

# The lessons from the housing market crisis

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## *Executive summary*

### **Causes**

The US housing market is not the cause of the credit crisis and the current woes of the global economy. It is simply the symptom of the huge liquidity that was put in place by “bad” financial engineering and some mistakes in the conduct of monetary policy, especially in the US. This liquidity has financed a number of bubbles in the last ten years with a major impact on the economy (internet, housing, and commodities) and a few more (shipping and private equity) with a smaller impact on the economy (see Arestis and Karakitsos, 2009b, and Karakitsos, 2008). From a European perspective, micro-economic fundamentals and country-specific factors have differentiated the countries in the euro area, with housing bubbles emerging in some countries, like Spain, but not in others, like Germany. Thus, both a macro- and micro-perspective are needed to understand the full story.

From a macro-perspective, liquidity is the real culprit. Without this excessive liquidity, there would have been no bubbles – no credit, no bubble. Although one might point to some errors on the part of the Fed in removing the accommodation bias on a number of occasions in the last ten years, financial engineering has played by far a more important role in creating this prodigious liquidity. In the press, financial engineering is deemed synonymous to fraud – finding loopholes in the law and the regulatory environment to make money – and it is accordingly condemned. “Bad” financial engineering has resulted in a “shadow-banking” that developed and worked in parallel with regulated banking. The “shadow-banking” operated outside the regulation and control of the authorities. So, whatever was not allowed in regulated banking was developed in the “shadow-banking”.

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## Consequences and risks

The K-model predicts that US house prices will stabilise in the spring of 2010 at more than 40% lower than the peak in 2006, triggering losses in financial institutions in excess of \$3 trillion. Gross wealth will return to its pre-bubble level, but net wealth will fall even lower, due to the irreversibility of the debt. The erosion of wealth will induce US households to save more, pushing the savings ratio to more than 8%, thus making consumption the driver to this deep and protracted recession. Firms will respond to lower demand by slashing investment and cutting employment, which will have a negative feedback on consumption. US GDP growth will bottom out in mid-2010, signalling a recovery in the second half. But there are risks to the sustainability of the recovery stemming from the current actions of policymakers. In the current environment, the Fed has flooded the system with liquidity, at a time when excess liquidity has been at the root of the problem of the current credit crisis. Moreover, the Fed is printing money at an unprecedented rate that risks fuelling higher inflation when the economy recovers and/or huge dollar depreciation. This liquidity has now sown the seeds of a new bubble – US government bonds, which might be pricked by the huge issuance of Treasuries. The burst of this new bubble will undermine the recovery in 2010 and risks plunging the US economy into another recession in 2011 or 2012, as default risk premiums, exchange-rate premiums and inflation premiums soar.

## Policy inconsistencies and challenges

Although the measures adopted so far have dealt with the panic phase of a bubble, the policymakers are inconsistent in their long-term objectives in that they want both deleverage and high asset prices. They should either engineer an orderly deleverage, while at the same time accepting that in the new long-run equilibrium asset prices will be substantially lower; or they should flood the system with liquidity to prevent the erosion of asset prices, knowing, however, that deleverage will not materialise. In other words the policymakers are not clear as to whether they should target deflation or inflation in the long run. It is a hard fact of life, however, that from a long-term perspective the first target is what makes sense; otherwise, the excess liquidity that financed so many bubbles in the last ten years will not be drained and will carry on financing new bubbles. Irrespective of whether the policymakers target deflation or inflation, the forces of deflation are more powerful than those of inflation. So, even if the policymakers wished to reflate asset prices, they might find it extremely hard to achieve their objectives.

The challenge for the policymakers is to break the vicious circle between falls in house prices and bank losses, if they are to shorten the asset and debt deflation process to less than ten years. This requires preventing households from falling into negative equity; otherwise, delinquencies rise and bank losses mount; mortgage-lenders repossess the properties and dump them

into the market, only causing lower house prices and even higher bank losses. Spending public money to cover the losses of the banks without supporting households to keep their homes and encourage others to obtain new mortgages is like throwing money into a black hole. Hence, the policies that should be pursued are on both sides of the credit market: demand and supply. Unless demand for credit and demand for the general bank products is boosted in the months ahead, no amount of money can salvage the financial system. Dealing just with the supply side of credit and ignoring its dependence on demand will be a waste of resources. Hoarding of cash by banks, mutual funds, hedge funds, businesses and individuals will be a terrible blow to demand that will trigger new losses for the financial institutions in 2009, thus creating a vicious circle. We are now in what Keynes called a “liquidity trap”. Monetary policy does not work in this environment and neither does fiscal policy in the form of tax cuts; people will hoard the extra money – they will not spend it.

### Assessment of current policies

The policymakers’ efforts so far have concentrated on unfreezing the credit markets and restoring confidence in banks by pumping liquidity and guaranteeing bank loans, so that the interbank market can start to function again. However, this is the wrong diagnosis as banks are not worried about liquidity, but about credit risk – the insolvency of other banks that results in a “queen of spades” strategy with hoarding of liquidity and unwillingness to lend to each other. Policymakers have also assigned public funds to recapitalise banks by buying mostly preferred shares and increased the guarantee limit on deposits to deflect runs on depository institutions. In the US the Fed has, in addition, extended credit facilities to non-depository institutions and has lowered the quality of assets that it accepts as collateral for lending. Although these measures may be adequate to ease the panic phase of the burst of a bubble, they are inadequate to deal with the crisis in the long run, as they deal with the supply side of credit, but not with the demand for it.

The various schemes that have been put forward to resolve the credit crisis can be grouped into two categories: “business-as-usual” and a “good bank” solution (see Karakitsos, 2009b). The first, which takes different forms – insurance or guarantee of the assets or liabilities of the financial institutions, “bad bank” and temporary nationalisation – is the one favoured by banks and pursued by governments in the US, the UK and other countries. It amounts to a bailout of the financial system with taxpayer money. Its drawback is that the cost may exceed by trillions the original estimates of \$700 billion; and despite the mounting cost it may not even prevent the bankruptcy of financial institutions. Moreover, it runs the risk of making the US and the UK government insolvent, and turning an already severe recession into a depression worse than the one of the 1930s. It is also immoral, unfair and unjust in accordance with the common concept of justice and maximises moral hazard.

The “good bank” solution consists of creating a new (Phoenix) banking system from the ashes of the old one by removing the healthy assets and liabilities from the balance sheet of the old banks. Apart from its small cost, it has the major advantage that credit flows will resume and the economy will recover. It is also fair and just and minimises moral hazard. Its drawback is that it lets the old banks swim or sink. But if they sink with huge losses, these might spill over to the personal sector and the ultimate cost may be the same as in the “business-as-usual” model. The downside may again be a depression.

Our own solution (see Karakitsos, 2009b) is for a “good bank” model but with a government guarantee of a large proportion of the assets of the personal sector or the assumption of the first loss by the government in case the old banks fail. It has the same advantages as the original “good bank” model, but it makes sure, in the eventuality that the old banks become insolvent, that the economy is shielded from falling into depression and the ultimate recovery is ensured.

### **Policies to avoid future crises**

The backlash of the greed of financial institutions is likely to increase calls for strict regulation of the industry. As the taxpayer is called upon to clean up the mess of the banks, tougher regulation of the industry is very likely to ensue. But from a policy perspective it should be recognised that regulation is backward- rather than forward-looking. Smart people will always look for loopholes to take advantage of any given legislation. Regulators will always react with a long lag to close the loopholes and in some occasions, like the current crisis, too late to prevent a calamity. A better approach than overregulation is for the central bank to have a target on asset prices in a way that does not impede the functioning of free markets and does not prevent “good” financial innovation (see Arestis and Karakitsos, 2009c). Since securitisation implies the transfer of assets and the risk to the personal sector, the ideal target variable for a central bank is the net wealth of the personal sector as a percent of disposable income. Since this is a stationary variable, a target range can be set. In the US, for example, this can be a range around five times the net wealth of the personal sector. In this way, the central bank can monitor the implications of financial innovations as they impact net wealth, even if it is ignorant of these innovations, as in the case of Structured Investment Vehicles (SIV). With a wealth target, the central bank can act pre-emptively to curb an asset upswing cycle from becoming a bubble. Information on the constituent components of net wealth is available in the US with a one-quarter lag, a month after the release of the NIPA accounts, thus making it useful for policy analysis and targeting. In the euro area, there are huge efforts to compile such data, a prerequisite for targeting.

Asset-led business cycles — like the current one, as well as those in Japan in the 1990s and the US in the 1930s —, produce a larger variability in output than inflation. In the upswing of the cycle, output growth surpasses historical norms giving the impression that potential output

growth has increased, thus creating a general feeling of euphoria and prosperity, as it did in the second half of the 1990s in the US. But in the downswing the recession is deeper than normal and, even more importantly, it lasts for a long time with many false dawns, as in the case of Japan. As asset prices fall, the past accumulation of debt becomes unsustainable and households engage in a debt reduction process by retrenching. This depresses demand putting a new downward pressure on asset prices thus creating a vicious circle. The burst of a bubble in the last five hundred years has entailed asset and debt deflation that has triggered retrenchment on the part of households and firms, with severe consequences for profits, the incomes of households and jobs. The deflation process is usually long and painful and the evidence of the last three episodes (1870s, 1930s and Japan in the 1990s) is that it usually lasts for ten years.

The policy implication is that in asset-led business cycles guiding monetary policy by developments in inflation alone will not prevent a bubble from becoming bigger than otherwise. Monetary policy should be formulated with two targets: inflation and the output gap. However, in a highly leveraged economy such a policy might lead to instability (see Karakitsos, 2009a). In this context there are merits to mild, but not excessive, wealth-targeting in addition to inflation- and output gap-targeting. Mild wealth-targeting will stabilise the system, whereas overzealous wealth-targeting may destabilise it. The problem is that there are three targets and just one instrument – interest rates. Although a rate hike will reduce the output gap, diminish inflation and curb the net wealth of the personal sector, the impact on each target will be felt with a variable lag. This differential speed of adjustment of each target to monetary policy poses perils to the central bank task of stabilising the economy along the potential output growth path. Thus, strict adherence to the fulfilment of each target by the central bank may cause instability rather than stability.

