Three Perspectives on the 2007-2009 Global Financial Crisis; Minskian, Austrian and New Keynesian

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Introduction

The recent "Global Financial Crisis" of 2007-2009 has been the most severe episode of financial and economic instability since The Great Depression with almost six million jobs lost in the US and over $13 trillion in wealth destroyed to date (Krugman 2009). The current crisis shares many historical parallels with previous crises including severe financial market instability, multiple institutional failures, asset price deflation and rising unemployment. There are however some points of difference, namely the sophistication of financial instruments involved, the extent of their distribution and, following their deterioration, the perverse effects on financial stability. In response to the crisis, central banks and international governments reacted in an aggressive, coordinated and unprecedented fashion. As the crisis developed, central banks rapidly lowered interest rates and injected billions of dollars worth of liquidity into the financial system, and as the crisis intensified, governments enacted huge fiscal stimulus, amounting to nearly $1.65 trillion across the G-20 (Prasad and Sorkin 2009)

A clear understanding of the causes and features of the Global Financial Crisis is of paramount importance, given interpretations and understandings will likely determine policy responses to the crisis and will define future policy initiatives. The Great Depression, for example, saw major reforms in both the structure of the economy as well as changes to banking and finance legislation (Wolfson 1986: 3). If the ultimate goal of policy reform is to reduce the extent of dislocations resulting from financial crises then the best possible understanding of the current crisis is crucial.

The crisis has also shaken some of the key intellectual foundations of current economic theory. The Economist (2009) recently argued that "the macroeconomic crisis of the past two years is also provoking a crisis of confidence in macroeconomics." Internal critics, notably

Paul Krugman of Princeton University, Brad Delong of the University of California, Berkley and Willem Buiter of the London School of Economics charge that economists largely missed the origins of the crisis, failed to appreciate its worst symptoms and have not been able to agree on a single cure (The Economist, 2009). These critics probably have in mind the view of financial markets which characterises conventional economic theory. According to conventional economic theory, financial markets and intermediaries increase the rate of growth by ensuring resources are available to those who can put them to their best use. The Efficient Market Hypothesis asserts that financial markets always get asset prices right given the available information.Tests of the Efficient Market Hypothesis have consistently suggested that markets do this reasonably well.

However, a number of alternative perspectives, which stand in stark contrast to the conventional view, have been offered over the years. Notable amongst these explanations is that of Hyman Minsky and the Post Keynesian School. In these views, capitalism and financial markets are not characterised by efficient allocations of resources and the appropriate pricing of risk. Instead, Minsky viewed capitalism as inherently unstable with the source of this instability originating in financial markets. Since the crisis, support for this view has gained considerable tract with key points in the development of the recent crisis being referred to in the financial press as "Minsky moments." In addition to Minsky's Financial Instability Hypothesis, the Austrian School of Economics offers a theory of crises which focuses on underlying real economic forces. For this school and the associated Real Business Cycle model of economic fluctuations, financial markets play a secondary and accommodating role in crises rather than being the source of instability as in Minsky's theory.

Mainstream economics also provides some analysis of financial crises, notwithstanding the observations of Paul Krugman and The Economist. The New Keynesian School and the so called 'New Theory of Intermediation' (Chant 1992) not only provide an analysis of the contribution to economic welfare provided by financial intermediaries such as banks but also an account of how the dynamics surrounding bank services can lead to bank failures with implications for the real economy.

The current crisis provides an opportunity to re-examine this spectrum of crisis analysis by comparing the broad structural characteristics of the current crisis with those of the three explanations of crises. Such an investigation has the potential both to cast some light on the

recent crisis but also to provide additional evidence pertaining to the validity and usefulness of the three models.

This paper will initially present an overview of the recent global crisis followed by a more detailed examination of the Minskian, Austrian and New Keynesian treatments of crises and their application to the present.

An overview of the 2007-2009 financial crisis:

Dating the beginning of the 2007-2009 *Global Financial Crisis* (GFC) is a difficult task given various commentators have chosen a variety of different events or trends to identify this point. The Reserve Bank of Australia (RBA) (2007: 3-4), for example, provided an early argument that the catalyst for the emerging crisis was the increase in delinquency rates on US subprime mortgages from the middle of 2005, but distinguished between the immediate impact of this development on financial markets and "spill over effects" or "broader contagion" to other parts of the economy. The RBA (2007) argued that the latter was marked by the announcement of Bear Stearns in June 2007 of large losses on two of its hedge funds that had significant exposure to the subprime loan market. Cohen & Remolona (2008: 8-10) identify a general increase in LIBOR-OIS spreads in August and September 2007 as the first in a series of events that together constituted the emerging crisis. This assessment is to some extent shared by Shin (2009: 102) who associated this with news that BNP Paribas was freezing a number of its own investment funds. Cecchetti (2009: 57) shares Shin's assessment although acknowledges that a "complete chronology" of the crisis might begin in February 2007 when subprime lenders in the U.S. began reporting increases in the losses they had been experiencing. Borio (2008: 26) also offers a chronology of the crisis however focuses instead on the initial repricing of risk, seen in the widening of spreads of structured products associated with the US mortgage market in January-February 2007.

The ultimate significance of these events is, of course, the impact they have had on the real economy where lost output and higher unemployment have had a perverse impact on economic welfare. The analyses of the crisis cited above have tended not to focus on these real dimensions of the crisis[1]. In contrast, Romer (1993), considering the earlier crisis of The

[1] Though this is likely to be explained in some part by the relatively early nature of these analyses where either real variables had not yet deteriorated significantly, or, updated data on real variables had not been released.

Great Depression, pays much closer attention to the impact of financial developments on production and employment in the United States and other developed economies. She examines the timing of changes to output in various sectors of the developed economies and the relationship of sectoral output changes in the real economy to various financial events such as changes to interest rates. Plosser (1989: 61-67) provides a similar analysis of cycles within the U.S. economy in the 1954-85 period that includes the 1966 credit crunch.

This enquiry begins its consideration of the recent crisis with an examination of its real dimensions given these are of central importance. It appears that the real dimensions have received less careful attention than the financial factors since the onset of the crisis. This provides a context for a consideration of the financial factors that have been more widely discussed.

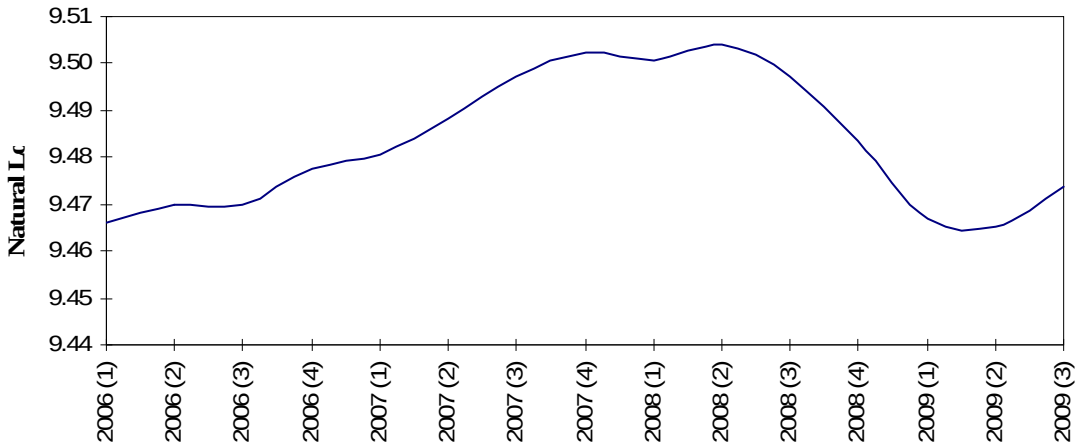

Figure 1: Log of Real US GDP, 2006(1) – 2009(3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, Real Gross Domestic Product, GDPC1, $US chained 2005 billions, quarterly, seasonally adjusted

Figure 1 shows the log of real U.S. GDP and Figure 2 shows the quarterly change in real GDP for the 2006(1) - 2009(3) period. Together, these figures indicate the complex nature of determining the timing of recessions. U.S. GDP experienced a peak in the last quarter of 2007, followed by a single quarter of negative growth and then a higher peak in the second quarter of 2008. It appears to have troughed in the second quarter of 2009 representing a 3.83 per cent decline across four quarters from the peak in 2008(2) to 2009(2), but a loss of 4.05%

if the additional quarter of negative growth in 2008(1) is included. Approximately 43 per cent of the loss using the first of these measures occurred in the single quarter of 2009(1).

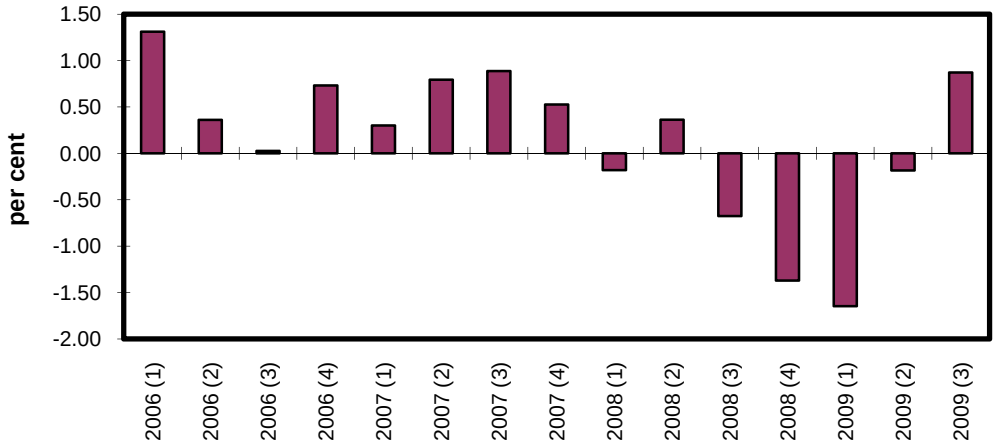

Figure 2: Quarterly Change in Real US GDP, 2006(1) – 2009(3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, Real Gross Domestic Product, GDPC1, $US chained 2005 billions, seasonally adjusted.

Figure 3 shows the behaviour of personal consumption spending over the period from 2006(1) to 2009(4). This component of GDP peaks in the second quarter of 2008, recovers briefly in the first quarter of 2009 and deteriorates again for a single quarter before appearing to recover in the third quarter of 2009

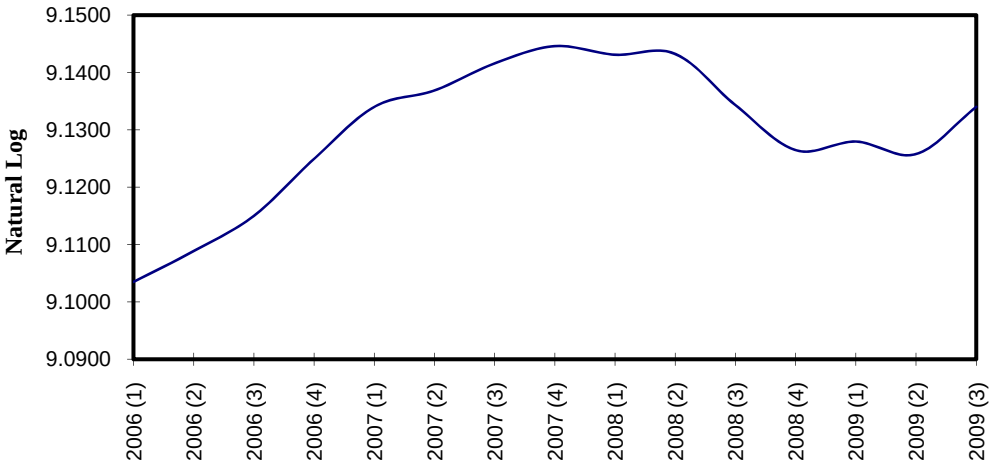

Figure 3: Real US Personal Consumption Spending, 2006(1)–2009 (3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, PCECC96, $US chained 2005 billions, quarterly, seasonally adjusted.

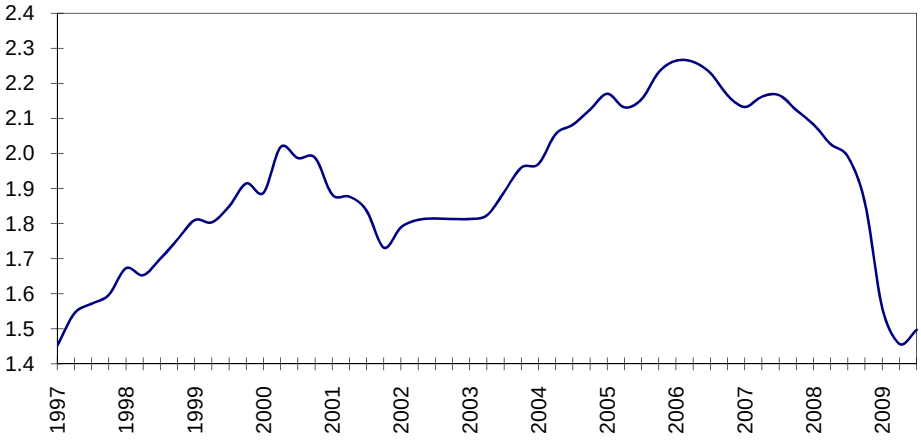

Figure 4: Real US Gross Private Investment, 1997(1) -2009(2)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, GDPIC96, $US chained 2005 billions, quarterly, seasonally adjusted.

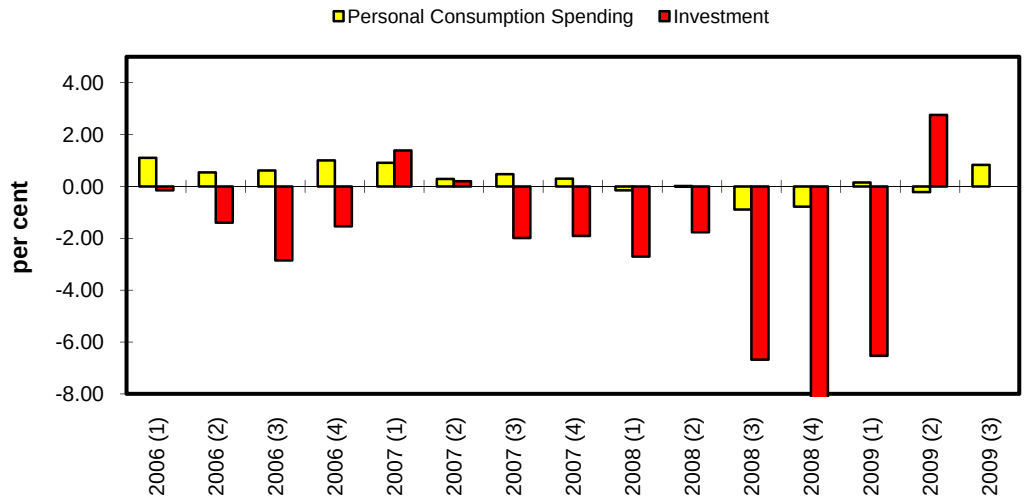

Figure 5: Quarterly Change in Real US GDP Components, 2006(1) – 2009(3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, PCECC96 and GDPIC96, $US chained 2005 billions, quarterly, seasonally adjusted.

The quarterly growth rates of this variable for the same period are shown in Figure 5. Figure 4 shows the log of gross investment spending in the U.S. over the longer period from the first quarter of 1997 to the third quarter of 2009. After eventually recovering in 2003 from the bursting of the dot com bubble, investment spending grows strongly to peak in 2005(4). It then falls consistently for four consecutive quarters, averaging a quarterly growth rate of -1.49 per cent, showing a second, lower peak in 2007(2). For seven quarters from 2007(3) until 2009(1), the rate of decline in investment spending increases dramatically to average a quarterly rate of -5.38 per cent over this period, a cumulative decline of 37.69 per cent. Approximately 43% of this cumulative decline occurs in the fourth quarter of 2008. These quarterly declines are shown clearly in Figure 5 (note that the negative scale is truncated at 8 percent to make the average quarterly growth rates more intelligible. The growth rate for investment in 2008(4) is -16.10 per cent).

The non-residential and residential components of fixed investment spending are shown in Figures 6 and 7 respectively. Average quarterly growth in residential fixed investment over the period from 1997(1) to 2005(4) was 1.30 per cent and growth was relatively steady. Figure 7 indicates a sharp downturn in this component of GDP in the first quarter of 2006 which continues for the following fourteen consecutive quarters with an average quarterly growth rate of -5.67 per cent summing to a cumulative reduction of 79.42 per cent over this

period. The pattern of non-residential fixed investment, however, is very different. Average quarterly growth for the period 1997(1) to 2000(4) was 2.50 per cent followed by a nine quarter decline associated with the bursting of the dot com bubble in which a cumulative reduction of 15.20 per cent was sustained. Growth then resumed for the following 21 quarters with a smaller quarterly average of 1.6 per cent, peaking in the second quarter of 2008. There then follows five quarters of negative growth with a cumulative reduction of 21.65 per cent. The reduction in residential fixed investment, therefore, commences eight quarters prior to the initial downturn in GDP while the downturn in non-residential

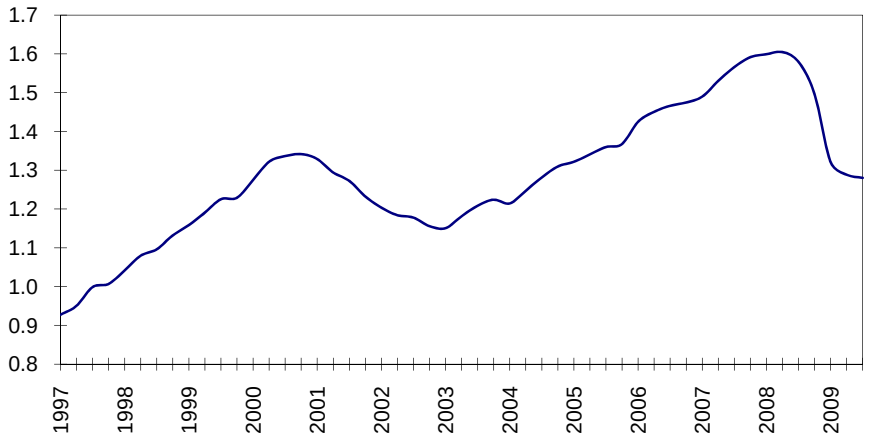

Figure 6: Real US Private Non-Residential Fixed Investment, 1997(1) - 2009(3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, PCECC96 and GDPIC96 series, $US chained 2005 billions, quarterly, seasonally adjusted.

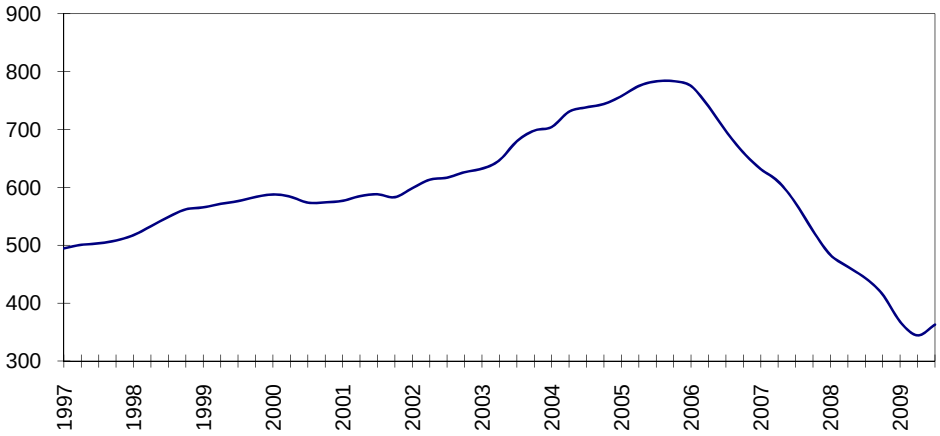

Figure 7: Real US Private Residential Fixed Investment, 1997(1) – 2009(3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, PCECC96 and GDPIC96 series, $US chained 2005 billions, quarterly, seasonally adjusted.

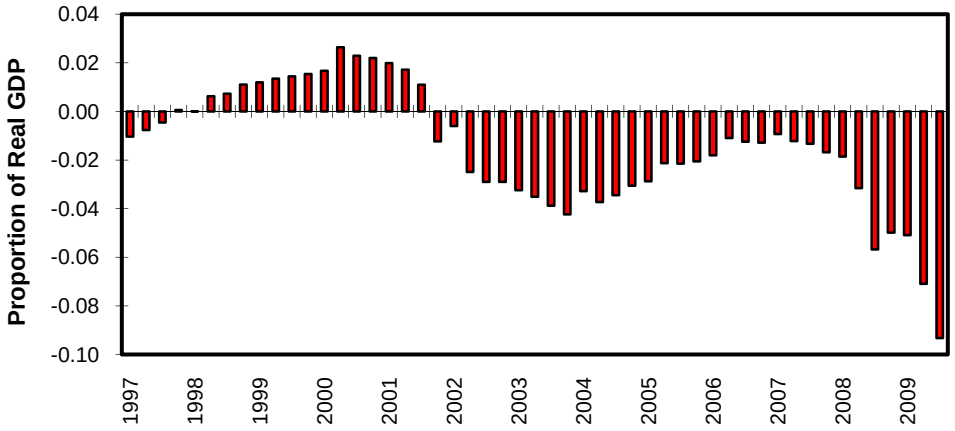

Figure 8: Real US Government Saving, 1997(1) – 2009(3)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, PCECC96 and GDPIC96 series, $US chained 2005 billions, quarterly, seasonally adjusted.

fixed investment occurs two periods *after* this initial effect and in the same period as the sustained downturn commences.

Figure 8 indicates that the first significant fiscal policy response represented by a reduction in net government saving doubles from 0.03 per cent of GDP in 2008(1) to 0.06 per cent in 2008(2) rising to 0.09 per cent in 2009(2).

Total industrial production for both the US and other major economies are shown in figures 9 and 10. Between 2002(1) and 2008(1), industrial production in the U.S increased by nearly 14%. The peak in industrial production was 2007(4), after which it declined for 17 out of the 18 proceeding months. From peak to trough industrial production fell by 16% before it started to increase in 2009(2).

