [Reprint: 2007].



Taleb, N. N., (2007), “The Black Swan: The Impact of the Highly Improbable”, London: Penguin Books [Reprint: 2008].

Taylor, C. T., and Threadgold, A. R., (1979), “Real National Savings and its Sectoral Composition”, *Bank of England Discussion Paper No.6*.

Taylor, J. B., (1988), “The Evolution of Ideas in Macroeconomics”, remarks made at a symposium on macroeconomics, sponsored by the Econometric Society and the Australian Economic Society in Canberra, Australia, 29 August.

Taylor, J. B., (2007), “Housing and Monetary Policy”, *NBER Working Paper No. 13682*, December.

Taylor, J. B., (2009), “Getting Off Track”, Stanford: The Hoover Institution.

Thornton, H., (1802), “An Enquiry into the Nature and Effects of the Paper Credit of Great Britain”, London: Knight and Compton.

Tobin, J., (1958), “Liquidity Preference as Behavior Towards Risk”, *Review of Economic Studies*, Vol. 25, No. 1.

Trichet, J., C., (2008), “Risk and the Macroeconomy”, keynote address at the conference “The ECB and its Watchers X”, Frankfurt am Main, 5 September.

Turner, A., (2009), “The Turner Review: A Regulatory Response to the Global Banking Crisis”, March.

Veblen, T., (1904a), “Credit and Prices”, *The Journal of Political Economy*, Vol. 13, No. 3, pp. 460-472, June.

Veblen, T., (1904b), “The Theory of Business Enterprise”, New York: Viking.

Warnock, F., and Warnock, V., (2005), “International Capital Flows and US Interest Rates”,



International Finance Discussion Paper No. 840, Boards of Governors of the Federal Reserve System, September.

White, W., R., (2006a), “Procyclicality in the Financial System: Do We Need a New Macrofinancial Stabilisation Framework”, *BIS Working Paper No. 193*, January.

White, W., R., (2006b), “Is Price Stability Enough?”, *BIS Working Paper No. 205*, April.

Wicksell, K., (1898), “Interest and Prices”, English Translation by R. F. Kahn, London: Macmillan, for the Royal Economic Society [Reprint: 1962].

Woodford, M., (1999), “Revolution and Evolution in Twentieth-Century Macroeconomics”, prepared for the conference on “Frontiers of the Mind in the Twenty-First Century”, Washington, June 14-18.

Young, G., (2008), “On the Sources of Macroeconomic Stability”, *Bank of England Quarterly Bulletin*, Q2.



Table 1 – Bank lending booms, 1970-2006

	Period (years)			Credit ratio: start-to-end		Peak	
	Start	End	Duration	chg, pp	chg, %	Year	Excess, %
World	1971	1973	2	5	10	1972	3
UK	1971	1974	3	24	69	1972	20
US	1972	1974	2	3	6	1973	4
Netherlands	1973	1980	7	25	63	1978	10
India	1975	1979	4	6	40	1976	12
South Africa	1981	1985	4	7	15	1984	8
UK	1981	1989	8	61	115	1984	14
Switzerland	1982	1984	2	7	6	1982	9
Norway	1982	1988	6	30	95	1986	25
Finland	1982	1989	7	31	59	1988	9
Denmark	1983	1987	4	44	29	1986	22
Emerging	1984	1987	3	10	22	1986	8
China	1984	1987	3	17	29	1986	12
World	1984	1989	5	13	21	1989	4
World ex US	1984	1989	5	17	27	1989	5
Australia	1984	1990	6	31	105	1989	18
Mexico	1984	1994	10	25	174	1992	34
US	1985	1987	2	2	3	1986	4
Brazil	1986	1989	3	75	124	1987	30
New Zealand	1986	1989	3	10	16	1987	6
Japan	1986	1989	3	18	19	1987	7
Sweden	1986	1990	4	34	37	1988	14
Belgium	1987	1991	4	20	33	1989	15
France	1987	1991	4	14	17	1990	6
Spain	1988	1991	3	4	6	1989	10
Austria	1989	1991	2	4	4	1990	4
Thailand	1989	1995	6	68	94	1994	10
Portugal	1991	2001	10	83	147	1992	19
Argentina	1993	1999	6	6	34	1994	16
Germany	1993	1998	5	20	20	1998	4
Uruguay	1994	2002	8	54	228	1998	50
Ireland	1995	2000	5	35	50	1995	30
Malaysia	1995	1998	3	34	27	1997	16
Singapore	1995	1998	3	20	22	1998	9
Chile	1995	2000	5	16	33	1996	15
Netherlands	1996	2000	4	35	35	1998	7
China	1997	2000	3	18	20	1998	7
World	1997	2000	3	6	7	1998	3
Advanced	1997	2000	3	6	8	1998	3
Korea	1997	2002	5	30	48	1999	9
Sweden	1997	2003	6	17	20	2000	13
World ex Japan, Germany	1998	2003	5	9	13	2000	4
Italy	1999	2001	2	7	10	1999	13

