

## **Pay-for-performance and the subprime crisis**

**Has the reward structure of bank managers and executives increased the financial crisis?**

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## **1. Introduction**

In August 2007 the subprime crisis started. It is a crisis following a period of good economic conditions and large innovation in the financial system. A lot of different institutions are to blame for what has happened. One of the fingers points in the direction of managers and executives in the financial sector, especially in investment banks. Their appetite for risk might have been one of the factors that led to the current crisis. This paper tries to answer the question if the reward structure of bank managers and executives increased the financial crisis. To do this one must first look at the compensation structure of the bankers and the effect this has on their behavior. Then the main factors and events that lead to the subprime crisis will be identified and the factors that could be influenced by the behavior of bankers following their pay will be discussed. It is hypothesized that the remuneration structure of bankers had increased their willingness to take on risk and this had led to an increase in the subprime crisis. A literary research will be conducted studying both articles from financial and microeconomic contract theory. Section two discusses the compensation system of bankers used these days. Section three goes on about the effect that this structure has on behavior of managers and executives. After that, the background creating the setting for financial crisis is explained in part four, followed by a description of the main events leading to the crisis. Part five identifies the factors and events on which the behavior of bankers could have had an influence. The way in which this influence manifests itself is also discussed in this section. Section six concludes the paper.

## **2. Bankers compensation systems**

To find out if the compensation structure of bankers has increased the financial crisis, this payment structure needs to be clarified. Focus will be put on executives and managers, because they can influence the risk taking and decide what to invest in. Rajan notes in his paper that around 1960, bankers were paid a fixed salary. They were conservative and mostly preoccupied with prudence (2006, p. 501). In those times, there was low competition and shareholders would run in case of big risks. There was no need for any incentive except a good salary for the bankers.

More recent, Crawford Ezzel and Miles find that pay for performance in banks increased significantly after 1981. They find evidence that executive pay is more

linked to the performance of the bank after deregulation and that stock options, stock holdings of the executive in the firm and bonuses are used more widely (1995, p. 254).

Hubbart and Palia also find that CEO pay in banks is more related to performance under deregulation and that the payments are also higher. They argue that this is because of higher competition and the desire of companies to attract more talented managers (1995, p. 129). In 1995, Houston and James found that the compensation in cash of bank managers is more sensitive to the performance of the firm than in other industries. Yet, they also found that the managers receive less cash compensation than in other industries (1995, p. 430). Because of the deregulation in banking in the nineties, banks had to sustain more competition. The increase in popularity of incentive-fees is a result of this. Banks had to become more efficient and therefore needed their executives to have the same interests as their shareholders. Performance sensitive compensation structures can do this. The shareholders want profit maximization and since the executive pay is linked to the performance, he will also want this. It is a way to align interests (Bergstresser and Phillippon, 2006, p. 528)

Bercher, Cambell II and Frye see the same structure over the nineties. They examined director incentives over this period. The authors conclude that at the beginning of the decade, pay-for-performance contracts were far less used in the finance than in other industries, but after the period of deregulation, at the end of the decade the difference in the use of incentive-fees between banking and non banking industries became almost nonexistent (2005, p. 1774).

A possible explanation for the wider use of pay-for-performance structures is given by Kim. By using a model containing a risk-neutral agent with limited liability and a risk neutral principal and under several assumptions, he shows that if a first-best contract exists, it is always a bonus contract. This contract could then lead to a full information outcome (1997, p. 911). He argues that, especially for higher levels such as managers, bonus contracts are the most efficient (Kim, 1997, p. 910). Mishra and Nielsen give another explanation for the increased popularity of pay-for-performance. They find a positive relation between the use of pay-for-performance structures and the performance of banks (2000, p. 66).

In 2006 the Bureau of Labor Statistics issued a report showing the wages of investment bankers and securities dealers in different counties. For example in New York, wages were at least three times higher in the first quarter of the year than in any

other. They state that this is caused by the bonuses that are issues for the performance of the previous year (BLS, 2007, p. 1).

Nowadays, The compensation structure of bankers includes various different items. Normally they receive a base pay as their normal salary. Next to that they can receive various kinds of incentive-fees such as bonuses, stocks and stock options (John and Qian, 2003, p. 111). John and Qian find a pay-for-performance sensitivity for bank CEOs of 4,7 Dollar for every thousand Dollar increase in shareholder value in their data over 1992-2000 (2003, p. 117). Rajan explains that investors leave their investments in the hands of investment managers and can give them incentives in the form of reward, based on how much return they generate. He goes on to say that for managers it is possible to take on more risk and thus generate more return, so investors have to make sure the managers don't take excessive risk. An example he gives to rate performance in Jensen's alpha, which is the excess return that a manager creates over the risk free rate and every unit over extra risk taken. Rajan states that the easiest way to give incentives to investment managers is to compare their performance to another manager who have an investment strategy that is similar (2006, p. 514).

Even though Kim, Nam and Thornton note that the structure of managers their payment is not public information, it is possible to conclude several things from the articles discussed (2008, p. 230). Summarizing, pay-for-performance has become a common thing in the financial industry. Not only for CEOs but also for lower functions such as investment managers. They get rewarded partly based on their performance in an effort to align the interest of these managers or agents with the interest of the shareholder or principals. The compensation structure normally includes stock options, a base pay and a bonus. The main reason for the increase in the use of pay-for-performance is the grown complication and competition following deregulation of the financial industry. The next section will discuss possible effect from these pay-for-performance or incentive compensation schemes in this industry.

### **3. The effect of pay-for-performance schemes on bankers' behavior**

There is a lot of literature on the effects of incentives on behavior. The focus here will mainly be on articles about the effects in the financial industry, especially on the effect on risk taking behavior. Risk taking in financial industries is an important issue

because it is easy for managers to increase their performance by taking on more risk. According to John and Quin, this is partly caused by the high leverage that financial institutions often have (203, p. 109).

Palomino and Prat set up an agency model in which the agent has limited liability and both the principal and the agent are risk neutral. The agent, a money manager in this case can adjust two things in the model, his effort and the level of risk he takes in the portfolio. The principal, who is the investor, tries to maximize return (2003, p.114). They show the optimal contract is a bonus contract where the agent is indifferent between exerting high or low effort and that this optimal contract does not induce efficient levels of risk taking. Palomino and Prat go on to say that a high threshold to get the bonus induces more risk taking and a lower threshold leads to less risk. As a result of that, if it is cheap to play with risk a principal sets the threshold lower and therefore the agent acts to be conservative because it is easier to get the bonus. If it is expensive to play with risk, for example: if risks can not be hedged easily, a principal will set the threshold higher which induces higher risk taking than efficient (2003, p. 129). To link this to the question of this thesis one would have to analyze if it is easy for money managers and CEOs to play with risk. Bankers have more possibility to adjust the risk than for example: managers of real projects, but threshold level of the difficulty to play with risk which leads to less risk taking than optimal is not specified, so it is difficult to say.

In his article, Rajan argues that incentives in the reward of investment managers could create two kinds of perverse behavior: herding and excessive risk taking, which is often concealed from investors (2006, p. 501). He states most managers are rewarded for their performance over one year, normally measured by a benchmark such as the S&P500 or the performance of other managers. Next to that, they get more pay if they have more assets in the fund they manage and the better they do, the more assets they attract. He shows that they attract more assets when they perform well than that they lose when the managers do not perform good. Rajan states that these two structures lead to an asymmetric compensation system, because the upside of performance is very significant to the reward of the manager, but the downside is limited in significance (2006, p. 515).

Rajan goes on explaining that by taking on more risk, managers can generally get more return, but more risk is often not desired, so managers take on so called tail risk. He explains that this is risk that can have very big negative consequences but

only with a small probability and are normally easily hidden from investors. Next to that, it offers high returns when the tail risk does not materialize (2006, p. 501). As an example of assets that have tail risk Rajan gives credit derivatives. Normally the manager receives positive return from the investment in these derivatives, but if suddenly many people start defaulting on their loans, the manager holding these assets and also pension funds and insurance companies who issued guarantees against the defaults of these loans, will have to accept significant losses (Rajan, 2006, p. 516). So taking the tail risk normally provides the manager with a high return on the short term, but on the long term it can actually imply losses as well.

The other perverse behavior that Rajan notes is herding. He explains this as the behavior of managers to do the same thing as other managers. It is the result of being evaluated by other managers' performance and the fear to under-perform. Another example of this he gives is to invest a part of the fund in the S&P500 if that is the benchmark for performance. Managers even invest in these assets when they know they are overvalued because they want to have the security of not under-performing. This moves the price of these assets away from the price it would have if it were based on normal investment fundamentals (Rajan, 2006, p. 517).

Rajan concludes his discussion on incentives by noting that the combination of more risk and tail risk taking together with herding which lead prices away from what they should be, could lead to large volatility. He reasons this because an adjustment or shift in the prices of assets that are not valued how they are supposed to be, could be a trigger to the potential losses in the tail risk taken (Rajan, 2006, p. 517).

This article helps to understand the asymmetry in contracts that leads to an undesired high level of risk taking as well as other undesirable behavior by managers. In times when an economy is doing well, tail risks have a lower probability of materializing than when economies are doing badly. If an economy is not doing well, the possibility of having a shock that triggers this risk is greater. A shock that could also be seen as a trigger is a fall in the housing price. The next two articles also cover the effect of incentive on risk taking but are more specified to sectors of the financial industry.

The first is by Carpenter, who shows the optimal behavior of an investment manager who is risk averse and receives a call option over the assets he manages as an incentive-fee. This is a common practice in hedge funds and mutual funds (2000, p. 2313). Risk is measured in the article by the volatility of the portfolio. Carpenter

shows that when the asset value is low, the manager will increase volatility above an optimal level, especially when the option is very much out of the money, excessive risk is taken. He also argues that when the asset value rises, the risk taken by the manager reduces and can even get below the level that the manager would have taken if he invested his own money (2000, p. 2327). This article discussed the behavior of a risk averse agent. The behavior changes a little in the second article, when the same investigation is done, but with a loss averse agent.

Kouwenberg and Zimba set up a model with an investment manager who receives a management fee, has own investment in the assets he manages and receives an incentive fee (2007, p.3307). The article differs from the one from Carpenter because the manager is loss averse and because Kouwenberg and Zimba assume the manager also receives a management fee and invests some of his own money in the fund. Their findings argue that because of the incentive fee, the manager becomes less loss averse and takes more risk than he would have done in a compensation structure without incentive fees. Another finding of them is that risk taking is significantly less when the manager has an own investment in the fund bigger than 30% of the fund value (Kouwenberg and Zimba, 2007, p. 3307).

Besides their model, Kouwenberg and Zimba also did an empirical research based on a dataset containing several hedge funds. They looked for the relation between the level of incentive fees and the risk taken in these funds. They find that in individual hedge funds two out of three measures they used for measuring risk were significant and positively related to incentive fees. Aside from that they also examined funds of funds, which are funds that invest in other funds. The relation between the risk taken and the incentive fee was significant and positive in all three ways of measuring the risk in their regression (Kouwenberg and Zimba, 2007, p. 3307).

In a similar empirical research about risk taking and incentive fees in mutual funds the researchers find a coherent result. Elton, Gruber and Blake find that mutual funds that reward their managers with incentive fees take on more risk than the mutual funds that do not use incentive fees (2003, p. 803) They also point out that incentive fees can attract more talented managers since they can make more money in the funds that use them. Because of that, investors are drawn to mutual funds that use incentive fees. They argue that rewarding management with these kinds of fees has a marketing function to attract more investors (Elton, Gruber and Blake, 2003, p. 785).

The articles discussed so far mostly focused on managers of funds. The articles that will be discussed in the following part focus their research more on CEOs. The first article, by Rogers, finds a relation between CEO incentives in compensation and the use of derivatives to hedge risk. According to the author, the more corporate derivatives are used, the more risk is being hedged. So, less risk is taken if more derivatives are used. Rogers finds a negative relation between corporate derivative usage and risk taking incentives such as options for CEOs (2001, p. 25). So when CEOs have more risk taking incentives like options, the risk taken by the company is higher than when these risk taking incentives are not used in the reward structure. This can be a good think to stimulate managers to not be too prudent, but it is possible that CEOs take on more risk than desired.

Kim, Nam and Thornton find a similar relation. They used a sample split up into two parts. One part had convex payoffs. This implies that the CEO is receiving a bonus when performance is over a certain accounting threshold. The other is concave, which means there is no bonus, or the bonus is already fully earned and the executive can't earn more bonus by generating more return (Kim, Nam and Thornton, 2008, p. 230). The authors conclude that in the part that has convex payoffs the relation to the use of derivatives is negative, while in the concave part the relation is positive (Kim, Nam and Thornton, 2008, p.242). This means that executives who receive a bonus payment hedge less risk than the ones who don't. The bonus payment therefore leads to more risk taking.

Furthermore, Benston and Evan find that risk shifting occurs at banks where CEOs have little inside ownership and enjoy a considerable bonus compensation. Risk shifting happens when managers take on unprofitable risk that shifts wealth away from debt holders towards the holders of equity. According to the authors the payment of bonuses leads to greater amounts of risk taking. They also argue that banks that pay their executives large bonuses have a higher probability of failure (Benston and Evan, 2006, p. 89).

Another aspect of executive pay is found by Garvey and Milbourn. They find that, when using a benchmark for payment, executive wages are asymmetrically linked to movements in shareholder value. They argue that when the performance is positive, the salary of executives is more related to this performance, than when performance is negative and there is a reduction in shareholder value (2006, p. 222). When the upside has more effect on the money received for executives than the

downside of performance, there is an incentive to take more risk than shareholders would find optimal.

Next to this asymmetry, Bertrand and Mullainathan find that payment of CEOs is just as sensitive to a dollar generated by luck as one that is generated by the skill of the CEO, especially in poorly governed organizations. (2007, p. 24). So a CEO who increases his firm value by getting lucky gets just as much reward from it as a CEO who increases the firm value by the same amount, but by skill. Although it is not sure that the same goes for banks because this research was done in other sectors than banking.

After reviewing these articles about the effect of incentives on manager behavior, there are several things to be concluded. The articles discussed here agree with each other that pay-for-performance structures lead to increased risk taking. Some do not really note if it is more or less than the optimal amount, others only note that under certain conditions risk-taking is above optimal points, for example when options are out of the money or when the threshold for a bonus is very high. Some authors do state that risk taking is excessive because of incentive-fees and that the compensation structures can even lead to perverse behavior like taking tail risk which is hidden from the principal. It is also shown that performance related compensation is often asymmetric with a stronger effect on the positive side. When a manager makes a profit he can get a percentage of the value he created, but when he loses investors money he is not affected in the same magnitude. In that case there does exist the possibility to lose his job, but managers have to under perform significantly for this to happen and they can protect themselves from this by herding.

#### **4. The subprime crisis background**

To find out if the reward system of bankers augmented the subprime crisis, all the reasons for the crisis must first be looked at. From that, the main events that lead to the crisis will be noted. First the background will be discussed and then the actual events leading up to the crisis. The different aspects in which the behavior of managers could have had an influence are identified. Several articles are discussed, although according to some authors like Goodhart it is still very early for a fully comprehensive view on the background of this crisis (2008, p. 331).

#### *4.1 Under priced risk*

In his article about the background of the recent financial crisis Goodhart lists factors that had an effect on the crisis. First of all he mentions the under-pricing of risk, leading to low requested risk premia. Three things mainly caused this: extraordinary low interest rates in the period from 2001-2005, The Great Stability and the Greenspan put (2008, p 331–332).

According to the author, the low interest rate came about because of fear of deflation and a large amount of savings from the tech bubble aftermath. The Great Stability refers to the period since around 1990 up to recently with inflation and growth rates being steady in most of the developed countries. Goodhart states that this persistent stability made many people believe that macro economic risk had been reduced. The Greenspan put is explained in the article by the consensus in the financial market that the Federal Reserve will support the market and especially the big financial institutions in case of a collapse. Large financial institutions have the idea that they are too big to fail. This protects the downside of investment (Goodhart, 2008, p.332). The current president of the Dutch bank, Wellink also mentions in his speech on financial stability that the under-pricing of risk is also a cyclical phenomena in with banks for example loosen their lending criteria in good economic times and tighten these again in worse times (Wellink, 2008, p.2).

#### *4.2 Changes in the financial market*

The second background factor Goodhart gives is the innovation of the financial market. Various derivatives have been created and gained popularity in use. Next to that, a lot of new ways of securitization have been invented (Goodhart, 2008, p. 333).

The first thing he mentions is the originate-to-distribute model (OTD) that many banks have started using instead of the buy-and-hold strategy. It implies that banks originate various loans, for example mortgages. They then bundle the rights to the mortgage payments together in pools of different sorts and then distribute them to other investors in the form of mortgage backed securities or collateralized debt

obligations so they leave their balance sheet, although this transfer is more often artificial than real (Goodhart, 2008, p. 334).

Goodhart explains the way in which the mortgages are pooled. People with loans are put into pools and then, according to their probability of default, they are separated into tranches. The lowest tranche gets the losses from default first. After that, there are middle tranches and senior tranches. The latter get affected by default risk when the capital of the lower tranches is used. Therefore the senior tranches were assumed to have a credit risk close to zero. The lowest riskiest tranches are mostly owned by hedge funds because they can hedge part of the risk. The middle ones are generally held by pension funds and other, more risk averse holders. Bank conduits and structured investment vehicles mostly hold the senior tranches. When the economy is thriving, default only happens when a lender loses his job or because of other personal trouble. Collecting these loans therefore eliminated a substantial part of this risk. But when housing prices fall for example, the risk of default rises and then even the senior tranches can start to look like they have a possibility of default. (Goodhart, 2008, p. 342).

The report on the crisis from the financial stability forum explains securitization further. OTD can give many benefits. The organizations originating benefit from more capital efficiency, better availability of funding and less earnings volatility because the model reduces interest rate and credit risk of the capital markets. Borrowers benefit because of increased credit availability, product choice and lower borrowing cost. Finally investors have more choice of investments that lets them diversify and match their risk preferences more closely (FSF, 2008, p. 9).

But in the years before the crisis the practices around OTD have deteriorated. Goodhart notes that the transfers of these securities were often to structured investment vehicles closely related to the bank or conduits that the bank owned themselves. They did this because under the regulation of the Basel I accord they did have to put capital behind these off-balance sheet non-bank subsidiaries (2008, p. 334). These SIVs and conduits were less regulated because they didn't have to abide by the regulation rules that the banks owning or sponsoring them had to. The conduits and the SIVs were often financed with asset-backed commercial paper like MBSs of short-term maturity while their assets were mostly long term creating liquidity risk. To bear this risk these organizations often had close ties with their sponsoring banks, which would provide the funding for them in case they could not refinance with the

short-term commercial paper. This made banks keep the liabilities as last resort lender. The report from the FSF also states that banks were still exposed in direct and indirect ways to the risk that had been transferred to the SIVs and conduits because of: revenue risks, contingent credit lines, reputational links and counterpart credit exposure. Furthermore they failed to measure and manage the risk associated with these practices (FSF, 2008, p. 10).

Another problem with the OTD model that Goodhart mentions is that the originators were less motivated to check the credit assessment and to monitor the borrowers' financial condition during the time of the loan because it left their balance sheet quickly (2008, p. 337).

#### *4.3 The credit rating agencies*

The third factor given by Goodhart, which had helped create the setting for the subprime crisis, is the credit rating agencies. First of all, the ratings credit agencies use are often misinterpreted. The author gives the example that AAA rated government debt is of different and normally higher quality than AAA rated senior tranches of collateralized mortgage obligations. Yet some investors believed that these assets were of the same quality (Goodhart, 2008, p. 337). Second, the FSF mentions the credit rating agencies have failed rating the quality of the pools of collateralized debt obligations using inadequate models and methodologies. Furthermore the FSF judges they were not transparent enough about the assumptions, methodologies and criteria that were used to rate the financial products and did not provide enough information about the meaning and risk characteristics of their ratings (2008, p. 8). Goodhart notes that in the data period the rating agencies use, the housing prices have never been falling over the whole US. As long as housing prices rise, people with mortgages will attempt to pay of their debt. But if the value of their house falls below the value of their mortgage, it is rational for them to give the right to the collateral to the bank. While normally people only default on their debt because of personal factors like illness or unemployment. He therefore notes that it is probable that in rating of, for instance CDOs, the rating agencies did not have the risk of an overall housing price fall in mind. Last, Goodhart mentions that there could be a moral

hazard problem. Rating agencies are paid by the originators of the debt. It could have been that they gave good ratings to these originators because they are the ones that pay (Goodhart, 2008, p. 338).

## **5. Events leading to the subprime crisis**

The Financial Stability Forum report states a short summary to the whole crisis before going into the facts with more depth:

The turmoil in the most advanced financial markets that started in the summer of 2007 was the culmination of an exceptional boom in credit growth and leverage in the financial system. This boom was fed by a long period of benign economic and financial conditions, including historically low real interest rates and abundant liquidity, which increased the amount of risk and leverage that borrowers, investors and intermediaries were willing to take on, and by a wave of financial innovation, which expanded the system's capacity to generate credit assets and leverage but outpaced its capacity to manage the associated risks. (FSF, 2008, p. 5)

Using this report the main actions and developments will be discussed. In their report, the FSF notes that the building stones for the crisis were laid with the global trend of low expected volatility, low interest rates and low risk premia from around 2003 and the great expansion of the use of CDOs. The products with complicated structures that came forth from the pooling and tranching of credit assets like mortgages got a high rating from the credit rating agencies (2008, p. 5). