DERIVATIVES AS THE WORLD FINANCIAL CRISIS FACTOR

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Abstract. This paper is focused on the analysis of derivative financial instruments as a factor that triggered the global financial crisis, which originated in the US (starting with "the credit crunch" in the middle of 2007). It outlines results of the author's research study aimed to analyse complex derivative instruments – credit default swaps and collateralised debt obligations – and to provide ensuing recommendations on their application in future. As a result of the analysis, the author found out that main causes of the crisis are embedded in the structured derivatives market of the US, but it is a combination of factors that matters, comprising: creation of subprime mortgages and securitisation, lack of regulation in the use of collateralised debt obligations and credit-default swaps as off-balance sheet instruments, faults of ranking agencies, highly leveraged balance sheets of banks due to warehousing of "toxic assets" and massive exposure to the instruments, overleveraging of world economies, multiple credit bubble collapses and mistakes of local economies, amongst others.

Keywords: Derivatives, The World Financial Crisis, Collateralised Debt Obligations, Credit-Default Swaps.

1. Introduction

Since the beginning of 2007, some of the world's biggest financial companies including Lehman Brothers and Merrill Lynch have collapsed as banks and other financial institutions reported almost USD 1.2 trillion of losses and write downs. Global stock markets lost about USD 28.7 trillion in 2008, and the world equities lost another USD 6.6 trillion in value since the beginning of 2009[1]. Starting from the "credit crunch" in the United States and resulting in the worldwide financial crisis, the issue has been widely discussed both in Western and Latvian financial media.

The considerable financial press attention has been given to the failure of the market for subprime mortgages and complex structured assets, whereas derivative financial instruments have been referred to as "financial weapons of mass destruction" that played a significant role in the credit crisis and its negative developments resulting in the system crisis due to high riskiness involving high-leverage speculation and arbitrage opportunities, large volume of trades and capital concentrated in both over-the-counter and organised exchanges, lack of control, application of "creative accounting" and other reasons.

In conditions of the global economic slowdown and given the enormous writedowns, the US banking industry could no longer provide credit resources to other institutions (as well as to each other), including Latvian banks, at the same cost and in the same amount as earlier – these resources have become scarce and expensive, the world credit markets started to seize up triggered by collapse of the household debt bubble in the United States. In case of Latvia, where real estate prices were also experiencing a dramatic rise and most banks practiced an aggressive credit policy, the bubble busted in 2008, following the market turmoil of July 2007 in the US (which left big international banks holding hundreds of billions of dollars of junk-bond debt). At the same time, Latvia had no such dramatic derivatives exposure, owing to underdevelopment of this market. Thus, the crisis in Latvia has had a number of local implications, i.e. it is the economic rather than the banking system crisis.

What is the role of derivatives in the current world financial crisis? Can they be regarded as the prime factor that triggered the crisis? Do these instruments have to be restricted or continue their existence as a useful hedging and effective market exposure instrument? What kind of changes is required in application of derivatives in future, if any? How did the global crisis impact on such a small developing economy as Latvia?

[1] Adam, S. Global Financial Assets lost $50 Trillion Last Year, ADB Says [link]. Bloomberg, 2009 [viewed 1 April 2009]. Available at: http://www.bloomberg.com/apps/news?pid=20601087&sid=aZ1kcJ7y3LDM&refer=worldwide.

2. Research and its Limitations

This article is a quintessence of the author's results research study. The objective of the research was to analyse the influence of derivatives on the world financial crisis. The research comprised two sets of tasks: theoretical analysis of available secondary data and a themed survey among industry professionals. The primary research methodology was based on a quantitative approach with the use of non-probability convenience sampling, as it allowed smaller samples and was less costly. 54 respondents, finance specialists from three largest Latvian banks – Swedbank, SEB and Rietumu Bank – participated in the survey. Limitations of the research:

a) Only Latvian market was covered – professionals from Latvian banks participated in the survey, while most of questions were focused on "American" topics.

b) Only three Latvian banks were represented in the research. Although Swedbank, SEB and Rietumu Bank cover over 40% of market share (by assets), the number of specialists, who took part in the survey, might not precisely represent the local banking system. At the same time, general trends are likely to be accurate.

c) Only 35% of respondents had experience in using derivatives.