Statistics**World**

Mean	-	-	4	23	46	-	13
Median	-	-	4	18	27	-	10
Standard deviation	-	-	2	20	50	-	10

Advanced

Mean	-	-	4	24	42	-	12
Median	-	-	4	20	29	-	10
Standard deviation	-	-	2	19	40	-	7

Emerging

Mean	-	-	5	29	68	-	18
Median	-	-	4	20	34	-	12
Standard deviation	-	-	2	23	67	-	13

Table 2 – Bank lending booms, 2007

	IMF Weight	Period (years)		Credit ratio: start-to-2007		Peak	
		Start	Duration	chg, pp	chg, %	Year	Excess, %
World	79.9	-	-	-	-	-	-
World ex US	56.4	-	-	-	-	-	-
World ex Japan, Germany	67.1	2005	3	9	11	2007	4
Advanced	58.6	2005	3	7	7	2006	3
US	23.6	1995	13	15	32	2000	6
Japan	7.7	-	-	-	-	-	-
Germany	5.2	-	-	-	-	-	-
France	3.7	2002	5	20	23	2007	7
UK	3.6	2003	4	45	31	2007	7
Italy	3.4	-	-	-	-	-	-
Spain	2.2	1997	11	104	133	2006	12
Canada	2.1	-	-	-	-	-	-
Australia	1.2	-	-	-	-	-	-
Netherlands	1.1	-	-	-	-	-	-
Belgium	0.7	-	-	-	-	-	-
Greece	0.6	1996	12	61	196	2001	22
Austria	0.6	-	-	-	-	-	-
Sweden	0.6	2005	3	15	14	2007	6
Switzerland	0.5	2005	3	12	7	2007	5
Portugal	0.4	-	-	-	-	-	-
Norway	0.4	-	-	-	-	-	-
Denmark	0.4	1997	11	81	67	1998	15
Finland	0.3	2000	8	28	54	2003	18
Ireland	0.3	2004	4	64	47	2005	11
New Zealand	0.2	2005	3	17	13	2006	5
Emerging	21.4	-	-	-	-	-	-
China	7.2	-	-	-	-	-	-
India	3.7	1998	10	24	98	2000	12
Brazil	3.0	2000	8	11	36	2007	39
Mexico	2.3	2005	3	4	27	2006	27
Korea	1.8	-	-	-	-	-	-
Argentina	0.8	-	-	-	-	-	-
Thailand	0.7	-	-	-	-	-	-
South Africa	0.7	1995	13	36	76	1998	8
Malaysia	0.5	-	-	-	-	-	-
Chile	0.3	-	-	-	-	-	-
Singapore	0.3	-	-	-	-	-	-
Uruguay	0.1	-	-	-	-	-	-
<u>Statistics</u>							
World							
Mean		2001	7	36	57	2004	13
Median		2002	8	24	36	2006	11
Standard deviation		-	4	29	52	-	10
Advanced							
Mean		2001	7	42	56	2004	10
Median		2002	5	28	32	2006	7
Standard deviation		-	4	32	58	-	6
Emerging							
Mean		2000	9	19	59	2003	22
Median		1999	9	17	56	2003	20
Standard deviation		-	4	14	33	-	14

Table 3 – US financial liabilities

<i>2007, % of GDP</i>	(A) Households and NPISH	(B) Non-financial Corporates	(C) Private Non-Financial =(A)+(B)	(D) General Government	(E) Total Non-financial =(C)+(D)	(F) Financial Corporations	(G) Total =(E)+(F)
(1) Deposits	0.0	0.0	0.0	0.2	0.2	66.9	67.1
(2) Loans	100.8	48.4	149.3	0.0	149.3	33.6	182.9
(3) Banking system = (1)+(2)	100.8	48.4	149.3	0.2	149.5	100.5	250.0
(4) Bonds	1.8	28.0	29.8	49.0	78.9	106.9	185.8
(5) Equity	0.0	177.8	177.8	0.0	177.8	139.2	317.0
(6) Capital markets =(4)+(5)	1.8	205.8	207.6	49.0	256.7	246.1	502.8
(7) Insurance reserves	0.2	0.3	0.5	8.1	8.6	113.5	122.1
(8) Other accounts payable	1.5	40.8	42.3	5.7	48.0	15.0	63.0
(9) Total =(3)+(6)+(7)+(8)	104.3	295.4	399.7	63.1	462.8	475.1	937.9
(10) Memo: Credit = (2)+(4)	102.7	76.5	179.1	49.0	228.2	140.5	368.7

Table 4 – US financial liabilities

<i>2007, % of total</i>	(A) Households and NPISH	(B) Non-financial Corporates	(C) Private Non-Financial =(A)+(B)	(D) General Government	(E) Total Non-financial =(C)+(D)	(F) Financial Corporations	(G) Total =(E)+(F)
(1) Deposits	0.0	0.0	0.0	0.0	0.0	7.1	7.2
(2) Loans	10.8	5.2	15.9	0.0	15.9	3.6	19.5
(3) Banking system = (1)+(2)	10.8	5.2	15.9	0.0	15.9	10.7	26.7
(4) Bonds	0.2	3.0	3.2	5.2	8.4	11.4	19.8
(5) Equity	0.0	19.0	19.0	0.0	19.0	14.8	33.8
(6) Capital markets =(4)+(5)	0.2	21.9	22.1	5.2	27.4	26.2	53.6
(7) Insurance reserves	0.0	0.0	0.1	0.9	0.9	12.1	13.0
(8) Other accounts payable	0.2	4.4	4.5	0.6	5.1	1.6	6.7
(9) Total =(3)+(6)+(7)+(8)	11.1	31.5	42.6	6.7	49.3	50.7	100.0
(10) Memo: Credit = (2)+(4)	10.9	8.2	19.1	5.2	24.3	15.0	39.3

