

Rabobank Working Paper Series

Financial Crisis Investigation

What were the causes of the global financial crisis in 2008/09?

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The views expressed in this paper are his own and not necessarily those of Rabobank

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"The global financial crisis of the late 2000s, whether measured by the depth, breadth, and (potential) duration of the accompanying recession or by its profound effect on asset markets, stands as the most serious global financial crisis since the Great Depression. The crisis has been a transformative moment in global economic history whose ultimate resolution will likely reshape politics and economics for at least a generation".

Reinhart and Rogoff (2009)

Introduction

The global financial crisis of 2007/8, which resulted in millions of people losing their savings, wealth, jobs and incomes, has not reached its final act just yet. But it would still be useful to take a look back and see what we have been through and, more importantly, how we got ourselves in such a mess in the first place. As regards the latter, many economists and policymakers have already offered their insights into who or what is to be blamed. For some it was international capital flows or monetary policy; for others, housing policy and people's financial illiteracy; and for still others, it was insufficient regulation and the greed of those in the financial sector. In each case, these arguments, when used as single-cause explanations, are too simplistic because they are incomplete. While all these factors were essential contributors to the crisis, each is insufficient as a standalone explanation. As we show in this chapter, it was the interaction of mistakes and policy failures that finally led to such a tragic ending. This is very similar to the findings of airplane crash investigators that typically conclude the plane was brought down thanks to errors of a number of human actors – the pilots, air traffic controllers, and some maintenance crew members.

In the first section of this paper we will briefly recap what we have been through since 2007. The second section will be a broad overview of all the actors involved in the Great Crash of 2008 and the following recession. The third section contains our conclusions.

1. The Chronology of the crisis

Phase 1: the banking crisis

It all started in the United States (US). Between 1996 and 2006, US house prices increased by 80% in real terms (see figure 1). To put that figure into context, consider that in the 100 years before that period (i.e. 1896-1996) real house prices rose by only 7.3%! As it turned out, properties in the US became extremely overvalued and the bubble eventually popped in 2006. The first hints of trouble in the mortgage market surfaced in mid-2006 as home foreclosures on subprime mortgages, which were generally targeted at borrowers who had tarnished credit histories and little savings available for down payments, began to creep upwards (see figure 2). This was partly due to the Federal Reserve's (Fed, the US central bank) monetary tightening from mid-2004 onwards. The policy rate was raised by 425 basis

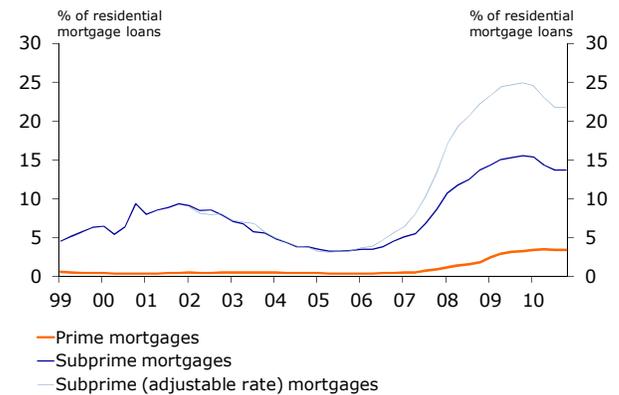
points to 5.25% in just two years. Since many mortgages granted in 2005 and 2006 had up-front 'teaser rates' (i.e. interest rates were low for a very short period to attract borrowers), they were being reset at much higher levels.

Figure 1: US real house prices (1890=100)



Source: Robert Shiller dataset

Figure 2: Home foreclosures in the US



Source: IMF

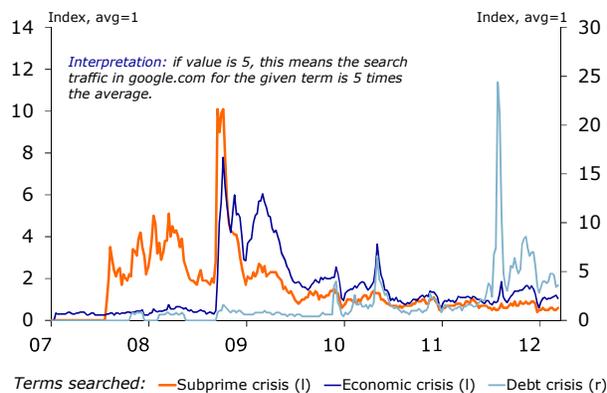
The first bank to acknowledge losses on its subprime loan portfolio was HSBC (the largest subprime lender in the US), which announced on February 22, 2007 that it had lost USD 10.5 billion. A month later, US subprime lender Accredited Home Lenders sold USD 2.7 billion worth of subprime loans at a heavy discount. This prompted the New York Attorney General to open an investigation into subprime lending. In May 2007, GMAC, the finance arm of General Motors, reported losses amounting to USD 1 billion. Meanwhile, UBS decided to close its US subprime business. Later that month, rating agencies issued comprehensive rating downgrades and credit watch warnings on an array of residential mortgage-backed securities. This, in turn, led to a deterioration in the prices of mortgage-related products in the financial markets. But it was not until the USD 3.2 billion injection of funds by Bear Stearns into two of its hedge funds¹ (June 22, 2007) that international investors took note of the growing troubles in the US subprime mortgage market. Figure 3 clearly demonstrates that the interest in the word 'subprime crisis' in the Google search engine only started from this period. Interestingly, the broader repercussions from the declining housing market were still not clear to the US authorities. 'I don't think [the subprime mess] poses any threat to the overall economy', Treasury Secretary Henry Paulson told Bloomberg on July 26, 2007 (FCIC, 2011).

As we now know, this event was just the tip of a very large iceberg. In July 2007, amid widespread concern about how to value complex structured finance products and an erosion

¹ The funds were suffering from falling CDO prices (amid difficulty meeting margin calls) and were shuttered within a month after losing over 90% of their value (Acharya et al., 2010).

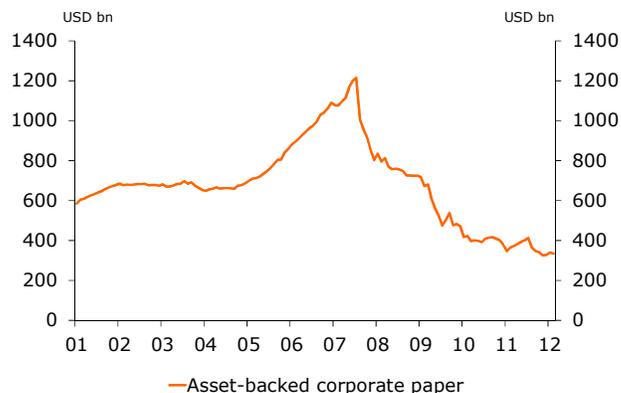
of confidence in the reliability of ratings given by the rating agencies, the market for short-term asset-backed corporate paper (ABCP)² began to dry up (see figure 4). There was, in fact, a complete re-pricing of all credit instruments. Credit spreads on investment grade bonds, high yield bonds, leverage loans, CDOs backed by commercial and subprime mortgages all began to widen.

Figure 3: Google trend



Source: Google

Figure 4: ABCP market started shrinking in 2007



Source: Reuters EcoWin

IKB³, a small German bank, was the first European casualty of the crisis. Its conduit was unable to roll-over ABCP and IKB proved unable to provide the promised credit line. By the end of the month, American Home Mortgage Investment Corp. announced its inability to fund lending obligations, and it subsequently declared bankruptcy on August 6. A day later, the French bank BNP Paribas froze redemptions for three investment funds⁴, citing its inability to value securitised products. This event informed investors that ABCPs and SIVs were not necessarily safe short-term vehicles. As a result, the first 'illiquidity wave' on the interbank market started as the increased opaqueness of bank balance sheets made it difficult to separate healthy from unhealthy institutions. In response to the freezing up of the interbank market, the European Central Bank (ECB) injected EUR 95 billion in overnight credit into the market (August 9). The Fed followed suit, injecting USD 24 billion. But the measures did not help much since liquidity provision could not enhance transparency. The evaporation of confidence resulted in the simultaneous global freezing up of virtually all wholesale capital markets, including the interbank markets (see figure 5), CDO markets, markets for ABCP and markets for all but the very best mortgage-backed securities (MBS)

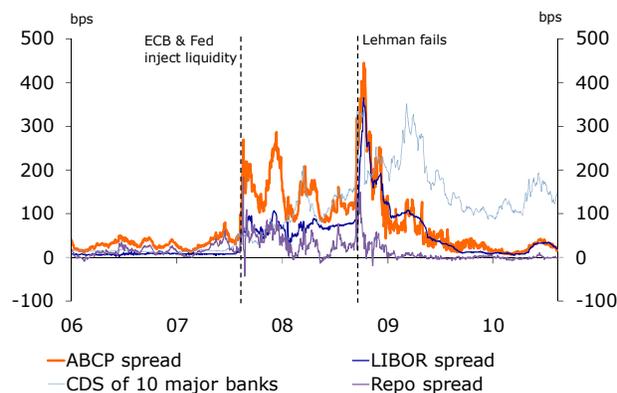
² The financial markets' jargon is explained in the end of this piece.

³ Since its foundation in 1924, IKB had focused on lending to midsize German businesses (Mittelstand), but in the past decade, management diversified. In 2002, IKB purchased a portfolio of structured finance securities. It made money by using less expensive short-term commercial paper to purchase higher-yielding long-term structured finance products.

⁴ Total assets in those funds were USD 2.2 billion, with a third of that amount in subprime securities rated AA or higher.