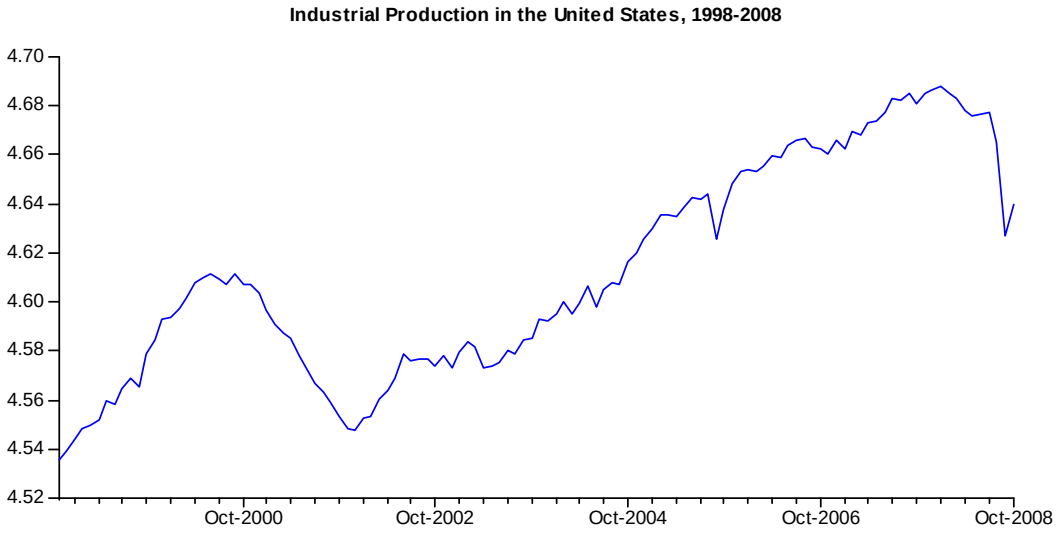

Figure 9: Industrial Production in the United States, 1998 - 2008

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, PCECC96 and GDPIC96 series, $US chained 2005 billions, quarterly, seasonally adjusted.

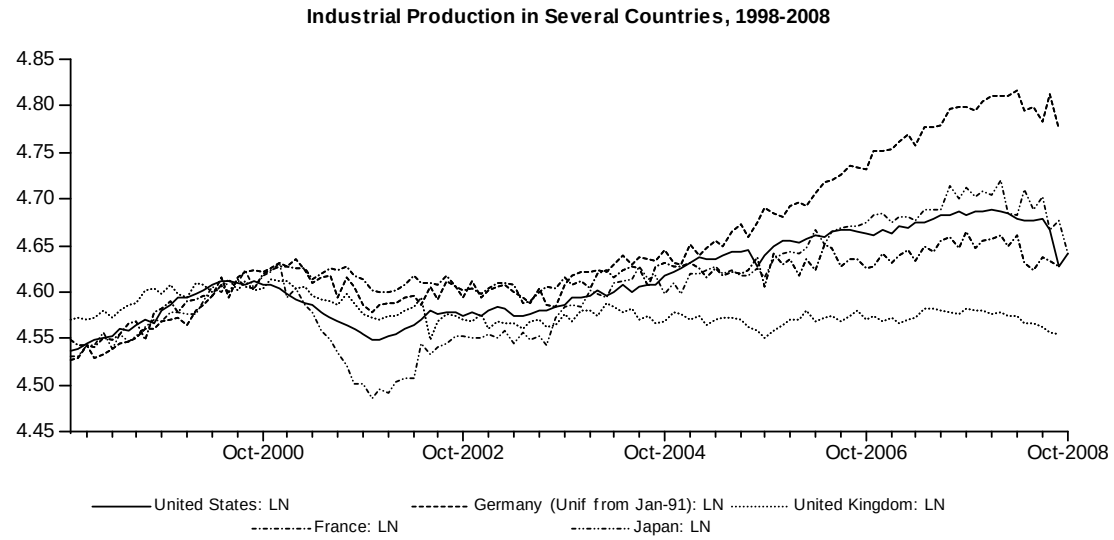

Figure 10: Industrial Production in Several Countries, 1998 – 2008

Source: DX

Figure 11 shows U.S capacity utilisation from 1997(1) to 2009(3). Following the dot com crash and the fallout from September 11 2001, capacity utilisation dropped to 73.5% in 2001(4). Capacity utilisation then increased to 81% in 2006(1). Capacity utilisation remained around this level or marginally below until 2008(1) when it started to decline sharply. Between 2008(1) and 2009(3) capacity utilisation fell by 10.3%.

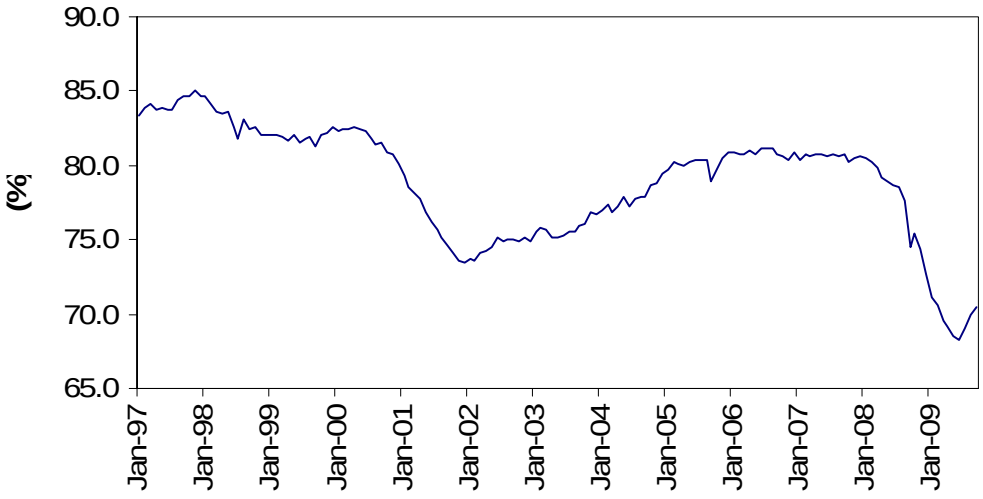

Figure 11: US Capacity Utilisation

Source: Federal Reserve Bank of St Louis, Percent of Capacity

Figure 12 shows the percentage of unemployed in the US, Australia, UK and Japan. Unemployment in the U.S, Australia and Japan all reach their trough in 2008(3). From 2003(3) to 2008(3), unemployment decreased by 1.4%, 1.4% and 1.9% in the US, Japan and Australia respectively. Over this same period unemployment went up by 0.2% in the UK. From their trough in 2008(3) to 2009(3) unemployment increased by 4.3%,1.9%,1.9% and 2.7% in the U.S, Australia, Japan and the UK respectively. In 2009(3) unemployment decreased in Australia and Japan, continued to climb in the U.S and remained steady in the U.K

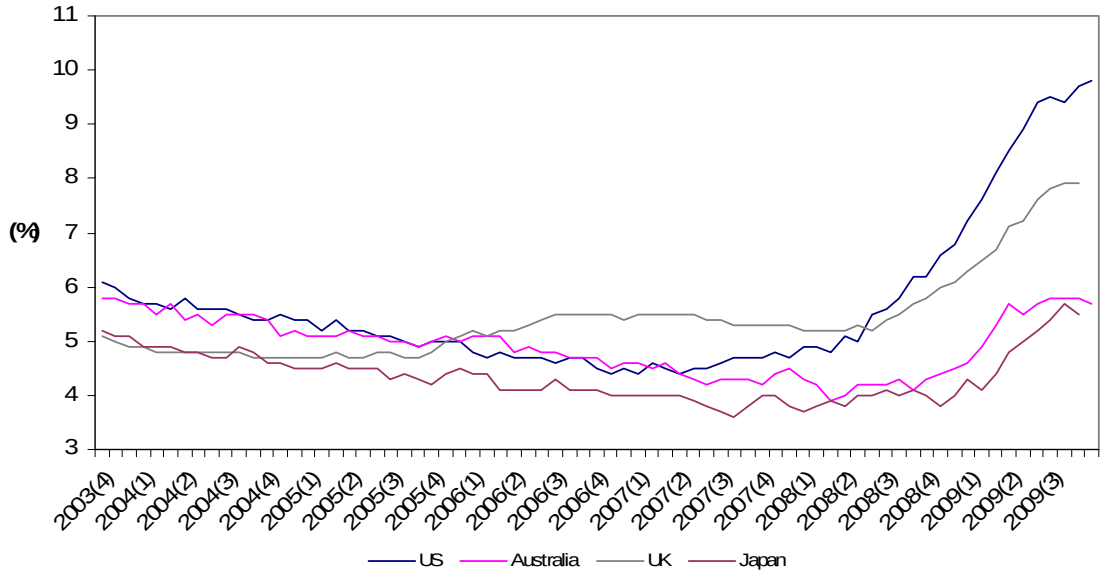

Figure 12: Unemployment Rates

Source: Bloomberg

The financial factors of the crisis have been given considerable attention by a number of commentators however, as previously mentioned, there is still much ambiguity over the event or trend which marked the start of the crisis. The Reserve Bank of Australia sites the catalyst for the crisis as the increase in delinquency rates on US subprime mortgages from the middle of 2005 (figure 13). From 2005(1) to 2007(1) delinquency rates on residential mortgages increased from 1.47% to 2.11%. Delinquency rates increased rapidly after 2007(1). Residential mortgage delinquency rates led commercial mortgage delinquency rates

throughout the crisis. The initial rise in delinquency rates was also accompanied by a slow-down in the growth of US house prices (figure 14). Whilst house prices did not peak nationally until mid 2007, in certain regional areas house prices were already falling by early 2006 (Borio 2008).

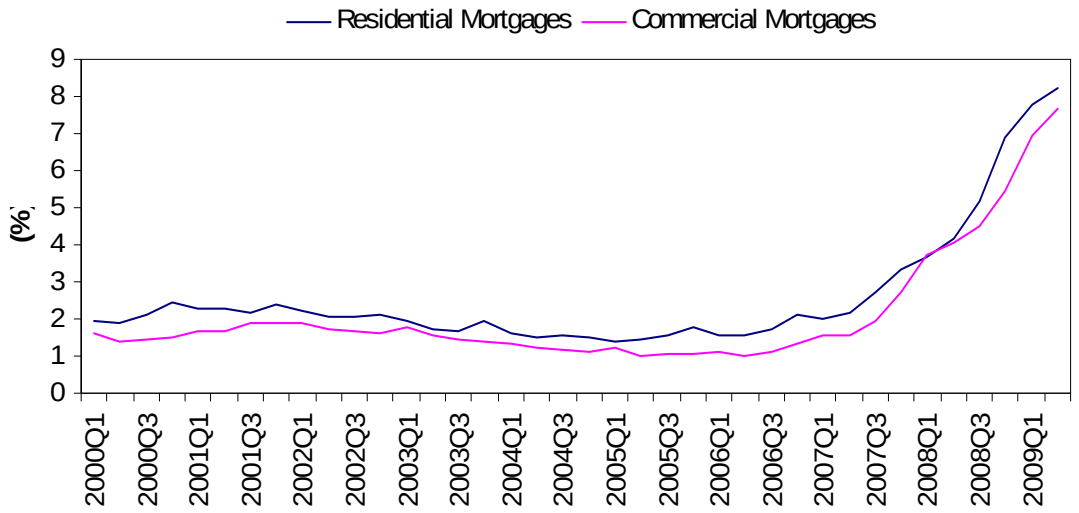

Figure 13: Delinquency Rates

Source: US Federal Reserve

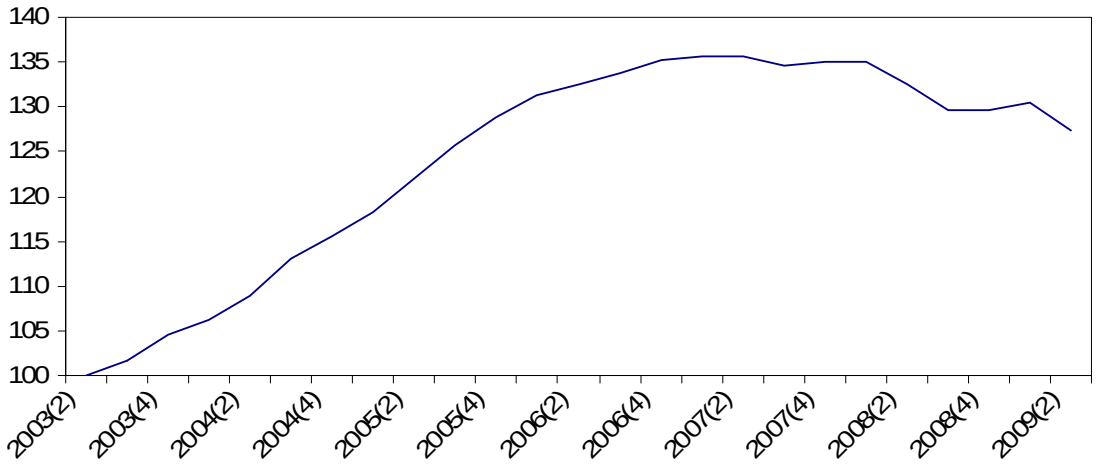

Figure 14: US House Prices

Source: Bloomberg, Case-Shiller index

In January 2007, whilst corporate credit spreads continued to tighten to near historic levels (figure 15), spreads on some structured products with exposures to the deteriorating subprime mortgage market began to widen (figure 16). Borio (2008) draws specific focus to the widening spreads on ABX tranches, an index on home equity loans, as the start of a global repricing of risk. It was from this point that investors required increased compensation to take given risks and perceived there to be increased downside risk in structured credit products. This repricing of risk however continued in a fairly orderly fashion until July 2007.

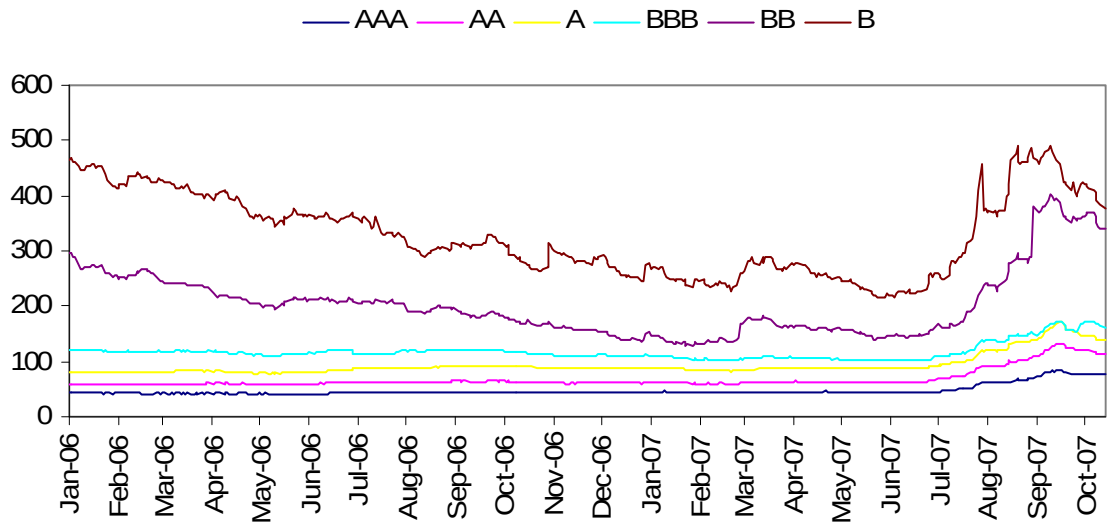

Figure 15: Corporate Bond spreads by rating

Source: Bank of England

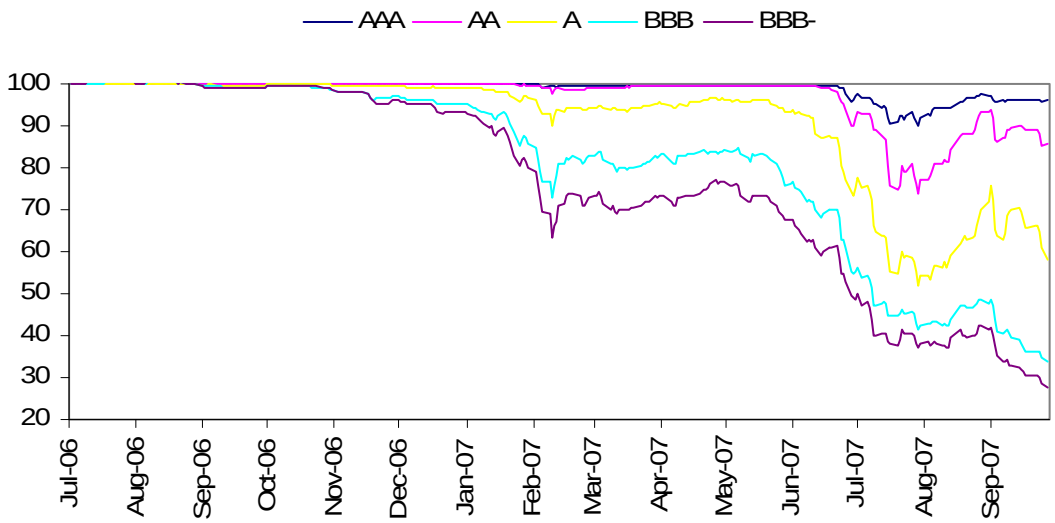

Figure 16: Prices of US Subprime Mortgage credit default swaps

Source: Bank of England

Cecchetti (2009), Shin (2009) and Cohen & Remolona (2008) in varying degrees and each with a different focus, argue that the true amplitude of the deterioration of the subprime market became evident in late July- early August with a series of confidence shaking news events. The first significant news events centred on the US investment bank Bear Stearns and two of its hedge funds. On June 14th 2007, rumours within the market suggested that two Bear Stearns hedge funds, which had investments in subprime mortgage securities, had incurred heavy losses (Borio 2008: 5). Furthermore it was believed that $3.8bn of high quality ABS bonds were up for sale to meet margin calls. Rumours continued to mount until June 22nd when news reports confirmed that both the Bear Stearns hedge funds in question were close to being shut down.

Cohen and Remoloma (2008: 9) argue the fears surrounding the subprime mortgage market were further exacerbated in mid July when both S&P and Moody's debt rating agencies downgraded billions of dollars worth of asset backed securities (ABS) and credit default obligations (CDOs) that had residential mortgages as collateral. The main cause of the downgrades was a revision to delinquency estimates (RBA 2007: 5).

Concerns about the quality of CDOs soon spread to asset backed commercial paper (ABCP) issued by entities that had invested in CDOs of mortgage backed securities (Cohen and Remolona 2008: 9). Disruptions in the ABCP market was of particular concern given the market amounted to about US$1.2 trillion, representing about one half of all US commercial paper on issue and about one quarter of the size of the US Treasuries market in late July (RBA 2007: 6). Some ABCP programmes faced roll over difficulties as nervous investors with capital and liquidity were not forthcoming. Commercial paper outstanding declined from $2.18 trillion to $1.88 trillion in the space of four weeks, a decline of nearly 14% (figure 17). Many market participants described the ABCP market as essentially being "closed" in mid August 2007 (RBA Sept 2007)

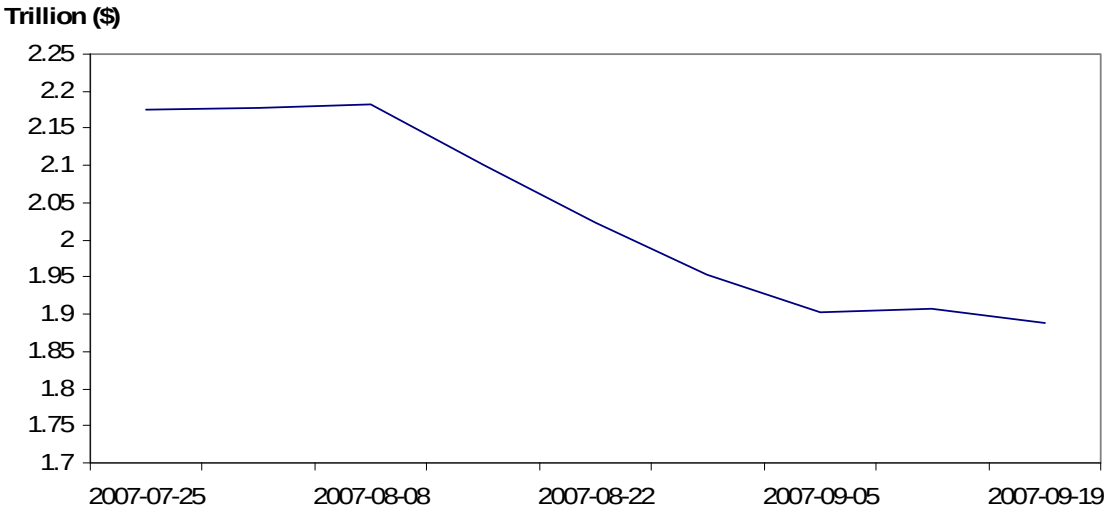

Figure 17: Commercial Paper Outstanding

Source: Federal Reserve Board

Shin (2009) specifically focuses on the freezing of hedge fund withdrawals as being a main contributing factor towards the onset of the liquidity crisis. On August 9th BNP Paribas froze redemptions from three hedge funds stating

"The complete evaporation of liquidity in certain market segments of the U.S. securitization market has made it impossible to value certain assets fairly regardless of their quality or credit rating," (BNP Paribas 2007)

Shin (2009) argues the freezing of hedge fund withdrawals (specifically that of BNP Paribas) had direct ramifications for the confidence of the market which contributed significantly to the turbulence in interbank markets both within the United States and in Europe on August 9th. Cohen and Remolona (2008) look at the events of August 9th in terms of LIBOR and CDS spreads. Cohen and Remolona (2008) argue the spread of the three month London Interbank Offered Rate (LIBOR) over the overnight index swap (OIS) (figure 18) is a useful proxy of liquidity in interbank markets and that spreads on credit default swaps (CDS) are a good indicator of credit risk premia (figure 19). Overnight these spreads blew out across the entire US, UK and Euro markets. In the US, the three month LIBOR to swap spread increased from 10 basis points to 80 basis points in just three weeks (figure 18). Over the same period, US investment bank CDS premia increased from 16 basis points to nearly 60 basis points. As Borio (2008: 7) summarises, markets in August were displaying "higher volatility in the overnight and longer rates, a sharp increase in the interbank rate risk premium beyond the shorter maturities, a drop in volumes, signs of rationing and a greater dispersion in pricing". Overnight liquidity became a precious commodity which banks and other market participants hoarded reflecting market sentiment towards both longer term credit and liquidity risk.