Chart 1: Bank lending
% of GDP

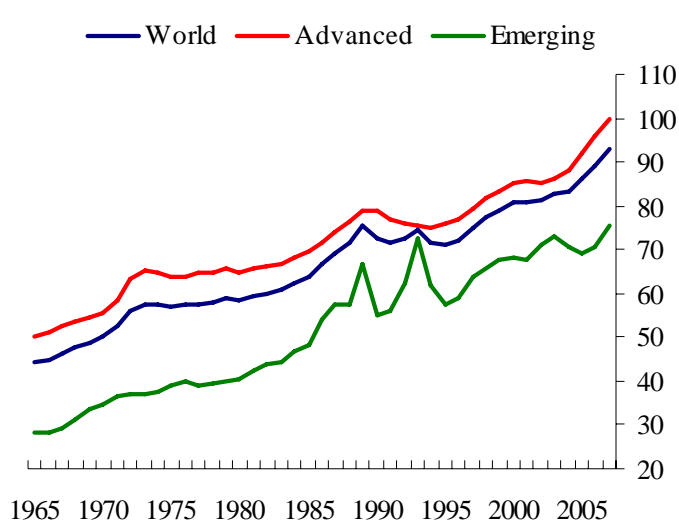


Chart 2: Bank lending
Deviation from trend, % of GDP

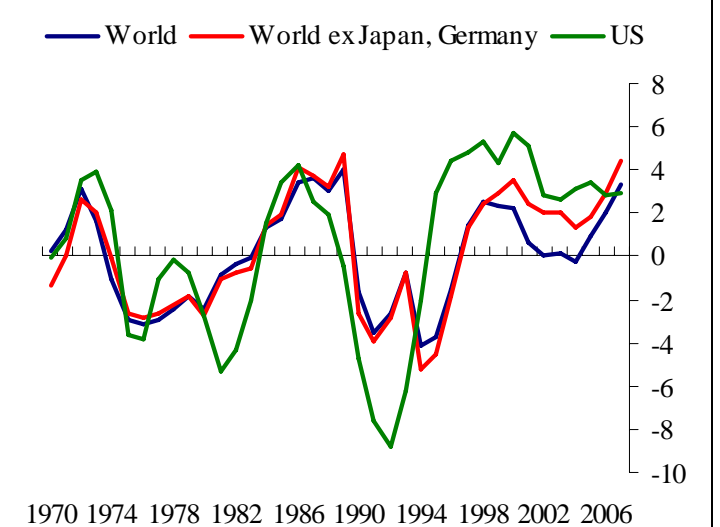


Chart 3: Non-bank credit to households and firms
% of GDP

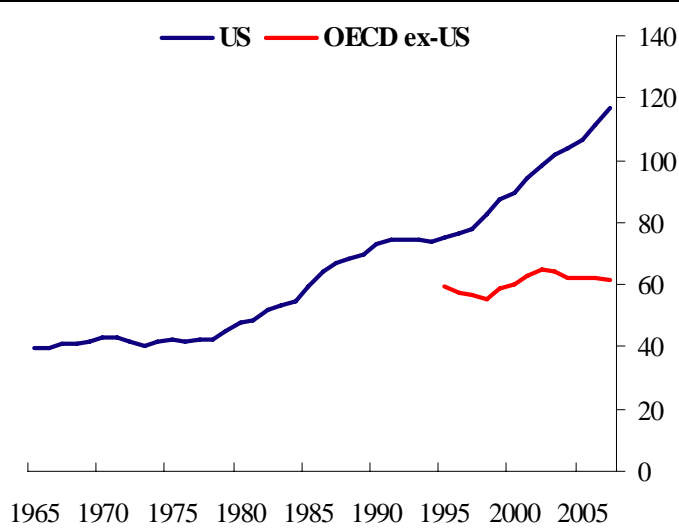


Chart 4: Non-deposit credit to the financial sector
% of GDP

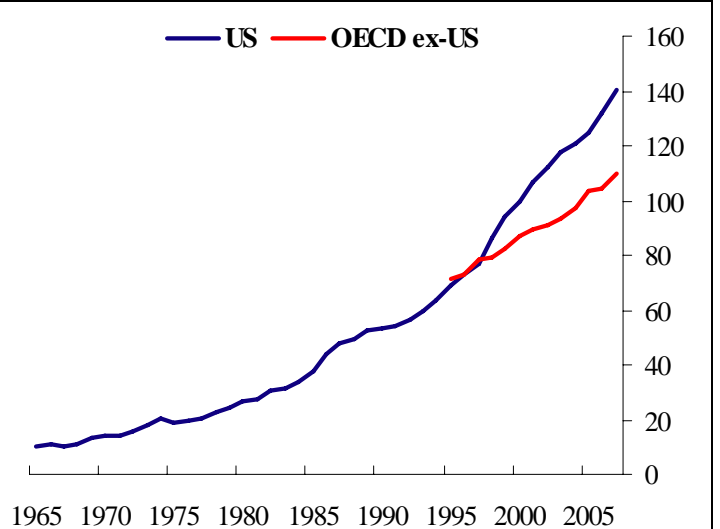


Chart 5: Total economy financial liabilities
% of GDP

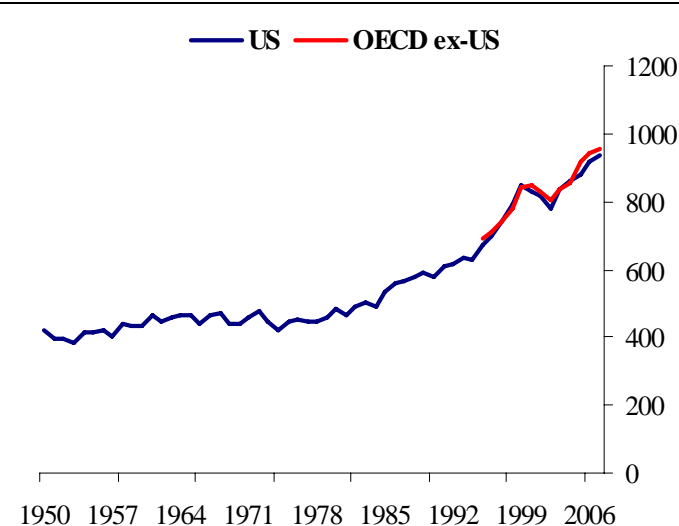


Chart 6: Total economy financial liabilities*
% of GDP

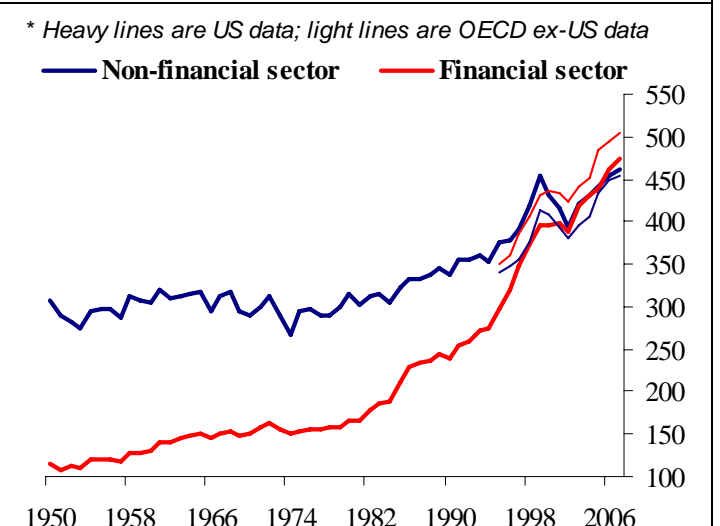


Chart 7: Non-financial private sector credit*
% of GDP

* Heavy lines are US data; light lines are OECD ex-US data

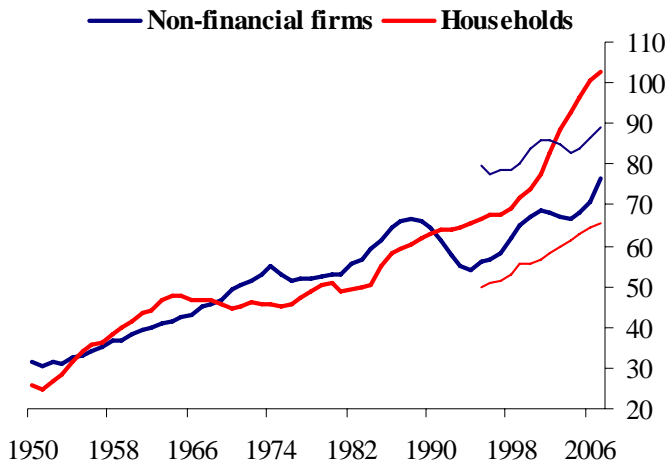


Table 5: Non-financial private sector credit
% of GDP, changes since 2000

	Households		Firms	
	pp	%	pp	%
US	29	32	9	11
Japan	-9	-11	-26	-18
Germany	-9	-12	-1	-6
UK	31	36	34	36
France	12	31	18	13
OECD	17	23	7	6
OECD ex US	10	15	5	4
OECD ex US/Jap/Ger	21	40	18	15
OECD ex Jap/Ger	25	35	14	15

Chart 8: OECD real interest rates
%

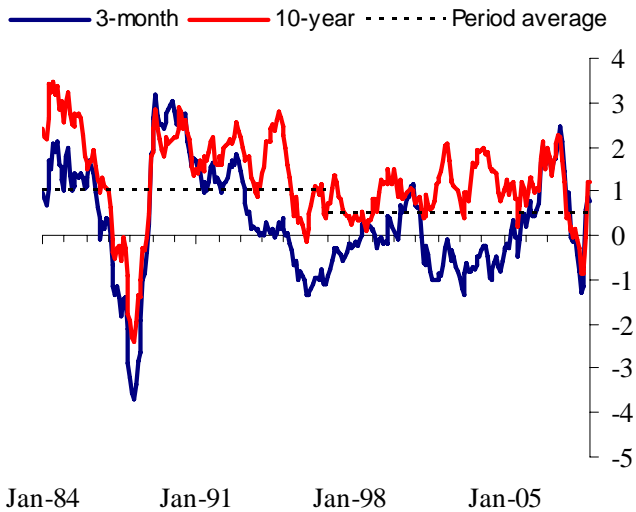


Table 6: Asset prices and imbalances
Indices, 2000=100 (current account is % of GDP)

	World real equity prices	OECD real house prices	OECD real exchange rate	OECD current account
1995	81	92	98	0.1
1996	86	91	97	0.0
1997	108	92	97	0.1
1998	117	94	100	-0.1
1999	141	97	100	-0.7
2000	100	100	100	-1.3
2001	91	103	101	-1.1
2002	59	108	101	-1.1
2003	91	112	100	-1.1
2004	98	117	100	-1.0
2005	111	123	99	-1.4
2006	122	127	98	-1.6
2007	113	129	97	-1.4
2008	63	125	97	-1.5

Chart 9: GDP deflator
% y-o-y

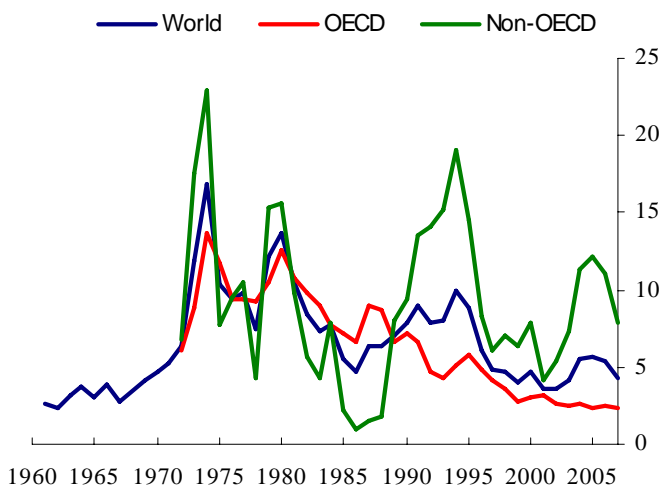


Chart 10: Credit ratios and inflation
Between 1995-97 and 2005-07

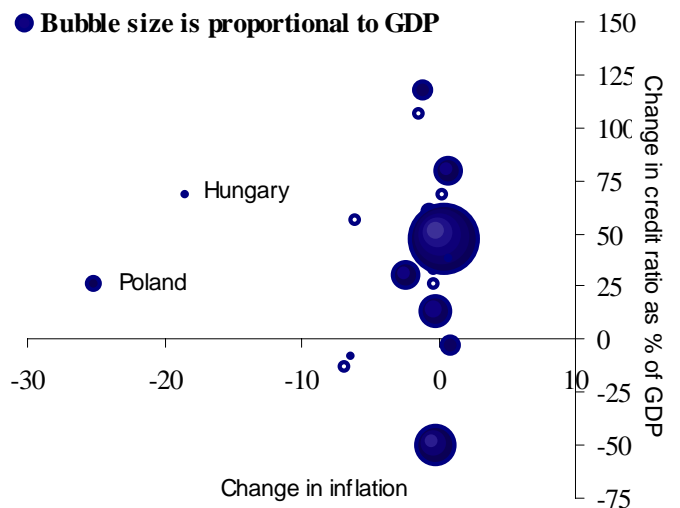


Chart 11: Real GDP

% y-o-y

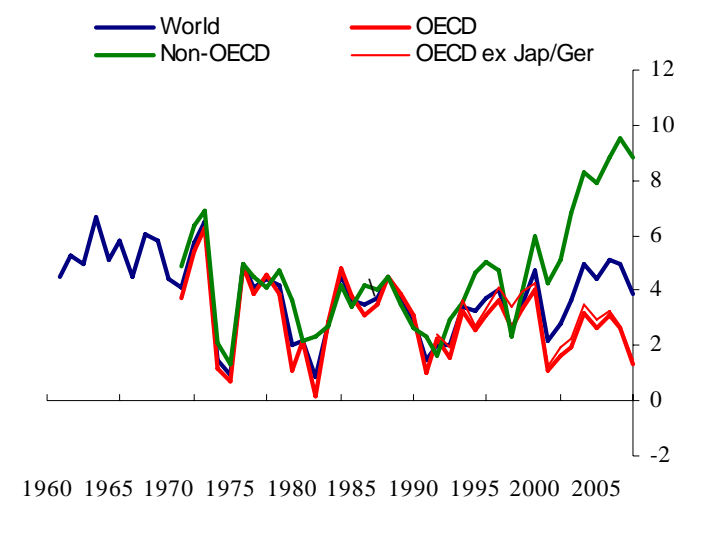


Chart 12: Credit ratios and real GDP

Between 1995-97 and 2005-07

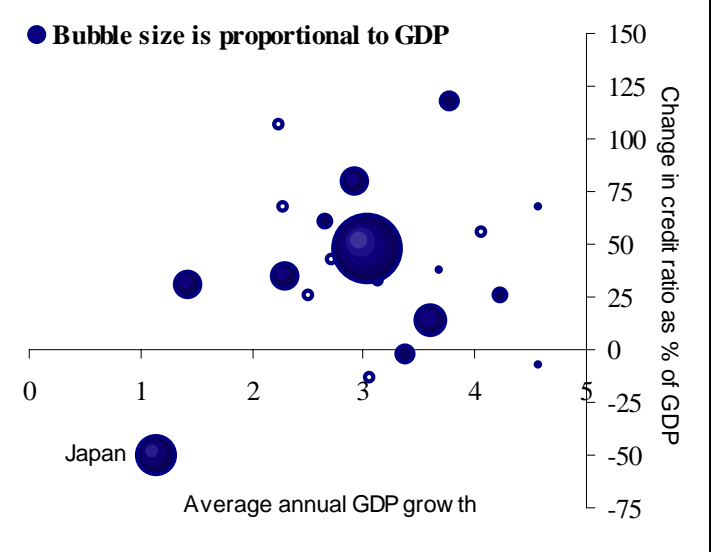


Chart 13: OECD CPI inflation