Qualitative research, e.g. in-depth interviews, would provide deeper insights into respondents' experience and opinions.

The research object was focused mainly on credit default swaps (CDS) and collateralised debt obligations (CDO).

3. Secondary Research Results

As a result of the secondary research, the author came up with "the crisis development scheme", identifying components of the US financial turmoil, the global financial crisis and the financial crisis in Latvia. "The scheme" is outlined herewith.

Credit-Default Swaps and Collateralised Debt Obligations

Key notions in the analysis of the US financial crisis are credit derivative products – credit-default swaps and collateralised debt obligations.

Credit derivatives are over-the-counter contracts that pass credit risk from one counterparty to another. Their payoff depends on the creditworthiness of one or more companies or countries and performance depends on a credit spread, credit rating or default status.

A credit default swap (CDS) is a swap contract, in which the buyer of the CDS makes a series of payments to the seller and, in exchange, receives a payoff if a credit instrument - typically a bond or loan - goes into default. By buying such protections, the banks can transfer a vast amount of resources from reserves or impairment allowances to liquid assets that bring additional income. Sellers can be insurance companies or hedge funds that channel resources from selling swaps towards a stock market.

Collateralised debt obligations (CDOs) consolidate a group of fixed income assets such as high-yield debt or asset-backed securities into a pool, which is then divided into various tranches. It is a way of creating securities with widely different risk characteristics from a portfolio of debt instruments (corporate bonds or commercial loans). Tranching is an important aspect of CDOs, because it creates different investment classes of securities. This, in turn, allows a cash flow from an underlying asset to be diverted to various investor groups. A key goal of tranching process is to create at least one class of securities whose rating is higher than the average rating of the underlying collateral pool or to create rated securities from a pool of unrated assets.

According to the Bank for International Settlements (BIS) statistical data, in the first half of 2008 the volume of over-the-counter derivatives market was USD 683.7 trillion in notional

amounts, while amounts outstanding in total futures and options trades accounted for USD 84.3 trillion[2]. Three quarters later – USD 592 trillion and USD 55.7 trillion, respectively[3]. The CDS market rocketed from USD 28.7 trillion in December 2006 to USD 57.9 trillion in December 2007 with later decline in face of the crisis – down to USD 42.0 trillion in 2008. Global CDO issuance in 2007 was USD 481.6 trillion; in 2008 – USD 61 trillion (87.3% decline). In the first half of 2009, there were no (!) CDOs issued[4]. By contrast, the US GDP accounted for USD 14.2 trillion in the 4th quarter of 2008; Latvia GDP – for LVL 16.2 billion in the end of 2008. The US debt to GDP ratio (a coarse measure of leverage of the economy as a whole) rose to an enormous 333.8%, or USD 47.4 trillion (includes domestic financial and foreign debt), by 2008[5]. As total debt continues to grow faster than GDP, the economy continues to leverage, while the estimation of derivatives' contribution to the economy in terms of share of GDP, employment and overseas earnings is far from straightforward.

Components of the US Financial Crisis

In the 4th quarter of 2008, US banking industry posted a net loss of USD 26.2 billion, the first quarterly deficit since 1990, while total assets of the US banking industry accounted for USD 4.67 trillion[6]. In 2009, total writedowns by global banks accounted for over USD 1.2 trillion, which have triggered a surge in the cost of credit, cutting off access to capital for consumers and companies[7]. Since "the credit crunch" began in mid-2007, US and European banks have reported more than USD 700 billion of writedowns and losses attributable to mortgages, CDOs and CDS, other derivatives and structured investment vehicles, as well as credit losses from consumer loans[8]. The value of global financial assets including stocks, bonds and currencies fell by approximately USD 50 trillion in 2008, equivalent to a year of world gross domestic product, according to an Asian Development Bank report[9].

What did really happen to cause these negative developments? The whole process started with the crisis of credit in the US.

"The Credit Crunch" Chain

The crisis of credit was based on the following chain that brought together mortgage brokers, lenders, homeowners, investment banks and investors:

a) In December 2000, in view of the dot-com bust, the Federal Reserve System (FED) lowered interest rates from 6.5% to 1% to keep the economy strong[10].
b) 1% was a very low return on investment at the time, and the investors started to look for new options. At the same time, banks borrowed from FED at 1%. Coupled with

[2] Bank for International Settlements. Quarterly Reviews. International banking and financial market developments [link]. BIS, 2009 [seen 2 March 2009]. Available at: http://www.bis.org/publ/qtrpdf/r_qt0812.pdf, http://www.bis.org/publ/qtrpdf/r_qa0906.pdf.
[3] i bid [seen 2 July 2009].
[4] Securities Industry and Financial Markets Association. Global CDO Market Issuance Data. Quarterly Research [links]. SIFMA, 2009. Available at: http://www.sifma.org/research/pdf/CDO_Data2008-Q4.pdf, http://www.sifma.org/research/pdf/RRVol4-8.pdf.
[5] Harrison, E. Chart of the day: Total US Debt [link]. Credit Writedowns, 2008 [viewed 20 February 2009]. Available at: http://www.creditwritedowns.com/2008/08/chart-of-day-21-aug-2008-total-us-debt.html.
[6] E-Commerce Journal. 1,816 U.S. banks with total assets of $4.67 trillion are at risk of failure [link]. ECJ, 2009 [viewed 13 March 2009]. Available at: http://www.ecommerce-journal.com/news/14497_1_816_u_s_banks_with_total_assets_of_4_67_trillion_are_at_risk_of_failure
[7] Harrison, E. Credit Writedowns [link]. CW, 2008 [viewed 20 February 2009]. Available at: http://www.creditwritedowns.com.
[8] Thomson Reuters. European writedowns and credit losses [link]. Reuters, 2009 [viewed 2 April 2009]. Available at: http://uk.reuters.com/article/UK_SMALLCAPSRPT/idUKN0238922920090205.
[9] Adam, Shamim. Global Financial Assets Lost $50 Trillion Last Year, ADB Says [link]. Bloomberg, 2009 [seen 1 April 2009]. Available at: http://www.bloomberg.com/apps/news?pid=20601087&sid=aZ1kcJ7y3LDM&refer=worldwide.
[10] Shostak, F. The Fed Did It, and Greenspan Should Admit It [link].LewRockwell.com, 2009 [seen 2 March 2009]. Available at: http://www.lewrockwell.com/orig9/shostak6.html.

general surpluses from Japan, China and the Middle East, the borrowing became easy and there was a lot of cheap credit, which caused the excessive use of leverage.

c) Mortgage brokers connected borrowers to lenders. Lenders gave out mortgages and received commission.
d) Then investment bankers bought these mortgages, packed them into mortgage-backed securities CDOs (securitisation[11]) – and sold tranches carrying different levels of risks to investors, whereas safe tranches were ranked as AAA and insured with CDS, medium – BBB, the most risky were left unmarked, but provided higher return to investors agreeing to take on the associated risk. Unfortunately credit rating agencies failed to adequately account for large risks (like a nationwide collapse of housing values), when rating CDOs and other asset-backed securities, and in October 2008 admitted that their "methodology" of ranking mortgage-backed securities from end of 2005 to 2008 failed.

Why ranking agencies failed to adequately assess these instruments? It did not happe for the first time in the history of structured finance – former Wall Street trader Frank Partnoy gives numerous examples of how banks can mask true nature of structured products with complex packaging in his famous "F.I.A.S.C.O." Complex CDOs were very popular in the late 1980s-early 1990s, also packaged as AAA-paper with hidden exposure to emerging markets FX rates, as well as other complex products. At the time, CDOs were also insured – by Freddie or Fannie, AIG… The latter, for instance, drove revenues from USD 737 million to over USD 3 billion in about five years on insuring CDOs through CDS[12]. CDS volume reached over USD 441 billion out of USD 1 trillion of AIG's assets. Evidently, AIG believed that it would have to cover the insured in insignificant amounts... But when foreclosures rose and Lehman collapsed, AIG had to pay more than USD 123 billion on its CDS obligations. AIG's bailout was soon to follow, yet again demonstrating another major shift from the free market theory.

a) At some point, brokers could find no new deals – everyone, who qualified for a mortgage, already had one.
b) Since house prices were rising, there was little risk in lowering standards of issuing mortgages – if homeowners defaulted, the lender or the owner of the mortgage loan would get houses that were rising in value. By 2006, there were USD 1.2 trillion subprime mortgage originations, of which 80% was securitised – low-quality loans became parts of mortgage-backed securities CDOs, while banks and investors were considerably increasing their exposure to these instruments[13].

Why did banks securities? With securitisation, both assets and liabilities were removed from their balance sheets, requiring less equity capital to operate (so called "regulatory arbitrage") – handy enough, when capital requirements for mortgages are high. At the same time, subprime mortgages were short-term; they featured a step-up rate creating a strong incentive to refinance and a prepayment penalty – an incentive not to refinance early. The whole process was tied to the housing prices.

Considering low creditworthiness of subprime borrowers, most of them started to default. Defaults, in turn, created increased supply of houses and caused plunge in prices.

a) Banks as major buyers of low risk tranches appeared to be holding CDOs full of worthless houses. When it became clear that losses on mortgages could cause losses

[11] Securitisation is a structured finance process that involves pooling and repackaging of cash-flow-producing financial assets into securities, which are then sold to investors.
[12] Gethard, G. Falling Giant. A Case Study of AIG [link]. Investopedia, 2009 [seen June]. Available at: http://investopedia.com/articles/economics/09/american-investment-group-aig-bailout.asp?viewed=1.
[13] Gorton, G. The Subprime Panic [link]. Scientific Commons, 2009 [viewed 28 January 2009]. Available at: http://en.scientificcommons.org/37968524.

on the securitisation tranches being held, they were forced to increase capital and to write down the value of assets. They stopped lending to each other and increased the cost of borrowing to other institutions. As the lack of liquidity started to impact other industries, the liquidity crunch developed into the credit crunch.

b) Warehousing of CDOs and mortgage-backed securities is another important component of the problem – much of the banks' writedowns attributed to such warehousing. Why would the banks had to repair their balance sheets, if the "problem instruments" were off-balance in their essence?

c) Given privacy of such contracts, no one actually knew, who owned CDOs (or the related mortgage-backed securities) and how many, due to the length of the chain. Investors and financial firms lost hundreds of billions of dollars as part of this housing and corporate loan meltdown as they purchased solid tranches of mortgage-backed securities, CDOs, etc.

A major factor in the growth of CDOs was introduction of Gaussian copula model by David X. Li in 2001, which allowed for the rapid pricing of CDOs based on the price of related CDS. The model is now severely criticised as "the formula that killed Wall Street". This formula assumed that the price of CDS was correlated with and could predict the correct price of mortgage-backed securities. The simplification of the approach was based on modelling default correlation without using historical default data (as actual defaults are rare in the real world and are hard to assemble), but market data (historical prices) from the CDS market.

Li's copula function was used to price hundreds of billions of dollars' worth of CDOs filled with mortgages. But CDS had been in existence for nearly a decade – since 1997, a period, when house prices soared and default correlations were very low. But when the home values started falling across USA, correlations soared. Bankers securitising mortgages most probably knew that their models were highly sensitive to house-price appreciation and if it ever turned negative on a national scale, a lot of bonds that had been rated AAA by copula-powered computer models would blow up, but no one was willing to stop the process.

At the same time, complex instruments as such do not create problems, e.g. CDOs first appeared back in 1987 and was in use since that time. Investors, in turn, should have the right to risk and there should be no obstacles to, as long as they risk with their own money. The problem with the banks and other institutions was the very fact that they were greedy enough to take on toxic assets on their own books (despite these being off-balance sheet) and on their branded funds (impacting their brand in case of collapses) – not the fact of packaging toxic assets and selling them itself. Essentially, instead of spreading their credit risk onto many unrelated investors, they increased it by adding leverage and putting it on their own books. "Guns don't kill people, people kill people"[14].

It is considered that the subprime crisis began in 2006, when housing prices started to decline after the peak in 2005. Increased default rates in late 2006 among US homeowners led to a subsequent crisis for the subprime, CDO, mortgage, credit, hedge fund, foreign bank and other markets.

The financial crisis itself began in July 2007, when the TED spread – the difference between the interest rates for 3-month US Treasuries contracts and the 3-month Eurodollars contract as represented by Libor, the indicator of perceived credit risk in the general economy – reached record 4.65% in October 2008 and the difference between 3-month Libor and the yield on a virtually risk-free 3-month Treasury bills rose sharply several times indicating on increasing doubts about the financial health of banks.

Losses in the US equity markets then followed a cascade along correlation of various stocks in the S&P 500 and NASDAQ 100 although the equity markets did not originate or

[14] Partnoy, F. *F.I.A.S.C.O. The Inside Story of a Wall Street Trader.* New York: Penguin Group Inc., 1999.

perpetuate the crisis. The collapse in the US market revealed a complex and collective systemic collapse of the financial system, which spread as its extent became more recognised and affected the credit or demand for sectors across the economy. This correlation rose with the increased volatility[15].

In December 2008, the National Bureau of Economic Research officially declared that the US economy had entered recession 12 months ago[16].

3.2. Components of the Global Financial Crisis

As stock markets worldwide crashed and entered a period of high volatility, and a considerable number of banks, mortgage lenders and insurance companies failed in September-October 2008, the crisis deepened. Many financial institutions in Europe also faced the liquidity and capital adequacy problem. The American and European governments devised plans to rescue distressed financial institutions and infuse capital into major banks. In 2008-2009, much of the industrialised world entered into a deep recession.

Economist Nouriel Roubini comprehensively explained this phenomenon in January 2009. Subprime mortgage defaults triggered the broader global credit crisis, but were part of multiple credit bubble collapses. There were many bubbles, and they extended beyond housing in many countries to commercial real estate mortgages and loans, to credit cards, auto loans, and student loans. There were bubbles for the securitised products that converted these loans and mortgages into complex, toxic, and destructive financial instruments. And there were still more bubbles for local government borrowing, leveraged buyouts, hedge funds, commercial and industrial loans, corporate bonds, commodities, and CDS. Over the last decade, a sequence of rapid debt expansion occurred – dot-com, equity, housing, and commodity... As the US economy shrank, the entire global economy went into recession. The current crisis can also be considered as the crisis of globalisation. Simply for the reason that world economies are so interlinked and deeply integrated, the chain reaction was so rapid. Fast-growing developing countries with underdeveloped financial systems were exporting savings to the developed world for packaging and re-export to them in the form of financial products[17].

3.3. Components of the Financial Crisis in Latvia

The derivatives market of Latvia is underdeveloped in comparison with other major markets (USA, UK, Sweden, etc.). The size of the market is tiny and active trading takes place in Northern Europe. The demand for local assets is very low, the liquidity and volume of trades – either. Therefore, problems in Latvia are rooted in other areas.

The global recession impacted on Latvia throughout 2008. At the same time, the peak of the crisis coincided with the slowdown of the Latvian economy, which had experienced the rapid growth of GDP for the previous three years attributed to accessibility of credit resources that channelled funds into non-tradable industries, such as real estate and retail, and fuelled a consumption boom in the country alongside with soaring wages.

During the dynamic growth period between 2000 and 2007, Latvian banks issued unjustifiably large amount of loans to private entities – over LVL 60 billion, which accounts for nearly 70% of total banks assets[18]. The Financial Capital Market Commission did nothing to control the inflow of funds to the country and to stop year-on-year increasing debt

[15] Smith, R. The Spread of the Crisis [link], Personal Webpage, 2009 [viewed 21 April 2009]. Available at: http://reggiesmithsci.googlepages.com/creditcrisis.

16 Wikipedia. Global Financial Crisis [link]. Wikipedia Online, 2009 [viewed 21 March 2009]. Available at: http://en.wikipedia.org/wiki/Global_financial_crisis_of_2008%E2%80%932009.

17 Roubini, N. Warning: More Doom Ahead [link]. Foreign Policy, 2009 [viewed 21 March 2009]. Available at: http://www.foreignpolicy.com/story/cms.php?story_id=4591.

[18] Association of Latvian Commercial Banks. Industry Statistics [link]. LKB, 2009 [viewed 5 March 2009]. Available at: http://www.bankasoc.lv/lka/statistika/nozare/article.php?id=608769.

financing. Due to total absence of regulation, competition among banks rose. Even being aware that the model was ineffective, most banks did not limit crediting during the boom, fearing to loose market share. The Government is also criticised for failing to make extra reserves, when GDP enjoyed double-digit growth in 2005-2007.

4. Primary Research Results

In general, primary research results coincided with the analysis of secondary sources less some minor exceptions. The most important questions are outlined below. Respondents were allowed to mark more than one answer.

Answering the question "What do you consider the main cause/key causes of the global financial crisis are?" most of respondents marked "US FED monetary policy in 2000-2004 and availability of cheap credit" and "Creation of subprime mortgages" (27 points out of 212 posted answers, or 13%) followed by "Lack of regulation of the derivatives market", "Overleveraging of economies", and "A set of local economic bubbles" (26 points, or 12%) – see Figure 1.

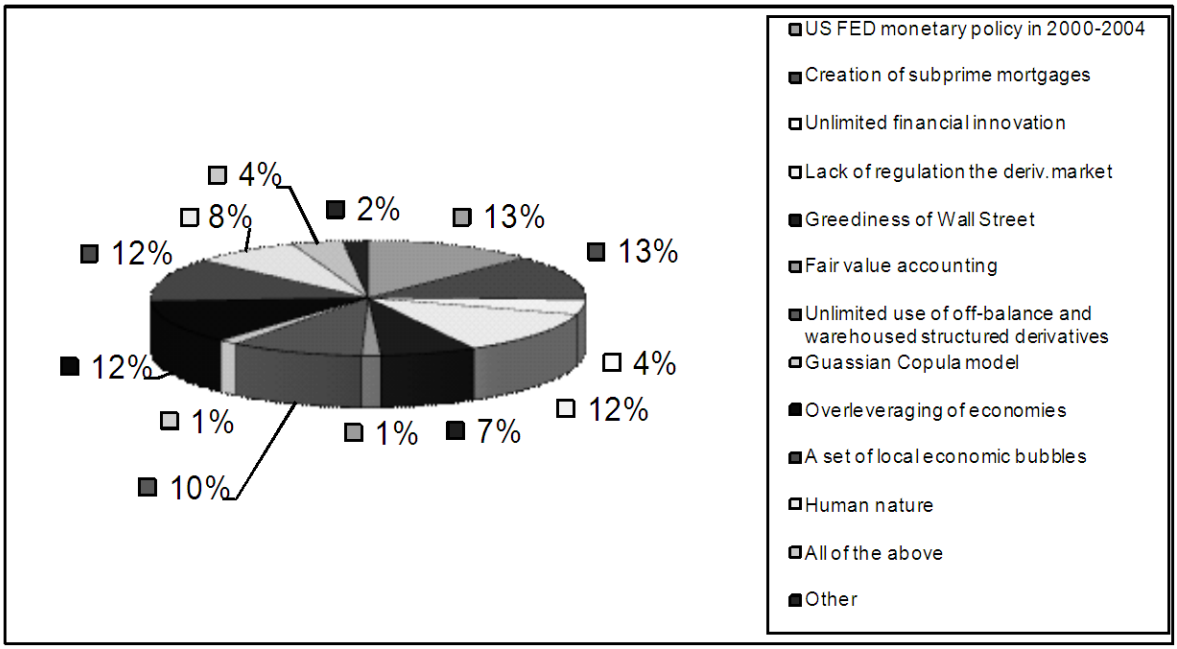

Figure 1: What are the main causes of the global financial crisis?

The majority of respondents think that US Government and FED must bear the responsibility for the cause(s) of the crisis as they failed to properly regulate the derivatives market – 26%, or 34 out of 132 posted answers. 27 respondents think that credit rating agencies must bear this responsibility (Figure 2).

Most of respondents consider that unwise economic policy of the Latvian Government during the dynamic growth period between 2000 and 2007, uncontrolled real estate and consumption boom as well as poor Central Bank's policies caused the current economic crisis in Latvia. "Aggressive credit policy of Latvian banks and inflow of cheap credit" also received substantial amount of points (see Figure 3).

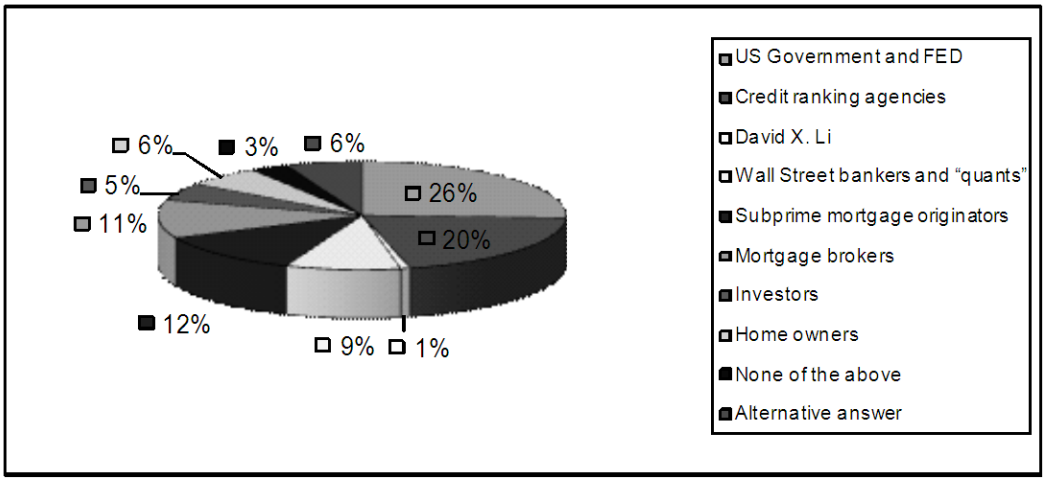

Figure 2: Who must bear the responsibility for the cause(s) of the crisis?

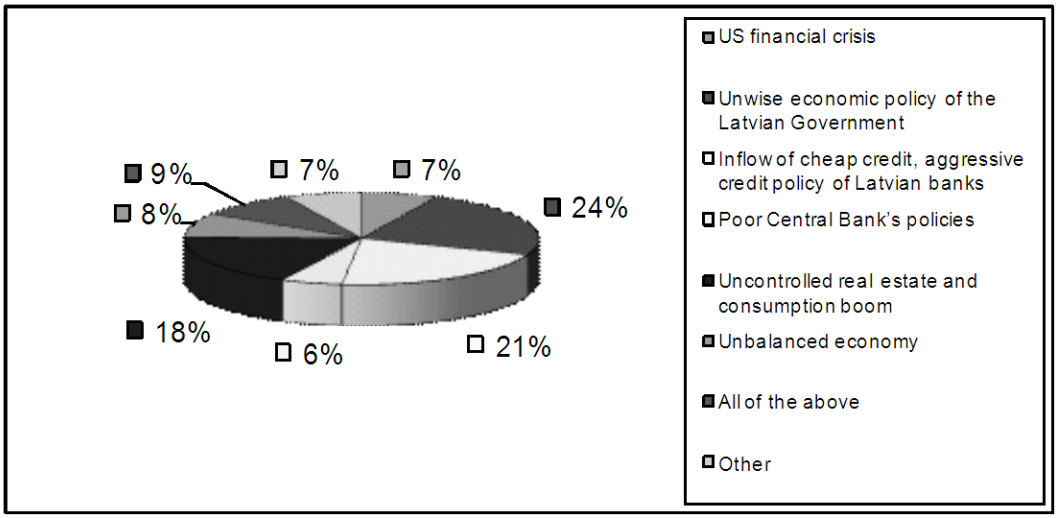

Figure 3: What do you consider caused the current economic crisis in Latvia?

Main Conclusions

1. Key triggers of the global financial crisis are embedded in the structured derivatives market of the US, but it is a combination of factors that matters:

The formula of "the credit crunch" is the sum of: creation of low-quality mortgages, subprime securitisation and ensuing regulatory arbitrage, long-term increase in housing prices, human factor – profit maximisation at any rate, lack of regulation in the use of CDOs and CDS as off-balance sheet instruments, Li's copula function, "wrong methodology" of credit rating agencies, highly leveraged balance sheets of the banks due to warehousing of "toxic assets" and massive exposure to the instruments; resulting bankruptcies of subprime borrowers and plunge in house prices.

The US financial crisis comprised: "the credit crunch sum" plus huge indebtedness of the US economy, the US equity markets plunge, highly increased volatility, loss of confidence and trust in banking.

Components of the global financial crisis include: overleveraging and deep mutual integration of world economies, multiple credit bubble collapses, – put another way, macro- and microeconomic imbalances and local market failures.

2. By buying CDS, banks transferred vast amount of resources from reserves or impairment allowances to liquid assets that brought additional income. In the context

of the crisis, credit risk and valuation principles were crucial since underlyings were forms of credit, but marking-to-market method and Guassian Copula formula massively relied on to rapidly value CDOs based on the price of related CDS failed.

3. Excessive and uncontrolled use of these instruments given favourable US housing market conditions is the underlying reason of the extraordinary events we had been witnessing – not the instruments per se, as products of financial innovation. A simple vanilla option is comparable to a 6-bullet revolver, while a CDO is more like a guiding missile. Yet both of them can kill and both of them need to be fired.
4. Banks themselves warehoused substantial amounts of toxic assets on their books despite these being off-balance; instead of spreading risks onto unrelated investors they increased it by adding leverage and putting it on their own books. Educated bank managers failed to see obvious problems with leveraged lending. Why? The answer is very simple – their pay was directly related to how many mortgages they approved and how many structured deals they closed, i.e., "the principle-agent" problem.
5. In conditions of free markets, the bailouts of such banks as Bear Stearns and Merrill Lynch would not be necessary as the free market theory could fix the derivatives problem – failed businesses serve as glaring examples of improper derivatives use and increase financials' internal regulation. At the same time, since most firms were bailed out, does this serve as a green light to future derivatives' misuse?
6. Components of the financial crisis in Latvia are: aggressive credit policy of Latvian banks (mainly, Scandinavian), unwise economic policy of the Latvian Government in 2000-2007 – it failed to prevent the economy from overheating, uncontrolled real estate, speculative and consumption boom, poor Central Bank's policies, especially in relation to the local currency peg to euro. Latvia's economy remains unbalanced and opened to external shocks.

Recommendations

1. To impose higher capital standards for banks using CDOs, mortgage-backed securities, CDS and other structured derivatives – it might decrease the rate of return on capital, but could absorb potential losses.
2. Financial institutions must maintain strict lending policies with no allowances of subprime mortgage lending in future.
3. Banks have to accumulate excess cash during growth periods to back up future cyclic downfalls.
4. Higher margin requirements can be introduced for OTC contracts by regulatory bodies.
5. Exchanges should reduce speculative capital in financial markets in the near-term. For instance, to decrease leverage ratios so that assets were mostly purchased on own, but not borrowed funds.
6. To delegate backing trades and absorbing losses in case of a dealer failure to clearinghouses for financial derivatives.
7. Financial supervisory authorities might require transparency for OTC deals from institutions and large investors participating in the market, including disclosure of details by request and regularly reporting. Strict reporting should be applied to all CDS and CDO market participants, in particular.
8. In order to reduce the volume of OTC market and to increase transparency, to relocate trading of most of derivatives, including swaps, to exchanges or electronic-trading platforms.
9. Financial supervisory authorities should introduce limits for warehousing and limit the practice of regulatory arbitrage.

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