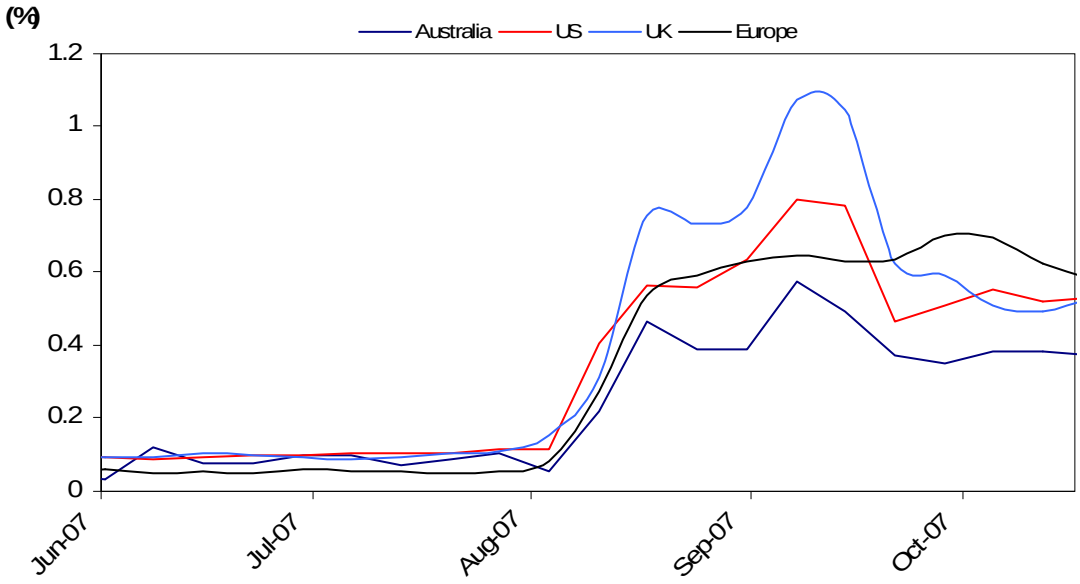

Figure 18: 3 month LIBOR to swap spread

Source: Bloomberg

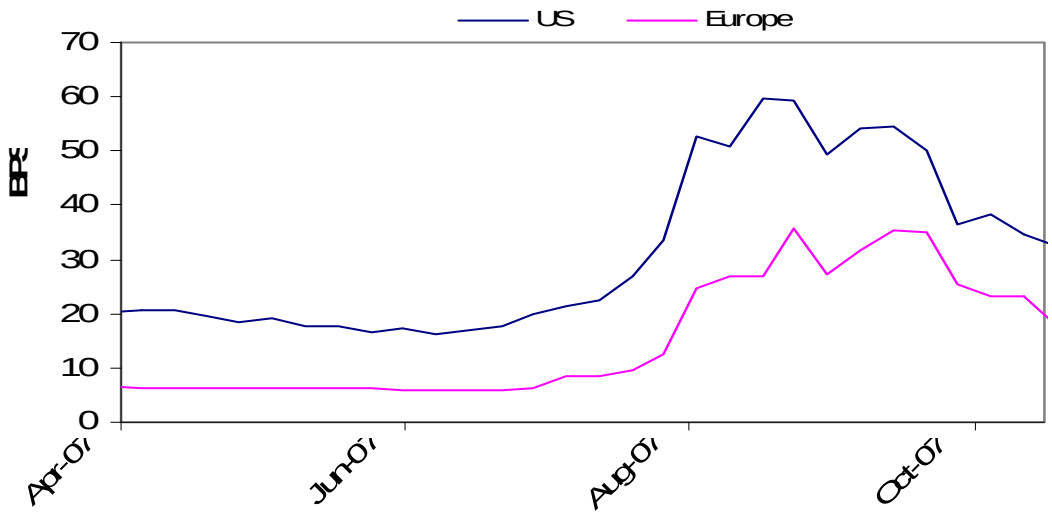

Figure 19: Investment Bank 5 yr CDS Premia

Source: Bloomberg

The liquidity crisis within interbank markets prompted significant and immediate response from central banks globally. Between August 9th – 10th the European Central Bank, in extraordinary measures, injected €95bn of liquidity of overnight funds into the interbank market. The US Fed followed suit and injected $38bn of liquidity through three auctions of overnight funds (Borio 2008: 7). These measures were implemented internationally by central banks in other industrialised nations including Australia, Canada, Switzerland and Japan.

The credit market dislocations of August 2007 resulted in a decline in asset prices across Europe, the U.S, Australia and the U.K (figure 20). In the UK and Europe, August 2007 marked the peak of asset prices. However, in both the U.S and Australia, asset prices subsequently regained their August 2007 losses and continued to increase and reach their peak in December 2007. In December 2007 and January 2008 asset prices in Europe, the U.S, Australia and the U.K all declined significantly.

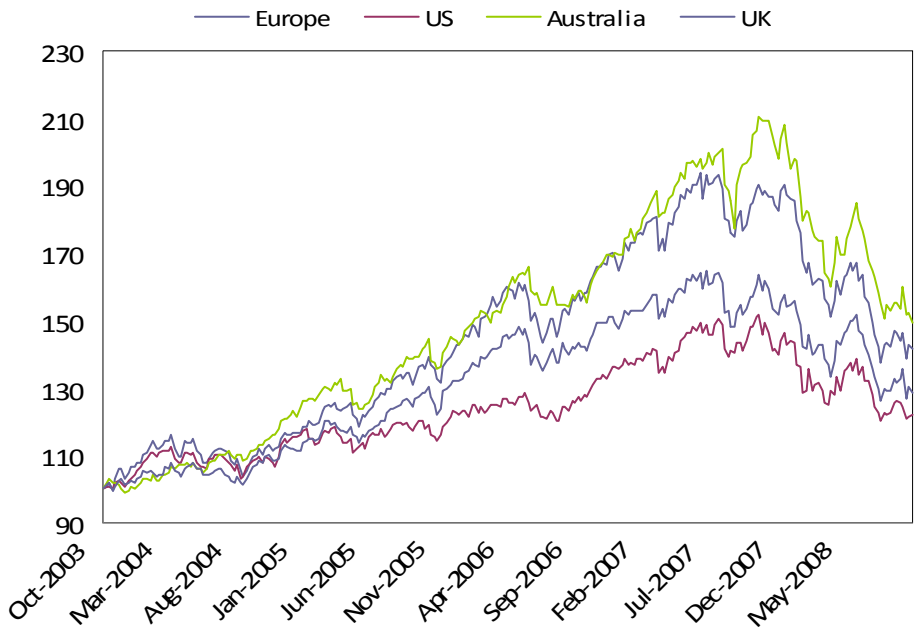

Figure 20: Asset Prices

Source: Bloomberg, major stock market indices

After the initial market dislocation culminating in August 2007, the proceeding months saw the focus of the crisis gradually shift away from liquidity concerns to underlying asset quality

concerns. Underpinning this change in focus was the significant repricing of risk which was taking place, increasing uncertainty concerning the strength of financial institutions, the unwinding of years of leverage and the deteriorating broader economic outlook (RBA 2008a p3). Indeed, what started as a liquidity crisis in August 2007 quickly transpired into a financial crisis throughout 2008. This paper identifies three key themes in the period up until the failure of Lehman Brothers; namely the further deterioration in the US housing market, increasing capital write downs in financial institutions as well as persistent funding strains within interbank markets. These culminated in the failure of a number of significant institutions in September 2008.

The deterioration of the subprime mortgage market which was one of the major contributing factors to the initial liquidity crisis within debt markets (RBA 2007), showed no signs of easing throughout 2008. All reported metrics used to gauge the health of the US housing market were unnerving. Delinquency rates on adjustable and fixed rate subprime mortgages continued to climb steadily. Arrears on prime loans rose too, albeit at a smaller pace (figure 21). By September 2008, foreclosure rates on both subprime and prime mortgages had more than doubled with 12% of total US subprime loans in foreclosure. Increases in delinquency were also experienced globally in Spain and the UK although to a lesser extent than in the US. Other key gauges on the health of the US housing market were alarming. Home starts and home sales were only 40% and 70% respectively of what they were immediately prior to the crisis (figure 22)

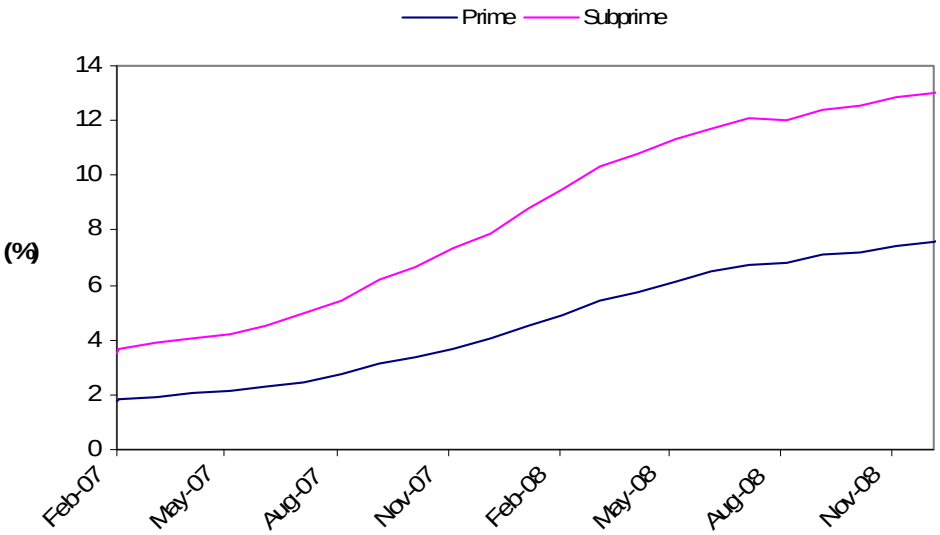

Figure 21: Percentage of US homes in delinquency

Source: Bloomberg

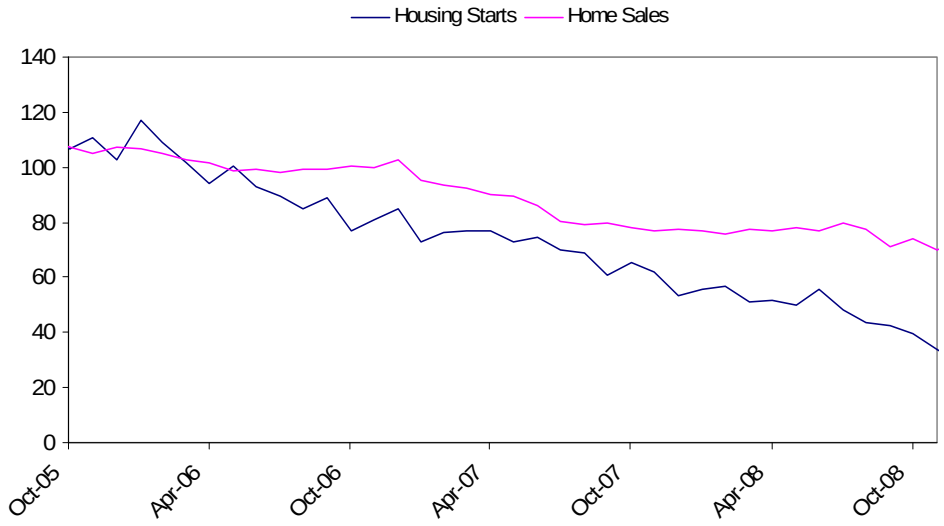

Figure 22: Housing Indicators

Source: Bloomberg

The continuing deterioration of the subprime mortgage market had further negative effects on associated debt and security markets. Losses on these products were severe given the structured nature of the securities not to mention the rapid decline in their value (RBA 2008b: 6). By September 2008, the highest rated (AAA) tranches of subprime RMBS were trading at half their initial value. Lower rated tranches in contrast had lost nearly their entire value.

The sharp declines in RMBS prices throughout the year reflected diminishing investor risk attitudes, a negative reassessment of default probabilities, and the uncertainty surrounding these probabilities as well as the deleveraging that was taking place in many financial institutions (RBA 2008b: 6). There was also widespread uncertainty in valuation methodologies as well as a loss of confidence in ratings agencies. In many cases asset prices were trading well below levels explained by economic and credit fundamentals alone suggesting an increase in liquidity and uncertainty premia (BOE 2008: 9).

Against this back drop of a continually deteriorating mortgage market, the initial focus on liquidity quickly abated and soon turned to underlying credit quality as financial institutions in late 2007-early 2008 began detailing their exposure to the subprime mortgage market in the form of substantial write downs (RBA 2008b). Fear and uncertainty concerning underlying credit quality and the scale and distribution of losses was amplified by institutions making multiple and consecutive write down announcements. Investors and the broader community were left pondering if bad news would be followed by further bad news (RBA 2008a: 6).

Whilst losses were broad based and affected both investment banks and commercial banks, investment banks were particularly affected given their high leverage and sizeable portfolios of structured credit products[2] (RBA 2008b: 7). UBS, Merrill Lynch and Citibank were the three standout institutions in terms of exposure to the subprime mortgage market.

By October 2008, mark to market losses on US home equity loan asset backed securities (ABS) and US collateralised debt obligations (CDO) had reached $310bn and $277bn respectively (BOE 2008: 14). Across the UK, EU and US total mark to market losses across a broad measure of financial assets[3] had risen to around $2.8trillion, equivalent to roughly 85% of banks pre crisis tier 1 capital (BOE 2008: 12)

Whilst suffering write downs financial institutions were being squeezed in other areas too. The capital ratios of banks were strained as some sought to bring back onto their balance sheets assets formerly held in off balance sheet vehicles, and by increased demand for funding made increasingly difficult by frozen capital markets (RBA 2008a: 7). As at September 2008, operating profitability across the federally insured US financial institutions

[2] The result of a movement into the originate and distribute business and away from more traditional investment banking activities like corporate advice and underwriting

[3] Assets include ABS, CDOs, Commercial mortgage backed securities, Investment grade corporate bonds and high yield corporate bonds.

was down some 75% on the equivalent period a year earlier. US investment banks had recorded a loss of $14bn while the six largest commercial banks had recorded a loss of $6bn (RBA 2008b: 4). The contraction in operating profit led to structural changes within many institutions as some sought to sell non-core assets such as wealth management and insurance arms. This can be seen as part of the broader deleveraging or "de-risking" trend that was occurring.

Banks did however have a small reprieve in their ability to raise capital. As at September 2008, since the start of the crisis banks raised around $370bn worth of capital to counter both capital and operating losses as well as maintain their liquidity (RBA 2008b: 7)

Throughout 2008 the increasing uncertainty and opaqueness concerning the health of major US financial institutions was evidenced in sharp increases and fluctuations in credit default swap premia (figure 23) as well as their falling share prices (figure 24). At their lowest point, US financial companies were trading at 20% the value of their pre-crisis level.

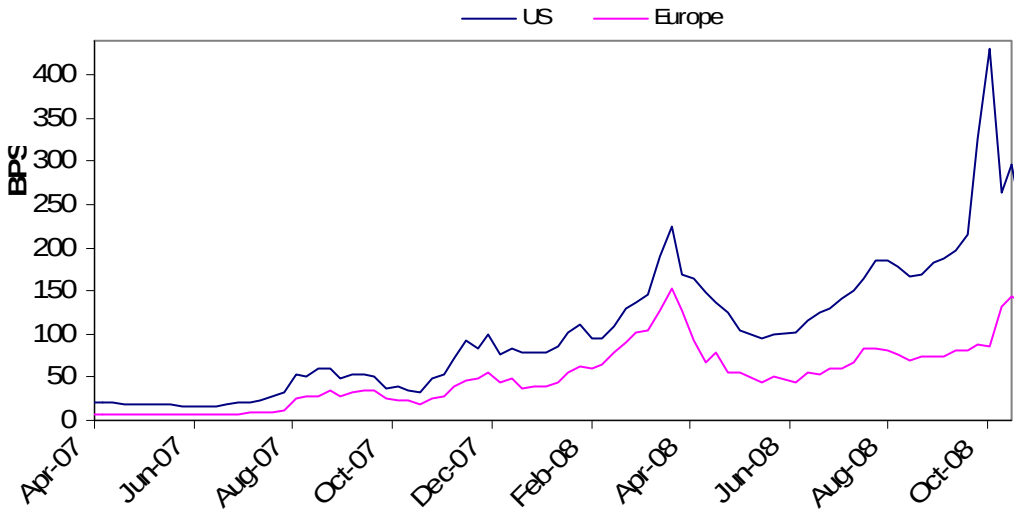

Figure 23: Investment Bank 5 yr CDS Premia

Source: Bloomberg

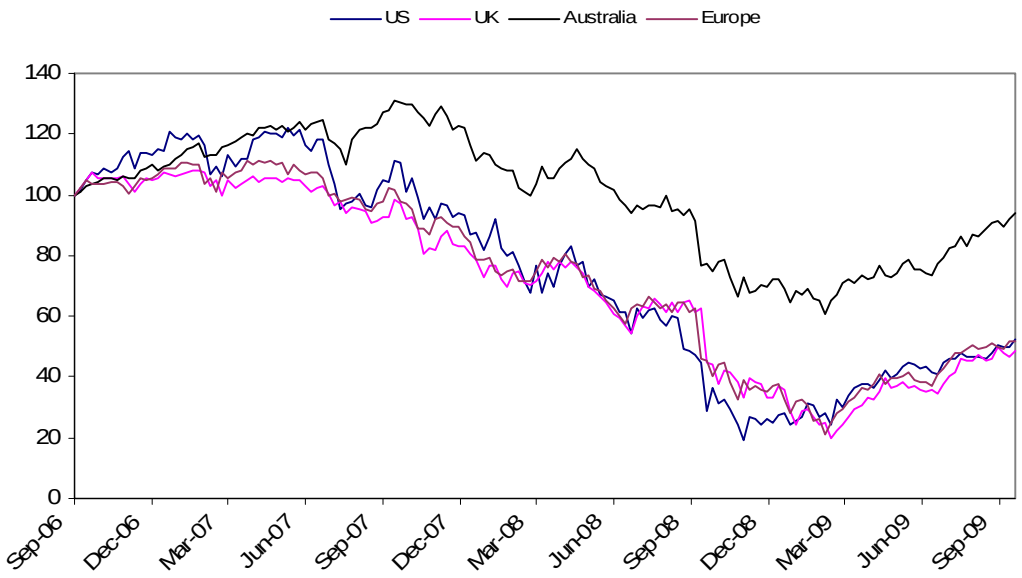

Figure 24: Financials Share Price

Source: Bloomberg

Deterioration in the US housing market culminated in the failure of a number of significant institutions. Fragility within the market fed upon itself as each institutional failure eroded confidence in other institutions as continual tight conditions in money markets, the declining health of financial institutions as well as further increasing counterparty credit risk (RBA 2008)

The "shotgun marriage" between Bear Stearns and JP Morgan in March 2008 marked the start of a long list of major US institutional failures, each one eclipsing the last in terms of size and impact on the market. On the back of the sickly US housing market, in July and August 2008, authorities became concerned at the deterioration of market confidence in two major mortgage finance agencies, Fannie Mae and Freddie Mac. On the basis of mark to market valuations of assets and expectations of further losses the agencies were poorly capitalised (BOE 2008: 17). The implicit relationship between these government sponsored entities (GSE) and the US government had allowed each to borrow at lower rates than other competitors and build large, highly levered balance sheets in the lead up to the crisis (RBA 2008b). It was estimated that these institutions "had exposures to around 45% of the

outstanding stock of US residential mortgage assets, both directly and through guarantees and securitisation" (RBA 2008b: 9). On 7 September 2008, the agencies were placed into conservatorship by the Federal Housing Finance Agency and given access to capital and funding from the US Treasury "in order to avoid unacceptably large dislocations in the financial sector and the economy as a whole" (BOE 2008: 17)

After the effective nationalisation of Freddie Mae and Fannie Mac, attention shifted to other US financial institutions due to their exposure to distressed assets and their wholesale funding dependencies (BOE Oct 2008: 17). Concerns about the survival of some of these institutions fed through to further restrictions in already tight interbank markets. Two institutions in particular focus were AIG and Lehman Brothers.

In the case of AIG, concerns over its losses relating to its substantial structured credit exposures became the "dominant fear" in US markets (BOE 2008: 18). The authorities judged that in the prevailing circumstances "failure could have destabilised the financial system, particularly given its size and complexity" (RBA 2008b: 11). The US government was forced to bail out the failed insurer providing an $85bn credit line and taking up an 80% equity interest.

Attention then turned to Lehman Brothers which had been deemed undercapitalised given its exposure to commercial real estate (BOE 2008: 18).

On September 15th 2008, following intense speculation, Lehman Brothers filed for Chapter 11 bankruptcy. The failure of Lehman Brothers resulted in the financial system undergoing the most significant stress test of the entire crisis. Interbank funding was one of the most immediate and visible casualties of the failure resulting in rapidly rising stress across funding and other markets as counterparties tried to limit their exposure to Lehman Brothers and other financial institutions (BOE 2008 : 19). Banks had to hoard cash in the event of the need to settle outstanding Credit Default Swaps linked to Lehman Brothers debt. By some estimates this amounted to $1 trillion (BOE 2008: 20). As such, September was characterised by significantly reduced lending maturities in interbank markets and a rush on government debt and gold. At one point US Treasury Bill yields fell briefly below zero (BOE Oct 2008: 19). Lehman Brothers' complex structure as well as network of international creditors meant its failure also permeated international financial markets (BOE 2008: 20).

The failure of Lehman Brothers and the lack of government intervention proved to be a critical point in the crisis. The failure of Lehman Brother marked the point where the financial crisis turned into a real economic crisis (RBA 2008), with GDP, investment and production declining thereafter.

Minsky's Financial Instability Hypothesis

The extensive works of Hyman P. Minsky concerning financial crises and financial instability makes him one of the foremost theorists in this area (Dickens 1999: 380) and as such a worthy starting point for the theoretical enquiry of this paper. Minsky has probably written more papers concerning financial instability than any other modern author, developing the basis of his theory even before the first post war financial crisis in 1966, a time when the study of financial crises was largely neglected (Wolfson1986: 176). Minsky pioneered the post-war challenge of dominant orthodox theory allowing for financial factors like time, money, uncertainty and the financing of capital assets and investment in his assessment of financial crises (Minsky1995, 1986: 155). These factors make Minsky a relevant inclusion in this papers examination of the current crisis. To evaluate Minsky's Financial Instability Hypothesis in light of the current crisis, it is first necessary to define from the Financial Instability Hypothesis a theoretical framework of crises which makes explicit the specific characteristics common to all crises, as supposed by Minsky.

Minsky (1986: 191) attributes the fundamental cyclical properties of our type of economy to the relationships between financial market conditions, investment, profits and capital asset prices. Whilst Minsky (1986:192, 1992:1) draws reference to Irving Fisher and Charles Kindleberger; Keynes' General Theory (1936) is largely used as the theoretical foundation for his work. The parallels between Minsky and Keynes (1936) are particularly evident in the role of financial market conditions and expectations in the Financial Instability Hypothesis. In the Financial Instability Hypothesis, financial market conditions will determine the aggregate level of investment and the level of investment will determine the overall state of the economy, seen in profits and asset prices (Minsky 1986:191). Financial market conditions are strongly linked to expectations and as expectations are subject to rapid change, investment decisions and the state of the economy will be characterised by uncertainty (Wolfson 1986:20).

Minsky gives careful consideration to the debt structures of economic units (i.e. a firm, household, or financial institution), drawing a strong link between instability and the ways

investment and capital assets are financed (Minsky 1986:193). Minsky presents an economy where the robustness and resilience of economic units are determined by financial market conditions. Cash flow commitments, present value calculations and liquid asset holdings will determine the strength of this relationship (Minsky 1986:192). More specifically, Minsky measures the financial robustness of an individual economic unit by the relations between the unit's cash flows and its payment commitments as determined by its liability structure (Minsky 1995:199-200). The cash-flows-to-payment relationship of an economic unit can be classified in one of three ways; namely *hedge*, *speculative* and *Ponzi* financing (Minsky 1995: 200, 1986: 79).

For units characterised by *hedge* financing, cash flows from operating capital assets are more than sufficient to meet both interest and principal payment commitments on liabilities, now and in the future. A *hedge* financing unit is vulnerable only to cost escalation, revenue declines or rapid increases in interest rates. Other than this, balance sheet payment commitments will not be affected by developments in the financial markets (Minsky 1995: 200, 1986: 79). *Speculative* financing units are characterised by cash flows which are sufficient to meet interest payments but insufficient to meet principal payments on maturing liabilities. To meet principal payments, *speculative* units are reliant on normal functioning financial markets in which they need to refinance or roll over debt. *Speculative* units are hence vulnerable to product, factor markets and financial market conditions as well (Minsky 1995: 200, 1986: 79). Finally, in *Ponzi* financing units, cash flows are insufficient to meet both interest and principal payments. *Ponzi* units are reliant on fully functioning credit markets as they have to refinance maturing debt and borrow funds to pay interest (Minsky 1995:200). An economy with a high ratio of speculative and Ponzi financing units will be more fragile than one dominated by hedge financing.

As Wolfson (1986: 21) asserts, the size and composition of an economic unit's liability structure is not permanent, but rather transitory and malleable. Minsky (1986:193) argues these malleable and transitory qualities arise because the acceptable and the desired liability structures of business firms and the organisations acting as middlemen in finance change in an endogenous fashion with the success of the economy. Minsky (1964: 326-327, 1995: 201) makes two assertions concerning the path of debt and liquidity in the economy over a period of "good times" and "tranquil" growth. Firstly, payment commitments due to private indebtedness will outpace gross profits available to support such payments. Secondly, the structure of liabilities will change, with short term financing increasing relative to long term

financing. As a result of the growth in debt relative to income and the changing structure of liabilities, an increasing portion of economic units will move from *hedge* financing to *speculative* and *Ponzi* financing arrangements. In this environment the economy will be more dependent on upon the "normal" functioning of financial markets where debts can be floated or rolled over (Minsky 1995: 201). It is clear that in Minsky's financial instability hypothesis, the seeds of instability are the result of a period of stable growth which reduces the financial robustness of the economy through a change in the liability structure of economic units.

The extent to which firms and households increase their debt and move towards the use of short term liabilities will depend on their willingness to speculate on future cash flows and financial market conditions (Minsky 1986: 199). If a positive yield curve exists, where short term interest rates are lower than long term rates (as in a financially robust economy), there are profit opportunities in financing positions in new or existing capital assets by using short term liquid liabilities (Minsky 1986: 234). Profit seeking bankers and entrepreneurs, with expectations of sound economic and financial conditions in which they can refinance the debt at some stage, will move towards these short term debt arrangements. This move is assisted by aggressive, profit seeking financial institutions which invent and reinvent new forms of money allowing for speculation and experimentation with liability structures (Dickens 1990: 182, Minsky 1986: 199). This exploitation of profit opportunities within a robust financial structure makes the shift from robustness to fragility an endogenous phenomenon (Minsky 1986:234).

In Minsky's model, the initial expansion of the business cycle is the result of each new type of money that is introduced or an old one that is used to a greater extent which in turn finances either some additional demand for capital and financial assets or more investment (Minsky 1986: 199). There are however other "Minskyesque" interpretations as to the initial expansion of the business cycle. Kindleberger (1978 : 15) argues the trigger of a boom could be non financial and quite general, such as, an invention, political change, war, a bumper crop, interest rate change etc. anything large enough to alter the economic outlook by changing profit opportunities**.** Spotton (1997: 179) agrees with Kindleberger's assessment but like Minsky acknowledges the importance and role of financial innovation in booms too. In Spotton's (1997) model, an innovation of some kind may cause speculative enthusiasm for an asset however the opportunity to trade highly liquid claims on this asset helps to spread this speculation.

The resulting credit expansion, whether due to financial innovation or otherwise will lead to the financing of either some additional demand for capital and financial assets or of more investment (Minsky 1986: 199). This leads to higher prices of capital assets which in turn raises the demand price for current investment and increases the financing available for future investment. Investment will also lead to an initial increase in the demand for consumer goods without any offsetting increase to the ability to supply, leading to higher profit margins (Minsky 1986: 240). Credit expansion therefore tends to induce capital gains, increase investment and increase profits (Minsky 1986: 199). As profits and capital gains are realised, and furthermore if they are expected to continue into the future, a favourable environment exists for further engagement in speculative and Ponzi finance (Minsky 1992: 4).

As expectations of profits and capital gains are revised upwards, cash payment commitments on liabilities that were once acceptable seem overly conservative as the performance of the economy validates previous debt structures and increases the apparent debt carrying capacity of the economy (Minsky 1986, 1992, 1995). Heartened by previous success, bankers respond to these revised expectations about the viability of debt structures by financing capital assets and investments with an increase in their own liabilities. Instruments like commercial paper enable the volume of near money to grow faster than the quantity of money (Minsky 1986: 236-7). If "mark to market" valuations are used, the rise in asset prices, rather than justifying the debt used in their purchase, is further destabilising, allowing for the unbounded pyramiding of assets and credit (Spotton 1997: 184).

As debt increases, increasingly higher portions of firm and household revenue will be used to service debt resulting in less flexible and liquid liability structures over time. Firms and households will be increasingly sensitive to changes in the general level of economic activity and may become liquidity constrained if profits and capital gains do not meet expectations. As the boom progresses, borrowing units and banks shift towards short term debt to finance positions in capital assets, resulting in an increased reliance on the normal functioning of financial markets in order to roll over short term liabilities (Minsky 1986: 227). Kregel (2008) points out that it is likely the economy will only slowly, and in many cases imperceptibly, move towards an environment characterised by speculative and Ponzi financing.

The existence of profit opportunities does not necessarily mean that fragile financing patterns will emerge immediately (Minsky 1986: 236). T he existing borrowing and lending criteria

established pre boom may set limits upon the speed with which profit opportunities are exploited, orthodoxy and conservatism can form a barrier to the assimilation of innovation and the need for assured refinancing by organisations engaging in speculative finance may cause some delays. Furthermore it may take some time for market participants to fully believe the optimistic forecasts.

As capital gains and firm profits continually meet expectations and credit is continually expanded, a euphoric economy may develop. Experiences of success appear to limit the possibility of failure resulting in fragile financing arrangements increasingly dominating the economy. As previous recessions fade into memory, it is quite natural for market participants to believe that a new era has arrived (Minsky 1986: 237). As Kindleberger (1978: 32) argues, overtrading is likely the result, defined as "pure speculation for a price rise, an over estimate of prospective returns or excessive gearing".

The end of the boom is caused by a rise in interest rates. As Wolfson (1986: 22) points out, interest rates will eventually rise because an inelastic demand for financing runs up against a less than perfectly elastic supply of money. The rise in interest rates isn't necessarily the result of the central bank officially moving rates but rather is likely the result of an increasing number of borrowers having to continually refinance their debt, tapping funds from borrowers that value liquidity ever more highly (Wolfson 1986: 22). The rise in interest rates will cause cash payment commitments on liabilities to rise relative to income receipts from operating assets, eliminating the margin of safety that made the initial financing of the investment possible. If interest rates rise high enough, the value of capital assets may fall below the supply price of investment (Minsky 1986: 239). As Kregel (2008: 4) observes, as interest rates and other costs rise, the margin of safety of investment projects and capital assets at the height of the boom may be so small that even the smallest departure of profit and capital gains realisations from expectations creates conditions in which firms are under stress to meet fixed cash flow commitments.

Firms and households under stress have to decrease investment or sell out of positions to meet fixed cash flow commitments which are now larger than cash receipts. A financial panic may develop if a substantial number of units, in a co-ordinated fashion, resort to asset sales to acquire cash (Minsky 1964: 331). Whenever the need to try and make a position by selling out positions becomes prevalent economy wide, the price level of capital assets and financial instruments break so that the prices of capital assets fall relative to their production cost

(Minsky 1986: 239). In particular, a financial panic can develop if the portfolios of financial intermediaries are linked to the speculative market, resulting in reduced lending and the forcing of financiers to sell assets to acquire cash (Spotton 1997, Minsky 1986: 239). If liquidity is sparse enough and confidence has been shaken, the crisis can manifest itself in the collapse of the financial system, one of its constituent markets, an extreme drop in asset prices or the failure of a significant number of financial institutions (Spotton 1997: 187).

The degree of economic and financial integration will be a key factor in the transmission of financial distress (Spotton 1997: 190). Given the increasingly close cash flow commitments, as defined by liability structures, between households, firms and financial intermediaries, instability of asset prices can lead to a spiral of declining investment, declining profits and declining asset prices. This may result in a negative feedback loop, the reverse of the positive feedback loop that was apparent during the boom (Minsky 1986: 239). The panic feeds upon itself until one of three things happen; prices fall low enough to tempt investors back into less liquid assets, trade is cut off by controlling prices and closing exchanges etc. or a lender of last resort convinces the market that the demand for cash will be met (Kindleberger 1978: 20).

Austrian Business Cycle Theory

Austrian Business cycle theory has its foundations in neoclassical theory. The predominant focus of the Austrian school is answering how the specialised activities and decentralised decisions of an entire population produce an efficient social allocation mechanism (Yeager 1997). However the environment underpinning the Austrian approach differs significantly from the stable neoclassical world, where producers and consumers are identified, resource availability is known and goods to be traded are clearly defined. Instead a high degree of uncertainty permeates Austrian theory with the economy continually evolving, resulting in knowledge and information being incomplete and widely dispersed (Rosen1997: 141,149). The extent of knowledge is so great and so unknown that an efficient centrally planned economic calculation of it is impossible (Yeager 1997). Given all the intellectual traffic flows in only one direction, from individual behaviour to social order, the central planning problem cannot even be defined (Rosen 1997: 141).

It is here that the entrepreneur plays a crucial role in Austrian theory. The entrepreneur can only exist in a world of "perpetually disturbed equilibrium" and it is for this reason that the Austrian approach can be considered disequilibrium in nature (Yeager 1997). In Austrian

theory, entrepreneurs exploit unrecognised profit opportunities and continually discover information through spontaneous ventures, experiments and arbitrage activities.

A higher order emerges as entrepreneurs, in their specialist fields, pursue and perfect their chosen business line for some kind of self interest, namely competitive advantage and profit (Kirzner 1982 in Gloria-Palermo 2002: 59). This includes intermediaries who buy and sell from the most economical suppliers and assemble and market the final product (Rosen 1997: 143). The sum of all entrepreneurial activity will result in resources over time moving endogenously away from inefficient uses to their perceived highest values. This natural selection mechanism defines which firms and institutions prosper and which firms fail, resulting in a system continually moving towards equilibrium, yet never finding it.

This natural selection process should mean that firm losses are not widespread or common and general observation within an average year would seem to confirm this. Within this context, the Austrian investigation into economic instability starts with a single question, that is, during the onset of a downturn, "how is it that frequently, the business world suddenly experiences a massive cluster of losses?" The Austrians formulated the Austrian Business Cycle Theory (ABCT) to answer this question. The main proposition of the ABCT is that banks create money by creating credit; this in turn finances investment in excess of savings, distorts the structure of production and sets the stage for the boom-bust cycle (Cochran and Call 2000)

In Classical theory, savings are defined as non spending on consumer goods or demand for future goods. Savings will flow into capital markets and changes in the rate of interest will ensure that funds saved are invested in the creation of new capital goods (Cochran and Call 2000: 36). The equilibrium rate of interest in this case will ensure that the demand for loan capital and the supply of savings exactly agree (Wicksell 1935: 193). The Austrians use the classical model as a basis for their approach but introduce a disequilibrium problem into their analysis, namely that investment can be in excess of natural savings. In the Austrian model, the banking system changes the supply of money and credit in such a way that investment is equal to real saving plus the change in the money supply (Ackley 1978 in Cochran and Call 2000: 40). To accommodate this increase in credit, interest rates are allowed to drop to levels far below where they would have been had credit been limited to savings.

In the Austrian model it is the fractional reserve banking system which allows commercial banks to expand credit considerably through the issue fiduciary media, (bank notes without

asset backing). The creation of additional fiduciary media permits banks to extend credit well beyond the limit set by their own assets and actual savings (Von Mises 1936 in Ebeling 1996: 25). As such, investment funded by an expansion of credit beyond a bank's deposits and assets, the economy's actual savings, can be considered artificial and excessive as no actual saving has occurred to fund this investment, i.e. in the traditional sense no claim on present goods has been foregone in exchange for a claim on future goods (Cochran and Call 2000: 40). Banks do this because the greater the credit expansion the higher their profits will be (Rothbard 1969 in Ebeling 1996: 67).

In a free banking system, any expansion of credit in excess of savings by one bank would quickly increase the debts of that bank in its competitors and its competitors would quickly call upon the expanding bank for redemption in cash. It is the introduction of the central bank which allows banks to expand credit beyond assets on a large scale and in a co-ordinated fashion since the expansion of central bank notes provide added cash reserves for the entire banking system and permits all commercial banks to expand together (Rothbard 1969 in Ebeling 1996: 70). Furthermore the central bank may encourage aggressive credit expansion given its promise to act as a lender of last resort in a liquidity crisis (Cochran and Call 2000: 47). As a result, in a central banking system with fiat currency, the link between real savings and the supply of loanable funds is fairly elastic, and the link between real savings and the funds available for business investment is equally loose (Sechrest 2006: 33).

The existence of a fractional reserve banking system, where banks can expand credit beyond true savings, means the supply and demand for savings never really confront each other as supposed by the classical school (Hayek 1966 in Cochran and Call 2000: 40). In the Austrian analysis, the money rate of interest can differ considerably from the natural rate, the rate which clears the market in the classical sense, defined as "the ratio of the value of want satisfaction in the immediate future and the value assigned to want satisfaction in remoter periods in the future…the discount of future goods against present goods" (Mises 1998 in Cochran and Call 2000: 39). An expansion of credit beyond actual savings will push the market interest rate below the natural rate, the rate that would have prevailed had there been no initial expansion of credit. In the eyes of the entrepreneur, the drop in interest rates signals a change in the time horizon of consumer spending with a shift towards increased consumer savings and delayed consumption.

This has significant implications for the capital structures of the economy. Austrians recognize that complex structures of heterogeneous capital goods reflect not only diverse and changeable consumption patterns and production processes but also diverse time horizons adopted in specific investment decisions (Yeager 1997: 154). Entrepreneurs are likely to change their capital structure in response to the change in consumption preferences as proxied by the interest rate. As consistent with the Austrian approach, each firm with its capital combination is always in disequilibrium and by its action in this state contributes to the continuous reshaping of the capital structure (Lachmann 1976 in Gloria-Palermo 2002: 310).

In a perfectly functioning market the natural interest rate will represent the economy's structure of production, which is the allocation of resources between consumption and capital goods production and also the length of time. As a proxy for the time horizon of consumption, the natural rate of interest reflects the "truth about the availability of resources for meeting present and future consumption demands, allowing production plans to be kept in line with the preferred pattern of consumption" (Garrison 2006: 59). It is the breakdown of this relationship that leads to economic cycles. If credit is expanded beyond actual savings and the market interest rate drops below the natural interest rate for a significant period of time, there will be a disconnection between intertemporal consumption preferences and intertemporal production plans, resulting in a misallocation of resources between different branches of industry (Garrison 2006: 59). This breakdown leads to the phenomena of malinvestment and overinvestment concentrated acutely in the capital goods industries.

The Austrians contributed significantly to business cycle theory, further extending and refining traditional monetary theory (Harberler 1932 in Ebeling 1996: 38-40). The Austrians saw traditional monetary theory as insufficient as the targeting of a price level is a misleading guide to monetary policy and furthermore that its stability is not a sufficient safeguard against economic cycles. This is because credit expansion has a much deeper and more fundamental influence on the whole economy, especially on the structure of production which cannot be measured and gauged in a mere change of a price index (Harberler 1932 in Ebeling 1996:41).

Harberler (1932 in Ebeling 1996: 38) identifies two situations where credit may be expanded beyond actual savings. The expansion of credit could originate from the side of money; the circulation is expanded by the deliberate actions of banks or other monetary authorities to stimulate economic growth. Monetary authorities may also take a more passive role by

expanding credit to accommodate an exogenous shock to growth, i.e. changes in demand for a certain commodity, changes in the structure of production, new inventions, large crops and psychological forces to name just a few possibilities. Garrison (2006: 60-61) suggests the latter is probably more applicable citing that the most significant historical applications of the ABCT are instances of accommodating growth rather than stimulating growth.

Sechrest (2006: 30) offers two criteria by which this credit expansion could be potentially cycle generating in an Austrian framework. Firstly, the expansion of credit must be artificial, where banks expand credit beyond genuine savings and assets. Second, the gap between credit and savings must be experienced by entrepreneurs and not consumers. Although Mises did not theorise in the post World War II environment, where large scale bank loans were made available to consumers, Rothbard (1978: 152-153) suggests this factor cannot be said to be cycle generating because loans to consumers cannot result in over investment which must be liquidated in a recession. The key focus of credit expansion within the Austrian approach is the difference between savings at disposal to entrepreneurs and the credit available to entrepreneurs, the former setting the limit on a sustainable lengthening of the capital structure and the latter indentifying the maximum initial investment in capital projects (Sechrest 2006: 30). Having established two paths for credit expansion and two criteria by which this credit expansion can be deemed unstable the full ABCT can now be defined.

In Garrisons (2006) model the path of credit expansion is started with some sort of exogenous shock which is most likely to be a technological breakthrough. In a completely free market, during the period that the new technology is implemented the natural rate of interest would rise as entrepreneurs compete for funds to invest in this new technology (Garrison 2006: 60). This “interest rate brake”, a temporarily high natural interest rate, allows the economy to adjust to the new technology at a rate that is consistent with consumer intertemporal preferences. In Garrisons (2006) model however, the Central Bank accommodates economic growth by lending freely at whatever rate of interest prevailed before the enhancements in technology occurred. In this case interest rates are not actively lowered but are not allowed to rise as they would have in the absence of any Central Bank intervention. Garrison (2006) notes that interest rates do not have to be low by historical standards for distorting forces to creep through, but rather low relative to the rate that would have occurred in the absence of growth accommodation by the monetary authorities.

Regardless of either path credit expansion can take, in the eyes of the entrepreneur the declines in the market interest rate relative to the natural rate appear as if consumers have chosen to save or delay consumption at a higher rate than before, when in fact they haven't done so (Sechrest 2006: 28). The fall in the market rate of interest relative to the natural rate will make previously unprofitable long term investments profitable and entice entrepreneurs to shift towards these investment projects, particularly those in the capital goods industry. This phenomenon is known as overinvestment (Harberler 1932 in Ebeling 1996: 47). This shift is due to the change in value of longer term projects, which will rise in value by a greater proportion than short term projects for the same change in interest rates (figure 1). As long as entrepreneurs think that the required complementary inputs will be available there will always be an incentive to undertake longer term projects in an environment of falling interest rates. If entrepreneurs think that the falling rates are a reflection of falling time preferences they will believe that those complementary inputs will be available when needed (Sechrest 2006: 37) and will move into longer term investment projects.

As entrepreneurs move into new investment projects on a large scale a boom within capital goods industries will develop. This will be characterised by an increase in demand for production materials and labour. The prices of production materials and wages will rise resulting in increased prices of consumer goods. Banks continue to expand credit on larger and larger scales and prices and wages continue their rise (Von Mises 1936 in Ebeling 1996: 26). However, as the boom progresses and prices continue to rise banks will raise the rate of interest so that from an arithmetic point of view interest rates will be higher towards the end of the boom than at the start of the boom. Von Mises (1936 in Ebeling 1996: 29) suggests that the raising of the rate of interest will still be insufficient to re-establish equilibrium in the market and end the boom.

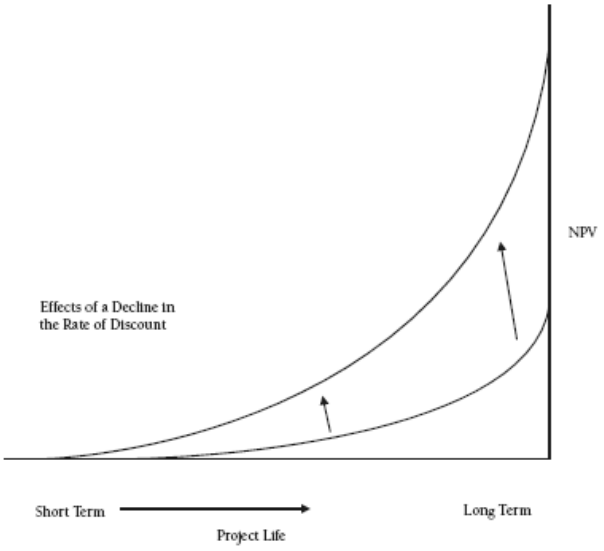

Figure 25: The Profitability time horizon of investment projects

Source: Harberler (1932: 47)

Harberler (1932:50) points out that inflation may not even be evident within a boom, providing no incentives for monetary authorities to raise interest rates. If through previous investment of voluntary savings there is already a tendency for the price level to fall, the new credit instead of resulting in an absolute price rise may simply offset the price fall which would otherwise have taken place. As such, a boom may appear orderly if key monetarist principles like a steady price level are the only factors taken into account. Under this scenario it is only towards the end of a boom that prices may increase significantly to merit concern in a monetarist framework

As the finishing of the productive process takes a considerable period of time, it eventuates that these newly initiated processes are too long (Harberler 1932 in Ebeling 1996: 47). This is largely because consumers eventually reassert their unchanged time preferences via strong demand for consumer goods and don't save and invest enough of their income to buy the newly produced machines, capital equipment and raw materials (Rothbard 1969 in Ebeling 1996: 74). For some time it may be possible to overcome this "counter tendency" through further credit expansions (Harberler 1932 in Ebeling 1996:50). Credit expansion however has to eventually stop at some point. To avoid an inflationary spiral and to protect the value of the currency, commercial banks (through the central bank) will stop expanding credit in a co-ordinated fashion (Von Mises 1936 in Ebeling 1996: 27-28). At this point it becomes apparent that many of the businesses that were started due to the lowering of the interest rate

and were sustained by the increases in prices are unprofitable. Consumers will reassert their existing preferences for more consumer goods and less investment in capital goods. The resources needed to complete many investments will not be forthcoming and will have to be completed either at a loss or abandoned (Sechrest 2006: 29). Businesses cut back their scale of production, close down or fail (Von Mises 1936 in Ebeling 1996: 28). Prices will collapse and a crisis or depression will follow. Sechrest (2006: 35) suggests it is the heterogeneous, durable and specific nature of capital goods which makes downturns so sharp and protracted given projects cannot be liquidated smoothly nor redirected easily. The downturn may extend to the consumer as although they may want to reassert their original increased consumption patterns they may have to cut spending and economise to rebuild capital funds lost in the drop in asset prices (Von Mises 1936 in Ebeling 1996: 29).

Harberler (1932 in Ebeling 1996) adds that the crisis within the capital goods industry and the real economy may extend itself to the banking sector. If one or more major banks fail then a wave of pessimism, distrust and nervousness may arise resulting in a secondary credit deflation. Although Harberler (1932 in Ebeling 1996) explicitly states that the banking crisis will be a result of the more fundamental economic adjustment at hand, it may still grow in scale to be just as damaging and overwhelming for the economy. As the nervousness in the market prompts consumers and entrepreneurs to hold liquid funds, a restriction of credit will result with loans becoming hard to obtain.

The longer the period of credit expansion and the longer the banks delay in changing their policy, the worse will be the consequences of the malinvestments and the inordinate speculation characterising the boom. The consequence will be a longer period of depression and a more uncertain date of recovery and return to normality (Von Mises 1936 in Ebeling 1996: 31).

The economy will not be able to develop harmoniously and smoothly unless all artificial measures that interfere with the level of prices, wages and interest rates as determined by the free play of economic forces are renounced (Von Mises 1936 in Ebeling 1996: 31-32). The market interest rate and the natural interest need to fall into equilibrium for steady growth to occur. Going forward the Austrians do not offer some Hayek Rule for a natural rate to be recommended over a Taylor Rule for a neutral rate, rather the one conclusion drawn from the ABCT is that centralising the business of banking deprives the market of its ability to find the natural rate (Garrison 2006: 68).

The modern contemporaries of the Austrians are the Real Business Cycle Theorists. Real Business Cycle Theorists share the same Neoclassical foundations of the Austrians as well as some of their more specific postulates. Fundamental to both the Austrians and the Real Business Cycle theorists is the role of technology shocks in sparking an investment boom. In Garrison's (2006) Austrian model and Plosser's (1989) Real Business Cycle model, technology can be subject to temporary productivity shifts or technical changes which provide an underlying source of variation in the economic environment to which agents respond. Agents in both Austrian and Real Business Cycle theory respond to positive technology shocks by increasing investment. The Real Business Cycle Theorists offer a relatively simple way of modelling technology shocks and will be drawn on in the application of the Austrian Business Cycles theory to the crisis.

New Keynesians

The principle focus of New Keynesian theory is not so much the provision of a systematic account of cycles but an explanation of how rigidities and imperfections in the economy can generate equilibrium below full employment and capacity utilisation. In New Keynesian theory, financial crises are the result of exogenous shocks and are propagated by market imperfections and rigidities. A particularly important imperfection which New Keynesians use to explain the propagation of exogenous shocks is asymmetric information. In a New Keynesian analysis of crises, asymmetric information propagates a shock in three broad ways. Firstly it increases uncertainty, secondly it increases the cost of financial intermediation and thirdly it can be conducive to bank runs and banking contagion. In a New Keynesian framework, an initial exogenous shock will be propagated into a financial crisis and an economic down turn by these asymmetric information problems. Bernanke (1983) for example finds banking problems in The Great Depression were transmitted to the real economy causing reductions in GDP and significantly increasing unemployment. Romer (1993) found banking panics to be the most significant cause in the propagation of The Great Depression, resulting in a reduction in the money supply, increased pessimism and a continued decline in production. Using a broad asymmetric information framework one can consider cycles from a New Keynesian perspective in terms of the impact and propagation of exogenous shocks.

Asymmetric information creates two problems in financial systems, namely adverse selection and moral hazard. Adverse selection occurs when potential borrowers who are the most likely to produce an undesirable outcome are the ones most likely to receive loans (Mishkin 1992: 117). An increase in adverse selection makes lenders less likely to make loans as they cannot distinguish between the good credit risks and bad credit risks. It also makes good firms less likely to borrow if they cannot differentiate themselves from bad firms. Moral hazard in financial markets occurs after a loan is extended and the borrower may engage in activities that are undesirable from the lenders point of view. Borrowers have incentives to engage in speculative activities given the high pay off if the project succeeds and the relatively small cost if the project fails. Asymmetric information arises as the lender, often because of high enforcement costs, cannot monitor the borrower's activities.

Mishkin (1999: 122) argues that in the US, historically, one of the main exogenous shocks leading to a financial crisis has been a rapid increase in interest rates. As noted in Christina Romer's (1993) analysis of The Great Depression, a tight monetary policy was used in a concerted effort by the Fed to deliberately target asset price inflation in the period up to 1929. The subsequent asset price deflation, seen in the stock market crash of October 1929, asks questions regarding the relationship between monetary policy and financial crises. The New Keynesians, under Bernanke and Gertler's (1995) study of the credit channel, made a significant theoretical contribution to understanding the monetary policy transmission mechanism. Whilst their study was not directed towards economic crises in general, it does provide the first "New Keynesian" pillar of knowledge in studying the monetary policy transmission mechanism and its bearing on business cycles and asset price deflation in an asymmetric information context.

The traditional monetarist/Keynesian view of monetary policy posits that the central bank, through its control over the short term interest rate, can influence aggregate economic activity by changing the cost of capital which will have a direct impact on investment in durable goods. However empirical studies by Blinder and Maccini (1991), Chirinko (1993) and Boldin (1994) have found non-neoclassical factors like lagged output, sales or cash flow to have a significant impact on spending. These factors have prompted research into and the development of a theory of the credit channel. Bernanke and Gertler (1995: 28) note that this is not a free standing theory but rather a set of factors that "amplify and propagate" conventional interest rate effects.

Bernanke and Gertler (1995) argue that through the bank lending channel, the net worth of a firm is negatively impacted by increases in interest rates. This has implications for information asymmetry. Normally to ameliorate information asymmetry firms use the assets they own as collateral when borrowing (Bernanke and Gertler 1999: 20). High amounts of collateral used by borrowing firms and households provides incentives to engage in risk averse behavior and will reduce a lender's loss in the event of default. The net worth of a firm has the same role as collateral, with a high net worth resulting in a firm being less prone to default given it will have a sufficient asset base to cushion any losses that may occur. Mishkin (1997: 64) argues the deterioration of the net worth of a firm reduces its collateral and is the most critical factor contributing to the severity of asymmetric information in the financial system, worsening both adverse selection and moral hazard problems.

According to advocates of the credit channel, monetary policy affects not only the general level of interest rates but also the size of the external finance premium; defined as the difference between the cost of funds raised externally and the opportunity cost of funds raise internally (Bernanke and Gertler 1995: 35). The external finance premium is thus a measure of asymmetric information. Among the factors reflected in the external finance premium are the lender's expected costs of evaluation, monitoring and collection, asymmetric information and the costs of moral hazard. Through the credit channel, Bernanke and Gertler (1995) argue that monetary policy will affect the size of the external finance premium through two mechanisms; the balance sheet channel and the bank lending channel.

The balance sheet channel is based on the theoretical prediction that there exists a relationship between the borrower's financial position and the external finance premium. The greater a borrower's net worth then the smaller the external finance premium will be, given a borrower is able to fund investment projects with greater proportions of equity, thus reducing conflicts of interest and information asymmetry with the lender. If the health of a borrower's balance sheet determines the external finance premium, which in turn determines the terms of credit the borrower faces, then fluctuations in the borrower's financial health should affect investment and spending decisions (Bernanke and Gertler 1995). The balance sheet channel arises because monetary policy decisions will affect the financial positions of borrowers in two ways. First, if firms have outstanding floating rate debt then a rise in interest rates will increase interest expense and reduce cash flows thereby weakening the borrower's position. Second, a rise in interest is typically associated with a decline in asset prices which reduces the value of the borrower's capital. A rise in interest rates may also have an indirect impact

on a firms net worth. For example, a rise in interest rates for a manufacturing firm may cause a reduction in the spending of downstream customers leading to reduced revenue against a stable cost structure. This finance gap erodes the wealth and credit worthiness of the firm over time. Bernanke and Gertler (1995) use the "coverage ratio" to measure a firm's financial health, defined as the ratio of interest payments to the sum of interest payments and profits.

The bank lending channel operates through changes in monetary policy which affect the external finance premium by shifting the amount of bank credit available, i.e. loans by commercial banks. Small firms which are credit dependent will either have to incur higher premiums at their existing bank or move to another bank where they are also likely to experience higher lending costs given the costs associated with developing new credit relationships. However, given the extent of financial deregulation and innovation, the importance of the bank lending channel has been diminished (Bernanke and Gertler 1995).

Bernanke and Gertler (1995) argue a fairly stable relationship exists between changes in real economic variables and shifts in interest rates. In terms of final demand and inventories; following an unexpected rise in interest rates, final demand falls of quicker than inventories do suggesting falls in final demand leads falls in aggregate production. In terms of spending; following an unexpected rise in interest rates, residential investment drops the most sharply followed by spending on consumer durables and non durables with spending on business fixed investment declining too but with a greater lag than the other variables.

The main contribution of Bernanke and Gertler's (1995) analysis of the credit channel was to show that monetary shocks and other disturbances can have long run effects because they affect the institutional structure of credit markets and the balance sheets of borrowers (Calomiris 1993). In Bernanke and Gertler's (1995) empirical models, the relationship between changes in interest rates and a firm's net worth is orderly and appears to have limited explanatory power over severe asset price deflation and financial instability. Calomiris (1993: 73) however, argues this link may become more explicit and propagated in an investment boom given the debt accumulation that occurs makes firms more susceptible to changes in cash flows, asset prices and ever dependent on a supply of funds. In such an environment the decline in a firm's net worth reduces available collateral, leads to an unplanned increase in leverage on the part of borrowers and ultimately impedes access to credit. There may be feedback effects to asset prices as declines in spending and income,

together with forced asset sales may lead to further declines in asset values (Bernanke and Gertler 1999: 20).

Historically most financial crises in the US have begun with a sharp rise in interest rates, a stock market crash and an increase in uncertainty resulting from a failure of a major financial or non financial firm (Mishkin 1992: 122). These factors are not mutually exclusive, for example in The Great Depression the collapse of the stock market was one of the driving forces behind the increase in uncertainty which then fed further into stock price declines (Romer 1993: 31). The rise in interest rates and the increase in uncertainty increase the adverse selection problem and the decline in the net worth of firms through the credit channel increases moral hazard problems. These factors will lead to an economic downturn as lenders reduce the amount of credit available. If these are the only factors contributing to the downturn then it is likely to be a conventional "garden variety" recession which will continue until lenders can differentiate between "good" credit and "bad" credit and resume lending. However, a downturn can deteriorate further if a banking crisis develops. Friedman and Schwartz (1963) attribute the banking crises of 1929-1933 as the main reason for the worsening and prolonging of The Great Depression beyond an ordinary recession.

Benston and Kaufman (1995) identify fragile aspects of the banking system that can originate from the lending operations of banks or the behavior of depositors. Banks are inherently leveraged organisations which finance illiquid, customised and non traded long term assets with short term money market instruments and demand deposits. Bank lending is unstable to the extent that banks invest in long term fixed interest obligations funded by short term liquid liabilities. The assets of a bank are liable to interest rate risk in the sense that should interest rates increase significantly the value of the banks' assets may decline to such an extent that they are less than the liabilities. In this situation the bank is economically insolvent (Benston and Kaufman 1995: 213). Bank deposits have unstable characteristics because they can be withdrawn very quickly. Given the fractional reserve banking system if banks did need to meet a sudden withdrawal of deposits they may have to resort to asset sales, which given their illiquid and customised nature, would have to be sold at heavily discounted prices. The narrow margin of capital which banks operate on means that extensive fire sale losses may result in insolvency (Benston and Kaufman 1995: 212).

As a result, in the onset of a financial crisis characterised by severe asset price deflation some banks may become insolvent as the value of their assets becomes less than their fixed debt

obligations or they are forced into insolvency by selling their assets at fire sale prices in the face of a run (Bernanke 1983: 259). The asymmetric information properties inherent in the banking system may propagate an initial shock of the insolvency of a small number of institutions into a large scale banking crisis. Mishkin (1992: 121) asserts that banking panics may arise from asymmetric information problems stemming from the heterogeneous nature of bank loans and the highly specialised information which banks accumulate about their borrowers. Given this asymmetric information, depositors cannot value a bank's assets accurately and if there is significant uncertainty may question the value of these assets. If there is a revision of perceived risk in the banking system then depositors may rush to withdraw funds from both solvent and insolvent banks as they cannot distinguish between either (Mishkin 1992: 74). This is especially the case if other banks have similarities in their balance sheets, borrower characteristics or market areas (Benston and Kaufman 1995). As such, within an asymmetric information framework banking panics are tipped off by economic events that are perceived to reduce a wide group of bank asset values and endanger the value of deposits. The economic event in question could be for example the failure of a large or important firm or major recession (Benston and Kaufman 1995: 217).

Brunnermeier (2009) identifies funding liquidity and market liquidity factors as likely determinants of the extent to which a banking crisis may be propagated. Funding liquidity factors are likely to affect banks and other firms that rely extensively on short term paper or repo contracts to fund longer term assets. Firms which rely extensively on short term debt face the risk that margins on debt will change significantly, the risk that it will be more costly or impossible to roll over short term debt and the risk that investors or depositors will withdraw their money. These factors are only of concern to a firm if the underlying assets which are supporting the debt can only be sold at fire sale prices. Whether an asset is sold at par value or at a fire sale price during a banking panic is likely to depend on market liquidity factors. Brunnermeier (2009) identifies the bid-ask spread, market depth and market resilience[4] as factors determining asset prices in a banking panic. If the banking panic is severe enough the financial system may face other risks including settlement, operational, valuation and legal risks (Benston and Kaufman 1995: 232).

In extreme cases a loss spiral may arise as borrowers who face increasing margins in short term funding markets have to sell assets to reduce their leverage ratio. If market liquidity (as

[4] Market resilience refers to how long it will take for prices that have temporarily fallen to bounce back

defined above) is low then these sales will depress prices further which in themselves increase lending margins and forces more sales (Brunnermeier 2009: 92-93). The margins that borrowers face in short term money markets will be defined by the hoarding characteristics of the lender. Lenders will be further encouraged to hoard if they are afraid they will suffer from interim shocks or fall short of funds needed for their own projects and trading strategies.

A banking panic can serve to feed and propagate the contraction in the real economy in three ways. Freidman and Schwartz (1963) argued that banking crises worsened the initial economic contraction by reducing the wealth of bank shareholders and reducing the supply of money. Bernanke (1983) introduced a third way in which a financial crisis can reduce output, namely through an increase in the cost of credit intermediation which he argues accounts for why crises can continue for extended periods of time. Bernanke (1983) attributes the increased cost of credit intermediation as the main reason in why the downturn of 1929 turned into a long and protracted depression.

The premise of Bernanke's (1983) argument is that borrower bankruptcies and banking panics reduce incentives for banks to overcome asymmetric information problems. This will increase the cost of channeling funds from the ultimate savers/lenders into the hands of good borrowers, defined as the cost of credit intermediation (CCI) (Bernanke 1983: 263).

A banking crisis will result in large withdrawals of deposits, precautionary increases in reserve deposit ratios and an increased desire to hold very liquid assets. These factors as well as the failure of other intermediaries will reduce the banking system's role in the intermediation of credit which will likely impair financial inefficiency and raise the CCI, squeezing many borrowers out (Bernanke 1983: 263). Bernanke finds that in The Great Depression, bank credit outstanding declined very little after the stock market crash and only declined significantly after the waves of banking crises that followed as banks switched into more liquid assets. The Great Depression also suggests that households, farmers and small businesses reliant on credit are likely to be the most affected by the increased CCI.

Bankruptcies and defaults may also significantly affect the CCI. As the representative borrower becomes further insolvent, banks have two choices, either raise interest rates which may prompt further defaults or simply not lend. Historical experience suggests the latter is more likely. This will preclude many borrowers with good investment projects from getting funds

The effects on aggregate demand of an increase in the CCI are numerous. If credit is not flowing efficiently, potential borrowers with worthwhile investment projects may not secure the funds to initiate them. If households and small businesses are incurring higher interest charges but this higher interest rate is not enjoyed on savings then these higher costs will result in a reduction in current period consumption of goods and services. Disruptions in credit channels will continue to affect economic activity until one of two things happen. Either borrowers establish new, or revive old, channels of credit flow after a major disruption or insolvent debtors are rehabilitated.

Similarities and Differences

Given both the New Keynesians and Minsky are to varying extents derived from Keynes' philosophy, economics and politics, it would be reasonable to expect that both theories complement each other and share similarities in many facets, albeit with important differences in other areas. Similarly, given the Austrians are normally placed at the opposite end of the "political economy" spectrum to Minsky, and their policy recommendations are polar opposites, one would expect the Austrian Business Cycle Theory to differ greatly from Minsky's Financial Instability Hypothesis. It is surprising then to discover that Minsky and the Austrians actually share many common paths and parallels in their examination of financial crises, again, albeit with important differences.

At their broadest level, the three theories can be categorised as to whether financial shocks are exogenous or endogenous to an economy. New Keynesians analyse financial shocks as exogenous phenomena with their roots linked to movements in interest rates, stock market crashes and uncertainty (Mishkin 1992), all of which are independent events to the underlying economy. Both Minsky and the Austrians establish financial crises as endogenous events with their initial roots linked to credit expansion. Credit expansion appears to play a very small role in the New Keynesian theory of crises.

In both Minskian and Austrian theory, credit is initially expanded by aggressive, profit seeking banks in response to innovation of varying kinds. Under the Austrian approach, entrepreneurs seek funds to invest in a new technological innovation. Banks can only expand credit and lend to entrepreneurs in a concerted, unified effort in the presence of a central bank. In Minsky's theory however, the nature of the innovation is financial, allowing banks to expand credit independent of the central bank.

The causal relationship between the expansion of a credit and a financial crisis, as defined by the Austrian Business Cycle Theory and the Financial Instability Hypothesis, gives both Austrian and Minskian theory their endogenous qualities. The nature of the relationship between credit expansion and financial crises is also the first major point of difference between the two schools. Under the Austrian approach, an expansion of credit beyond natural in inducing capital gains and profits and their impact on consumer and firm liability structures.

In the Financial Instability Hypothesis, a concerted credit expansion will always induce business cycles regardless of whether it is in excess of savings or not. However, in Austrian theory, credit expansion will only be cyclical if it is in excess of savings. In the New Keynesian school, credit expansion is only important to the extent that it increases an economic unit's debt accumulation and dependence on credit, which in turn increases a unit's sensitivity to the credit channel of monetary policy. Otherwise the expansion of credit is not a predominant cause of financial crises.

In both Austrian and Minskian theory, expectations are of significant importance to the endogenous nature of crises. Within a Minskian framework, expectations of capital gains will feed directly into credit expansion and expectations concerning the profitability of speculative and Ponzi financing will push more firms towards such arrangements. As such, in a Minskian framework expectations are central to an economy moving towards a state of financial instability. In Austrian theory, the expectations of entrepreneurs are central to the shift in the structure of production. If entrepreneurs expect resources to be available over the life of an investment project and if they expect consumers to be willing to buy the capital goods upon the project's completion, then they will lengthen their production processes accordingly. In the Austrian school, the expectations of an entrepreneur are explicitly tied to the rate of interest, which if defined purely by the level of natural savings, will give the entrepreneur clues as to the consumption horizon of consumers and their preference between consumer and capital goods.

The trigger event of a financial crisis is broadly different in all three schools considered. In Minsky's Financial Instability Hypothesis, a revising of expectations is the principle catalyst for a crisis. A financial crisis is realised when asset prices do not meet expectations and there is a sudden realisation that liability structures, increasingly squeezed by increases in interest rates, are unsustainable. A mass sell-off of assets resulting in asset price deflation is the

likely consequence. In the Austrian School, the raising of interest rates in the latter part of a crisis and the lack of demand for capital goods will cause entrepreneurs to revise their expectations concerning their investment projects and deem them unprofitable. Firms at this point either fail or scale back investment resulting in reduced asset prices and consumption. In the New Keynesian school, a crisis is caused by one of three exogenous events; an increase in interest rates, a stock market crash and increased uncertainty resulting from the failure of a firm. Each of these three events can be found in both Austrian and Minsky theory in varying forms. However, unlike in New Keynesian theory, these events are not seen as the explicit cause of the crisis, rather the result of the endogenous changes in the economy.

The phenomenona of banking panics are accounted for in each theory, though in varying degrees. In each school a banking panic may be sparked if the assets of financial intermediaries are linked to the asset price depreciation of the initial financial crisis. A disproportionately small amount of attention is paid to banking panics in Minsky's Financial Instability Hypothesis when compared with other factors of crises. This is no less deliberate as Minsky sought to focus more on the endogenous nature of crises rather than a crisis itself (Papadimitriou and Wray in Minsky 1986). The main point concerning banking panics in The Financial Instability Hypothesis is that they will discourage lending and will be detrimental to investment and profit across the economy. Unlike other theories, the story of The Financial Instability Hypothesis is ended quite succinctly with a banking panic and central bank intervention. The New Keynesians and Austrians however, go further in emphasising the ability of a banking panic "spiral" to further affect the economic cycle. This is not heavily emphasised by Minsky (1986), though it is not explicitly ruled out either.

In a New Keynesian analysis, a banking crisis is precipitated by asymmetric information problems, which are manifested by runs on deposits and funding problems for banks. In the Austrian school however, it is bank failure which specifically precipitates a banking panic, not asymmetric information. Following the failure of a bank, the Austrians approach banking panics by focusing on the uncertainty that an initial bank failure causes and the ramifications this has on the liquidity preferences of lenders. This uncertainty could perhaps be interpreted as an asymmetric information problem though it is not explicitly defined as such.

Another important distinction exists between the Austrians and the New Keynesians concerning bank panics. The Austrians see banking panics as the outcome of the more fundamental economic crisis which is unrelated to the banking sector. The New Keynesians

however view banking panics as typically causing the broader economic crisis. This is certainly the conclusion reached from studies into The Great Depression; that continual bank failures prolonged the crisis (Friedman and Schwartz 1920; Romer, C. 1993)

The cyclicality of crises is another key area of difference between the schools. In Minsky's Financial Instability Hypothesis crises follow a fairly predictable and continuous pattern and are an inherent feature of a capitalist economy. Following a banking panic, the central bank will intervene and act as a lender of last resort, forcing their securities onto the portfolios of financial intermediaries, rebuilding the financial robustness of the economy. The endogenous nature of financial instability means that at this point the credit expansion cycle will continue again.

The Austrians approach the matter differently; crises will only occur if the market interest rate deviates significantly from the natural interest rate. If interest rates deviate from their natural levels then the economy will be in disequilibrium and a crisis may result until the market rate is equal to the natural rate again and the economy and capital structure are back to equilibrium.

Given the New Keynesian approach views crises as exogenous phenomenon, they are likely to persist as random shocks rather than defined cycles.

Minsky Analysis

Since its inception in the post war period of the 1950's, Minsky's Financial Instability Hypothesis has been used to interpret various financial crises. In a recent debate, Dickens (1999), Wolfson (1999) and Wray (1999) each apply Minsky's Financial Instability Hypothesis to the first post war financial crisis, the 1966 U.S credit crisis. A striking feature of this debate is the variety of conclusions reached, concerning the extent to which the Financial Instability Hypothesis explains this particular crisis. Wray (1999) for example, finds that the 1966 credit crisis is a strong verification of the Financial Instability Hypothesis. Wray argues that over the course of the post war expansion, the financial system changed from being robust to increasingly fragile, citing increased leverage ratios and financial innovations as contributing to this fragility. Wolfson (1999) echoes Wray's sentiments to an extent, arguing that the post war period in the US is "powerfully" explained by the Financial Instability Hypothesis, however he contends the 1966 credit crisis was in itself unrelated to

any increased financial fragility in the economy and therefore cannot be explained by the hypothesis. In contrast, Dickens (1999) argues that instead of financial fragility, financial crises are caused by class and intra-class conflict.

Minsky's analysis has also been applied to the current crisis in varying degrees by Davidson (2008) and Kregel (2008). Like the aforementioned debate, different conclusions were reached as to how well the crisis is explained by the Financial Instability Hypothesis. Davidson (2008) argues that the necessary preconditions for financial fragility as defined by the Financial Instability Hypothesis did not occur. In his analysis, Davidson (2008) focuses only on the US housing market and charges that subprime mortgages were technically not speculative or Ponzi finance in a traditional Minskian sense. Kregel (2008) also examines the current crisis, focusing specifically on Minsky's cushions of safety in the housing market. Kregel (2008: 17) concludes that the inadequacy of the cushions of safety, which led to high delinquency rates, cannot be attributed to a traditional endogenous Minskian process, but rather, is the result of structural way in which credit worthiness was assessed in the system.

Davidson (2008) and Kregel (2008) have applied a Minskian analysis to the features and trends of the U.S housing market but have not extended their analysis to the broader economy, which as per Minsky's analysis, should also exhibit specific behavior in its movement towards financial instability. In using a Minskian framework to explain the current crisis, an analysis based on the U.S housing market alone is perhaps insufficient as it gives too much focus to the peculiarities of a specific industry and denies the ability of the endogenous characteristics of the wider economy to explain financial instability and fragility. In a comprehensive Minskian analysis of any crisis, the endogenous characteristics of the economy are crucial in explaining an economy's movement from robustness to fragility. For example, Minsky (1986) in his treatment of the 1966 US credit crisis, focuses on broader variables like the level of debt, the ability of households and firms to service this debt and the liquidity characteristics of the debt in addition to the peculiarities of the crisis.

In Minsky's analysis, economic cycles are characterised by an investment boom and a movement of the economy towards financial fragility. An investment boom is the result of an increase in investment spending financed by an excessive amount of debt. Financial fragility will result if debt payment obligations due to indebtedness outpace profits and short term financing increases relative to long term financing. Hence, for the Financial Instability Hypothesis to be valid, bank credit must be expanded and then coincide with or lead

increases in investment spending, asset prices should consistently rise with increases in bank credit and debt must increase significantly relative to profits. As this analysis will show, these trends all occurred prior to the current crisis.

Figure 26 and figure 27 show outstanding US bank credit and the ratio of US Bank credit to GDP respectively for the period 1995(1) to 2008(4). In figure 26, between 1995(1) and 2008(4), bank credit increased in nominal terms by $6.1 trillion, an increase of 187%. Figure 27 shows that over this same period, bank credit as a percentage of GDP increased from 44% to 64%. As marked by the dotted lines, credit expansion both nominally and as a percentage of GDP appeared to increase from 2002(2) onwards. In figure 26, from 1995(1) to 2002(2) bank credit grew by an average of 0.54% per month and from 2002(3) to 2008(1), bank credit expansion exhibited cyclical properties, increasing on average 0.726% per month. From 2002(3) to 2008(1), US bank credit increased by $3.7 trillion and as a percentage of GDP accelerated from 50.8% to 60.8%.

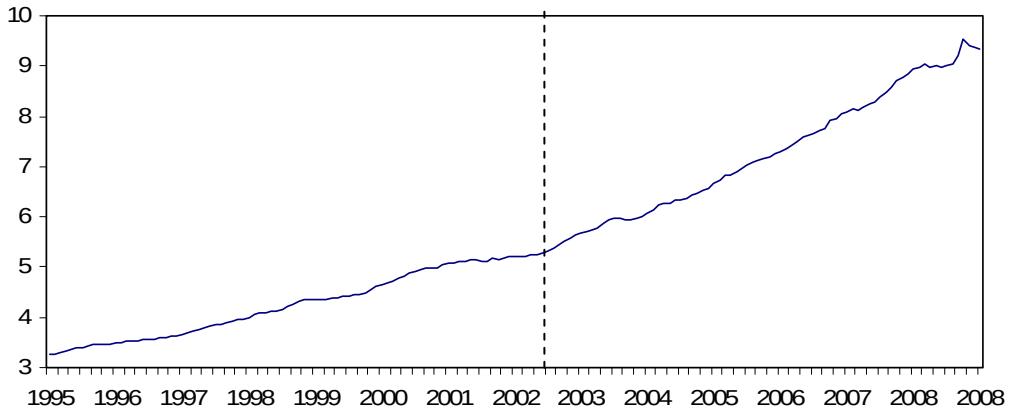

Figure 26: US Bank Credit outstanding (Trillion $) 1995(1) – 2008(4)

Source: US Federal Reserve Board of Governors

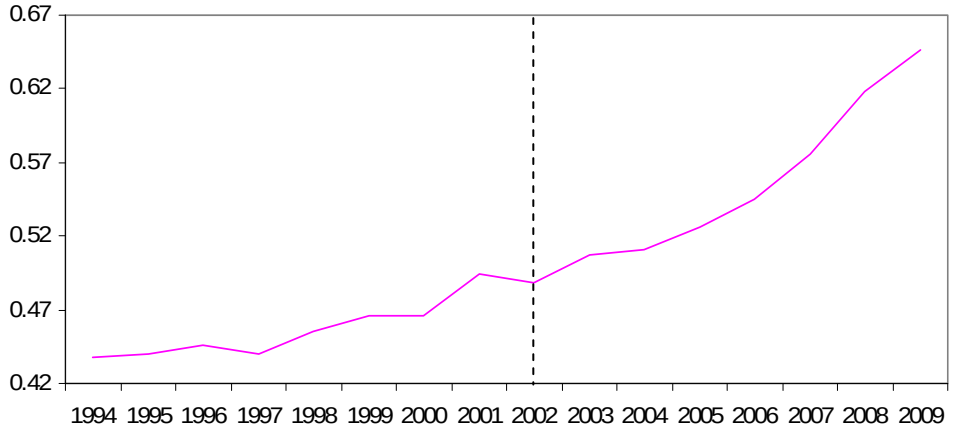

Figure 27: US Bank Credit/GDP

Source: Federal Reserve Board of Governors

Figures 28 and 29 respectively show the ratio of the increase in corporate debt and household debt to GDP. In figure 28, corporate debt/GDP appears to increase significantly in two periods (as indicated by the dotted lines). From 2001(1) to 2004(1), the ratio of corporate debt to GDP increased from 3.02 to 3.152, an increase of nearly 5%. From 2004(1) to 2008(1) the ratio of corporate debt to GDP increased rapidly from 3.15 to 3.58, an increase of nearly 12%. The rapid increase of corporate debt to GDP from 2004(1) coincides with the significant increase in total bank credit outstanding from 2003(1) onwards. In figure 29, between 2001(1) and 2007(3), the ratio of household debt to GDP increased steadily from 1.36 to 1.90, an increase of nearly 40%. These graphs show that the increases in debt in both the household and corporate sector coincided with the increase in total bank credit. Furthermore the rapid increase in household debt relative to corporate debt suggests households absorbed a significant amount of the increase in bank credit.

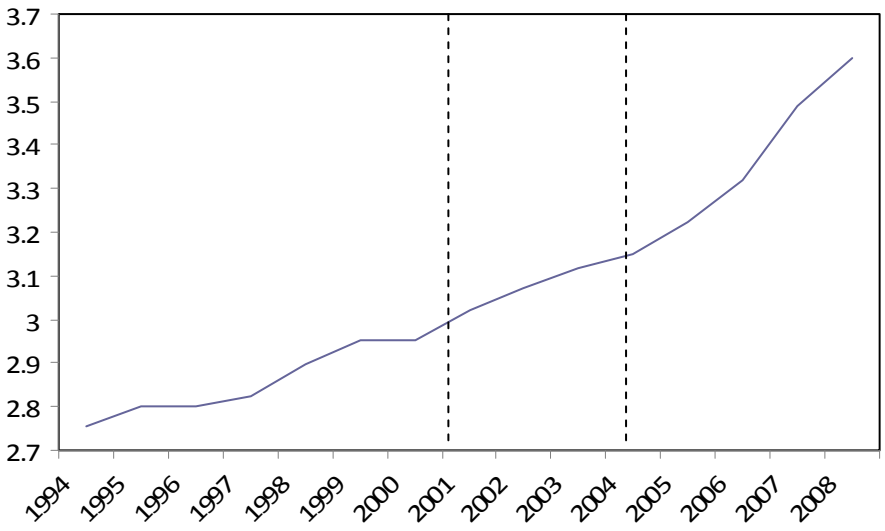

Figure 28: Corporate Debt/GDP

Source: Federal Reserve Board of Governors

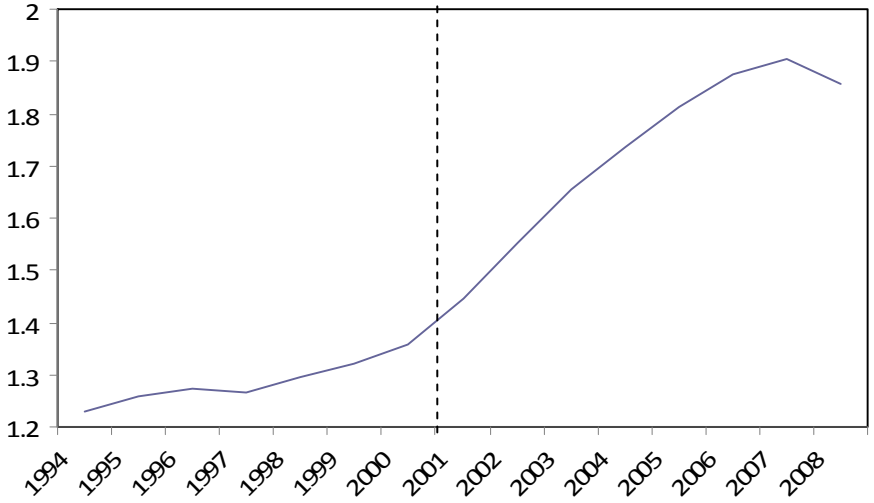

Figure 29: Household Debt/GDP

Source: Federal Reserve Board of Governors

Figure 30 depicts U.S Gross Private Investment. For the Financial Instability Hypothesis to be valid an increase in bank credit must translate into an increase in investment. In figure 30, as indicated by the dotted lines, from 2003(1) to 2006(1), gross private investment increased from $1.824bn to $2.26bn. The sharp increase in investment in 2003(1) coincides with the increase in bank credit in 2002(3) shown in figure 27.

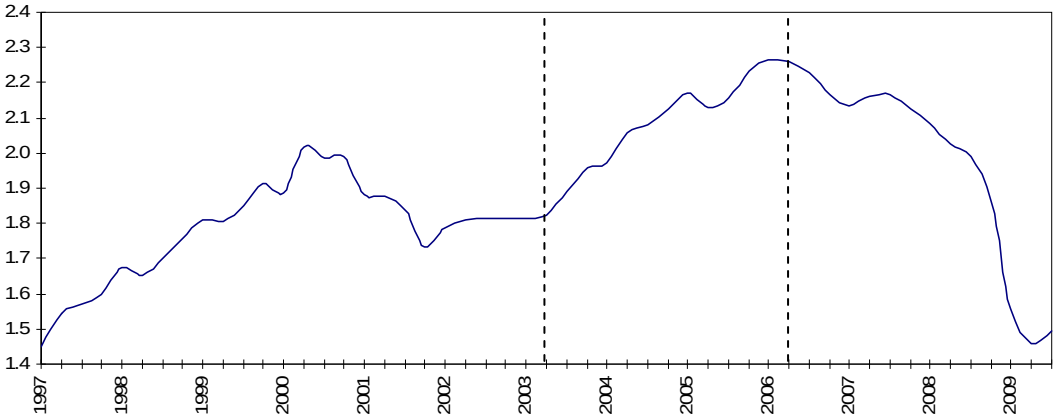

Figure 30: Real US Gross Private Investment 1997(1)-2009(2), Billions ($)

Source: Federal Reserve Bank of St Louis and U.S. Department of Commerce, Bureau of Economic Analysis, GDPIC96, $US chained 2005 billions, quarterly, seasonally adjusted.

As has been well documented, the investment boom that preceded the crisis was concentrated in the housing market. Figure 31 and figure 32 show the ratio of US Real Estate Loans/GDP and US house prices respectively. As shown in figure 31, between 1994(1) and 2009(2), real estate loans as a portion of GDP almost doubled from 14.58% to 26.34%, growing on average 0.78% per year. Real estate loans as a portion of GDP increased significantly from 2002(2) onwards, increasing from 17.03% in 2002(2) to 26.34% in 2008(4) at an average yearly growth rate of 1.39%, significantly above the average yearly growth rate for the whole period.

A central tenet of the Financial Instability Hypothesis is that credit expansion will lead to the financing of additional demand for capital or for more investment, which in turn will lead to a higher price of capital assets. As figures 32 and 33 show, house prices and stock market indices increased significantly up to 2007(1), coinciding with the rapid credit expansion of 2003(1) onwards (figure 26). As indicated by the dotted lines in figure 32, house prices in

particular increased in a seemingly exponential fashion from 2002(1) to 2006(4) onwards. Figure 33 shows the rapid increase in stock prices from 2003(3) onwards. In a rapid recovery from the dot com crash and September 11, US stocks increased 51%. A striking feature of figure 33 is the broad and global nature of the boom with other market indices increasing considerably.

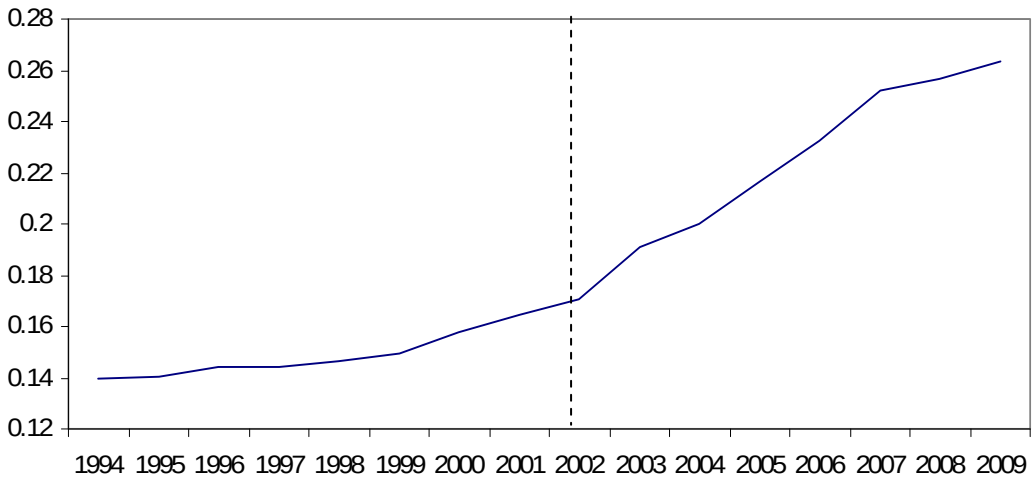

Figure 31: US Real Estate Loans/GDP

Source: US Federal Reserve Board of Governors

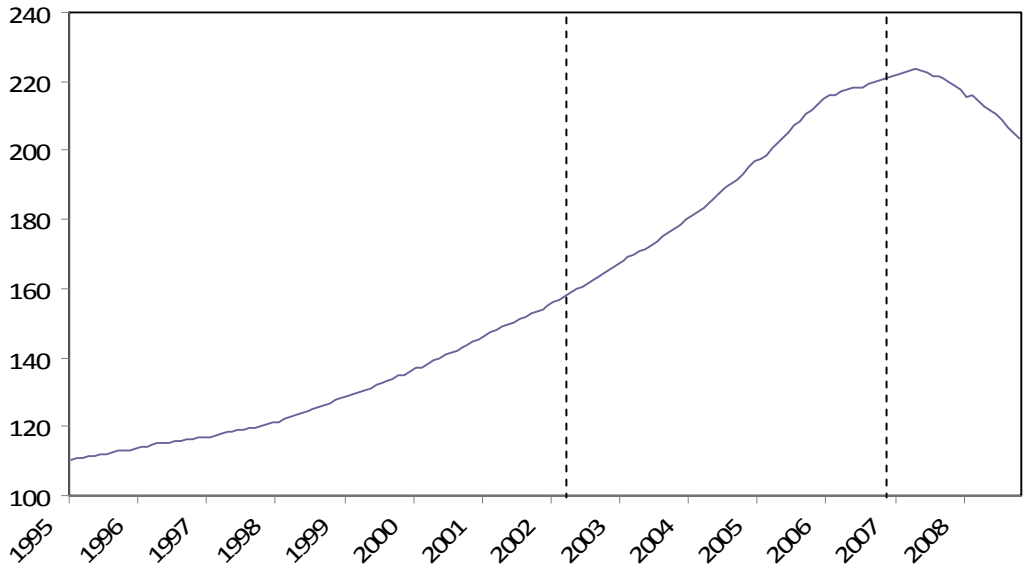

Figure 32: U.S House Price Index

Source: Federal Housing and Finance Agency

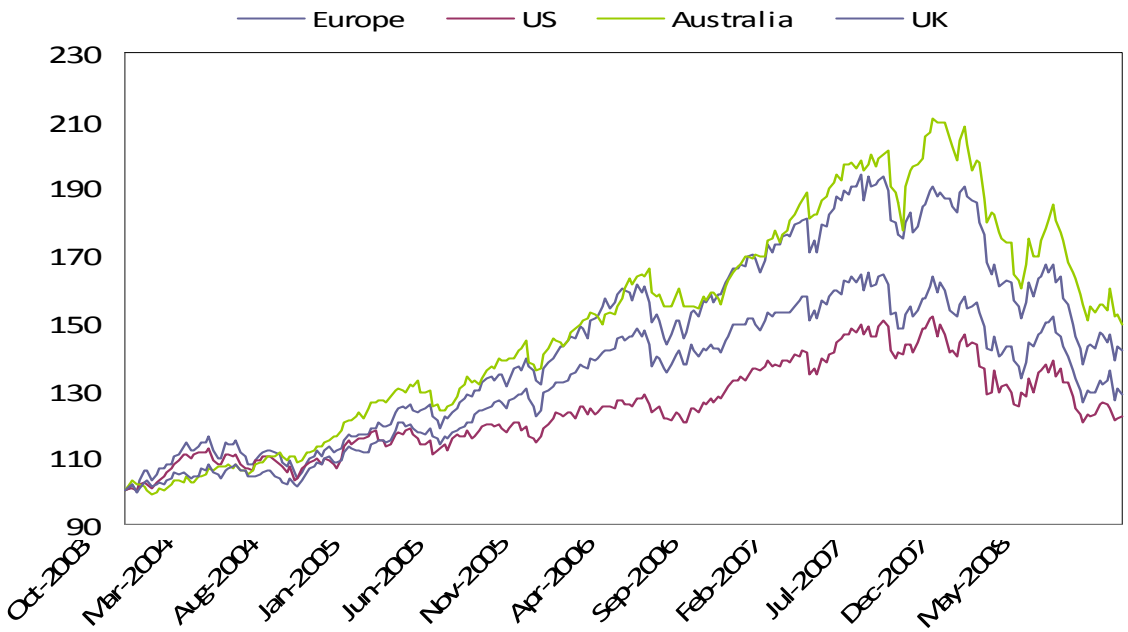

Figure 33: Major Share Indices

Source: Bloomberg

These broad macro economic data are very consistent with the features of an investment boom as posited in the Financial Instability Hypothesis. From the data it appears credit was expanded considerably in the years preceding the crisis, particularly from 2003(1) onwards. Relative debt levels in the economy increased, particularly in the household sector. Investment increased considerably following the credit expansion and was concentrated in the US housing market. Asset prices also increased considerably, particularly after 2003(1) where house prices increased in an almost exponential fashion and stock market indices grew strongly.

For the Financial Instability Hypothesis to be valid, the economy also needs to move from a state of financial robustness to a state of fragility where households and firms have a diminished ability to service their debt. Given households absorbed the majority of the increase in credit and increased their debt burden relative to GDP the most significantly, one would expect a diminished ability of households to service their debt. The household debt service ratio (figure 34) increased considerably in the years preceding the crisis, particularly from 2000(1) onwards and again from 2004(3) onwards. Between 1993(4) and the peak at 2008(1) the debt service ratio increased from 0.1085 to 0.1389, a 25.23% increase. The substantial increase in the debt servicing ratio is consistent with an increasingly small cushion of safety between income receipts and debt payments for households. It is likely that over this time period many households moved from hedge financing to speculative financing arrangements.

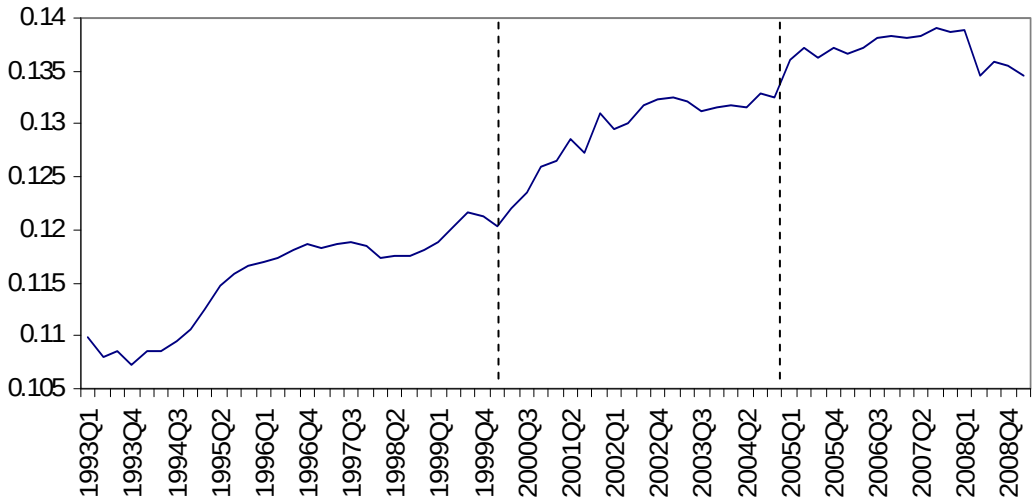

Figure 34: Household debt service ratio (%)

Source: Federal Reserve Board of Governors

Using the ratio of corporate profits to total liabilities (figure 35) as a crude measure of the debt servicing capabilities of firms, there are some striking features of this trend in the period leading into the crisis. In a Minskian analysis one would expect the debt servicing capabilities of firms to decrease in the period preceding the crisis, with income decreasing relative to debt. Figure 35 however, shows exactly the opposite. Corporate profits increased relative to liabilities from 2002(1) to 2006(4) with profit only decreasing relative to liabilities from 2006(4) to 2009(1). Figure 35 suggests that the corporate sector did not follow the path of financial fragility as outlined in Minsky's analysis. Rather than being inconsistent with Minsky's analysis, this graph suggests that the crisis may have originated in the household sector rather than in the corporate sector.

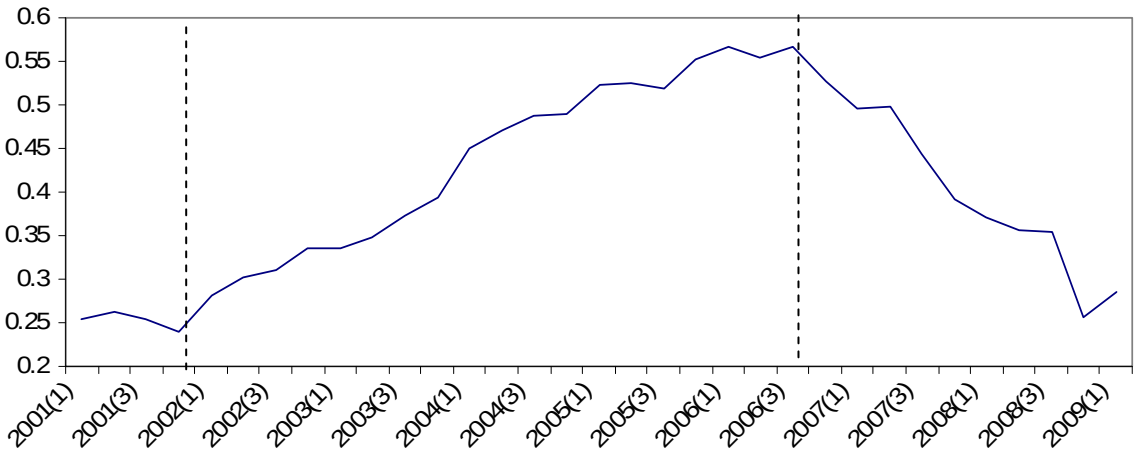

Figure 35: Corporate Profits/Liabilities

Source: Bureau of Economic Analysis, Federal Reserve Board of Governors

The Financial Instability Hypothesis also posits that the structure of liabilities will change, with short term financing increasing relative to long term financing. Figure 36 shows the ratio of commercial paper relative to commercial loans. This ratio captures the balance of short term financing and long term financing in the economy. The use of commercial paper increased by 33.24% relative to commercial loans from 2003(4) to 2007(2) meaning short term financing increased relative to long term financing in the lead up to the crisis. This is consistent with Minsky's analysis.

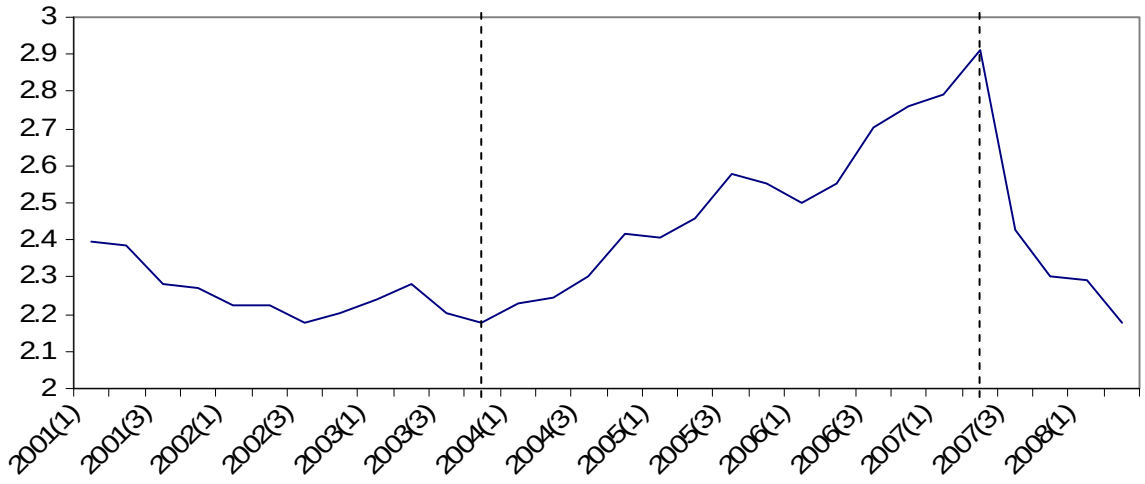

Figure 36: Commercial Paper/Commercial Loans

Source: US Federal Reserve Board of Governors

As argued by Minsky, Kindleberger (1978) and Spotton (1997), innovations of varying kinds play a crucial role in the expansion of the business cycle. In Spotton's (1997) analysis, financial innovations in the form of highly liquid claims on assets allow speculative enthusiasm for an asset to be spread, encouraging investment and trading in the asset. Both the increasing use of credit structured products and the Originate and Distribute banking model fit Spotton's definition of a financial innovation well.

Credit structured products with subprime mortgages as their underlying asset, allowed increasingly higher credit risks to be more easily traded, fostering increased speculation in the US housing market. In the period preceding the crisis, the use of credit structured products became quite widespread and complex variations on the instruments proliferated rapidly, aided by advances in modelling techniques. Variations of credit structured products included collateral debt obligations based on asset backed securities as well as asset backed commercial paper issues by structured investment vehicles that held highly rated credit instruments including CDO tranches (Borio 2008: 11). The Originate and Distribute model allowed the credit risks and income streams on subprime mortgages to be distributed widely,

increasing the market for such a product. As a result, the Originate and Distribute model contributed to the rapid growth of the US mortgage market (Cohen and Remolona (2008: 11).

Davidson (2008) and Kregel (2008) argue the Financial Instability Hypothesis inadequately accounts for the features of the U.S housing market. This paper argues that by using a broader analysis which takes into account macroeconomic variables outside the housing market, the current crisis is explained well by Minsky's financial instability hypothesis. The investment boom preceding the crisis exhibits all the features of the financial instability hypothesis including the increase in credit, the increase household and corporate debt and the increase in investment. The movement of the economy towards a state of fragility as defined by the Financial Instability Hypothesis is consistent for households but not for firms.

Austrian Analysis:

An application of the Austrians to a business cycle comes with its qualifications. A common criticism of the Austrian school as raised by Rosen (1997: 147) and Yeager (1997: 156) is their lack of empirical methodology. Rosen (1997: 147) points out that many Austrians hold the view that quantitative empirical work in economics is infeasible or uninteresting because the world is changing so much that behavioural relationships are inherently unstable and it is fruitless to estimate them. The Austrian distaste for mathematics and empirics makes it application to crises on any non anecdotal level limited, especially given some of the complex relationships embedded in their theory. Given the methodological limitations of the Austrian school and their strong theoretical overlap with Real Business Cycle Theorists, one can use Real Business Cycle methods to examine some of the Austrian assertions concerning crises, particularly the relationship between technology shocks and investment.

Real Business Cycle Theorists like the Austrians also acknowledge that business cycles are fundamentally phenomena that are characterised by their changing behaviour through time. However Plosser (1989: 54) argues that using a neoclassical model of capital accumulation which is dynamic at its most basic level can be useful in examining certain economic relationships, particularly that of technology shocks and investment.

In Austrian Business Cycle Theory, investment booms are the result of technology shocks. Garrison (2006) argues that technology shocks encourage investment as they often temporarily increase the yield of an asset. Investment in the technology shock will only be excessive if the central bank has an accommodating monetary policy.

To analyse the Austrian approach it is necessary to obtain some measure of productivity shocks. Plosser (1989: 62) argues to construct a measure of the state of productivity, a crude but straightforward method is to follow the example provided by Solow. To model changes in technology, Plosser (1989) uses a simple growth accounting equation[5][6]:

$$(\Delta Y/Y)-(\Delta L/L) = \alpha(g_k-g_l) + R$$

In Austrian theory, a lag exists between the initiation of an investment project and the liquidation of the investment project during an economy crisis. Hence one needs to examine investment and technology growth over an appropriate period before the crisis, allowing enough time in the sample period for investment projects to be initiated and completed to the point where they become heterogeneous. The sample period used to measure investment and technology growth extends from 1985(1) to 2009(2), allowing a long enough period to observe the general behaviour of investment and technology growth prior to the crisis. More specific focus is given to the period 2001(1) to 2009(2) which is most likely the period that technology shocks and investment growth should occur in order for there to be a crisis in 2007-2009.

Figure 37 shows the annual growth rate of technology as defined by the Solow residual and the annual rate of investment growth. For the Austrian Theory of Business Cycles to validly explain the current crisis, one would expect the period preceding the crisis to be characterised by technology shocks leading huge increases in investment.

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[5] Where Y is GDP, L is Labour, R is the Solow residual and α is capitals share of total output

[6] As in Hall and Jones (1999: 89) I estimate the initial value of the capital stock as $I_{78}/(g + \delta)$, where g is calculated as the average geometric growth rate from 1978 to 2009 of the investment series. I assume a depreciation rate of 6 percent. Alpha is assumed to be 0.66

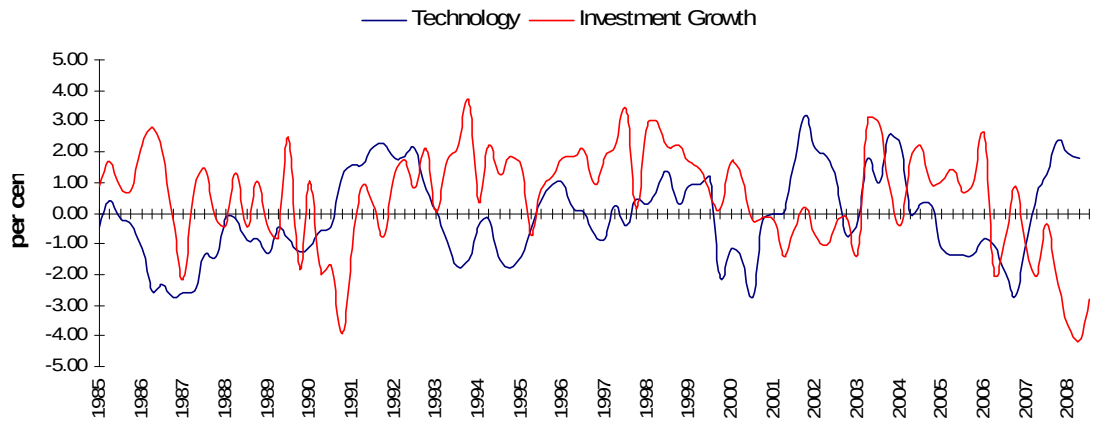

Figure 37: Annual Growth Rate of Technology and Investment 1985(1)-2009(2)

Source: DX

A visual examination of the graph provides some interesting insights into the behaviour of technology growth and investment growth prior to the crisis. There appears to be two discernible technology shocks in the years preceding the crisis, in 2002 and 2004. Spikes in investment growth also appear to lag these technology shocks in 2003-2004 and 2004-2006. This is broadly consistent with Austrian theory; one would expect to see technology shocks leading investment growth prior to a crisis.

However, given the magnitude of the crisis, in an Austrian analysis one would also expect the spike in investment growth prior to the crisis to be relatively large compared to the entire sample period. Between 1985(1) and 2009(2) annual investment and technology growth was on average 0.54% per year and -0.11% respectively. In the years immediately preceding the crisis, from 2001(1) to 2009(2) annual investment and technology growth were -0.19% and 0.39% respectively. Whilst technology growth was greater in the years preceding the crisis than over the whole period, investment growth was relatively smaller in the years preceding the crisis than over the whole period. This is counter intuitive to the Austrian argument.

In Austrian theory, overinvestment in a technology shock occurs when central banks accommodate the increase in investment either by lowering or maintaining market interest rates at a time when interest rates should be rising due to increased investor demand for funds. Hence in Austrian theory, the deviation of the market rate from the natural rate of interest is a necessary precondition for overinvestment to occur. The natural interest rate cannot be proxied easily, especially given the varying interest rates and different maturities along the yield curve. A crude measure of the natural rate of interest could be the long run average of corporate bond yields over time.

Figure 38 shows AAA corporate bond yields from 2000(1) to 2009(3). The horizontal line represents the long run average of the AAA corporate bond yield from 1919(1) to 2009(1). From 2003(2) to 2009(3) the AAA corporate bond yield was consistently below its long term average by -0.4%. This is consistent with Austrian theory. In the years prior to a crisis interest rates should be significantly lower than the natural rate of interest. However the average deviation of the AAA corporate bond yield from its long term average from 2003(2) to 2009(3) is quite small. Whilst this figure is consistent with Austrian theory, the significance of this explaining any overinvestment is likely to be small given the relatively minor deviations of the AAA corporate bond yield from its long term average.

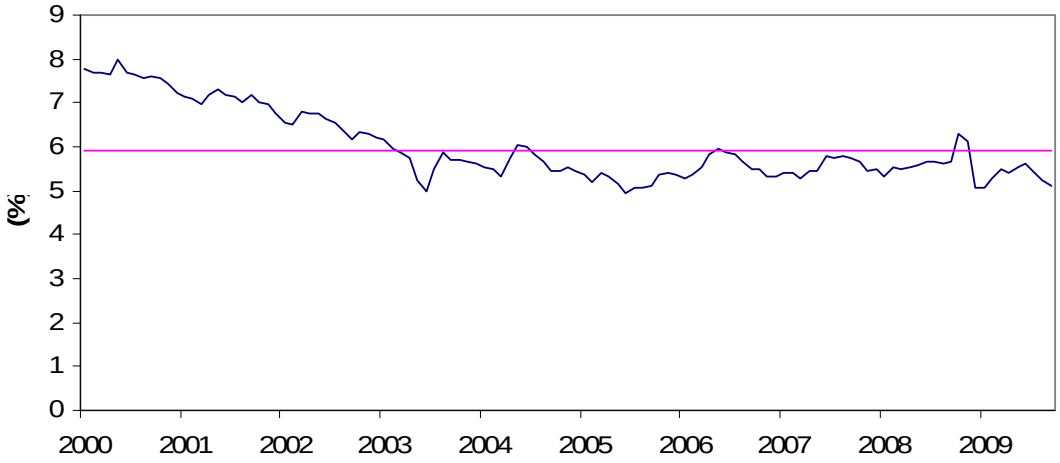

Figure 38: AAA Corporate Bond yield 2000(1) – 2009(3)

Source: Bloomberg

Austrian Business Cycle Theory posits that economic crises are caused by a series of very specific events. For the Austrian theory to be valid, technology shocks should lead a significant investment boom prior to a crisis. Given the extent of the current crisis one would expect investment in the period immediately preceding the crisis to be significant. Whilst there were two discernible technology shocks which lead investment from 2001(1) to 2009(2) as one would expect in Austrian theory, the investment shocks themselves were relatively small compared to the average for the period 1985(1) to 2009(2). This inconsistency suggests the current economic crisis was not the result of an investment boom and bust following a technology shock as argued by Austrian Business Cycle Theory.

New Keynesian Analysis

Whilst the New Keynesians do not offer an overall theory for crises, the financial crisis of 2007 – 2009 can be examined within a New Keynesian framework as a series of increasingly severe shocks which were propagated to varying extents in both the financial system and the real economy. For the New Keynesian synthesis on crises to validly explain the current crisis, it needs to go some way in accounting for some of the main features of the crisis, particularly the failure of major institutions, asset price deflation, banking panics, the rationing of credit and the downturn in the real economy. For the New Keynesian synthesis to be valid it also needs to account for the start of the downturn and its initial propagation into a crisis.

In the New Keynesian synthesis, an exogenous shock of some description must occur for a financial crisis and an economic downturn to begin. Whilst different economic commentators have pointed to different specific events, the consensus seems to be that the initial shocks leading to the financial crisis came in the form of a series of confidence shaking news events concerning the announcement of losses from hedge funds with exposure to the subprime crisis in mid 2007. For example Brunnermeier (2009: 85) points to May 2007, when UBS shut down its internal hedge fund Dillon Read after suffering $125m of subprime related losses, as the first negative announcement concerning the subprime market. Borio (2008: 3) that in mid June 2007, two Bear Stearns hedge funds had trouble meeting margin calls leading to Bear Stearns injecting nearly $3.2bn to save its reputation. These shocks helped contribute to the crisis of confidence within the valuation of residential mortgage backed securities, seen in the significant decline of prices of US subprime Mortgage credit default swaps from June 2007 onwards (figure 16). In June alone the value of BBB and BBB-

subprime mortgage credit default swaps decreased by 13.5% and 14.4% respectively. These initial shocks are consistent with those of "uncertainty" as defined by Mishkin (1992).

New Keynesians stress the role of market rigidities like asymmetric information in the propagation of exogenous shocks into financial crises. The RBA (2007: 5) argues that the crisis of confidence in the valuation of subprime mortgages had contagion effects and was spread to other debt markets, in particular the asset backed commercial paper market in August 2007. In this period many asset backed commercial paper programs faced roll over difficulties and in the space of 4 weeks over August commercial paper outstanding declined from $2.18 trillion to $1.88 trillion, a decline of nearly 14% (figure 17).

Under an asymmetric information framework one would expect lenders to suffer adverse selection in choosing who to lend to. Anecdotal evidence of the commercial paper market being essentially closed in August 2007 (Borio 2008: 8) suggests many investors and lenders who had liquid funds could not discriminate between both the "good" credit risks and the "bad" credit risks and instead chose not to lend or roll over their existing loans. This is consistent with adverse selection as defined by Mishkin (1992)

This adverse selection problem was also evident in the CDS premia of investment banks. At the same time in the third quarter of 2007, US investment bank CDS premia increased significantly from 16 basis points to nearly 60 basis points (figure 39). In the early stages of the crisis, CDS premia increased consistently for all investment banks even though some investment banks had limited exposure to the subprime mortgage market and the banks that it was later revealed did have exposure had not yet made significant announcements of write downs. For instance figure 37 shows that between August 2007 and October 2007 the initial spike in CDS premia was experienced by Bank of America, JP Morgan, Merrill Lynch and Goldman Sachs together even though it was later revealed that Merrill Lynch had significant exposure to the subprime mortgage market and Goldman Sachs had a much more salient exposure. This suggests investors could not differentiate between banks that were "good" credit risks and banks that were "bad" credit risks and demanded significant risk premia across all banks.

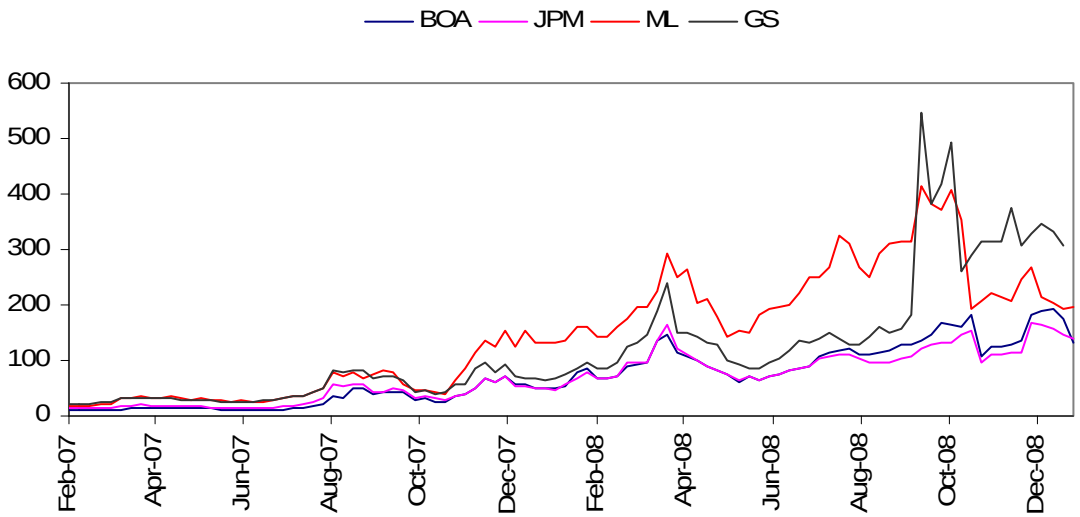

Figure 39: Selected Investment Bank CDS Premia, 2007(1) – 2008(4)

Source: Bloomberg: Bank of America, JP Morgan, Merrill Lynch, Goldman Sachs

The fallout from the decline of the U.S housing market and the resulting contagion to other debt markets prompted a liquidity crisis, characterised by significantly increased lending costs between banks. The broad based uncertainty of the period was characterised by a significantly higher 3 month LIBOR to swap spread (figure 18).

The New Keynesian framework, with a focus on market imperfections like asymmetric information, allows one to observe how an initial shock to uncertainty in the form of losses on products with exposure to the subprime mortgage market can be propagated into a financial crisis. In this framework the New Keynesians adequately explain the initial advent of a financial crisis.

Following the disruptions to credit markets in mid 2007, particularly the commercial paper and interbank lending market, there were some major institutional failures. A striking feature of the crisis was the bank run on Northern Rock on September 13th 2007. For a New Keynesian approach of financial crises to be valid it should go some way in explaining such a major event. New Keynesian theory argues that banking panics can either be caused by a run on a bank by depositors who suffer from asymmetric information and coordination failure (Mishkin 1992) or can be the result of distressed banks facing difficulties meeting increased margins and facing roll over difficulty on short term debt (Brunnermeier 2009).

Both of these features characterise the run on Northern Rock. On September 13th 2007, following the announcement that Northern Rock had sought the Bank of England's support, depositors queued outside branches to withdraw their savings. This was the first bank run in the UK since 1866. From June 2007 to December 2007 retail deposits at Northern Rock decreased from £24,350m to £10,469m. Whilst the most visible run was that of depositors queuing outside branches, the run on Northern Rock also took place in the short term money market and was carried out by sophisticated institutional investors who refused to meet the banks wholesale funding requirements. From June 2007 to December 2007 wholesale funding decreased from £26,710m to £11,472 (Shin 2009 p.108). Northern Rock, which had an excessive reliance on short term wholesale funding, was left short when it couldn't raise the funds it needed in the money market. Instead it had to take out a loan of £28,473m from the bank of England. These features are very consistent with co-ordination failure amongst depositors and the "roll over risk" banks face in short term money market as identified by Brunnermeier (2009). As such in a broader definition of a bank run, where market funding risks are taken into consideration the run on Northern Rock is adequately explained by the New Keynesians.

The New Keynesian synthesis, rather than constituting a generic theory for crises like Minsky and the Austrians, focuses more on the specific observations and events of previous crises. The Great Depression has been of particular focus to the New Keynesians with Bernanke (1983) and Romer (1993: 24) focusing on the various shocks of 1929 to 1933 and how they were propagated into a severe economic downturn. As argued by Bernanke (1983), the main factor propagating The Great Depression was the significant decline in bank lending following the waves of banking crises from 1930 to 1933. The main premise of Bernanke's argument is that the multiple bank failures reduced incentives for the remaining banks to overcome asymmetric information problems to continue lending. The reduced willingness of banks to lend resulted in an increase in the cost of credit intermediation, further dampening economic activity. Romer (1993) argues the banking crises of 1930-1933 also contributed significantly to the increase in pessimism and uncertainty resulting in reduced consumer spending and investment.

There are four major events which characterise the various stages of the current crisis, namely the failure of Bear Stearns, the decline in the stockmarket, the failure of Lehman Brothers and the downturn in the real economy. For the New Keynesian synthesis on crises to be valid, these shocks should exert specifically observable effects on the economy. Using

Bernanke's (1983) analysis, one would expect the failures of Bear Stearns and Lehman Brothers to increase the cost of credit intermediation and result in a reduction of credit available in the economy, seen in a fall in loans. One would also expect these events to contribute significantly to uncertainty and lead any reduction in the downturn in the real economy.

Figure 40 represents the natural log of real estate loans from 2007(1) to 2009(3). Following the failure of Bear Stearns in 2000(1) as indicated by the first dotted line, real estate loans declined for four consecutive months by a total of -1.07%. However prior to the failure of Lehman Brothers, as indicated by the second dotted line, Real Estate Loans increased by 5.33%. Following the failure of Lehman Brothers in 2008(3) real estate loans broadly levelled off however did not decline in earnest until 2009(1), after which they declined -3.24%. These characteristics are not entirely consistent with the New Keynesian argument. Under a New Keynesian argument one would expect bank credit to decline significantly and immediately following a large shock like the failure of Lehman Brothers.

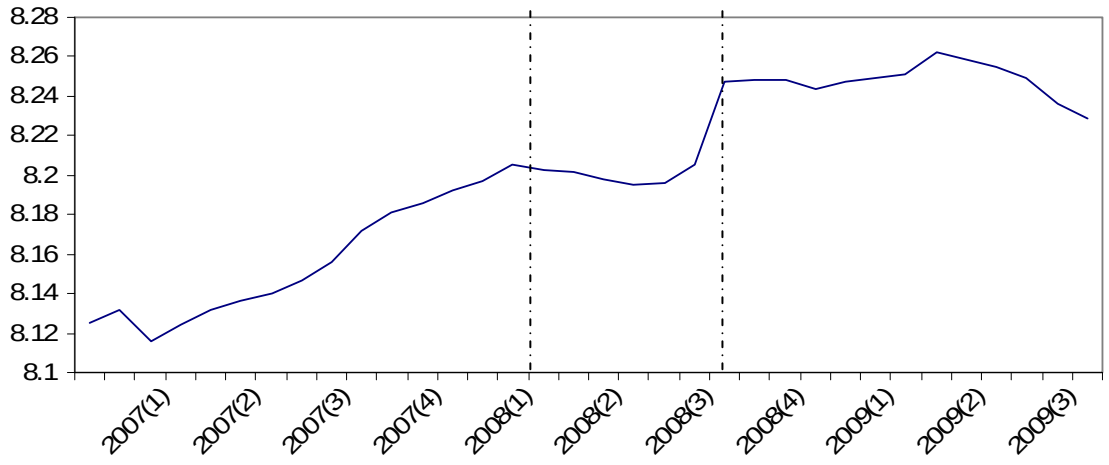

Figure 40: The Natural Log of Real Estate Loans 2007(1)-2009(3)

Source: Federal Reserve Bank of St Louis

Figure 42 shows the natural log of consumer loans from 2007(1) to 2009(3). Following the failure of Bear Stearns (as indicated by the first dotted line) and up until the failure of Lehman Brothers (the second dotted line), consumer credit increased by 2.29%. Following the failure of Lehman Brothers, consumer credit plateaued for 3 months before declining significantly for 8 months from 2008(4) to 2009(2), declining by 4.86% in this period. Again these features are not entirely consistent with the New Keynesian argument given one would expect consumer credit to decline significantly following the failure of Lehman Brothers.

Figure 42 shows the natural log of commercial credit from 2007(1) to 2009(3). Following the failure of Bear Stearns and up until the collapse of Lehman Brothers, commercial credit increased by 9.39%. Following the failure of Lehman Brothers, commercial credit tapered off very consistently, losing 15.07% over 11 months from 2008(4) to 2009(3). The immediate reduction in commercial credit outstanding following the failure of Lehman Brothers is consistent with the New Keynesian argument.

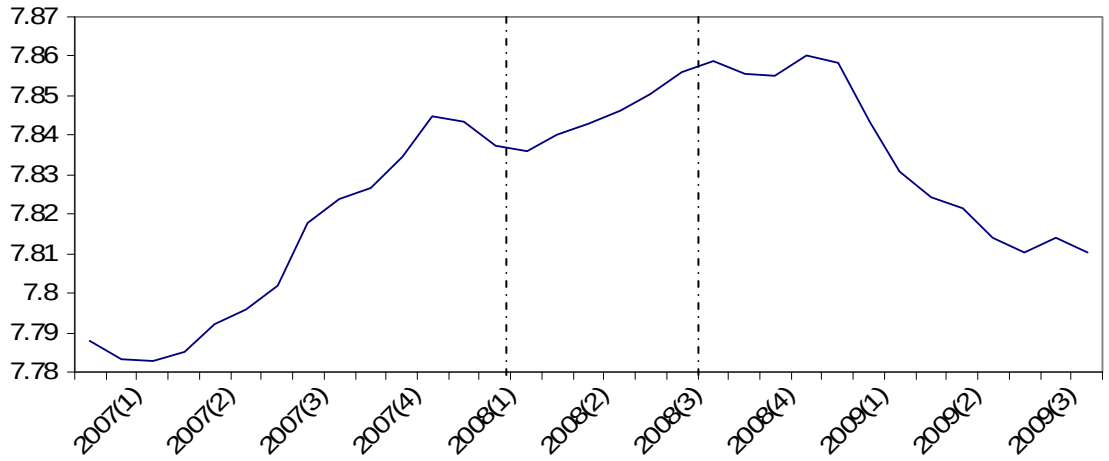

Figure 41: Natural Log of Consumer Credit 2007(1)-2009(3)

Source: Federal Reserve Bank of St Louis

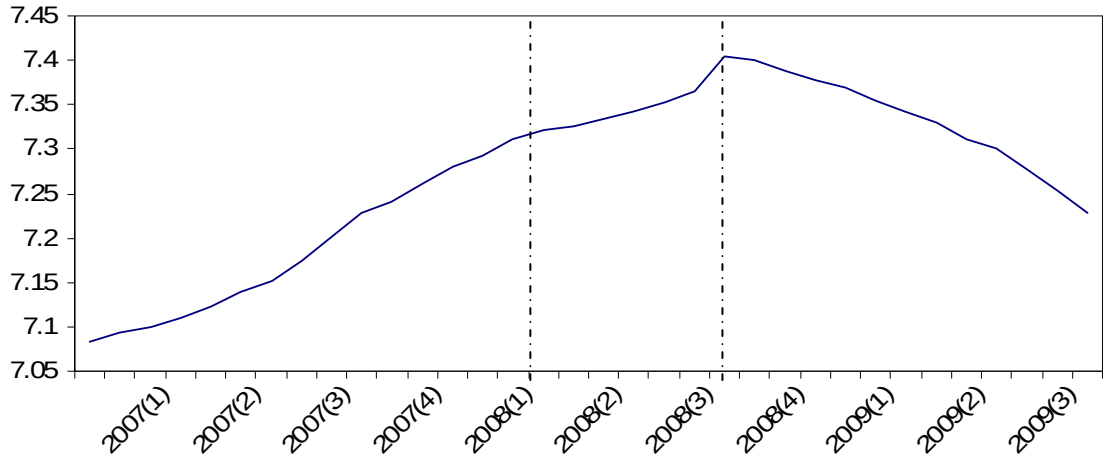

Figure 42: Natural Log of Commercial Credit 2007(1)-2009(3)

Source: Federal Reserve Bank of St Louis

The failure of Bear Stearns and Lehman Brothers explain the New Keynesian synthesis, particularly Bernanke's (1983:269) cost of credit intermediation theory in varying degrees. Following the failure of Bear Stearns, Real Estate Loans, Consumer Credit and Commercial credit all increased to some degree before the failure of Lehman Brothers. This suggests the failure of Bear Stearns was not a significant enough event to disrupt the process of credit intermediation. Bank lending following the failure of Lehman Brothers exhibits specific behaviour that is more consistent with increased costs of credit intermediation following a banking panic as defined by Bernanke (1983). Commercial loans dropped immediately following the failure of Lehman Brothers however for Real Estate loans and Consumers loans there was a lag before lending was reduced suggesting credit intermediation was not disrupted immediately.

Bernanke (1983) and Romer (1993:26) argue that bank failures further deepened the Great Depression by increasing uncertainty in the financial system. The increase in uncertainty following the failure of Lehman Brothers is likely to explain the broad sell off in the stock market (figure 43), which characterised late 2008. The failure of Lehman Brothers also increased uncertainty in interbank markets, resulting in increased hoarding by market

participants. This is captured in the dramatic increase in the three month Libor to Swap Spread (figure 44).

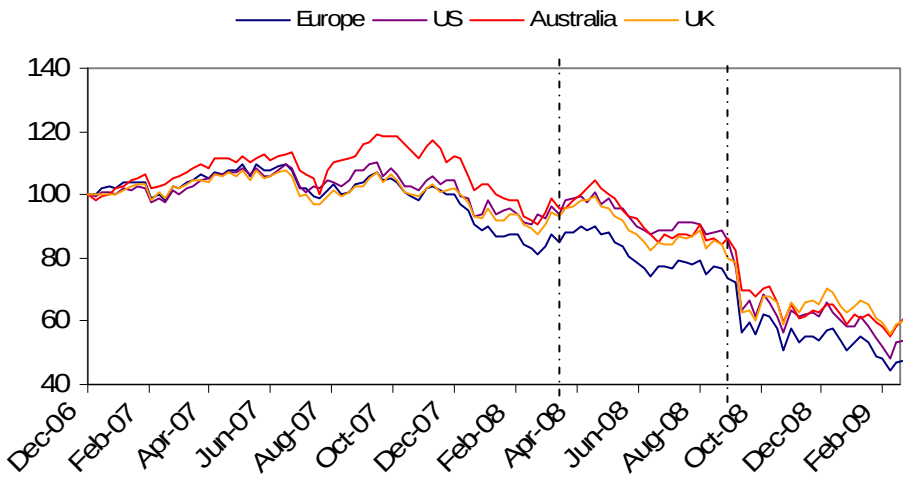

Figure 43: Major Stock market indices

Source: Bloomberg

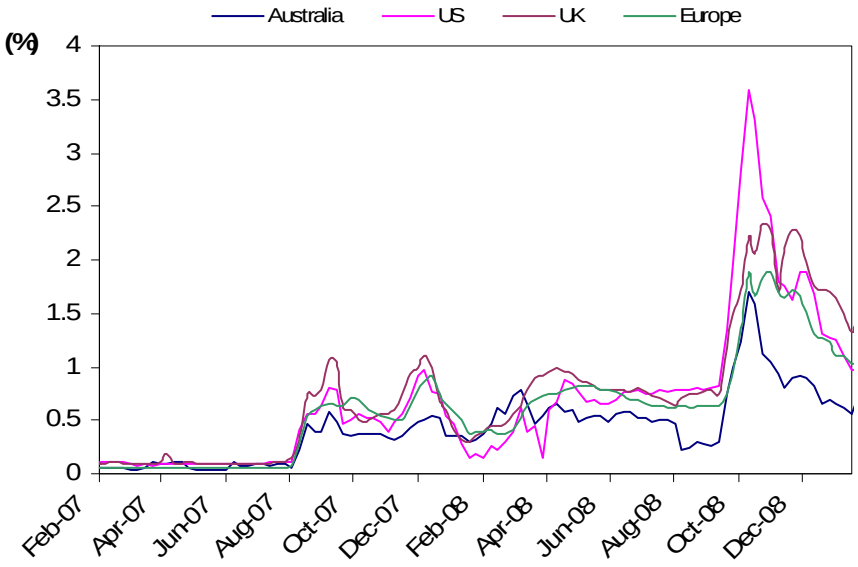

Figure 44: 3 month Libor to Swap Spread

Source: Bloomberg

Bernanke (1983) argued that following a bank failure, the increased cost of credit intermediation would reduce lending and ultimately affect the real economy through a decline in investment. In figure 6, private non residential fixed investment decreased considerably from 2008(3) following the failure of Lehman Brothers. From 2008(3) to 2009(3) non residential fixed investment dropped 21.65%. Figure 9 shows US industrial production which also fell off considerably from 2008(3) onwards, though had been in a state of decline for a considerable time before the failure of Lehman Brothers. Unemployment also increased rapidly following the failure of Lehman Brothers (figure 12). From their trough in 2008(3) to 2009(3) unemployment increased by 4.3%,1.9%,1.9% and 2.7% in the U.S, Australia, Japan and the UK respectively. The rapid decline in these real variables following the failure of Lehman Brothers is explained well by Bernanke's 'cost of credit intermediation' and is very consistent with the New Keynesian argument.

Conclusion:

The current crisis provides an opportunity to re-examine the spectrum of crisis analysis by comparing the broad structural characteristics of the current crisis with those of the three chosen explanations of crises. Such an investigation has the potential both to cast some light on the recent crisis but also to provide additional evidence pertaining to the validity and usefulness of the three models.

By using a broader analysis which takes into account macroeconomic variables outside the housing market, the current crisis is explained well by Minsky's financial instability hypothesis. The investment boom preceding the crisis exhibits all the features of the Financial Instability Hypothesis including the increase in credit, the increase household and corporate debt and the increase in investment. The movement of the economy towards a state of fragility as defined by the Financial Instability Hypothesis is consistent for households but not for firms.

For the Austrian theory to explain the crisis well, one would expect to see technology shocks preceding a significant investment boom prior to a crisis. Whilst the data shows two technology shocks in the period prior to 2007, each followed by an increase in investment the growth was too small to lend strong support to the theory. Austrian theory also suggests that in the years prior to a crisis market interest rates should be significantly lower than the natural rates of interest to foster increased investment in the technology shock. If one studies the

long run average of the corporate bond yield as an indicator this certainly occurred but not to any significant great degree and does not support the Austrian theory convincingly.

Whilst the New Keynesians do not offer a specific theory of crises, their explanation of crises in terms of exogenous shocks and their propagation seems to broadly characterise the onset and increasing severity of both The Great Depression and the current crisis well. The exogenous shock which began the financial crisis is interpreted as a series of confidence shaking news events derived from announcements of hedge fund losses from funds with exposure to the subprime crisis of 2007. Specifically observable features of the current crisis like bank failures, the reduction in lending and the downturn in the real economy are all explained well within the various New Keynesian literature. In particular Bernanke (1983) offers a specific relationship between bank failures and a downturn in the real economy. The relationship seems to be broadly consistent for the current crisis with commercial lending falling significantly after the failure of Lehman Brothers, coinciding with the downturn in the real economy. Consumer and mortgage lending also fell significantly following the failure of Lehman Brothers, though as noted, consumer and mortgage lending did have a lag before they declined which was not consistent with Bernanke's (1983) argument.

Whilst both the New Keynesians and the Austrians appear to explain the crisis well in their own right, the New Keynesian synthesis on crises is reconcilable with Minsky's analysis. Minsky offers a broad endogenous examination of crises, paying more attention to the fundamental causes rather than the unfolding events of a crisis itself. The New Keynesians on the other hand take crises as exogenous events and add considerably to the understanding of the propagation of crises, particularly in terms of phenomena like banking panics and asset price deflation. Hence these theories are both complimentary to each other and allow for a much broader and precise understanding of the causation and nature of financial and economic crises.

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