% y-o-y

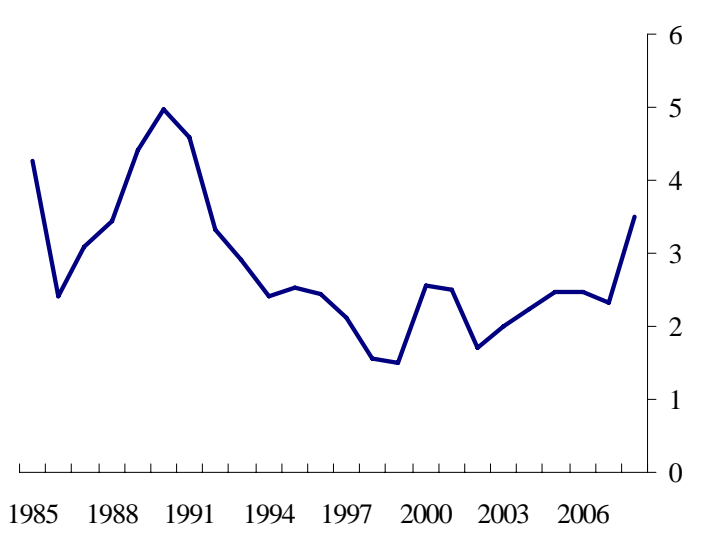


Chart 14: GDP growth in the late 1980s and 1990s

Annual average, % y-o-y

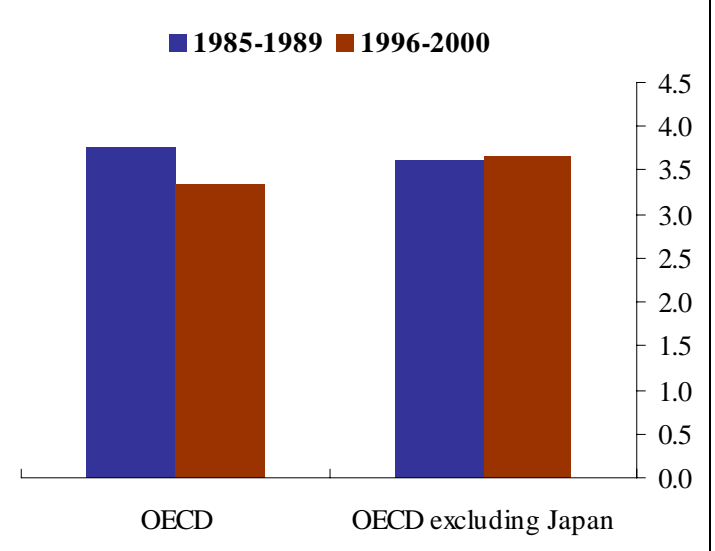


Chart 15: Credit ratios and real domestic demand

Between 1995-97 and 2005-07

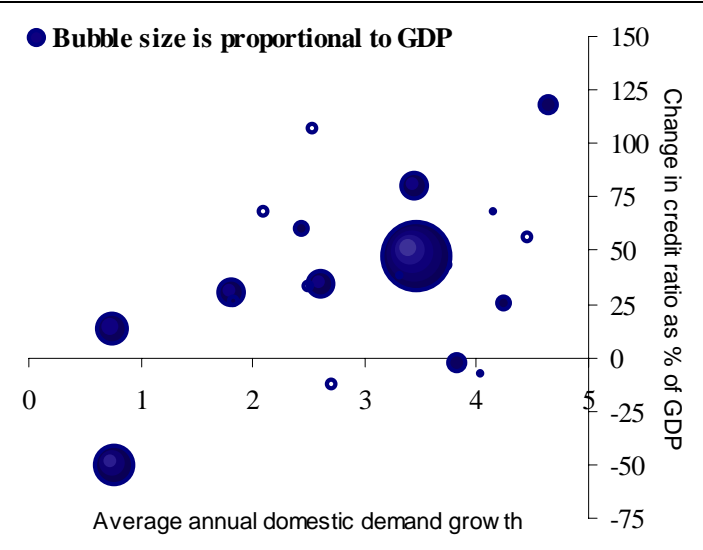


Chart 16: Credit ratios and current accounts

Between 1995-97 and 2005-07