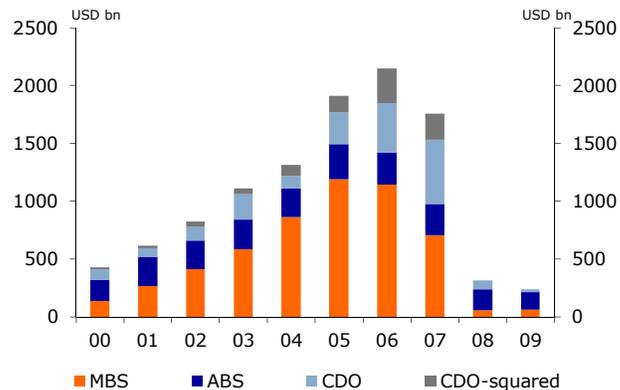
(see figure 6). Thus, once the increased opacity of the structured-finance market became an issue, the seeds were sown for a full-blown banking crisis.

Figure 5: Wholesale capital markets



Source: IMF

Figure 6: US securitisation issuance by type



Source: IMF

A month later, Britain experienced its first classic 'bank run' in 141 years after depositors queued in front of Northern Rock's⁵ branches, which was a mortgage lender. For a time, some sort of calm seemed to have returned to the markets as major global banks started to clean their books. The central banks' liquidity injections appeared more effective too. But on October 24, Merrill Lynch stunned investors when it announced that 07Q3 earnings would include a USD 6.9 billion loss on CDOs and USD 1 billion on subprime mortgages – the largest Wall Street write-down to that point⁶.

Matters worsened even more in November as financial institutions incurred larger losses and wrote down illiquid securities. Solvency concerns across markets fuelled a process of rapid deleveraging and forced asset sales at 'fire sale' prices. The resulting vicious circle brought about by mark-to-market rules (due to fair value accounting⁷) played a major role. In January 2008, Citigroup and Merrill Lynch each booked a record loss of USD 9.8 billion over

⁵ Northern Rock was a 'building society' – that is, a mutually owned savings and mortgage bank – until its decision (under pressure from the so-called 'carpet baggers') to go public and float its shares on the stock market in 1997. As with other building societies in the United Kingdom, Northern Rock traced its origin to the so-called cooperative movement of the 19th century. As a mutual bank, it was rather restricted in its lending and funding operations. After demutualization, it turned itself into a very aggressive lender, heavily dependent on the money markets for its lending operations. The mortgage lender got into trouble because of its heavy reliance on non-retail funding, which accounted for 60% of the bank's liabilities in 1998, but had fallen to 23% on the eve of the crisis (Shin, 2009).

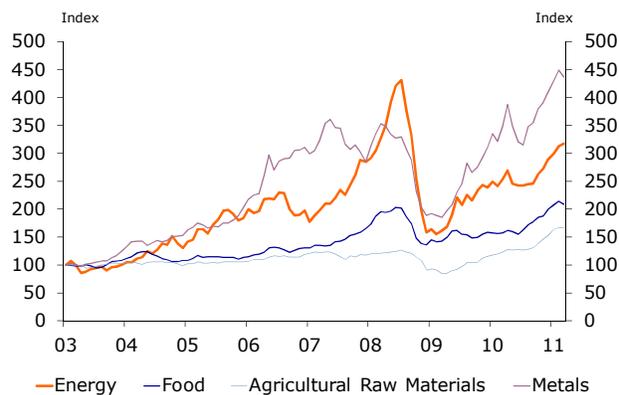
⁶ Six days later, the CEO of Merrill resigned (leaving with a severance package worth USD 161.5m).

⁷ Under this system, financial institutions value the assets that they hold at those prices at which they could sell in the market. In cases where markets for the securities are not functioning, market prices of securities with similar characteristics are used as a standard of reference. If that is also unavailable, econometric models are used to provide estimates of what the securities could be traded for if the markets were functioning (called mark-to-model).

the fourth quarter of 2007 after writing down USD 18 billion and USD 17 billion of assets, respectively. Almost a month later, ING wrote down USD 1 billion of its US mortgage-related assets.

In early March 2008, events (such as the bankruptcy of Carlyle Capital, a hedge fund) put pressure on Bear Stearns, which was a prime candidate; it was the smallest of the major investment banks, had the most leverage, and was exposed quite significantly to the subprime mortgage market (Acharya et al. 2010). During the course of a weekend, JPMorgan Chase & Co. acquired Bear Stearns for USD 2 per share (ultimately increased to USD 10) after the Fed decided to guarantee USD 30 billion of Bear Stearns' toxic assets. By comparison, Bear's shares had traded at around USD 150 less than a year before and USD 60 just a week before. The rescue of Bear Stearns was a relief for the markets as it was a major player in the USD 2.5 trillion repo market, as well as being the leading prime broker on Wall Street to hedge funds and a significant participant in the credit default swap (CDS) market. Stocks rallied once the news broke and banks got a chance once again to repair their balance sheets.

Figure 7: Commodity prices (2003=100)



Source: IMF

Meanwhile, another major development was lurking in the background; the enormous spike in commodity prices (see figure 7). On July 11, 2008 oil prices rose above USD 147 (that was an eye-watering 93% increase compared to the same day one year before). As inflationary pressures mounted, central banks were getting more anxious. To ensure inflation expectations remained well-anchored, the ECB went even so far as to raise the policy rate by 25 basis points in mid-2008. But as US mortgage delinquency rates rose further and commodity prices tumbled in the subsequent months, attention shifted to the financial crisis once again. During the summer of 2008, Fannie Mae and Freddie Mac⁸, which

⁸ The two major GSEs were private companies that were exempt from federal income taxes and securities registration requirements for their debt securities. They were also allowed to operate with lower capital requirements than

were two publicly traded but government-sponsored enterprises (GSEs) that securitised a large fraction of US mortgages and had about USD 1.5 trillion in bonds outstanding, got into financial trouble. Eventually, both firms were brought into Federal conservatorship on September 7, 2008.

At the same time, Lehman Brothers – the fourth largest US investment bank at the time with over USD 600 billion in assets and 25,000 employees – came under severe financial stress. By the end of 2007, Lehman had amassed USD 111 billion in commercial and residential real estate holdings and securities, which was more than four times its total equity (FCIC, 2011). As it became clear that the Korea Development Bank would not buy the firm (September 9), shares of Lehman plunged by 45%. The Fed convened a weekend meeting with all major banks' most senior executives on September 12–14 to secure the future of Lehman. Initially, Barclays and Bank of America (BoA) were named as possible suitors. However, they both refused to take over Lehman without a government guarantee. The US Treasury and Fed officials decided, however, not to offer a guarantee. This gave Lehman no option but to declare bankruptcy⁹ early Monday morning (September 15, 2008). On the same day, investors read on the newswires that Merrill Lynch had been purchased by BoA for USD 50 billion. The bankruptcy of Lehman sent shockwaves throughout the global financial markets as the shared belief that no systemically relevant bank would be allowed to go bust was proven false. What's more, when Lehman failed, it had close to one million derivatives contracts on its books with hundreds of financial firms. As such, there was a colossal amount of uncertainty in the marketplace as to how the counterparties of these contracts would be affected. The contagion effect led to a surge in systemic risk and global stock markets plummeted as a result. Meanwhile, interbank spreads and volatility in the financial markets went through the roof causing a massive tightening in financial conditions (see figure 8).

One day after the collapse of Lehman, AIG¹⁰ disclosed that it faced a serious liquidity shortage due to massive losses in its credit derivatives business. Owing to systemic risks that would arise from AIG's bankruptcy¹¹, the Fed quickly organised a bailout of USD 85 billion in exchange for an 80% equity stake. The same day we observed a run on the Reserve Primary Fund (RPF), the world's first money market mutual fund. The RPF held USD 785 million of Lehman's paper. When Lehman filed for bankruptcy protection, the fund could no longer afford to redeem its shares at the par value of USD 1 – a situation known as 'breaking the buck' – and shareholders pulled out their money, with the fund losing 90% of

their purely private-sector counterparts and benefited from an implicit government guarantee that lowered funding costs. Their business model involved purchasing primarily conventional mortgages from private lenders to hold in their own portfolios, or package into MBSs.

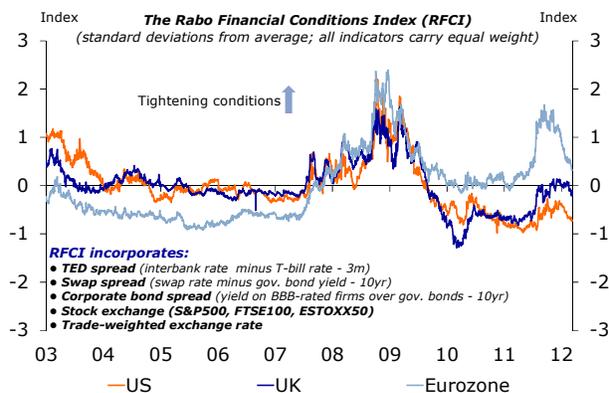
⁹ The bankruptcy of Lehman Brothers was the largest in the US history.

¹⁰ The largest American insurance group, which is the largest underwriter of commercial and industrial insurance in the US.

¹¹ AIG had a notional exposure of about USD 500 billion to CDSs (and related derivatives) while having a capital base of about USD 100 billion to cover all its traditional insurance activities as well as its financial derivatives business (Levine, 2010).

its assets. A run on money market funds followed. Even those with no direct Lehman exposure were hit hard. By the middle of the following week, prime money market mutual fund investors had withdrawn USD 350 billion (FCIC, 2011). In turn, this run exerted further pressure on the banks given that a significant amount of their funding was coming from commercial paper and certificates of deposits held by money market mutual funds.

