

Greeninvestment Club White Paper on the Financial Crisis

(also presented for a course in the MSc Finance program of Trinity College Dublin)

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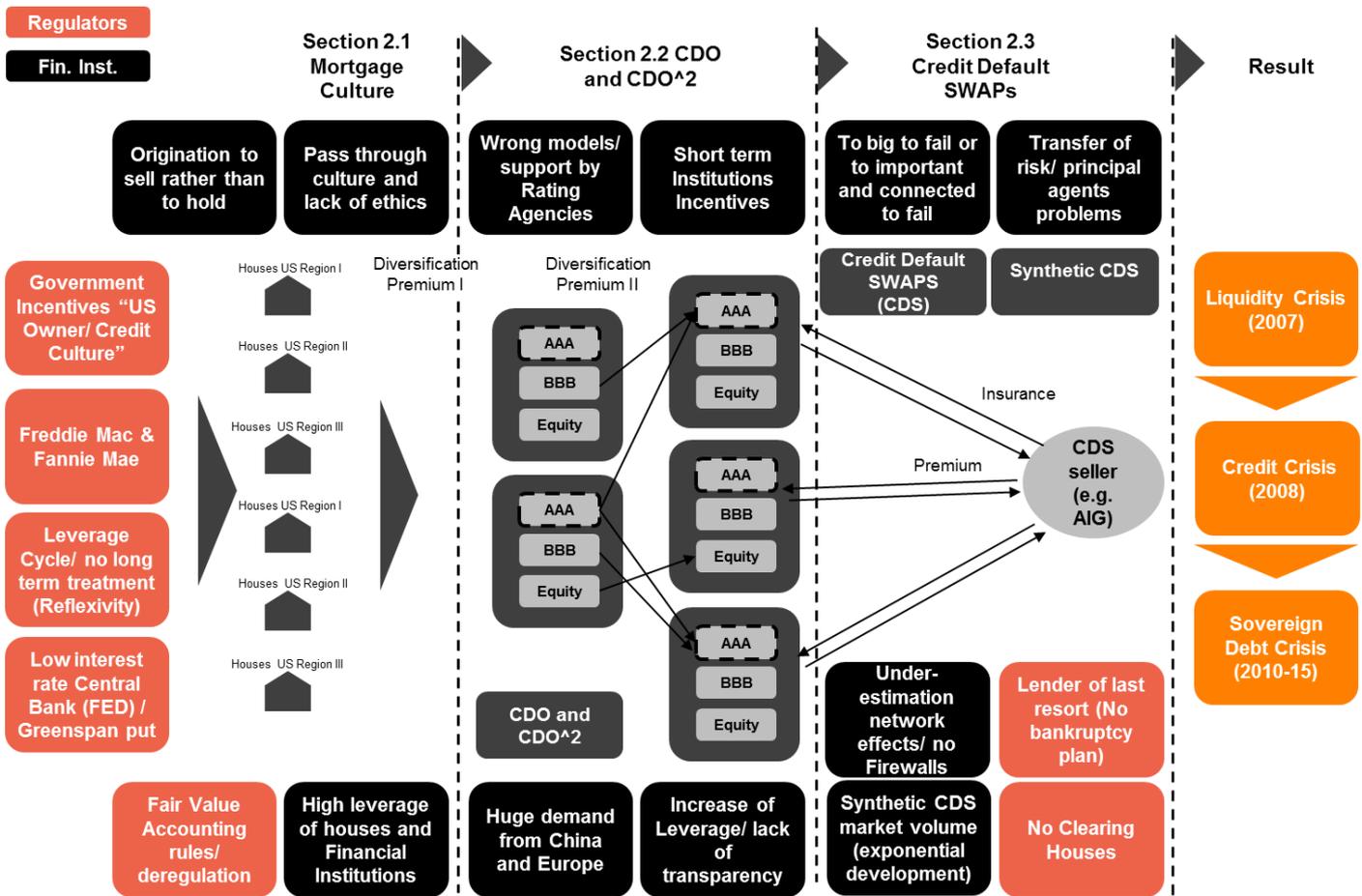
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1 Introduction

This paper will focus on the main causes of the financial crisis and analyse the role of the regulator and financial institutions in it and put emphasize on behavioural aspects. A general overview about the financial crisis is presented by figure 1, which points out various reasons and the structure of the crisis in the process of securitization. Section 2 will focus on the financial crisis from the regulator and financial institution perspective and go along the graph (Section 2.1, Section 2.2 and Section 2.3).

Figure 1 Causes of the crisis along the securitization process



Source: Own illustration

2 Financial Crisis along the securitization process

2.1 Mortgage market

As shown by Figure 1 regulation played a key role in the financial crisis impacting the general housing culture in the US. Implicit reasons are strong **government incentives** resulting in groupthink¹ and herding² in terms of buying houses and consumer goods on credit.³ This includes also from a behavioural finance perspective the “keeping up with the Jones” aspect, supporting a culture of leverage. Another underlying cause of the crisis is **Fair Value Accounting**. Fair Value Accounting requires financial assets to be held at current market price under “normal” market conditions, this resulted in illiquidity and panic selling ending in a vicious cycle in the crisis.

The State supported programs⁴ such as the **Freddie Mac & Fannie Mae** which reinforced in general lending with low loan to income ratios.⁵ The conservatorship of Freddie Mac and Fannie Mae prevented mortgage rates from rising and thereby prohibited further foreclosures and delinquencies with devastating effects on the housing market and the economy.⁶ Finally the **Greenspan put**⁷ (belief that the FED would always come to the rescue if the bubble bust) and macroeconomic policy helped to fuel the credit bubble.

“Without U.S. government policy the great financial crisis of 2008 would never have occurred.” Peter Wallison argues **housing policy** was the sine qua non event for the financial crisis and that all other vulnerabilities only worsened the crisis, but did not cause it.⁸ John Taylor and Ben Bernanke do not share this view⁹: While Taylor believes loose monetary¹⁰ transformed a normal housing cycle into an enormous bubble¹¹, Bernanke blames a decline in lending standards, lax regulation and an emerging economy’ savings glut for the evolvment of the housing bubble.¹²

The result partly due to regulation was that the share of subprime loans increased, accounting for \$2.7 to 4.6 trillion, and the housing market flourished.¹³ Further loan underwriting standards fell: higher LTVs &

¹ (Janis, 1991, p. 247), *Groupthink* meaning that the decision of a group is often biased towards the majority

² This is a situation where, based on the observation of others, individuals take the same decision regardless of their own private signals, believing that others know better. (Sornette, 2003, p. 95) or (Schiller, 2006)

³ (Allen & D., 2007)

⁴ The GSE Act of 1992 required government sponsored enterprises, such as Fannie Mae and Freddie Mac, to give mortgage loans to low- and moderate-income borrowers. Governments set goals for their share of outstanding loans, which rose from 30% in 1992 to 56% in 2008 with additional requirement of 27% to borrowers below the 80% median income threshold. In addition to this regulation, the Community Reinvestment Act of 1995 required insured banks and S&L to give loans to low-income borrowers.

⁵ (Federal Reserve Bank of New York)

⁶ (International Monetary Fund , 2011, p. 22)

⁷ “Job of the central bank: to take away the punch bowl just as the party gets going, Greenspan did not believe in intervention and did not take it away” Paul Kulkarni TCD MSc Finance Securitization Lecture Slide, Part 5

⁸ (Wallison, 2011, p. 2)

⁹ (Bernanke & Gertler, Monetary Policy and Asset Price Volatility, 1999, p. 18)

¹⁰ On December 12, 2007 the FED announced the “Term Auction Facility”, which was supposed to deal with a rising Libor-OIS spread and to prevent banks from having to reveal their assets when accessing the discount window. Following the announcement and implementation of TAF, the 3-month Libor-OIS spread decreased significantly, but started increasing as soon as February '08 towards pre-TAF-levels. TAF worked for reducing the liquidity risk, measured by the OIS-T-Bill-spread, whereas it did not successfully bring down counterparty risk – stated by the Libor-OIS-spread – which became the main problem for the financial sector during 2008.

¹¹ The FED lowered the interest rate in several steps – from 5.25% in September '07 to 0.-0.25% in December '08

¹² (Bernanke, Causes of the Financial Crisis, 2010, pp. 1-2)

¹³ (Federal Reserve Bank of New York)

DTIs, lower documentation, predatory lending practice (e.g. Ninjas). As house prices fell, high LTVs and inability to refinance caused negative equity and crystallization of losses.

George Soros sums up the above discussion based on the ideas of Minsky:

“Each time a financial crisis occurred; the authorities intervened, merged away or otherwise took care of the failing financial institutions, and applied monetary and fiscal stimuli to protect the economy. These measures reinforced the prevailing trend of ever increasing credit and leverage, but as long as they worked, they also reinforced the prevailing misconception that markets can be safely left to their own devices.” (Soros, The Soros Lecture at the Central European University , 2010, p. 39)

This brings us to the two key issues, which are the **Leverage cycle theory**¹⁴ and the influence of powerful financial institutions on their own regulation (**Theory of reflexivity**)¹⁵. Reflexivity is an important concept which ensures that financial institutions have an influence on their own regulation, making sure that the reality becomes the reality in their favour. This effect should not be underestimated and worked well to legalise Credit Default Swaps (see Section 2.3).

Geanakoplos focuses on the leverage cycle. His key findings are that the possibility to leverage collateral had a real effect on house prices, because of collateral optimists where able to leverage further and had a stronger impact on market prices¹⁶ (Compare figure 2). The leverage cycle also is related to liquidity functioning as a hedge against crisis for agents. Thus agents hedging themselves against a crisis are only willing to buy assets at a large discount.¹⁷ As holding liquidity provides an opportunity cost, the amount of liquidity in the system will always be based on wrong incentives and be too low, especially for banks.¹⁸ Theoretical models and also University textbooks did not account for the leverage cycle theory and again here reflexivity had its impact on reality.

¹⁴ A further mathematical proof for the problem is provided by Geanakoplos in his Open Yale Lecture. (Geanakoplos, 2010)

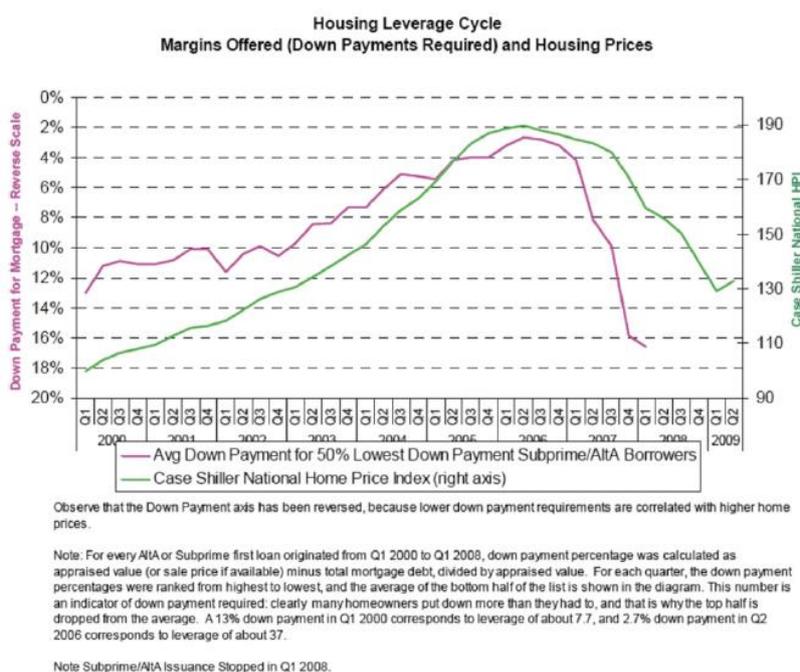
¹⁵ The other half is that mispricing itself can change reality to some extent. Thus, investing itself can change the fundamental values. If this statement were true, reality would be shaped by the interests of financial markets as well as the other way around. That is what George Soros calls *reflexivity*. (Soros, 2008). For example the recent success against Basel III compare (Financial Times, 2013)

¹⁶ More detailed description of the Theory can be found here: (Geanakoplos J. , Solving the Present Crisis and Managing the Leverage Cycle, 2010) and (Geanakoplos J. , The Leverage Cycle, 2010)

¹⁷ (Janeway, 2012, p. 157)

¹⁸ (Allen & D., 2007, pp. 127-128)

Figure 2 Housing leverage cycle



Source: (Ganakoplos & Fostel, 2012, p. 502)

Finally Kindleberger and Aliber as well as Reinhart and Rogoff, all support the statement that private debt often fueled by capital from abroad are key conditions during financial crisis.¹⁹

2.2 CDO market

Due to securitization and the repacking of mortgages into CDOs, CLOs or RMBS²⁰, banks were working with the 'Originate-to-distribute' model rather than 'Originate-to-hold' model also related to company incentives and regulation²¹. The CDO market really took off supported by huge demand not for risky but for riskless AAA rated assets from **China and Europe**²². The demand also stimulated a further increase in prices.²³ The huge demand for *riskless* CDO was relying on models from Rating Agencies calculating the benefits of diversification assuming low correlation between house prices. Alternatives such as CoVaR methods²⁴ and updates of system wide correlation and further stress during crisis were only recently developed.²⁵

The market of rating agencies was also regulated in a oligopolistic structure and wrong **incentives**, because rating agencies, get paid by the issuer rather than the investor. Complex structures and the repackaging of CDO to CDO² resulted in a **lack of transparency** and lead investors to underestimate

¹⁹ (Reinhart & Rogoff, 2009, p. 157), (Kindleberger & Aliber, 2011)

²⁰ Collateralized Debt Obligation, Collateralized Loan Obligation and Residential Mortgages Backed Securities

²¹ Bankers become more mortgage salesman rather than bankers focused on a rigorous risk return analysis for each loan.

²² Europe was affected in form of banks, such as IKB and WestLB, suffering huge losses from exposure to American money markets and subprime mortgages respectively.

²³ (Fostel & Geanakoplos, 2012, p. 191)

²⁴ (Brunnermeier & Adrian, 2011)

²⁵ In June 2012 Moody's adjusted the methodology further by introducing a Minimum Portfolio MILAN CE and the Minimum expected loss multiple. The Minimum Portfolio MILAN CE should incorporate more country risk and market uncertainties, system wide event risk and asset correlation (Moody's, 2012)

risk. Securitization technology permitted low quality risky assets to be transformed to highly-rated securities (compare Figure 1). The theory that securitization transferred credit risk to investors around the world, did not work out due to behavioral biases and incentives to put toxic assets into securitization. Still Financial Institutions (FI) retained exposure to risk through provision of warehouse lines, liquidity/credit support to conduits and investing in CDOs MBS (through off balance sheet exposure).

Daniel Ariely shows in an interesting way how wrong incentives on a micro level can result in catastrophic outcomes on a macro level. He emphasizes that the distance between our action and responsibility creates unsocial/unethical²⁶ decisions, this distance was created by securitization.²⁷ Moreover employees of rating agencies get lower salaries and jobs are not well respected as investment banking. Consequently on average smarter people were working in Investment banks stimulated to benefit from the not perfect rating models on a micro level.

Ultimately the introduction of Credit Default SWAPs allowed Banks to transfer the default risk again of their books and make a profit along the securitization chain. Only a few investors such as Michael Lewis understood the whole fragility of the system and emphasize from an insider perspective also how difficult it was to bet against the market.²⁸ The difficulty of betting against the market and a complex system which results into herding also in the CDO market are further important underlying factors. The US government again supported the trenching of mortgages into CDOs because it raises the price of the underlying asset and so reduces the borrowing cost to the homeowner.²⁹

“When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you’ve got to get up and dance. We’re still dancing.” Chuck Prince CEO of Citigroup 2007, (Financial Times , 2007)

²⁶ Ethics defined as obedience to the unenforceable

²⁷ (Ariely, 2012)

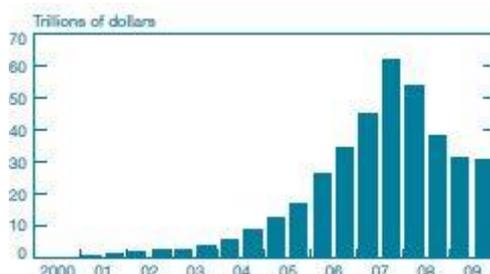
²⁸ (Lewis, 2010)

²⁹ (Fostel & Geanakoplos, 2012, p. 194)

2.3 CDS market

A cornerstone of modern finance theory relating to instruments influencing the market came with the introduction of credit derivatives in 1997.³⁰ But it took until 2005 to standardize credit default swaps for mortgages.³¹ Here also the lobbying power of banks played its role in making credit derivatives, especially Credit Default SWAPs (CDS), legally acceptable.³² What is clear is that the explosive growth of the CDS market (compare figure 3) came after the explosive growth of securitization. The non-linear effects of derivatives had a high impact on hiding the real amount of leverage,³³ while for the first time CDS allowed the pessimistic agents to leverage as well, resulting in an even more important role of leverage during the financial crisis.³⁴ According to Geanakoplos and Fostel, the CDS market finally pricked the leverage cycle³⁵, since it provided a powerful force to the pessimistic agents³⁶ coupled with bad news about delinquencies.³⁷ The over optimistic agents in the real world was AIG, selling massively CDS, which increased the whole systematic risk because the risk models of banks were based on the solvency of AIG (also taking implicitly **Government bailouts** into accounts). This **transferred the risk** from the Banks (which also were to **interconnected to fail**) to the regulators and provided the underlying structure for the current sovereign debt crisis. The whole process of securitization also resulted in a situation in which the value of liquidity was underpriced and limited the ability to roll over debt.³⁸

Figure 3 CDS volume



Source: (Geanakoplos J. , Solving the Present Crisis and Managing the Leverage Cycle, 2010, p. 111)

Geanakoplos and Fostel argue that if a CDS is created exclusively inside the securitization tranche of the asset, it has positive impacts on the asset price. A CDS outside the securitization (synthetic) lowers the asset price. This seems to be counterintuitive at first glance but they explain it by the following: when agents sell CDS and put up cash as collateral they are tranching cash. This raises the value of cash relative to the references asset. They argue that when every asset (all future cash flows) are perfectly tranced, the result is an Arrow-Debreu equilibrium, and all asset bubbles disappear. The depressing effect of CDS on asset is stronger if the asset is not tranced, but is held outright or levered, because now the buyers of the asset will divert their wealth into writing CDS, being a perfect substitute for holding the asset.³⁹ Haug and Taleb also support the idea that demand and supply effects are underestimated in

³⁰ See (Janeway, 2012, p. 163), (Tett, 2009)

³¹ (Fostel & Geanakoplos, 2012, p. 191)

³² See (Pistor K. , 2012)

³³ "2006 the \$2.5 trillion of so-called toxic mortgage securities could be bought by putting \$150bn down and borrowing the other \$2.35 trillion. In 2009 the securities might have been worth half as much yet a buyer might have to had put nearly the whole amount down in cash. Number is calculated by applying the bank regulatory capital requirement (based on bond credit rating) to each security in 2006." (Geanakoplos J. , Solving the Present Crisis and Managing the Leverage Cycle, 2010, p. 103)

³⁴ Engle also supports the idea that volatility is hidden during stable periods, and downside volatility has a different process included. Compare (Engle, 2003)

³⁵ (Hong, Lim, & Stein, 2000)

³⁶ (Fostel & Geanakoplos, 2012, p. 195)

³⁷ See (Geanakoplos J. , Solving the Present Crisis and Managing the Leverage Cycle, 2010, p. 111)

³⁸ (Archarya & Viswanathan, 2011, p. 99)

³⁹ (Fostel & Geanakoplos, 2012, p. 195)

general in *theoretical models*.⁴⁰ Furthermore disagreement and news⁴¹ can drive up volume.⁴² Finally according to Geanakoplos and Fostel the timing of financial innovation along the securitization chain was crucial. Had CDS come to the same time as Securitization the crash would have been milder and asset prices lower.⁴³

3 Conclusion

Section 1 and 2 analyzed the financial crisis along the securitization chain and indicated that political incentives, behavioural aspects⁴⁴, financial innovation, the leverage cycle⁴⁵, financial models⁴⁶ and reflexivity theory were main causes of the financial crisis. One central lesson which can be drawn from the past is that debt and leverage always played a key role during crisis.⁴⁷ Furthermore this paper only represents the limited perspective of the author and further underlying causes in the complex financial world could be missing. We must learn to be aware of our own fallibility.⁴⁸ The progress of knowledge is framed not just by what we know, but also by gaining a better understanding of what we cannot know.⁴⁹ This could be also a direction for the future. Nassim Taleb argues that we need a system becoming stronger and not weaker from random shocks.

“Meanwhile, over the past few years, the world has gone the other way, upon the discovery of the Black Swan idea. Opportunists are now into predicting, predictioning, and predictionizing Black Swans with even more complicated models coming from chaos-complexity-catastrophe-fractal theory. Yet, again the answer is simple: less is more; move the discourse to (anti) fragility.” (Taleb, 2012, pp. 138-139)

A way into this direction might come from Katharina Pistor arguing for the implementation of more natural firewalls coming out of the system⁵⁰ (including ideas from the Glass-Steagall act, Volcker rule). This process is still in development but might be more stable over the long run than a central regulation. Still beside the Rogoff and Reinhart analysis a further lesson is that government regulation with clear long term targets is difficult to implement.⁵¹ Additionally it is important to avoid reflexive influence of the financial markets on its own regulation⁵², while still pursuing more global coordination among regulators. Regulation of the OTC market particularly new derivatives is an issue for further research, while currently the regulation of OTC markets is already in progress and could be combined with the purpose of creating ceilings⁵³ for leverage.⁵⁴ Finally the importance of behavioural aspects should not be underestimated and a simple solution here is that decision makers need more skin in the game.

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⁴⁰ (Haug & Taleb, 2010)

⁴¹ An interesting way to analyse this is sentiment analysis compare (Khurshid, 2011)

⁴² (Hong H. S., 2006),

⁴³ (Fostel & Geanakoplos, 2012, p. 195)

⁴⁴ Overview of biases compare (Kahneman & Tversky, 1974)

⁴⁵ (Adrian & Shin, 2010)

⁴⁶ Compare for example (MacKenzie, 2008)

⁴⁷ (Reinhart & Rogoff, 2009)

⁴⁸ As the German physicist Werner Heisenberg's states in his uncertainty principal, the root of the problem was man's examination of nature, which inevitable impacts the natural phenomena under examination so that the phenomena cannot be objectively understood. (Bookstaber, 2007, pp. 223-224)

⁴⁹ (Soros, 2008, p. 69) and (Bookstaber, 2007, p. 220)

⁵⁰ (Pistor K., 2012)

⁵¹ See (El-Erian, 2013), (Taylor, 2011, p. 22)

⁵² See (Soros, The New Paradigm of Financial Markets: The credit crisis 2008 and what it means, 2008)

⁵³ Contrary the provision of better liquidity buffers and supporting more leverage during crisis is also necessary and is a further issue (Geanakoplos J., Solving the Present Crisis and Managing the Leverage Cycle, 2010, p. 123)

⁵⁴ See (FSA, 2012)

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