**Keywords:** housing market, credit crisis, wealth effect, monetary policy, monetary rules, natural rate of interest, real profit rate, potential output, Neo-Wicksellian model, new consensus macroeconomics.

**JEL Codes:** E13, E32, E43

## 1. Introduction

The US housing market has played a key role in the last business cycle. In the upswing it boosted output and concealed adverse macroeconomic developments, such as the decline in multi-factor productivity, while in the downswing it has been the key driver of the unravelling recession that has turned out to be one of the worst since the Great Depression. The boom in the housing market was financed not by rising household incomes, but by accumulated debt because of unduly low interest rates and easy credit conditions, as banks abandoned the traditional “originate-and-hold” model of loan portfolio in favour of the “originate-and-distribute” one. “Bad” financial engineering, in the form of synthetic products, such as Collateralised Debt

Obligations (CDO), and derivative products, such as Credit Default Swaps (CDS), has disproportionately expanded credit to households. Banks set up a “shadow banking” through Structured Investment Vehicles (SIV) or conduits that facilitated the credit boom by an expanded securitisation programme that enabled the transfer of risks from the originate banks to the personal sector and banks abroad, thus making the problem global. With low risk in their loan portfolio, banks had an incentive to expand credit through the subprime market, Alt-A mortgages and “teaser” interest rates. As the Fed removed, albeit sluggishly, the accommodation bias that had been put in place after the burst of the internet bubble, the yield curve became inverted for one and a half years to mid-2007 triggering the collapse of shadow banking. The losses of shadow banking spilled over to the mother banks, which were aggravated by direct holdings of CDO and an as yet unsecuritised loan portfolio at the time the crisis erupted in the summer of 2007, which amounts to \$4.5 trillion. Nominal house prices have so far fallen more than 25% from their peak in mid-2006, but real prices have dropped nearly 35% from their peak in mid-2005. The losses of financial institutions, globally, have so far mounted to \$1.3 trillion. This paper uses the K-model to assess the likely fall in US house prices and its impact on the unravelling asset and debt deflation process.

Central banks have formulated monetary policy by targeting inflation and/or the output gap. The intellectual basis of this approach lies in the New-Consensus Macroeconomics (NCM) or the Neo-Wicksellian model. The NCM model implies that inflation is under the control of the central bank in the long run, through changes in interest rates, whereas output and the unemployment rate are not (see Arestis, 2007, for a review of the NCM model). Adding the output gap to the central bank objective function might help in achieving the inflation target, as minimising the output gap ensures that inflation approaches its target faster. Yet the NCM model is incapable of detecting a bubble and monitoring its growth, as the credit that has financed the bubbles in the last ten years does not show up in monetary aggregates. Even worse, monetary aggregates are a residual in the NCM model and therefore have no effect on inflation, output and unemployment. Arestis and Karakitsos (2009a) have endogenised potential output and the natural interest rate, which in the original Wicksellian model is the real profit rate, whereas in the NCM model it is simply the long-run interest rate to which the short-term interest rate (the instrument of monetary policy) converges in the long-run equilibrium. These two amendments are sufficient to reject the NCM proposition that output and unemployment are not under the control of the central bank, in the long run. In this new framework the real profit rate plays a significant equilibrating role, in addition to interest rates. In fact, the real profit rate moves first to restore long-run equilibrium, following a shock to the system. The interest rate, on the other hand, affects the real profit rate fast, but output and inflation sluggishly. Strict adherence to inflation-targeting may interfere with the equilibrating function of the real profit rate. Karakitsos (2008) has extended the model of



Arestis and Karakitsos (2009a) by incorporating a wealth effect in aggregate demand, through its influence on consumption in accordance with the Life-Cycle-Hypothesis, and has endogenised wealth by modelling its two constituent components (equities and houses). In this expanded system, inflation and the output gap are necessary targets in central bank policy to stabilise the economy around an endogenous potential output. However, in a highly leveraged economy, such as the US in the 2000s, monetary policy based on inflation and the output gap may, in fact, destabilise the system (see Karakitsos, 2009a). In this paper, we assess the merits of adding net wealth as an additional target to the central bank objective function. It is shown that mild, but not over-zealous, wealth-targeting stabilises the system, even in a highly leveraged economy.

The paper is organised as follows: the next two sections review monetary policy in the last two business cycles and analyse the risks of the current crisis using the K-model. Section 4 puts forward the case for wealth-targeting in addition to inflation and the output gap. Section 5 presents an overhaul of the NCM model to deal with asset-led business cycles. Section 6 uses the model and the augmented objective function to assess the merits and perils of wealth-targeting, while the final section summarises and concludes.

## 2. Monetary policy in the last two business cycles

The evidence of the last two business cycles shows that monetary policy has to a large extent been successful in keeping inflation under control (see Figure 1). Since the mid-1990s, core PCE-inflation, the preferred measure of the Fed, has fluctuated between 1% and 2.6%, not far from the unofficial target of 1-2%. Minimising the output gap has been more successful than in any other period and this has been instrumental in keeping inflation within a narrow band (see Figure 2).

Figure 1 Headline CPI & core PCE inflation

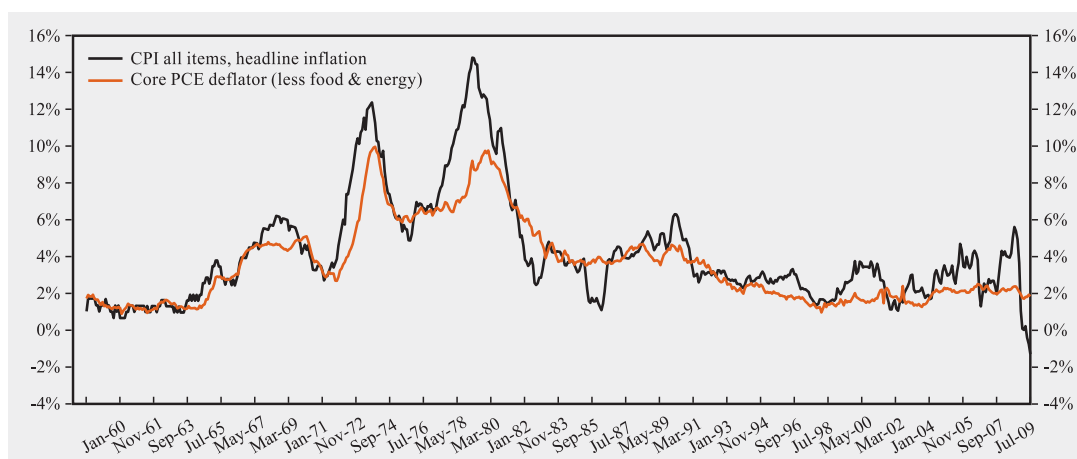
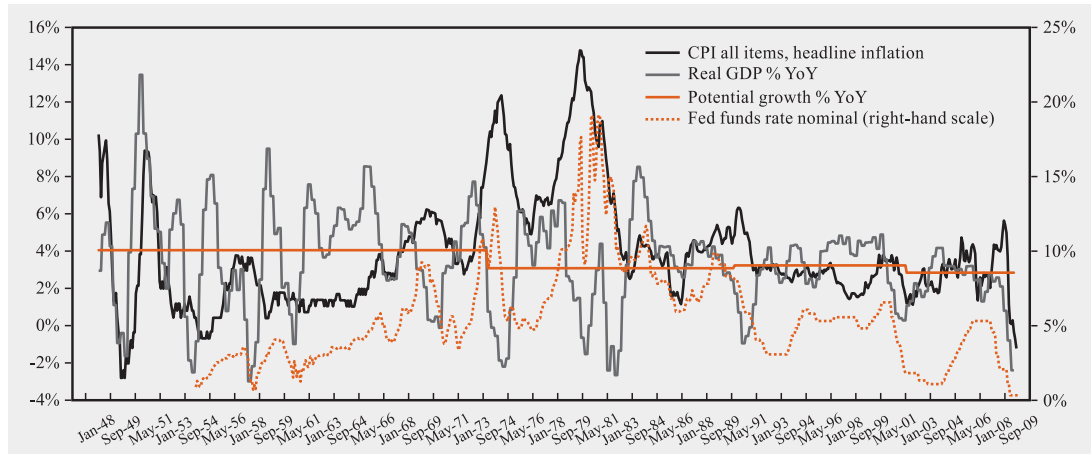


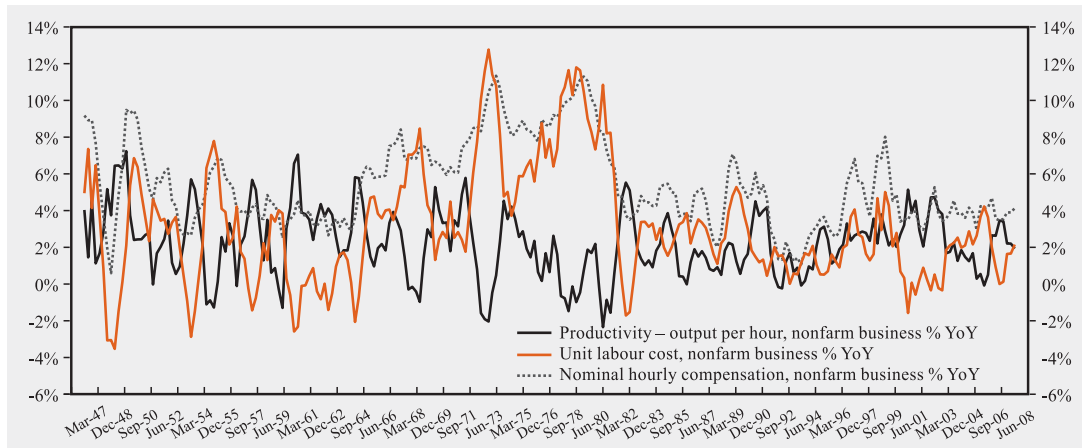
Figure 2 US Business cycle



After the soft landing of 1994-95 and the easing of monetary policy in the second half of 1995, US economic growth exceeded potential once more in the spring of 1996 (see Figure 2). As a result of this overheating, wage inflation accelerated and unit labour cost soared. It quadrupled to more than 4% in the twelve months to the autumn of 1998 (see Figure 3). The Asian-Russian crisis of 1997-98 put a lid on wage growth for a year (from the autumn of 1998 to the autumn of 1999) and unit labour cost slowed down. However, the easing of monetary policy during the Asian-Russian crisis kept US economic growth intact with the economy remaining overheated. As a result, wage growth and unit labour cost soared once more. The Fed not only reversed the rate cuts of the Asian-Russian crisis, but raised them to 6.5% and kept them at this level until the economy entered into a recession (i.e. at the end of 2000) that broke the wage-price spiral. Both wage inflation and the growth rate of unit labour cost peaked in the autumn of 2000 and fell precipitously in the next two years. In spite of the apparent success in stabilising the economy around potential and keeping inflation at historically low levels, the Fed did not manage to prevent the internet bubble from ballooning in the second half of the 1990s. It also did not deflect the burst of the bubble. Instead, the Fed preferred to deal with the consequences of the burst of the bubble, which usually result in asset and debt deflation. Thus, despite the shallowest recession in the post-WWII era, or because of it, the Fed cut interest rates to 1%, a level that had not been seen since the 1950s. The over-accommodative monetary policy can be seen in the Fed cutting interest rates, from 1.75% to 1%, after the economy had begun to recover. The justification of the Fed for easing monetary policy was that the recovery was anaemic (i.e. growth during the recovery below potential). This, along with easy fiscal policy (there was another fiscal package in 2003) boosted growth that exceeded potential in the autumn of 2003. Despite the overheating the Fed kept rates at 1% until mid-2004, thus providing the clearest evidence of an over-accom-



Figure 3 Wages, productivity & unit labour cost in non-farm business



moderation bias. Moreover, this was removed only gradually “at a pace that can be measured”, meaning 25 basis points (bps) in every FOMC meeting.

The low interest rates spurred the housing boom, which was evident as early as 2004.<sup>1</sup> Indeed, the housing bubble ballooned in the next two years as prodigious credit flows were made available through the “shadow banking”. The overheating of the economy persisted until mid-2006, although it was the mildest in the entire post-WWII era. But in spite of the miniscule overheating, unit labour cost, which had oscillated around zero until late 2004, soared in the following two years, not so much because of heightened wage inflation, but because of declining labour productivity, as the pace of job creation accelerated. As the economy grew faster than potential growth, companies became confident about the sustainability of the recovery and hired labour as fast as in other recoveries. The Fed under Bernanke continued to remove the accommodation bias at the same sluggish pace and interest rates reached a plateau of 5.25% in mid-2006, a level that was maintained until the credit crisis erupted in the summer of 2007. By then the economy had cooled down and a negative output gap had emerged since late 2006. However, headline inflation surged as the prices of commodities, and in particular oil, industrial supplies and imported raw materials were soaring. The liquidity that had financed the previous two bubbles was now financing the commodities bubble, which only burst when all major economies fell off a cliff in mid-2008.

This account of the conduct of monetary policy shows that the Fed made some errors by cutting interest rates when the economy started to recover and by removing the accommodation bias too sluggishly. But in spite of these errors the Fed maintained growth nearer to potential

<sup>1</sup> Arestis and Karakitsos (2004) warned that the internet bubble will be transformed into a housing bubble that would burst when the 30-year mortgage rate nudges 7% plunging the economy into a huge recession. See Arestis and Karakitsos (2007), (2008) for an assessment of the housing market plunge and its impact on consumption and the overall economy.

output than ever before and kept at least core inflation as low as in the 1960s and within a very narrow range. One can hardly claim that monetary policy was unsuccessful.

### **3. The inadequacy of monetary policy in asset-led business cycles and current risks**

The NCM model is incapable of detecting a bubble and cannot monitor its growth, as the liquidity created by the process of securitisation is not reflected in ordinary monetary aggregates. The original loan is counted in the consolidated banking balance sheet and therefore in the overall liquidity. However, it is removed from the banking balance sheet once it is securitised. Therefore, the huge liquidity of the last ten years was not detected by central banks, which continued as late as the spring of 2007 to believe that the subprime market was not posing a threat to the economy, as the size of this market was small, around 10%, of the overall market (see Bernanke, 2007).

Asset-led business cycles —like the current one, Japan in the 1990s and the US in the 1930s—, produce a larger variability in output than in inflation. In the upswing of the cycle, output growth surpasses historical norms giving the impression that potential output growth has increased, thus creating a general feeling of euphoria and prosperity. But in the downswing the recession is deeper than normal and, even more importantly, lasts for a long time with many false dawns, as in the case of Japan. The bubble is usually pricked by rising interest rates, as the central bank tries to control a relatively small increase in inflation. In fact, the more leveraged the economy, the smaller the interest rate hike necessary to prick a bubble. As asset prices fall, the past accumulation of debt becomes unsustainable and households and businesses engage in a debt reduction process by retrenching. This depresses demand putting a new downward pressure on asset prices, thus creating a vicious circle.

The NCM model, with its emphasis on targeting inflation, is incapable of preventing the ballooning of a bubble and deflecting its burst. The reason is that, in an asset-led business cycle, the volatility of the output gap is greater than the volatility of inflation. In the upswing of the cycle, when credit expands and asset prices soar, inflation remains subdued for two reasons. First, potential output increases in the upswing, thus dampening the positive output gap and containing inflationary pressures. Second, cyclical productivity improvements, which appear as structural as they did in the US in the late 1990s, reduce unit labour cost thus putting a lid on inflation. On the other hand, the expansion of credit and the soaring asset prices increase output disproportionately compared to a standard demand-led business cycle. This explains why the Fed appeared successful in controlling inflation and minimising the output gap in the last ten years.

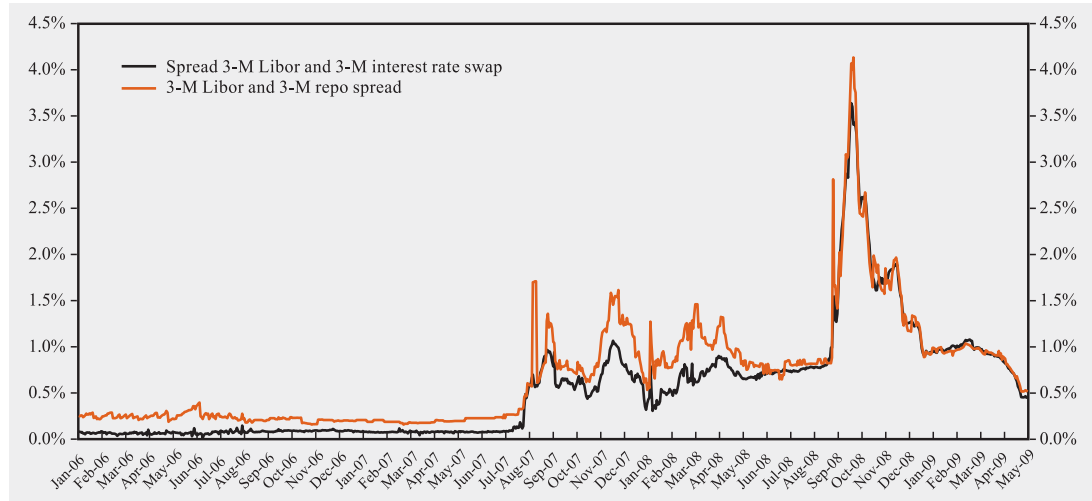
The burst of the internet bubble would have plunged the US economy into a long and deep recession, had it not been for the prodigious and pre-emptive rate cuts by the Fed from 6.5% to 1%. This resulted in the shallowest recession in half a century. Greenspan was fully aware of

the risks of asset and debt deflation that plague an economy after the burst of a bubble. He had recognised in mid-1990s that a bubble was in the making and tried to talk it down with his remarks of an “irrational exuberance”. However, either because of statutory constraints or because of his fervent support of the market mechanism, he did not try to prevent the bubble, but decided instead to deal with its consequences. In retrospect, the prodigious easing of monetary policy averted an asset and debt deflation but sowed the seeds for the housing bubble. From this angle, the aforementioned mistakes of the Fed proved to be significant ones in fuelling the housing bubble. Bernanke, following in Greenspan’s steps, presided over the last two years of the ballooning of the housing bubble and financed the commodities bubble, which further weakened the effectiveness of monetary policy in dealing with the burst of the housing bubble.

House price inflation peaked at the end of 2005, but house prices carried on rising until mid-2006. The combination of falling house prices with an inverted yield curve for one and a half years to mid-2007 turned the hefty profits of “shadow banking” into mounting losses that spilled over to the mother banks. The credit crisis is the outcome of financial distress, which in the refined Minsky model is the third stage of a bubble cycle: displacement, euphoria, distress, panic and crash. The credit crisis can be seen as unfolding in three stages. In the first stage, credit spreads widen as banks become unwilling to lend to each other for fear of contagion from potential losses on the collateral assets of the borrowing banks. In the second stage, the losses of the financial institutions unravel, while in the third stage the ramifications to the economy are felt. Credit spreads have been widening since the summer of 2007, although coordinated central bank efforts have succeeded at times in suppressing them (see Figures 4a and 4b). In spite of central bank action, the credit crisis deepened with credit spreads widening yet again, culminating in a pinnacle and the panic of September and October of 2008. The worldwide losses of financial institutions have amounted so far to \$1.3 trillion, as asset-backed securities have lost around 80% of their value. Since the outbreak of the crisis, the systemic risk has fluctuated but has mainly remained high. It subsided with the bailout of Bear Stearns, but surged again in the autumn of 2008, as Fannie Mae and Freddie Mac that hold or guarantee nearly half of mortgage-backed securities (\$5.4 trillion) came to a bankruptcy point and had to be bailed out by the US Treasury. In spite of the bailout of the two giants in the US mortgage market, the credit risk remained high with the bankruptcy of Lehman Bros in mid-September and finally with the near collapse and subsequent bailout of AIG. The crisis has brought the demise of the investment-bank model, and the remaining institutions (Morgan Stanley and Goldman Sachs) have run for cover behind the façade of commercial banks.

Central banks have attributed the widening of credit spreads to a lack of liquidity and responded by flooding the system with liquidity. However, this is the wrong diagnosis as banks are not worried about liquidity, but the insolvency of the banking system. Although credit default

Figure 4a Liquidity and credit risk vs credit risk (libor OIS vs libor repo)



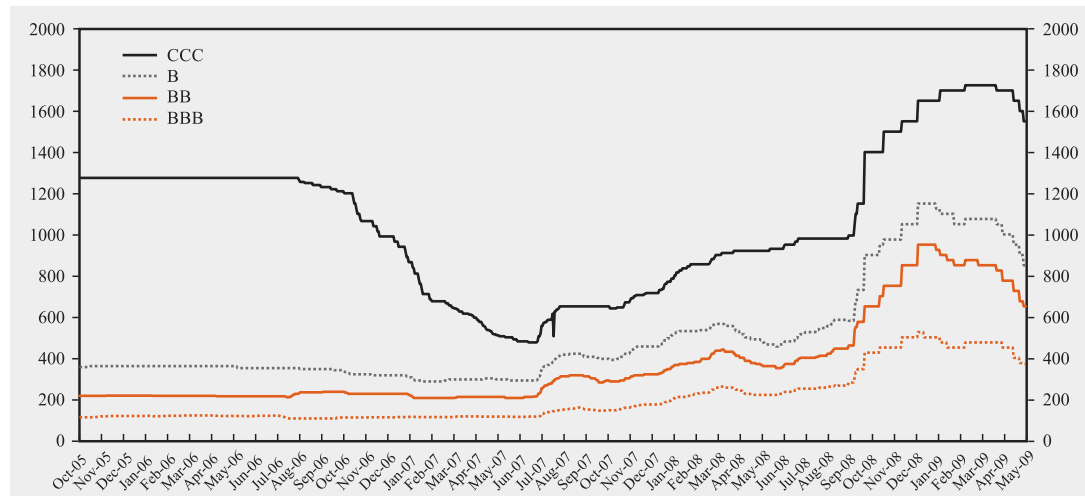
swaps illustrate such risk for individual banks, an aggregate measure of the insolvency risk of the banks can be obtained by decomposing the risk implicit in the Libor rate into interest rate risk, liquidity risk and credit (or counterparty) risk. The 3-month Libor rate reflects the true cost of money for banks. The overnight 3-month interest rate swap (OIS) is a measure of the interest rate risk, as it reflects market expectations of what the fed funds rate will be over the next three months. Thus, the spread between Libor and OIS of corresponding maturities is a measure of liquidity and credit risk, as it has eliminated the interest rate risk. A measure of credit risk, in turn, is the spread between secured and unsecured borrowing by the banks. One form of secure loans is government-backed repos between banks. Thus, the spread between Libor and repo rates of corresponding maturities provides a measure of credit risk. Figure 4a shows the close correlation between the Libor-OIS spread and Libor-repo spread. This suggests that the banks are concerned more about credit risk than liquidity risk and hence they are worried about the insolvency of the entire financial system. Hence, central banks have made the wrong diagnosis and have administered the wrong medicine. This highlights a fundamental difference between the Great Depression and the current credit crisis. The former was due to liquidity risk and therefore the remedy was an increase in the supply of money. But the current crisis is mainly due to credit risk. By flooding the system with liquidity the policymakers have sowed the seeds for the next bubble in US Treasuries that could threaten the solvency of the US government.<sup>2</sup>

The ramifications to the economy from the credit crisis are likely to stem from the response of the banks to their losses – tightening of lending standards, higher cost of lending, lower avail-

<sup>2</sup> See Karakitsos (2009b) for a review and assessment of the various models that have been suggested for resolving the credit crisis and for a recommendation of a viable solution.

Figure 4b 10-year spread over Treasuries

(basis points)



ability of credit, hoarding of money balances. The huge liquidity, which was created by “bad” financial engineering and the aforementioned mistakes of monetary policy, financed the house bubble (see Arestis and Karakitsos, 2009b). The low interest rates prompted households to accumulate mortgage debt. Between 1998 and 2007 mortgage debt as a proportion of disposable income increased by more than 50% from 61% to 101% (see Figure 5a). This debt spurred house prices, and the gross house wealth of the personal sector soared to 230% of disposable income by the end of 2005, from 144% in 1998. The increase in gross house wealth was less than 50%, which is lower than the more than 50% increase in debt, making the marginal efficiency of leverage less than unit – a sign of diminishing returns from extra borrowing. In the last two years of

Figure 5a Gross, net real estate of households and mortgage debt

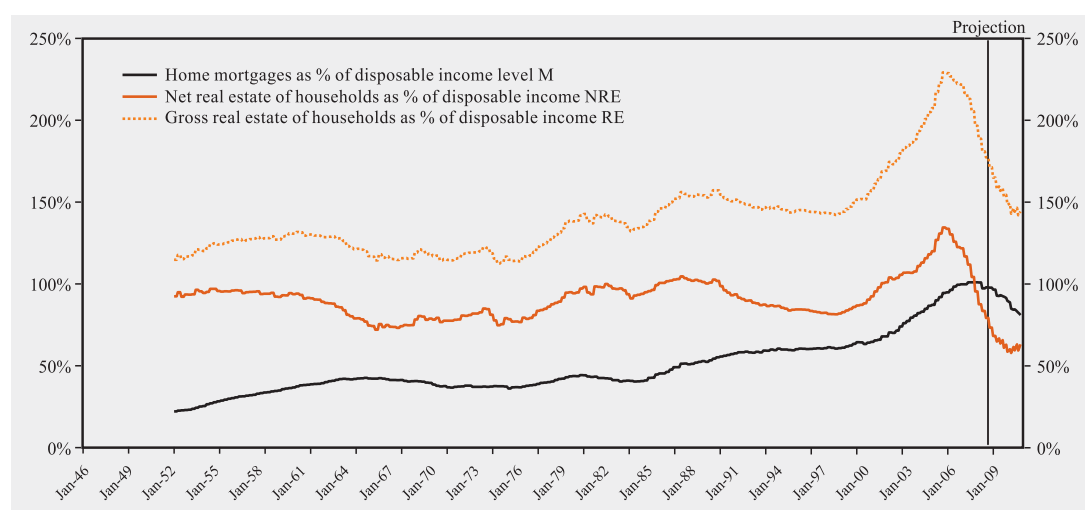
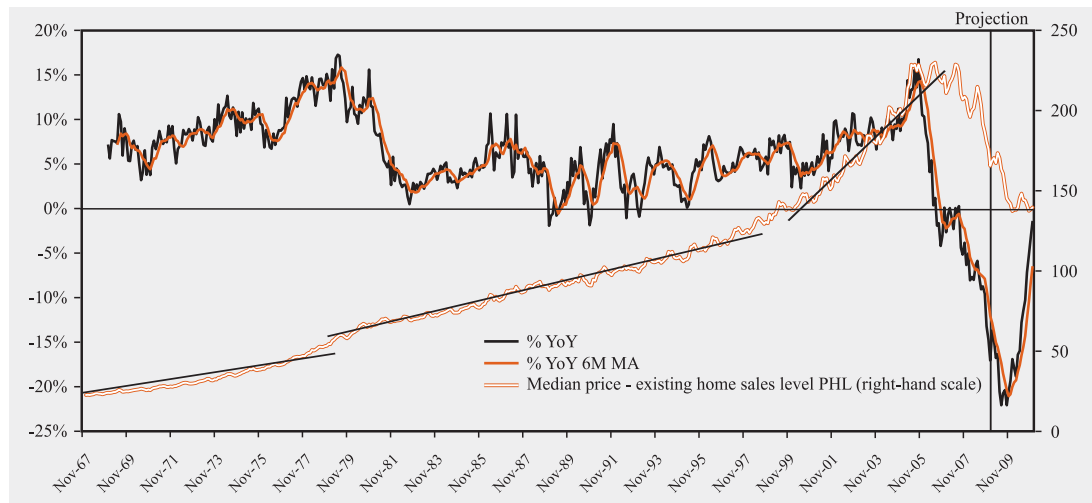


Figure 5b Median price — existing homes



the house bubble, when the subprime market thrived, additional debt was not adding to the gross house wealth. Instead, gross house wealth was decreasing. Accordingly, gross and net house wealth peaked at the end of 2005. The ultimate damage to gross and net wealth depends on the extent to which house prices will fall in the current downturn, as this determines the losses of financial institutions. According to the K-model (see Arestis and Karakitsos, 2004) house prices will bottom out in the spring of 2010 at more than 40% lower than the peak, sending bank losses to \$3 trillion (see Figure 5b). Gross and net wealth will continue falling probably beyond the forecast period, end of 2010. Gross house wealth will return by the end of 2010 to its level at the beginning of the bubble in 1998. Net wealth, on the other hand, will probably diminish to a much lower level than at the beginning of the bubble in 1998 as a result of the irreversibility of debt – households cannot easily get rid of their debt (see Figure 5a).

House wealth and financial wealth have moved in opposite directions for most of the past ten years. Thus, in the aftermath of the burst of the internet bubble financial wealth (mainly equities) tumbled, but house wealth increased, thus ameliorating the impact on the net wealth of the personal sector. As the house bubble ballooned, equities recovered and the net wealth of the personal sector soared higher than the peak of the internet bubble (see Figure 5a). But since the credit crisis erupted in mid-2007, both equities and house prices moved lower in tandem, thus magnifying the fall of net wealth. The fall in asset prices has made debt unsustainable and the only way households can restore the value of their net wealth is by saving a higher proportion out of their current income (i.e. a higher savings ratio). The K-model predicts that the savings ratio will increase to more than 8%. Consumption will register its worst recession after WWII, as incomes slide and employment losses mount, causing GDP to plunge (see Figures 6a, 6b and 6c).



Figure 6a Consumption, income, savings and wealth

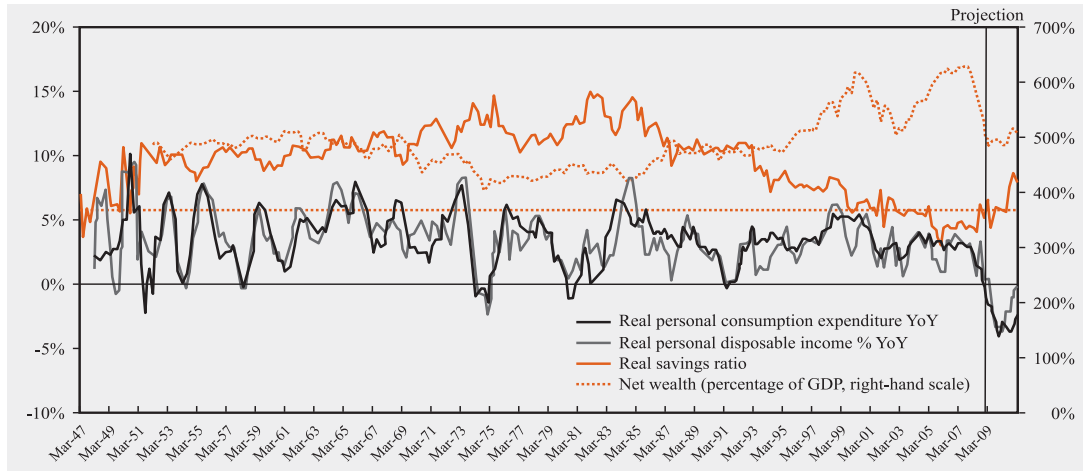


Figure 6b Employment growth, non-farm payrolls – short-run equilibrium

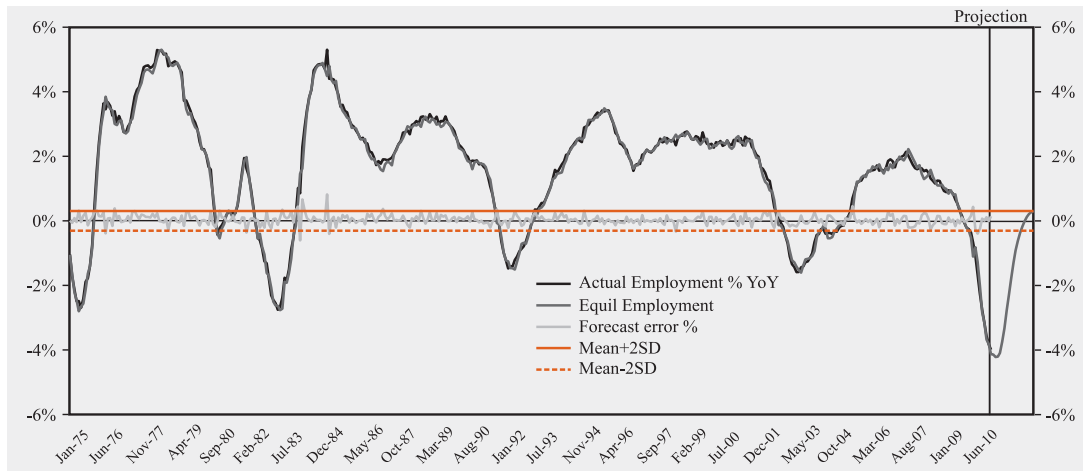
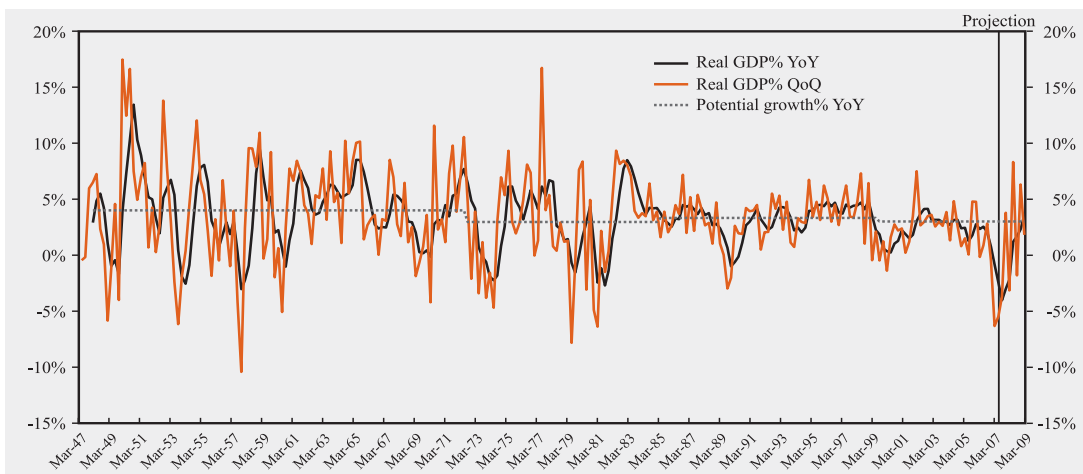


Figure 6c Real GDP

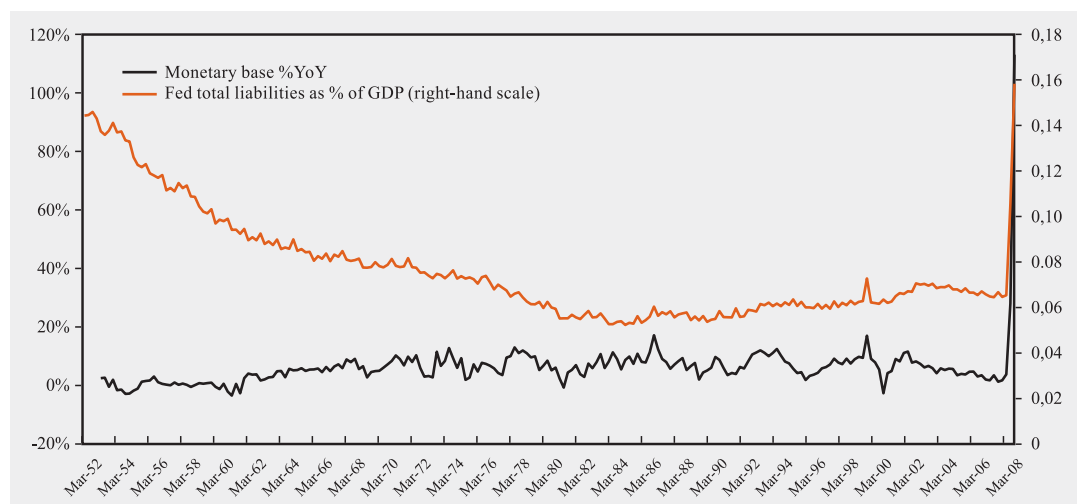


**Table 1 Government commitments and current allocations**

	Amounts (in billion US \$)	
	Limit	Current
<b>Total</b>	<b>12,798.14</b>	<b>4,169.71</b>
Federal Reserve total	7,765.64	1,678.71
Primary credit discount	110.74	61.31
Secondary credit	0.19	1.00
Primary dealer and others	147.00	20.18
ABCP liquidity	152.11	6.85
AIG credit	60.00	43.19
Net portfolio CP funding	1,800.00	241.31
Maiden Lane (Bear Stearns)	29.50	28.82
Maiden Lane II (AIG)	22.50	18.54
Maiden Lane III (AIG)	30.00	24.04
Term securities lending	250.00	88.55
Term auction facility	900.00	468.59
Securities lending overnight	10.00	4.41
Term asset-backed loan facility	900.00	4.71
Currency swaps/other assets	606.00	377.87
MMIFF	540.00	0.00
GSE debt purchases	600.00	50.39
GSE mortgage-backed securities	1,000.00	236.16
Citigroup bailout Fed portion	220.40	0.00
Bank of America bailout	87.20	0.00
Commitment to buy Treasuries	300.00	7.50
<b>FDIC Total</b>	<b>2,038.50</b>	<b>357.50</b>
Public-private investment*	500.00	0.00
FDIC liquidity guarantees	1,400.00	316.50
GE	126.00	41.00
Citigroup bailout FDIC	10.00	0.00
Bank of America bailout FDIC	2.50	0.00
<b>Treasury total</b>	<b>2,694.00</b>	<b>1,833.50</b>
TARP	700.00	599.50
Tax break for banks	29.00	29.00
Stimulus package (Bush)	168.00	168.00
Stimulus II (Obama)	787.00	787.00
Treasury exchange stabilisation	50.00	50.00
Student loan purchases	60.00	0.00
Support for Fannie/Freddie	400.00	200.00
Line of credit for FDIC*	500.00	0.00
<b>HUD Total</b>	<b>300.00</b>	<b>300.00</b>
Hope for homeowners FHA	300.00	300.00

Source: Bloomberg.

Figure 7 Fed balance sheet and monetary base



Besides the deep and long recession, there are lingering fears about the sustainability of the recovery and false dawns, implying further downturns in the years to come. Such fears stem from the US government and the Fed spending, lending or guaranteeing \$12.8 trillion so far, an amount that approaches the level of nominal GDP (\$14.2 trillion). Table 1 summarises the hitherto commitments and the money that has already been allocated to fund them, which amount to \$4.2 trillion. For the Fed these measures imply the expansion of its balance sheet, which means printing money to buy diversified assets, such as mortgage debt, agency paper and commercial paper. Since the crisis erupted in mid-2007, the Fed balance sheet has expanded by \$1.4 trillion to \$2.2 trillion by the end of 2008 (see Figure 7). As a result the monetary base soared to more than 100% in the second half of 2008 (see Figure 7). Further expansion of the Fed balance sheet should be expected in the course of 2009. This huge liquidity poses two risks, unless it is drained in timely fashion. First, inflation might surge once the negative output gap is eliminated. Second, the dollar might depreciate dramatically. Of course, the Fed has a number of tools at its disposal to drain this liquidity, such as raising short-term rates once the crisis wanes; unwinding emergency-loan programmes; conducting reverse repurchase agreements against long-term securities holdings; and increasing the rate the Fed pays on bank reserves. However, there are lingering fears that the Fed will be under huge pressure not to drain the liquidity as unemployment will continue to soar in 2010.

Further risks arise from the vast issuance of US Treasuries, which this year alone will soar to \$2.5 trillion, with more to come next year. For the supply of Treasuries to be absorbed yields will ultimately have to rise, even though in the short run this may be capped by Fed purchases of government bonds. The Fed announced in its March 2009 meeting that it will buy \$300 billion of Treasuries. The ultimate rise of long-term interest rates will undermine

the sustainability of the recovery in 2010 and risks plunging the economy into another recession in 2011 or 2012.

#### 4. A reformulated central bank objective function

Central banks have an aversion to bailing out speculators when asset bubbles burst, but ultimately, as custodians of the financial system, they have to do exactly that. Their actions are justified by the goal of protecting the economy from the bursting of bubbles. While their intention may be different, the result is the same: speculators, careless investors, and banks are bailed out. A far better approach is for central banks to widen their scope and target the net wealth of the personal sector. Using interest rates in both the upswing and the downswing of a (business) cycle would avoid moral hazard (Arestis and Karakitsos, 2009c).

A net wealth target would not impede the free functioning of the financial system, as it deals with the economic consequences of the *rise and fall* of asset prices rather than asset prices (equities or houses) *per se*. Thus, it is not a target, say, on the S&P 500, on house prices or on their rates of growth. Although a boost in house or equity prices will increase gross wealth, this is not a one-to-one relationship, as it also depends on the volume of houses and the capitalisation of the stock market. Moreover, if an increase in gross wealth is matched by a corresponding increase in debt or in disposable income, net wealth will remain unchanged. In the last two years of the house bubble, gross wealth increased but net wealth decreased. A wealth target would also help to control liquidity and thus avoid future crises.

One can sympathise with those who argue that central banks should not rescue speculators, careless investors or banks when bubbles burst because they encouraged the sale (purchase) of assets in the upswing of the economic cycle. A rescue encourages one-way bets on future bubbles, as investors expect central banks to bail them out in an economic downswing. Many commentators during the current crisis have advocated policies that avoid moral hazard. As custodians of the financial system, central bankers share this concern, but they must act when markets are dysfunctional. During the current crisis they injected temporary liquidity and provided direct loans to banks in trouble. In the beginning (of the crisis) they refrained from lowering interest rates that would make their temporary liquidity injections permanent, thereby avoiding moral hazard issues. As the crisis deepened, however, the Fed, the Bank of England (BoE) and the European Central Bank (ECB), the latter reluctantly, made temporary liquidity injections permanent by cutting interest rates. Leamer (2007) makes the point well when he argues that the Fed's focus on issues other than housing led to an overheated housing market whose unravelling threatens to plunge the US economy into recession (which has come to pass). As it has been argued in Section 2, successful control of CPI-inflation does not guarantee control of asset price-inflation. The thrust of the argument is succinctly summarised by Claudio Borio (2008), who labels it a "paradox of credibility," implying that the more a central bank succeeds

in keeping prices stable, the more likely asset bubbles will be the first signal of an overheating economy.<sup>3</sup>

The standard argument against asset price targeting is that it interferes not only with the free functioning of financial markets, but also with the economy as a whole. Moreover, it is considered to be outside the realm of central banks because it results from “irrational exuberance” or else reflects market forces. According to Alan Greenspan (2005), asset price targeting would require the authorities to outperform market participants. Central bankers would rather deal with the consequences of bubbles that burst by minimising the damage to the real economy. Greenspan’s success after the internet bubble burst in 2001 gave some credence to this approach, which has been adopted by the four major central banks (the Fed, the BoE, the ECB and the Bank of Japan). But, as has been argued, the recent housing bubble could be viewed as the result of Greenspan’s “successful” policies at the turn of the 21st century that countered the threat of a 1930s-style depression after the internet collapse.

The way to avoid these problems is to monitor and target the implications of asset prices for consumer spending patterns. A primary candidate for this purpose is the net wealth of the private sector. Net wealth is defined as (financial and tangible) assets less personal sector liabilities, including mortgage debt and consumer credit. The ratio of net wealth to disposable income fluctuates widely in the short term but there is no trend in the long term because to imply otherwise would mean intergenerational changes in savings habits. Net wealth is an ideal variable to monitor (and control) bubbles because it is at the heart of the transmission mechanism between asset prices and debt, and consumption.

Since the end of World War II, average net wealth in the US has been approximately five times the annual disposable income. The peak of the recent internet bubble became transparent when net wealth hit a high of 6.2 times annual disposable income. The peak ratio subsided when equity prices fell, but it revived with the emergence of a new (housing) bubble. Thus, the Fed should maintain a target ratio of net wealth to disposable income in the range of, say, 4.3 to 5.3, similar to its implicit target of 1 to 2 percent for core PCE (personal consumption expenditure) inflation. The target range could be revised to account for demographics or to anchor expectations of asset price inflation. Furthermore, monetary policy should be tightened or relaxed to maintain this particular threshold. This action would not only allow asset price booms but it would also prevent bubbles, and their huge adverse economic consequences.

This approach would also help to regulate financial engineering. Securitisation implies a transfer of risk from banks to the personal sector, making banks more willing to promote both lending and the sale of asset-backed securities to the personal sector. Financial engineering

3 “Paradoxically, these endogenous responses to credible monetary policy increase the probability that latent inflation pressures manifest themselves in the development of imbalances in the financial system, rather than immediate upward pressure on higher goods and services price inflation”, Borio and Lowe (2002, p. 22).

enabled the US housing market bubble, and its complexity means that central banks would find it difficult to measure, monitor, and control total liquidity in the economy. A wealth target, however, would mitigate the consequences of liquidity and not impede the financial engineering of banks.

## 5. A reformulated NCM model

The micro-foundations of the NCM or Neo-Wicksellian model are established in Rotemberg and Woodford (1995, 1997). The similarities of the NCM with Wicksell (1898) are pointed out in Woodford (2003) and Fontana (2006). A review of the NCM model can be found in Arestis (2007) and Goodhart (2004).

The reduced form of the model in Karakitsos (2008) consists of six equations with only one difference. The central bank objective function includes a net wealth target. Thus, the system is:

$$(1) Y_t = a_0(G-T) + a_1Y_t + a_2Y_{t-1} + a_3E_tY_{t+1} + a_4[R_t - E_t(P_{t+1}) - RR_t] + a_5NW_t + u_{1t}$$

$$(2) Y_t^s = a_0(G-T) - q + (a_1 - b_1)Y_t + a_2Y_{t-1} + a_3E_t(Y_{t+1}) + a_4[R_t - E_t(P_{t+1})] - (a_4 + b_2)RR + a_5NW_t + u_{2t}$$

$$(3) P_t = d_0 + d_1E_t(P_{t+1}) + d_3P_{t-1} + (d_4)Y_t^s + u_{3t}$$

$$(4) RR_t = q + f_1[P_t - E_t(P_{t+1})] + f_2Y_t + f_3R_t + f_4Y_t^s + u_{4t}$$

$$(5) R_t = (1 - \gamma_0)[R_t + E_t(P_{t+1})] + \gamma_1Y_{t-1}^s + \gamma_2(P_{t-1} - P^T) + \gamma_3(NW_t - NW^T) + \gamma_1R_{t-1} + u_{5t}$$

$$(6) NW_t = \Omega_1R_t + \Omega_2RR_t + \Omega_3RC + u_{6t}, \quad \Omega_1, \Omega_3 < 0, \quad \Omega_2 > 0$$

All variables are expressed as rates of growth (log-differences):  $Y$  is (the rate of growth of) output, which is equal to the rate of aggregate demand;  $Y^s$  is (the rate of growth of) the supply of output (potential-output);  $Y^g$  is the output gap, the difference between the growth rates of current output and potential output;  $R$  is the nominal short-term interest rate;  $RR$  is the natural interest rate or real profit rate;  $P$  is the inflation rate;  $P^T$  is the central bank target inflation rate;  $NW$  is net household wealth;  $RC$  is credit risk;  $E_t(X_{t+1})$  and is the expectation of variable  $X$  in period  $t+1$ , as with information at time  $t$ .

The system of equations (1)–(6) determines the six endogenous variables:

The similarities and differences with the NCM (or Neo-Wicksellian) model are the following: The NCM model is simply equations (2), (3) and (5) with the last two terms in (2) being omitted. In the reformulated model there are three more equations: equation (1), which determines the equilibrium level of output from the level of demand in the economy; equation (4),



which determines the rate of profit, which is treated as a constant in NCM models; equation (6), which determines net wealth. The reformulated model through the last two terms in equation (2) emphasises: (i) the influence of the profit rate in determining the output gap; and (ii) the wealth effect on consumption.

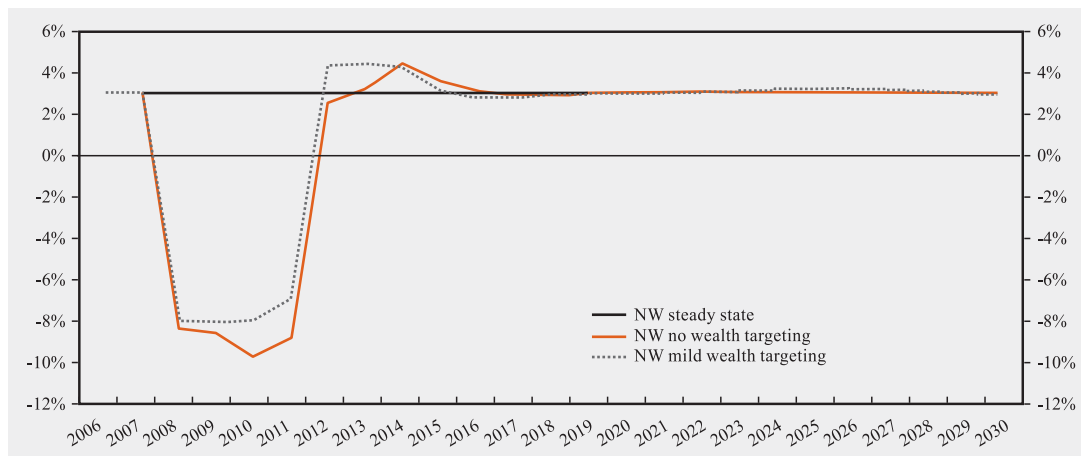
The steady-state properties of the system and the stability conditions are analysed in Karakitsos (2008). The model is capable of accounting for the stylised facts of the last three major bubbles – internet, housing and commodities – (see Karakitsos, 2008 and 2009). Financial engineering creates more liquidity than is consistent with long run equilibrium and this boosts equities and/or house prices. The higher level of wealth stimulates output and inflation rises above the central bank target, prompting higher interest rates. This pricks the bubble triggering rising risk aversion (a widening of credit spreads). This, in turn, reduces wealth that leads to a fall in output. The central bank responds by cutting interest rates to offset the deflationary gap and with this action prevents the de-leveraging (i.e. the drain of liquidity). By doing so, the central bank perpetuates the excessive liquidity and sows the seeds for a new bubble. This explains how successive bubbles have been created and subsequently pricked. The house bubble is a transformation of the internet bubble and the commodities bubble a transformation of the house bubble. The story keeps repeating itself, but in every cycle liquidity makes another leap forward.

## 6. The merits and perils of wealth targeting

We have shown elsewhere (see Karakitsos, 2009a) that in an asset-led business cycle a central bank should have two targets – inflation and the output gap. With these two targets and despite the fact that the central bank is using only one instrument – interest rates – it is more likely to be successful in dealing with a credit crisis and the consequences of the burst of an asset bubble. However, in a highly leveraged economy, like the US, even the two targets of inflation and the output gap are likely to prove inadequate to deal with the crisis. As the degree of leverage increases, guidance of monetary policy by these two targets is likely to lead to a prolonged crisis and possibly to instability because of the differential speed of the economy to changes in interest rates and profitability. The real profit rate impacts the economy rapidly, while the interest rate slowly. Moreover, the interest rate responds to economic developments with a lag, as a central bank waits until it is sure that the economy is leaning in one way before it acts. But the interest rate affects the profit rate faster than other output and inflation. Thus, a central bank might delay, if not destabilise, the recovery of a highly leveraged economy. Indeed, Karakitsos (2009a) shows that, as the degree of leverage increases, central bank action guided by inflation and the output gap leads to instability. It is in this context that a wealth target in addition to the two other conventional targets might be important.

The dynamic effects of the credit crisis are analysed by simulating a numerical analogue of the theoretical model. The credit crisis is portrayed in the model by a widening of credit spreads

Figure 8 Net wealth



– corporate bond yields increase over government bond yields. In the simulations it is assumed that for four years credit spreads widen by 450 bps, consistent with the stylised facts of the current crisis. Two cases are analysed: (1) no wealth targeting, meaning that the targets are inflation and the output gap; and (2) mild wealth targeting, in addition to the other two targets. With no wealth targeting, net wealth falls from its steady-state value of 3% to -10% in the next three years, as both equities and house prices plunge, but then gradually recover (see Figure 8). Net wealth overshoots its initial steady-state by 1.5% and then converges to it. The whole dynamic adjustment lasts ten years, which is consistent with the experience of the 1930s and Japan in the 1990s. With mild wealth targeting, wealth falls by less.

The fall in net wealth creates a recession with a negative output gap, which in the case of no wealth targeting reaches a trough at nearly -3% in three years (see Figure 9). But then the econ-

Figure 9 Output gap

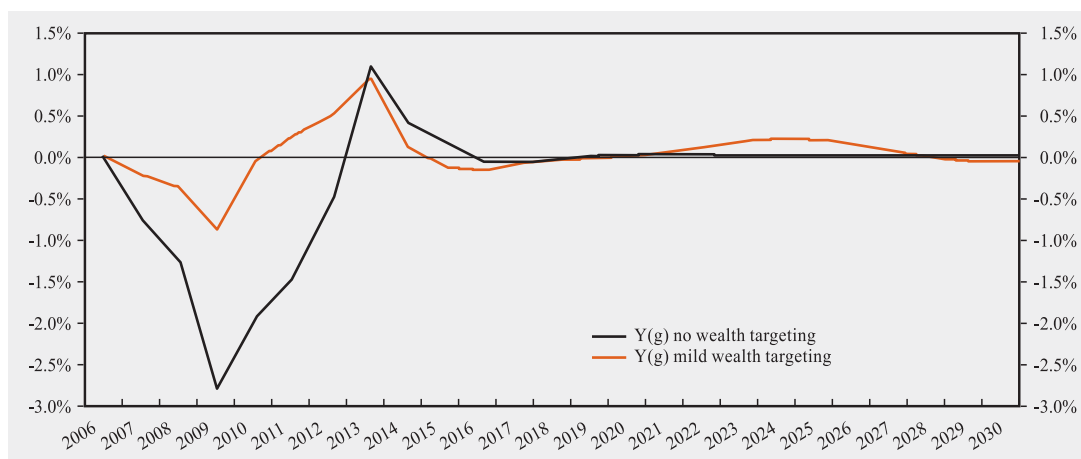
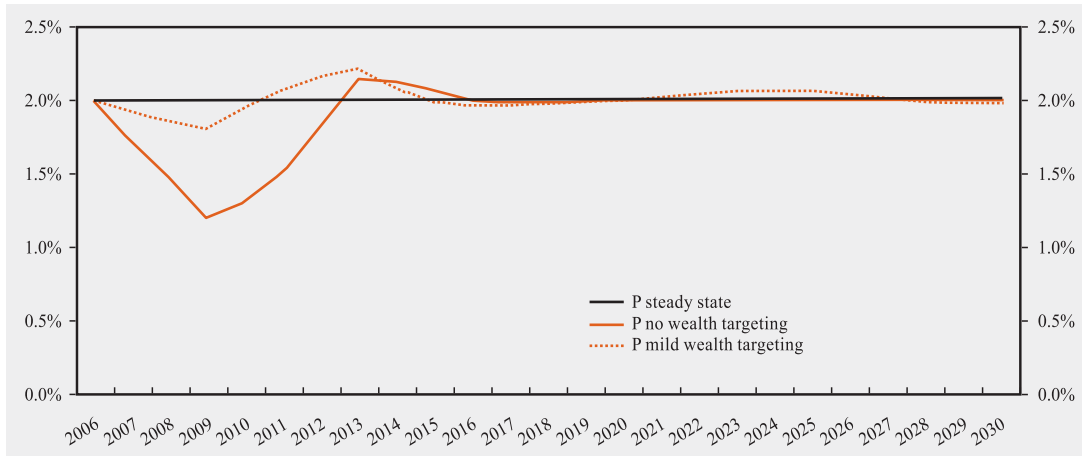


Figure 10 Inflation



omy recovers and converges to its initial steady state in ten years, while overshooting it for a short period of time. Potential output growth also diminishes during the credit crisis by a maximum of 1%, but ultimately returns to its initial steady-state. The fall in potential output mitigates the negative output gap and therefore it has a stabilising effect on the deflationary impact of the credit crisis. The decrease in potential output is due to lower growth and the impact of declining profitability on the capital accumulation process. With wealth targeting the recession is milder; just one-third as deep as in the previous case.

As a result of the negative output gap, inflation falls in both cases, but much more with no wealth targeting. Inflation falls from its steady-state value of 2% to slightly more than 1% in three years and then converges to its initial steady state, largely following the path of the output gap (see Figure 10). With wealth targeting, inflation falls by far less, in line with the smaller negative output gap. As inflation falls below the central bank target and the economy falters with a negative output gap, the central bank responds by cutting interest rates aggressively from 4.5% to less than 0.5% in four years, consistent with the stylised facts of Japan in the 1990s and the US in the 2000s. A year after the economy begins to recover, the central bank gradually removes the accommodation bias. During the overshooting it lifts the interest rate above the target level, but then takes it back to its initial steady state (see Figure 11). With wealth targeting the central bank cuts interest rates less aggressively.

The key to the differences between the two policy regimes is the real profit rate, which falls deeply with no wealth targeting and does not recover for six years. With wealth targeting, the real profit rate falls only mildly and recovers strongly later on (see Figure 12). This mitigates the fall in wealth that has a dampening effect on the negative output gap. The early recovery of profitability is due to the quick impact of the interest rate cut and an early return of company pricing power.

Figure 11 Interest rate

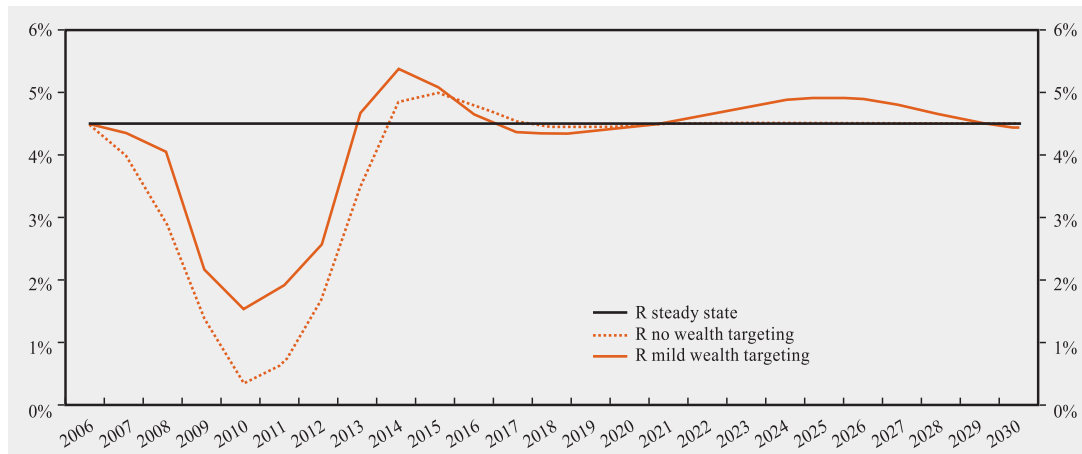
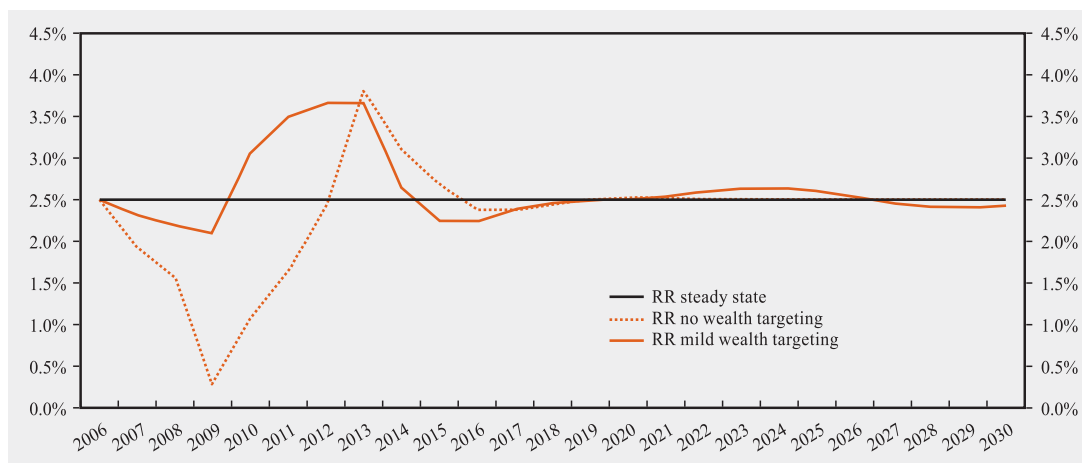


Figure 12 Real profit rate



We caution that overly zealous enthusiasm for wealth targeting might cause instability and lead to a deeper recession than that associated with mild wealth targeting. As the importance of wealth targeting increases in relation to inflation and the output gap, the swings in interest rates become larger and given the lags in the effects of monetary policy on output and inflation, but the fast response of wealth to profitability, this volatility in interest rates destabilises the economy (see Figures 13-15). Hence, excessive wealth targeting leads to a prolonged recession and risks destabilising the economy. Therefore, a mild wealth targeting is preferable to both no wealth targeting and excessive wealth targeting. The simple rationale of this conclusion stems from the fact that in the real world profitability adjusts faster than interest rates and the economy responds faster to changes in profitability than to interest rates.

Figure 13 Net wealth with excessive wealth targeting

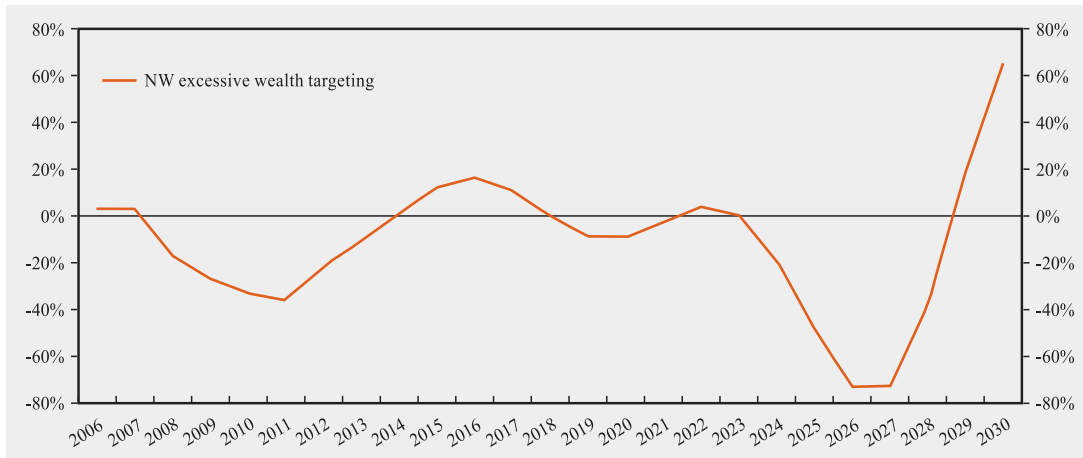


Figure 14 Output gap with excessive wealth targeting

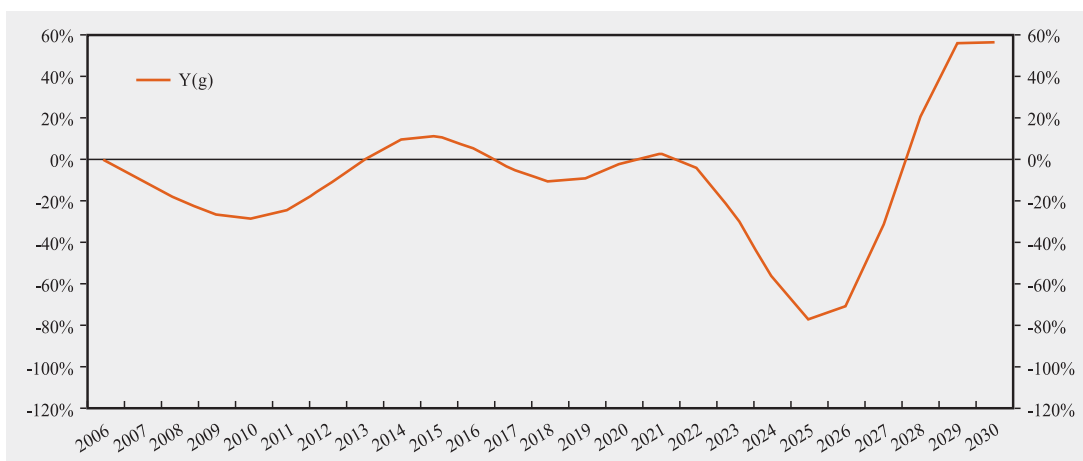
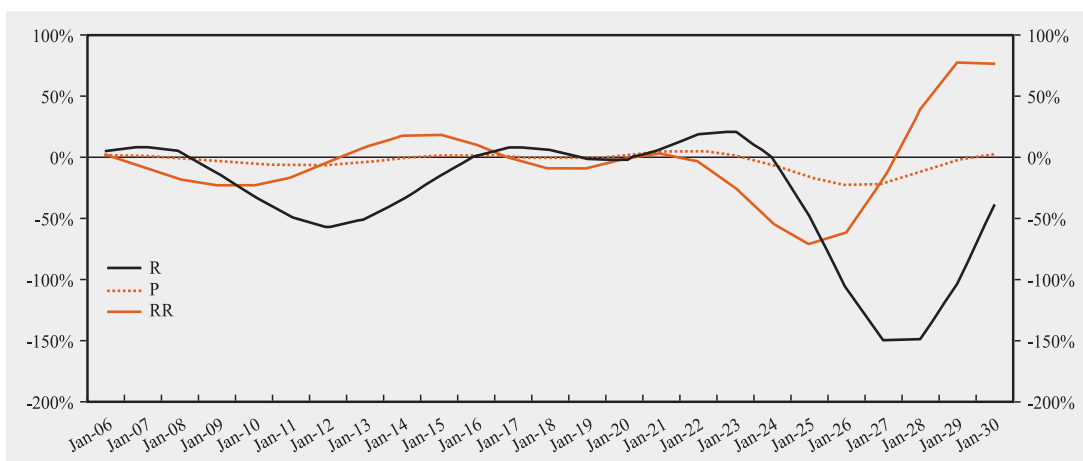


Figure 15 Interest rate, inflation and the natural interest rate with excessive wealth targeting



The simulations show that the model captures the stylised facts of asset and debt deflation, caused by bank losses during the burst of an asset bubble that trigger the widening of credit spreads. The credit crisis causes larger swings in the output gap than in inflation, a characteristic of all asset and debt deflations, and shows the importance of the output gap as a target of central bank policy. Reliance on inflation alone is likely to exacerbate and prolong the deflationary impact of the credit crisis. Output gap targeting helps, but not when the economy is over-leveraged. Mild, but not excessive, wealth targeting further bolsters the central bank task of stabilising the economy.

## 7. Summary and conclusions

The K-model predicts that house prices will stabilise in the spring of 2010 at more than 40% lower than the peak in 2006, triggering losses in financial institutions in excess of \$3 trillion. Gross wealth will return to its pre-bubble level, but net wealth will fall even lower, due to the irreversibility of debt. The erosion of wealth will induce households to save more, pushing the savings ratio to more than 8%, thus making consumption the driver to this deep and protracted recession. Firms will respond to lower demand by slashing investment and cutting employment, which will have a negative feedback on consumption. GDP growth will bottom out in mid-2010, signalling a recovery in the second half. But there are risks to the sustainability of the recovery stemming from the current actions of policymakers. In the current environment the Fed has flooded the system with liquidity, at a time when excess liquidity has been at the root of the problem of the current credit crisis. Moreover, the Fed is printing money at an unprecedented rate that risks fuelling higher inflation when the economy recovers and/or huge dollar depreciation. This liquidity has now sown the seeds of a new bubble – US government bonds, which might be pricked by the huge issuance of Treasuries. The burst of this new bubble will undermine the recovery in 2010 and risks plunging the US economy into another recession in 2011 or 2012, as default risk premiums, exchange-rate premiums and inflation premiums soar.

The experience of the last two business cycles suggests that there are lessons for the design of policy. In asset-led business cycles, like the last two in the US, sole reliance on inflation targeting is unlikely to prevent a bubble from ballooning and deflecting its catastrophic consequences once it bursts, as the volatility of the output gap is greater than the volatility of inflation. This explains why the Fed, among other central banks, such as the BoE and the ECB, has been successful in keeping inflation and its volatility low, yet the US and, consequently, the world at large are in one of the most severe recessions since the Great Depression. Adding the output gap as an additional target of monetary policy helps, but it is insufficient when the economy is highly leveraged. In this case the pursuit of such policies leads to instability – every time a bubble bursts, the central bank adds further liquidity that sows the seeds for the next bubble. In every cycle the level of interest rates required to prick the bubble is lower, but the downturn



is worse. In this context mild, but not excessive, wealth targeting ensures the central bank task of stabilising the economy along an endogenous path of potential output. A wealth target does not imply a target on asset prices *per se* (such as the S&P or house prices), as it deals with the consequences of net wealth on the spending patterns of consumers. The ratio of net wealth to disposable income is an ideal variable to monitor bubbles and control them from ballooning and bursting, as it is a stationary variable at the heart of the transmission of monetary policy. A central bank hikes rates when net wealth exceeds the upper end of an acceptable range and cuts rates when it falls below the low end. This framework will allow asset cycles, while it will prevent them from becoming bubbles. It will also control liquidity, which is at the root of the current woes, without having to resort to an overregulated system, as it is now suggested, that will interfere with financial engineering.

The reformulated central bank objective function is interlinked with an overhauling of the NCM model, which forms the intellectual basis of inflation targeting. The overhaul involves endogenising the natural interest rate and potential output; introducing a wealth effect in demand and explaining its constituent components of equities and houses. The amended NCM model along with the reformulated objective function provides a framework for explaining the stylised facts of the asset and debt deflation that characterises the current downturn.

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