Figure 8: Financial conditions



Source: Reuters EcoWin, Rabobank

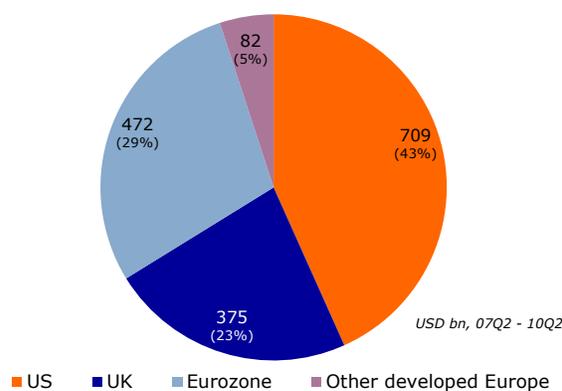
In a desperate attempt to stave off a depression-like scenario, the US Treasury Secretary, Hank Paulson, and the Fed Chairman, Ben Bernanke, delivered their Troubled Asset Relief Programme (TARP) in an infamous three-page document to the US Congress on September 19, 2008. In its original form, the TARP would have authorised the Treasury to spend USD 700 billion purchasing subprime mortgage assets from troubled financial institutions without any accountability to the Congress. Unsurprisingly, the Congress voted down the bill on September 29. On the same day, Washington Mutual (WaMu), the largest US savings bank, was placed in receivership by the Federal Deposit Insurance Corporation (FDIC), and then sold to JPMorgan Chase & Co. Consequently, stock markets crashed worldwide with the Dow Jones Industrial Average falling by 777.6 points (or 7%) – the biggest point-drop since records began (1896). Eventually the TARP bill was passed¹² on October 3, but passage required numerous ‘Christmas-tree’ provisions such as a tax break for makers of toy wooden arrows (Mishkin, 2010). Note that the TARP was subsequently used to inject capital into financial institutions, thereby shoring up their balance sheets more directly.

The enormous amount of uncertainty in late September and early October sent the financial markets into a tailspin. In the following months the interbank market remained shut, meaning that banks with liquidity shortages were fully dependent on the central banks for

¹² As of September 2010 – two years after TARP’s creation.– Treasury had allocated USD 395 billion of the USD 700 billion authorised. Of that amount, USD 204 billion had been repaid, USD 185 billion remained outstanding, and USD 3.9 billion in losses had been incurred (FCIC, 2011).

liquidity. At this stage of the crisis, the US was not the only country facing a banking crisis. According to the dataset provided by Reinhart and Rogoff (2010) and Laeven and Valencia (2010), 15 advanced countries, including the US, experienced a banking crisis in 2008¹³. In other words, only 8 countries in the industrialised world managed to avoid an outright banking crisis¹⁴! The huge bank failures thanks to substantial losses (see figure 9) led to bailouts of financial institutions. Alessandri and Haldane (2009) discuss USD 10 trillion worth of these bailout packages across 20 countries, which includes liquidity support, guarantees on bank liabilities, asset purchases, asset guarantees, and equity injections (see table in the appendix).

Figure 9: Bank writedowns/loss provisions



Source: IMF

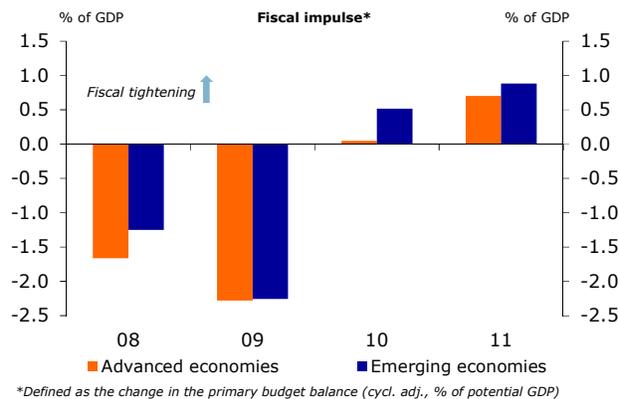
The start of 2009 was no better, unfortunately, even though economic policymakers were throwing everything they had at the crisis to avert a repeat of the Great Depression. Public sectors in almost all major advanced economies started releveraging while monetary policymakers were slashing policy rates at a rampant speed (see figures 10 and 11). Major central banks even got their hands dirty with unorthodox support measures given that policy rates were already at rock-bottom levels. These include further asset purchases, a process better known as quantitative easing¹⁵ (in the US and the UK), further liquidity-boosting operations (in the eurozone) and changes to the way future monetary policy decisions is communicated (in the US).

¹³ The countries included in both samples are Austria, Belgium, Denmark, France, Germany, Greece, Iceland, Ireland, Luxembourg, the Netherlands, Portugal, Spain, Switzerland and the UK.

¹⁴ These were Australia, Canada, Finland, Italy, Japan, New Zealand, Norway and Sweden.

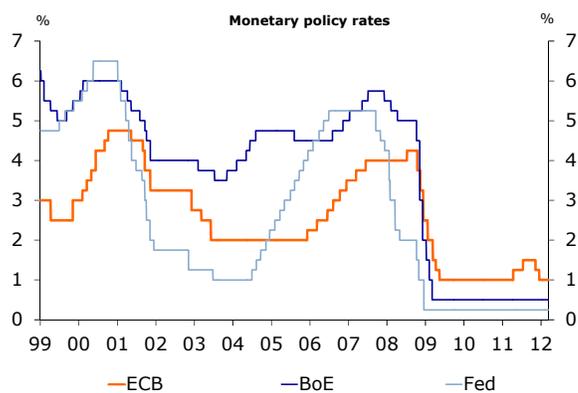
¹⁵ In theory quantitative easing can buoy growth through four channels. First, QE lowers the long-end of the yield curve (*interest rate channel*). Second, when interest rates are kept artificially low, yield-seeking investors will be forced into riskier, alternative investments (i.e. asset prices are pushed upwards), which results in a positive wealth effect for the private sector (*portfolio rebalancing channel*). Third, it improves export competitiveness through competitive devaluation of the currency (*exchange rate channel*). Fourth, it boosts banks' reserves thereby helping them in extending more loans (*bank lending channel*).

Figure 10: Fiscal policy turned expansionary...



Source: IMF

Figure 11: ...similar to monetary policy



Source: Reuters EcoWin

Phase 2: the economic crisis

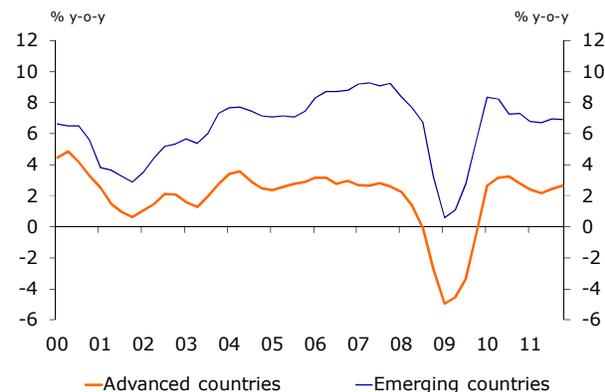
Regrettably, none of these measures managed to prevent the global economy from going into free fall (see figure 12). From the bankruptcy of Lehman until March 2009 the global economy entered the deepest recession since at least the 1930s. Tightening credit conditions led to a sharp compression in consumer spending in most advanced countries. With households deleveraging and net assets at historic lows, financial constraints imposed by banks under stress in many countries directly translated into reduced consumer spending, leading to declines in corporate sector profitability, layoffs and rising unemployment, slowing economies and more foreclosures.

Banks continued to book heavy losses while governments took various measures to shore up bank balance sheets (by ring-fencing their toxic assets and recapitalising them) and prop up their economies. But it was not until the US stress tests, announced in February 2009, that the financial markets decidedly turned the corner. The Treasury required the 19 largest banking institutions to undergo stress tests to ensure that they had sufficient capital to withstand adverse macroeconomic shocks. The results, published in early May 2009, were very well received by market participants, allowing these institutions to raise substantial amounts of capital from the private sector. In essence, the stress tests were a key factor that helped increase the amount of information in the marketplace, thereby reducing asymmetric information problems. Another helpful ingredient was the change in accounting rules that allowed US banks to ignore the market value of their distressed assets.

Throughout 2009 calm was somewhat restored to the financial markets. Not only did stocks rally (see figure 13) but risk premiums started falling too. However, the investors' hope for things getting back to 'normal' soon came to an end. This was because the severe economic contraction combined with falling asset prices, shrinking financial sector profits and sizeable

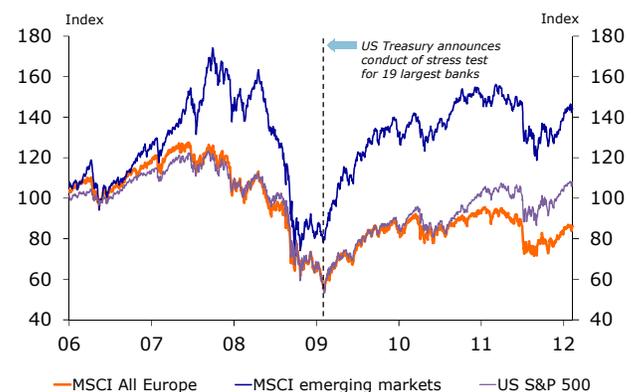
fiscal stimulus packages were starting to take their toll on public finances. In essence, once the crash arrived and the private sector had to be bailed out, private sins became public problems.

Figure 12: Real GDP growth



Source: IMF

Figure 13: Global stock markets (2006=100)



Source: Reuters EcoWin

Phase 3: the sovereign debt crisis

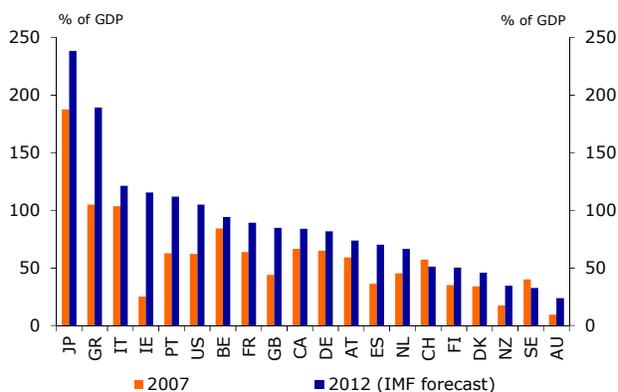
Spiralling primary budget deficits (i.e. excluding interest payments), bank bailouts and adverse debt dynamics pushed public debt levels in most advanced countries to unprecedented levels (see figure 14). The announcement by the Greek government in November 2009 that the previous administration had 'cooked the books' together with Dubai's financial troubles¹⁶ further concentrated investors' minds. All of a sudden, bond vigilantes woke up to the fact that public debt, especially in the industrialised countries, was not as risk-free as most had thought. Many started wondering whether the global crisis was entering into its third act, namely sovereign default in the industrialised world; a prospect that was simply unimaginable a few years ago.

The periphery countries of the eurozone (i.e. Portugal, Ireland, Greece and, to a lesser extent, Spain and Italy) were hit particularly hard. The phenomenal speed with which sovereign risk was being re-priced (see figure 15) eventually forced Greece, Ireland and Portugal into the arms of the IMF and the EU. The European leaders reluctantly threw the *no-bailout clause* of the EU Treaty into the bin by directly offering loans to these countries in order to avert financial catastrophe in the euro area. Unfortunately, the situation is still fluid as this piece is being written and it is very difficult to assess with any degree of certainty how the sovereign debt crisis in the eurozone will unfold. But one thing is for sure: most

¹⁶ In November 2009, Dubai World, one of the largest conglomerates owned by the government of Dubai, announced a moratorium on debt payments after the housing market slump. Eventually, Dubai World achieved a successful debt restructuring thanks to financial support from the government of Abu Dhabi.

advanced countries have to carry out major fiscal consolidation measures in the coming years to restore order to their public finances. Depending on the political willingness of the governments and global macro conditions, this can turn out to be an orderly or messy affair. Only time will tell.

Figure 14: Gross public debt



Source: IMF

Figure 15: Default probabilities derived from CDSs



Source: Reuters EcoWin, Rabobank

2. What went wrong?

Given how devastating the global financial crisis was, it is very important to form a sound understanding of its underlying causes. Alas, when the crisis made landfall, most investors and policymakers were taken by surprise. It seemed as if the financial meltdown was a bolt from the blue, a 'six sigma' event if you like. The reason was that the interaction of events was so complex that this made it very difficult, if not impossible, for a single person/entity to connect all the dots prior to the crisis. Even the most experienced organisations such as the IMF, which were supposed to predict such events, were caught off guard¹⁷. Now that we are four years down the road, we are in a relatively better position to assess what went wrong. Of course, it will take decades for us to completely appreciate the reasons why the global economy suffered from this crisis. After all, books are still being published today about the Great Depression, and that was eight decades ago!

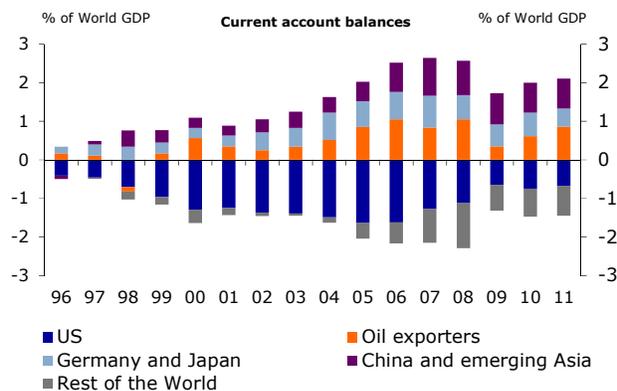
Blame the emerging countries

As we have expressed in numerous publications (see for example Kamalodin, 2010), a very important contributing factor to the crisis consisted of the 'global economic imbalances'. This term refers to the pattern of deficits and surpluses in the current account (CA) balances

¹⁷ In April 2007 the IMF concluded in its twice-annual *World Economic Outlook* that risks to the global economy had become extremely low and that, for the moment, there were no great worries (Reinhart and Rogoff, 2009)

that built up in the global economy starting in the late 1990s, with some countries developing large and persistent deficits, and others large and persistent surpluses (see figure 16). Put simply, some countries were net savers (notably Germany, the Netherlands, Switzerland, Japan, China, former Asian tigers, and oil exporters posting CA surpluses) and later exported their excess capital to those countries that were net spenders (US; UK; and Southern, Central and Eastern European countries posting CA deficits).

Figure 16: Global imbalances



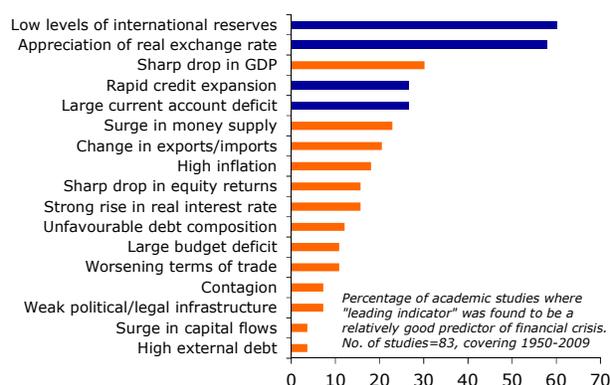
Source: IMF

But why did the global imbalances widen since the late 1990s? To understand this, one needs to look back at the financial crises of the late 1990s and early 2000s. During this period, a wave of financial crises swept through the emerging markets: East Asia in 1997, Russia and Brazil in 1998, and Turkey and Argentina in 2001. In response to these crises and the harsh conditionality imposed by the IMF as the quid pro quo for financial assistance – which left a bitter memory in most crisis-hit countries – emerging markets became far more circumspect about borrowing from abroad. More specifically, policymakers in these countries realised that the combination of low reserves, an overvalued exchange rate and reliance on excessive amounts of foreign capital, which leads to a sharp rise in domestic credit expansion, will in most cases push the country towards financial disaster. Gourinchas and Obstfeld (2011) investigate crises since 1973 and conclude that domestic credit expansion and real currency appreciation are the most robust and significant predictors of financial collapse, regardless of whether a country is emerging or advanced. For emerging economies, specifically, lower foreign exchange reserves are a good predictor of crisis. The extensive study of Frankel and Saravelos (2010) also confirms these findings (see figure 17).

To avoid a repeat of financial crisis, the emerging markets shifted their policy strategy by cutting back on domestic (credit-fuelled) spending and instead focusing on exports. Policymakers stimulated saving by maintaining an undervalued exchange rate, providing

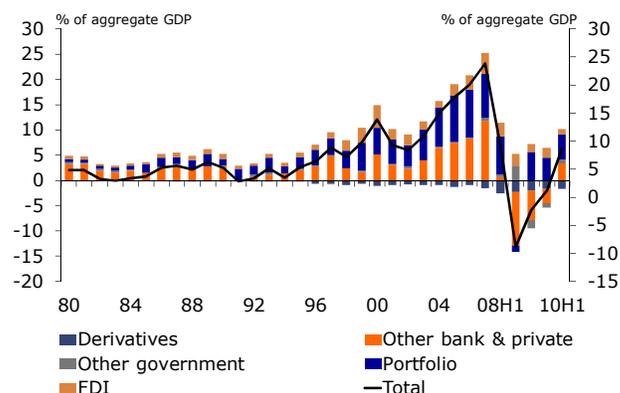
export levies, subsidising energy prices and directing bank lending to the industrial sector. The lack of adequate social safety nets as well as inadequate pension, healthcare and education systems also contributed to higher savings in the household sector. All of these resulted in a rapid increase in the global pool of savings in the EMs, which found its way into mature economies given their ability to create safe and liquid financial assets (Caballero, 2006). The US was a particular beneficiary of the 'savings glut' in the East as it was able to attract the most amount of capital (in absolute terms) due to the dollar's unique position and the depth of its financial markets (Bernanke, 2005).

Figure 17: Early warning indicators



Source: Frankel and Saravelos (2010)

Figure 18: Gross inflows to advanced economies



Source: IMF

The ensuing flows of capital into western financial markets (see figure 18) eased financial conditions in capital importing countries¹⁸ and exerted significant downward pressure on world interest rates.¹⁹ This encouraged risk-taking on an extraordinary scale as Western financial institutions expanded their balance sheets²⁰ and created new instruments to satisfy the *search for yield*. Thus, the fact that emerging markets became a new source of capital helped to fuel a credit boom in many advanced economies, particularly in the US, thereby laying the groundwork for the current crisis²¹. The sheer size of the US economy meant that a problem in the United States would quickly take on global proportions.

¹⁸ In the run-up to the crisis, credit aggregates grew extremely fast in the UK, Spain, Iceland, and several Eastern European countries. As in the United States, these credit expansions fueled real estate booms.

¹⁹ Estimates by Krishnamurthy and Vissing-Jorgensen (2008) and Warnock and Warnock (2006) suggest that official foreign demand for US government debt depressed Treasury yields by at least 50 basis points.

²⁰ The size of the US financial sector rose from an average of 4% of GDP in the mid-1970s to almost 8% of GDP in 2007 (Reinhart and Rogoff, 2009).

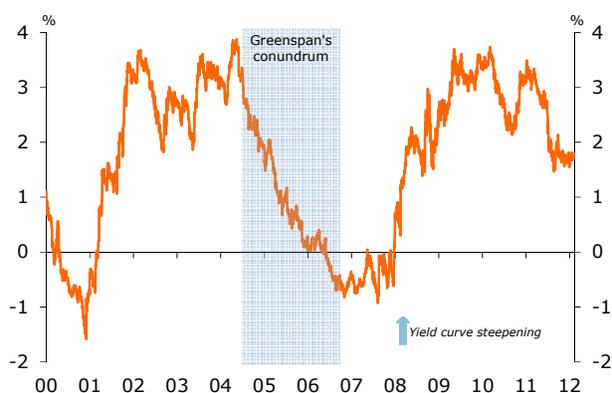
²¹ Many other observers have singled out global imbalances as a key factor contributing to the turmoil. For example, Bernanke (2009), Council of Economic Advisers (2009), Dunaway (2009), Eichengreen (2009), King (2010), Kohn (2010), Krugman (2009) and Portes (2009).

Blame the monetary authorities

Normally, an abundance of credit fuels inflation, which results in a tightening of monetary policy. However, in the period 2000-2007, inflation in the advanced economies was actually very low by historical standards. This was to large extent due to the emergence of China as the 'manufacturer for the world' following its inclusion in the World Trade Organisation in 2001. The excess supply of labour in the East depressed consumer prices globally. The absence of visible (and narrowly defined) inflationary pressures allowed inflation-targeting central banks to keep monetary policy very loose after the collapse of the dot-com bubble.

The accommodative monetary stance worldwide certainly boosted even more liquidity into the global monetary system. With an artificially low policy rate, banks could gorge themselves on cheap funding and boost their leverage ratios further. Not everyone is convinced though. The impact of accommodative monetary policy on house prices could have been overstated according to some scholars. Del Negro and Otrok (2007) found that the low Fed funds rate had a small influence on the overall housing price increase in the US. Merrouche and Nier (2010) likewise do not find that differences in monetary policy had an effect on the build-up of financial imbalances when capital flows are accounted for. Looking across countries, the IMF found that while in many economies policy rates had been low by historical standards, there was virtually no association between measures of the monetary policy stance and house price increases across advanced economies (Kamalodin, 2010). This is because the latter is usually determined by long-term interest rates, which monetary authorities have no (direct) control over. In fact, the former Fed Chairman, Alan Greenspan, mentioned in his testimony to the Congress (February 2005) that he was puzzled by the low long-term interest rates (including mortgage rates) given that the Fed was on a tightening cycle and macro fundamentals were relatively strong – a development that is now dubbed 'Greenspan's conundrum' (see figure 19).

Figure 19: Gov. bond yield (10y) minus policy rate



Source: Reuters EcoWin, Rabobank

Blame the regulators and bankers

The drop in yields to historic lows during the 2000s did not need to end in financial catastrophe per se. The decision of recipients of capital (i.e. the deficit countries) to frontload consumption or invest in unprofitable/risky areas such as real estate was a key contributing factor to the crisis. And this is where banks come into the picture. So the question that needs to be asked is the following: why were banks engaging in such risky lending with borrowed money? To answer this we will first focus on the policy failures of the financial watchdogs and then turn our attention to banks' inappropriate risk management practices.

a. The failure of regulators

In many ways the collapse of the global financial system reflects a systemic failure of the governance of financial regulation – the system associated with designing, enacting, implementing, and reforming financial policies (Levine, 2010). As memories of the Great Depression dimmed, the advantages of liberalising financial markets and encouraging financial innovation acquired more weight in policy discussions. This was to a large extent pushed by the powerful financial industry (Igan and Mishra, 2011). In the US alone, the financial sector expended USD 2.7 billion in reported federal lobbying costs between 1999 and 2008; individuals and political action committees in the sector made more than USD 1 billion in campaign contributions (FCIC, 2011).

The rapid process of deregulation allowed financial institutions to significantly boost their leverage ratios. In the US, some of the financial institutions were levered 35:1 or higher.²² This meant that every USD 35 of assets was financed with USD 1 of equity capital and USD 34 of debt. This made these firms enormously profitable when times were good²³, but incredibly sensitive to even a small loss, as their entire capital stock would be wiped out. With hindsight, we can safely argue that allowing banks to lever-up their bets in order to maximise profits during tranquil times was a huge policy error. As Claessens et al. (2010) note, the build-up of an unusually high degree of leverage in financial institutions strongly contributed to the propagation of shocks across the global financial system.

On top of higher leverage, banks were permitted to reduce the capital that they held by shifting assets to various legal entities (e.g. conduits and SIVs) that they did not own. Regulators did not seem to care about, or they simply ignored, the implicit contingent liabilities that this entailed for banks. Part of the blame, according to Coval et al. (2009),

²² In 2007, the leverage ratios of Bank of America, Citigroup, Morgan Stanley, Goldman Sachs and Lehman Brothers were 35:1, 48:1, 40:1, 32:1 and 40:1, respectively. But the kings of leverage were Fannie Mae and Freddie Mac. By the end of 2007, their combined leverage ratio stood at 75:1.

²³ Consider the following example: if an investor uses EUR 100 of his own money to purchase a security that increases in value by 10%, he earns EUR 10. However, if he borrows another EUR 900 and invests 10 times as much (EUR 1,000), the same 10% increase in value yields a profit of EUR 100 (i.e. his return would be 100%). There is a catch though. If the investment sours, leverage magnifies the loss just as much. A decline of 10% costs the unleveraged investor EUR 10, leaving him with EUR 90, but wipes out the leveraged investor's EUR 100.

lies with the minimum capital requirements set forth in Basel I and II. Under these guidelines, banks could bundle shaky loans into investment products that seemed to offer investors the best of both worlds – high-yield, risk-free assets (it was later discovered that in many cases, these assets were actually loaded with systemic risk and which was inadequately rewarded). Most of these securities acquired the highest rating from the three largest rating agencies. Banks holding AAA-rated securities were required to hold only half as much capital as was required to support other investment-grade securities. The small yield advantage in AAA-rated structured finance securities (compared to AAA-rated public debt) during a period of very low interest rates led to a dramatic increase in the demanded quantity. In essence, the structured finance machinery enabled the creation of securities that had a yield advantage over government bonds while, according to the rating agencies, carrying the same risk. To this end, financial institutions were more than willing to supply these highly demanded assets. Between 1990 and 2006, triple-A assets across the world rose from a little over 20% of total rated fixed-income issues to almost 55%. This was mostly thanks to the securitisation process. Specifically, during this period, asset-backed securities (ABSs) accounted for 64% of the total growth of gross issues of long-term fixed-income AAA-rated assets, compared with 27% attributable to the growth in public debt, 2% to corporate debt and 8% to other products (BIS, 2011).

The shared belief of regulators was that securitisation would disperse the risks associated with bank lending as deep-pocketed investors who were better able to absorb losses would share the risks. The huge lesson learnt from the crisis was that securitisation actually managed to concentrate risks in the banking sector as banks and other financial institutions maintained a significant exposure to mortgages, MBSs, and CDOs (Acharya et al. 2010). The reason was that the structured finance business offered enormous short-run payoffs, which seemed too compelling to ignore. By 2006, structured finance issuance led Wall Street to record revenue and compensation levels²⁴ (Coval et al., 2009). When the structured finance market came crashing down in late 2007, banks found themselves holding hundreds of billions of dollars of toxic waste they could not easily dispose of.

Regulators also missed the fact that the originate-to-distribute model brought about by securitisation reduced the incentives for the originator of the claims to monitor the creditworthiness of the borrower (Keys et al., 2008). This was not too difficult to assume because the originator had little or no skin in the game. In the securitisation food chain, every intermediary in the chain was making a fee; eventually the credit risk got transferred to a structure that was so opaque even the most sophisticated investors had no real idea what they were holding. The mortgage broker; the home appraiser; the bank originating the mortgages and repackaging them into MBSs; the investment bank repackaging the MBSs into CDOs, CDOs of CDOs (CDO-squared), and even CDO-cubed – each of these intermediaries was earning income from charging fees for their step of the intermediation

²⁴ The top employees of the five largest investment banks in the US divided a bonus pool of over USD 36 billion in 2007 (Reinhart and Rogoff, 2009).

process and transferring the credit risk down the line. This is why mortgage brokers in the US started offering teaser rates, interest-only mortgages, no-documentation mortgages, piggyback mortgages (a combination of two mortgages that eliminates the need for a down payment), and NINJA ('no income, no job or assets') mortgages to entice people to buy homes. Indeed, the Federal Bureau of Investigation (FBI) publicly warned in 2004 of an epidemic of fraud in subprime lending (Levine, 2010). Lower lending standards were perhaps tolerated amid the fast rate of house price appreciation, which was consistent with the notion that not only house-buyers, but regulators as well were gambling on a continuing housing boom. We now know that the reduction in credit quality ultimately added to the fragility of the financial system.

Supervisory authorities not only did not discourage the build-up of off-balance sheet risk exposure, they almost completely neglected the relevance of liquidity risk in the financial markets. As Goodhart (2008) notes, until about the end of the 1960s, commercial banks in the UK, and indeed around much of the rest of the industrialised world, held some 25%, or more, of their assets in real liquid assets. These were largely government debt. Ever since, the share of claims on the public sector in bank assets has been going down steadily and has been replaced by private sector assets (e.g. MBSs and CDOs). These were liquid so long as investors trusted them. Once confidence evaporated in a puff of smoke, these assets became highly illiquid. Financial institutions were also increasingly reliant on wholesale funding and on the short-term credit market, which made them vulnerable to liquidity crunches and disruptions to their funding (Bologna, 2011). The liability structure of Bear Stearns was an extreme example of this. At the end of 2007, Bear Stearns had USD 11.8 billion in equity and USD 383.6 billion in liabilities and was borrowing as much as USD 70 billion in the overnight market (FCIC, 2011). The funding structure of the financial sector was very different during the 1960s and 1970s whereby banks mostly funded their assets on the basis of relatively more stable retail deposits (Goodhart, 2008).

The final shortcoming on the part of the regulators was their lack of appreciation of how complex the global financial markets had become. In particular, counterparty risk in the market place was fully ignored. To make this point clearer, consider the decision of regulators to permit banks to use CDSs²⁵ to reduce capital reserves. Hedging risks of, say, mortgage defaults via CDSs makes perfect sense if the counterparty, that is deemed reliable, simply assumes that role. However, given the active trading of CDSs, it was at times almost impossible to identify the actual counterparty legally responsible for compensating a bank if an 'insured' security failed. This pass-the-hot-potato game went on and on until it became impossible for *anyone* to know where risk was eventually parked. At the end of the day, as the executive director of the financial stability department of the Bank of England argues, knowing your ultimate counterparty's risk became like solving a high-dimension Sudoku puzzle given the complexity of the financial system (Haldane,

²⁵ Based on survey data from the BIS, the total notional amount of the CDS market was USD 6 trillion in 2004 and reached USD 57 trillion by June 2008 (Stulz, 2010).

2009). Moreover, the counterparty could decide to hedge many other positions without asking anyone's permission. For example, AIG assumed the role of *hedger-of-last-resort* by betting that nothing would go wrong *at once*. This is similar to insuring all houses in your neighbourhood against damage. You are bound to make quick and easy money until disaster strikes. The supervisors only noticed this and took action when it was too late.

b. The failure of bankers

It is not fair to put the blame squarely on financial regulators. Financial institutions needed to conduct prudent risk management in order to minimise potential costs and thereby maximise returns for their shareholders. So why did they utterly fail in recognising limitations in risk management practices?

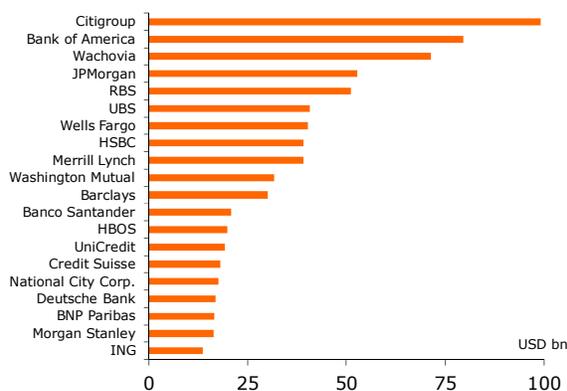
One explanation is that banks were encouraged by the development of risk models (Eichengreen, 2008). Physicists and mathematicians were increasingly hired by Wall Street (and later in other advanced countries) to develop computer models that 'managed' to quantify and hedge risks. These rigorous models, which almost no bank CEO understood completely, promised to provide 'exact' information and this, in effect, emboldened bankers to believe that the additional leverage was safe since they now used scientific techniques to manage risk (Schneider and Kirchgässner, 2009). However, these so-called quants did not realise that their models could not incorporate counterparty risk. Designing CDSs and other complicated insurance contracts is not enough if the counterparty has insufficient capital to make good on its promise.

Another explanation is the banking sector's poor due diligence practices (Tabellini, 2008), including excessive and misplaced reliance on credit rating agencies (CRAs). This was partly because the readily available information was sometimes useless. Bankers, for example, would need to read 30,300 pages worth of information for every CDO purchased to be aware of everything that was being acquired. For understanding the risks of a CDO-squared, 1,250,000,300 pages had to be read (Haldane, 2009). Since no one had the time nor the inclination to read so many pages, banks decided to blindly believe the ratings given by CRAs. They did not realise at the time that the structured finance market could dry up very fast if the ratings given by CRAs were not accurately reflecting the risks they were taking.

Acharya et al. (2010) believe that the role of poor governance in the banking sector was also non-negligible. More specifically, the remuneration system in many banks in most countries rewarded myopic risk-taking behaviour. Since a large fraction of payment was in the form of bonuses tied to short-term profits, and because such bonuses were asymmetric (substantial and positive when times were good and at worst zero when returns were poor), bankers had a huge incentive to take larger risks than warranted by the goal of shareholders' long-run value maximisation. The wrong remuneration scheme persuaded bank CEOs to make the wrong choices. Specifically, the career of many CEOs would be very short if they would generate earnings that were low compared to their peers. Against this

backdrop, when a number of leading banks made high returns by investing in questionable assets, the CEOs of other banks were placed under intense pressure to follow suit (Diamond and Rajan, 2009). This point was made painfully clear in the remark of the then-CEO of Citigroup, Chuck Prince, in July 2007. He acknowledged that the credit-fuelled boom would eventually end, but that in the meantime, his firm would continue to participate in the structured finance market (as reported in Nakamoto and Wighton, 2007): *“When the music stops, in terms of liquidity, things will get complicated. As long as the music is playing, you’ve got to get up and dance. We’re still dancing.”* What Mr. Prince did not realise was that the music had stopped long before he made that comment and, the result of his reckless decisions forced the firm to book the greatest loss in the global banking industry (see figure 20). This example leads us to conclude that even if CEOs recognise that a given strategy is not truly value-creating, a desire to pump up their share prices in the short-term to please stock holders can force them to maintain the status quo.

Figure 20: Total credit losses/writedowns of the hardest hit banks (top 20, until mid-2011)



Source: Bloomberg

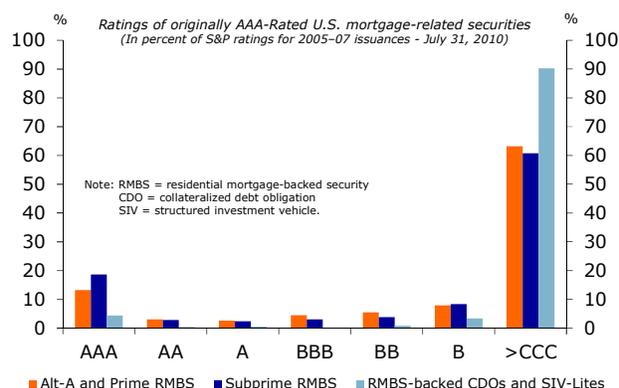
Blame the credit rating agencies

As expressed in the previous section, banks and regulators had a strong sense of trust in the competence of the CRAs even though they had made numerous mistakes in the past. Since investors do not often know as much as issuers about the factors that determine credit quality, credit ratings address an important problem of asymmetric information between debt issuers and investors. Hence, CRAs provide an independent evaluation and assessment of the ability of issuers to meet their debt obligations.

Sadly, these institutions failed miserably in spotting the risks building up in the world of structured finance products. The BIS (2011) shows that during the period 1990 to 2006, the average percentage of corporate issues with a AAA rating, compared with total corporate issues, was 9%; this proportion reached 48% for sovereign issues, and 75% in the case of

securitisations. To take an example, in 2006 alone, Moody's put its triple-A stamp of approval on 30 mortgage-related securities every working day. Shockingly, 83% of the mortgage securities rated triple-A that year were eventually downgraded (FCIC, 2011).

Figure 21: Ratings being downgraded



Source: IMF

With the benefit of hindsight, it can be argued that rating agencies were too optimistic about securitised products (see figure 21). But what explains this optimism? There are a number of explanations. The first is that data samples used to rate securitised products were often very short and mostly included a period of rapidly rising house prices (Danielsson, 2008). This meant the models could not account for a crash in the housing market. The second explanation is that the rating agencies' models underestimated the default correlation in mortgages by assuming that mortgage defaults are fairly independent events. This may hold true from a mathematical point of view²⁶, but even a cursory glance at history reveals that mortgage defaults become highly correlated during housing market downturns. Finally, there are some who place most of blame with the CRAs' conflict of interest – and not the models – as the real reason behind their optimism (Buiter, 2007). This is primarily because the originator, rather than the investor, pays for the rating. Essentially, issuers could shop around for the best rating and, given the enormous quantity of securitised products on offer, CRAs would have been enticed to grant generous ratings to attract originators. In 2006, Moody's reported that 44% of its revenues came from rating structured finance products, surpassing the 32% of revenues from their traditional business of rating corporate bonds (Coval et al., 2009). That said, the Committee on the Global Financial System from the BIS investigated this concern and concluded that it was no more severe for securitised products than for single-name credit products, arguing that reputation was a strong force against bad behaviour in both markets (Coval et al., 2009). So the jury is still out as to whether the long-run reputation damage outweighs the short-term profits.

²⁶ The assumption was: the larger the number of loans pooled, the smaller the probability of default due to imperfect correlation (Portes, 2009).

Blame the government

Governments around the world have been big cheerleaders of increased home-ownership. This strategy was a sure-shot way to win the hearts and minds of potential voters while boosting job creation, as the construction sector is very labour intensive. The conviction that everyone must be able to become home-owners was particularly strong in the US. In a famous remark in Atlanta, Georgia in 2002, the former US president, George W. Bush, claimed: *"I do believe in the American Dream...Owning a home is a part of that dream; it just is."* No wonder that Americans believed they were simply realising the American Dream by buying houses they could not afford. Of course, the Bush administration did not try to boost home-ownership through fancy statements only. They ensured that this 'dream' would come true by encouraging GSEs such as Fannie Mae and Freddie Mac to purchase mortgages originated by local banks and mortgage brokers. Subsequently, mortgages were repackaged into MBSs, and resold in capital markets with the implicit (that later became explicit) guarantee of the US government, which made them highly attractive to global investors.

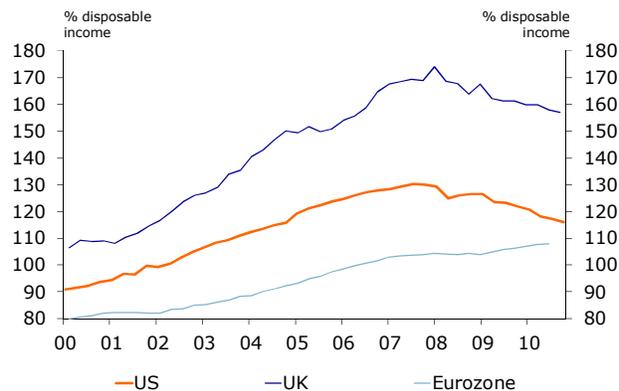
In 1996, the department of Housing and Urban Development (HUD) required that 12% of all mortgage purchases by the GSEs to be 'special affordable' loans, typically to borrowers with incomes less than 60% of their area's median income. That number was increased to 22% in 2005 and the 2008 goal was 28%. Against this background, origination of subprime mortgages grew from USD 96.8 billion in 1996 to roughly USD 600 billion in 2006, accounting for around one quarter of all mortgages issued that year in the US (Coval et al., 2009). Mind you, the GSEs also managed to purchase hundreds of billions of dollars' worth of subprime securities for their own portfolios to make money and help satisfy the government's affordable housing goals. In any case, demanding that GSEs do more to increase home-ownership among less well-off allowed the administration to subsidise low-income housing outside of the budget. Arguably, a very smart strategy to win votes in the short-term. What the government failed to realise was that they were on the hook if the housing market turned for the worse.

Blame the borrowers

If you ask people on the streets what the causes of the current crisis are, you will most probably get answers that associate it with some mix of bankers' greed (i.e. predatory lending), regulators' incompetence, and overly loose credit conditions. This is quite strange as no one seems to blame those who have borrowed money in the first place. After all, if it was not for households' decision to increase their indebtedness²⁷ (see figure 22) in order to frontload consumption and/or purchase assets, there would be no financial crisis. To paraphrase Shakespeare, the fault lies not in the stars, but in us.

²⁷ The mortgage debt of American households rose almost as much in the six years from 2001 to 2007 as it had over the course of the country's more than 200-year history (FCIC, 2011).

Figure 22: Household debt



Source: IMF

So why did households make wrong investment and consumption decisions? To appreciate this we will need to take stock from behavioural economics²⁸. Scholars have shown that it is indeed very difficult for people to correctly assess all the risks involved in borrowing money (Berthoud and Kempson, 1992). The US subprime crisis was a clear illustration of this, as Americans opted to purchase houses even though they had no jobs, no incomes nor any assets. Many clearly committed themselves to ill-understood financial contracts on the premise that house prices can only go in one direction, namely upwards.

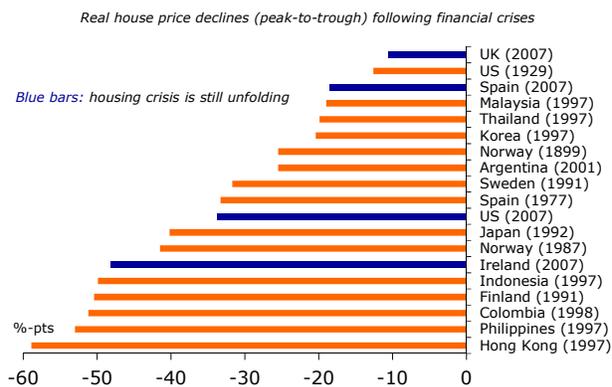
We need to stress that our lack of understanding about the exact costs of credit use (i.e. financial illiteracy) is not the only factor that makes us vulnerable to incorrect decisions. Another reason why we tend to increase our indebtedness to unsustainable levels is because of our present-bias preference –we focus more on the present and prefer to spend our money immediately rather than later (Frederick et al., 2002). This bias will become more destructive when it is combined with our competitive nature. Research shows that our well-being is negatively affected when we see others, especially our friends and relatives, becoming wealthier by the day. So if we have fewer financial resources available to buy assets, goods or services compared to others, we may try to close this financial gap by simply borrowing (instead of waiting to save enough money). This is exactly the reason why we observe herd behaviour in all societies. When everyone's getting rich by, say, investing in real estate, we also tend to buy a house to 'keep up with the Joneses'. In the age of credit, no one wants to miss the high speed train to prosperity. When credit is offered on lax conditions, we find it even more difficult to refuse it (Soman, 2001). Boeri and Guiso (2008) claim that the low borrowing rates in the US attracted throngs of borrowers who were seduced by the possibility of acquiring assets that had always been beyond their means. Not only were people buying homes they could not afford, but they were at times using them as

²⁸ This relatively new discipline of economics draws its conclusions from actual laboratory experiments involving real people.

their own ATM machines. This was particularly problematic in the US as people used their houses as collateral to seek extra credit which was used to send their kids to college, pay medical bills, install designer kitchens, or purchase cars. Survey evidence from the Fed shows that about 5% of US homeowners pulled out equity to buy a car and over 40% spent the cash on a catchall category including clothing, gifts, tax payments, and living expenses (FCIC, 2011).

It is important to note though that overconsumption and, especially asset price bubbles, occur even when credit is *not* readily available. The long history of bubbles and manias show that excessive euphoria concerning a specific asset class (e.g. tulips in the 1630s, IT shares in the 1990s or houses in the 2000s) is enough to push prices into bubble territory. This is due to our optimism bias and illusory superiority (or hubris), which makes us buy assets with the intent of selling at a profit to “a bigger fool” who is expected to come along soon (Akerlof and Shiller, 2009). In the meantime, we concentrate solely on the news that vindicates our original thought while trying to ignore all contradictory information (this is known as confirmation bias or ‘the ostrich effect’).

Figure 23: Household debt



Source: Reinhart and Rogoff (2009), Reuters EcoWin

We also tend to make the wrong choices due to our short memories (or ignorance of history) that regularly makes us oblivious of previous financial disasters. In their extensive work on financial crises over the past 800 years, Reinhart and Rogoff (2009) show that people permanently suffer from the so-called ‘this-time-is-different’ syndrome –the belief that financial crises are something that happens to other countries at other times because their country has the right policies, has learnt from its mistakes and is built on sound fundamentals. Put differently, American home-buyers thought that the collapse of house prices throughout the world on numerous occasions in the past was completely irrelevant. Their housing market was supposedly on a solid footing. At least that is what they believed after having listened to Ben Bernanke’s testimony to the Congress a year before the bubble

burst (i.e. 2005): "... at a national level [house] price increases largely reflect strong economic fundamentals." The Americans were not alone in this. The Irish, Danes, Spaniards, British and most of the people living in the other countries experiencing a housing market bubble believed in the notion that the rich history of housing market crashes was not relevant in their case (see figure 23). Sadly, this will not be the last housing bubble and there will be many more to come. Every time we will be under the illusion that this-time-is-really-different!

3. Conclusion

The evidence provided in this chapter shows that the current financial crisis can only be understood if one looks at the big picture. Arguably, none of the actors had a leading role, but everyone played their part in bringing about this crisis.

The emerging countries had a key position from the very start. Their emergence as a new source of financial capital since the early 2000s helped to fuel a credit boom in many advanced economies. In the meantime, inflation in the Western world remained at historical low levels as cheap goods from the East were flooding the markets. This gave the monetary policymakers the illusion that they can keep policy rates too low, for too long in order to buoy growth. Regrettably, they did not take account of the other type of inflation, namely asset price inflation, that was brewing in the background.

Even bank regulators were caught unawares. Financial deregulation had been the ruling dogma since the 1970s. Once the crisis made landfall and regulators realised they had been smacked in the face by the invisible hand of the markets, they made desperate attempts to minimise the damage. They had some success in doing so until they allowed Lehman to fail in September 2008 amid fears of stoking moral hazard in the marketplace. This decision truly took the world economy to the edge of the abyss. Trust, which is arguably the most valuable commodity in the financial markets, vanished in the blink of an eye. Liquidity dried up completely as uncertainty regarding the health of the banking sector rose to unprecedented levels.

The policy errors of the regulators notwithstanding, bankers' search for a quick buck pushed the global financial system towards the brink of total meltdown. Through financial alchemy, banks developed structured finance products that 'transformed' risky loans into highly-rated securities and chose to hold onto them (either on or off-balance sheet) in the hope of boosting their risk-adjusted returns. Once the US housing downturn started pushing down the ratings on these securitised products, thereby their prices, banks realised that they cannot get rid of them as quickly as they thought. The plunge in prices of MBSs and CDOs resulted in huge losses for the industry as a whole.

The rating agencies' lack of understanding of the complexity of securitised products further exacerbated the problem. Although these agencies constantly remind us that their role is merely 'advisory', their judgment is highly respected by regulators and bankers alike. The fact that the CRAs believed that the US housing market would never experience a downturn nationwide is extremely disappointing given their knowledge about past housing busts across the world. Had they acknowledged this earlier (i.e. given lower ratings to securitised products), they could have minimised the losses in the financial industry.

Governments contributed to the crisis in two ways. Firstly, they boosted the confidence of potential home-buyers by making them believe that everyone deserves to have their own home regardless of their financial situation. Secondly, they supported the housing market through numerous measures. These include social housing policies to benefit low-income and first-time homebuyers; tax incentives; state-owned financial institutions that originate mortgage loans; and state-sponsored housing finance agencies that (mostly) provide liquidity facilities for the mortgage markets. Had governments left the housing market to its own devices, prices might have dropped at an earlier stage or never have appreciated in an unsustainable pace in the first place, thereby limiting the damage to the private sector. Thus, meddling with the housing market through direct and indirect policies was a rather big mistake on their part.

Finally, home-buyers were under the false impression that houses have only way to go: up. As some got wealthier by investing in real estate, others decided that they also wanted a piece of the pie. No one cared that valuations were out of whack. Euphoria got the best of us once again. What made matters worse this time round was that the housing bubble was fuelled by rapid credit expansion. The sudden surge in jobless rates and drop in real incomes in the aftermath of Lehman bankruptcy meant the painful deleveraging process had to take place at a far faster speed than was desirable.

To be sure, this will not be the last crisis the world will ever see. To be sure, we are still grappling with the hangover in terms of a sovereign debt crisis in the eurozone. Still, we can draw a broad lesson from this horrendous crisis, which is that the complex interaction of mistakes and policy failures makes financial crises extremely difficult to predict, especially in terms of their timing. All we can hope for is to put in place better/smarter policies to reduce their frequency and severity. There is a lot of work to be done and we probably won't have much time before the next one hits.

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Appendix

Banking crises policy responses in the advanced economies (2007-09)

Countries	Liquidity support	Gross restructuring costs	Asset purchases	Asset guarantees	Guarantees on liabilities	Nationalisation
	% of deposits and liabilities to non-residents	Recapitalization and other restructuring costs, excluding liquidity and asset purchases, in % of GDP	Funded by treasury and central bank % of GDP	Funded by treasury and central bank % of GDP	Significant guarantees on bank liabilities in addition to increasing deposit insurance ceilings	State takes control over institutions
Austria	8.2	2.1		0.6	Unlimited coverage to depositors Bank and non-bank bond issues	Hypo Group Alpe Adria
Belgium	14.0	5.0		7.7	DI raised from €20,000 to €100,000. Deposit-like insurance instruments. Interbank loans and short-term debt Specific guarantees on Dexia	Fortis
Denmark	10.5	2.8			Deposits and unsecured claims of PCA banks	Fionia Bank
Germany	2.8	1.2	0.2		Unlimited coverage of household deposits. Interbank loans and bank debt (capped at €400 billion).	Hypo Real Estate
Iceland	2.4	13.0			Unlimited coverage to domestic deposits	Kaupthing, Landsbanki, Glitnir, Straumur-Burdaras, SPRON and Sparisjóðabankinn
Luxembourg	4.3	7.7			DI raised from €20,000 to €100,000. €4.5 billion guarantee on Dexia's debt.	Fortis and Dexia's subsidiaries
Netherlands	3.3	6.5		3.3	DI raised to €100,000. Interbank loans of solvent banks Fortis bonds (€5 bn) and Dexia's debt	ABN AMRO/Fortis
United Kingdom	5.5	5.1	13.4	14.5	DI raised from £ 35,000 to 50,000. Guarantee on short- to medium-term debt (capped at £ 250 billion). Blanket guarantee on Northern Rock and Bradford & Bingley wholesale deposits	Northern Rock, RBS
United States	4.6	3.5	9.0		DI raised from \$100,000 to \$250,000 (until end-2009). Money market funds (capped at 50 billion). Full guarantee on transaction deposits. Newly issued senior unsecured debt	Fannie Mae, Freddie Mac, AIG
France	6.4				DI already higher than EU new limit. €360 billion in guarantees for refinancing credit institutions. €55 billions Dexia's debt	
Greece	18.3	1.7			DI raised from €20,000 to €100,000. Funding guarantees up to €15 billion.	
Portugal	5.5				DI raised from €25,000 to €100,000. Debt securities issued by credit institutions (up to 12% of GDP)	Banco Portugues de Negócios
Italy	2.5	0.8				
Ireland	13.3	7.6			Unlimited coverage until 9/29/10 to most liabilities of 10 banks	Anglo Irish Bank
Spain	4.1				DI raised from €20,000 to €100,000. Credit Institutions New Debt Issues (capped at €200 billion)	
Sweden	13.1	0.7			DI raised from SEK 250,000 to SEK 500,000. Medium-term debt of banks and mortgage institutions (up to SEK 1.5 trillion).	
Switzerland	2.8	1.1	6.7		DI raised from SFr 30,000 to SFr 100,000 until 12/31/11.	
Japan	1.1	0.1	1.1	2.6		

Source: Laeven and Valencia (2010)

Jargon buster

Asset backed corporate paper (ABCP): is a form of commercial paper that is collateralized by other financial assets. Commercial Paper is a money-market security issued by large banks and corporations to get money to meet short term debt obligations and is only backed by an issuing bank or corporation's promise to pay the face amount on the maturity date specified on the note.

Breaking the buck: Under SEC regulations, money market funds that serve retail investors must keep two sets of accounting books, one reflecting the price they paid for securities and the other the fund's mark-to-market value (the 'shadow price', in market parlance). Funds do not have to disclose the shadow price unless their net asset value (NAV) falls to USD 0.995 per share. Such a decline in market value is known as '**breaking the buck**' and generally leads to a fund's collapse.

Certificates of deposits (CD): Is a time deposit, a financial product commonly offered to consumers in the US by banks. CDs are similar to savings accounts in that they are insured and thus virtually risk-free. They are different from savings accounts in that the CD has a specific, fixed term (often 3 months, 6 months, or 1-5 years), and, usually, a fixed interest rate.

Collateralised debt obligation (CDO): Despite the relatively high returns of MBSs, tranches rated other than triple-A were sometimes hard to sell. Wall Street came up with a solution: they would buy these low investment-grade tranches, largely rated BBB or A, from many MBSs and repackage them into the new securities called CDOs. Approximately 80% of these CDO tranches would be rated triple-A despite the fact that they generally comprised the lower-rated tranches of MBSs. CDOs would be sold in tranches as well, with the risk-averse investors, again, paid first and the risk-seeking investors paid last.

Common equity (or core Tier 1 capital): is the first buffer to absorb unexpected losses and is always available. It consists of common shares (commercial banks) or member certificates/cooperative shares (cooperative banks) and retained earnings.

Conduits and special investment vehicles (SIVs): They are finance companies established to earn a spread between their assets and liabilities; much like a traditional bank. Their strategy is to borrow money by issuing short-term securities, at low interest rates and then lend that money by buying longer term securities at higher interest rates. Long term assets could include, among other things, mortgage backed securities (MBS), bank bonds, and corporate bonds. Conduits are 100% bank liquidity backed, commercial paper (CP) financed vehicles that invest in assets. So the CP investor is exposed to the bank that pays under the liquidity facility if CP cannot be rolled. SIVs, in contrast, are only partially backed by bank liquidity. Therefore, CP investors are exposed both to the bank liquidity providers, and potentially to asset values, should bank liquidity not be sufficient to cover CP maturing.

Current account balance: This is the sum of the exports minus imports of goods and services, net factor income (such as interest and dividends) and net transfer payments (such as foreign aid). When a country runs a current account surplus, it increases its net foreign assets by the corresponding

amount. A current account deficit does the reverse. Both government and private payments are included in the calculation.

Credit default Swap (CDS): is a bilateral contract under which one counterparty ('protection buyer') agrees to compensate another counterparty ('protection seller') if a particular company ('reference entity') experiences one of a number of defined 'credit events', such as bankruptcy or failure to meet its obligations. Although there are important legal distinctions, a CDS contract has some similar economic characteristics to an insurance contract under which the seller insures the buyer against default of the reference entity.

Credit spreads: is the yield spread, or difference in yield between different securities.

Deposit guarantee scheme (DGS): has three functions. First, it aims to improve financial stability by preventing unnecessary bank runs. Second, by covering most small deposits it also protects consumers. It does not need to hamper competition, if only a limited part of the amount of savings is guaranteed, leaving a large market open for competition between banks. In fact, and that is the third function, a DGS improves the competitive position of small, systemically irrelevant banks relative to systemically relevant banks (which always operate under the umbrella of an implicit state guarantee).

Money market mutual funds: They invest depositors' money in short-term, safe securities such as government bonds and highly rated corporate debt. These funds differed from bank deposits in one important respect: they are not protected by deposit insurance.

Mortgage backed security (MBS): Is an asset-backed security (ABS) that represents a claim on the cash flows from mortgage loans through securitization.

Originate-to-distribute model: This is a model whereby banks use borrowed money to make loans and then package, repackage, slice and dice them and later sell them as debt securities to investors. This is very different from the traditional originate-to-hold model: banks borrow to make loans and hold them until maturity.

Quantitative easing: In theory quantitative easing can buoy growth through four channels. First, QE lowers the long-end of the yield curve (*interest rate channel*). Second, when interest rates are kept artificially low, yield-seeking investors will be forced into riskier, alternative investments (i.e. asset prices are pushed upwards), which results in a positive wealth effect for the private sector (*portfolio rebalancing channel*). Third, it improves export competitiveness through competitive devaluation of the currency (*exchange rate channel*). Fourth, it boosts banks' reserves thereby helping them in extending more loans (*bank lending channel*).

Repo: A repurchase agreement, also known as a repo, is the sale of securities together with an agreement for the seller to buy back the securities at a later date. The repurchase price should be greater than the original sale price, the difference effectively representing interest, also called the re-

po rate. The party that originally buys the securities effectively acts as a lender. The original seller is effectively acting as a borrower, using their security as collateral for a secured cash loan at a fixed rate of interest.

Securitisation: is the process by which securities are created by a special investment vehicle (SIV) and issued to investors with a right to payments supported by the cash flows from a pool of financial assets held by the SIV. For banks, the benefits of securitisation are large. By moving loans off their books, banks can reduce the amount of capital they hold as protection against losses, thereby improving their earnings. Securitisation also lets banks rely less on deposits for funding, because selling securities generates cash that could be used to make loans. Banks can also keep parts of the securities on their books as collateral for borrowing (particularly from central banks). Prior to the crisis, fees from securitisation were an important source of revenue.

Wholesale capital markets: is a market in which banks lend money to or borrow money from each other for short periods.

Country codes:

PT: Portugal; GR: Greece; ES: Spain; US: United States; ZA: South Africa; IE: Ireland; GB: Great Britain; IT: Italy; IN: India; India; FR: France; BR: Brazil; BE: Belgium; AT: Austria; JP: Japan; DE: Germany; FI: Finland; CN: China; NL: Netherlands; RU: Russia; CH: Switzerland.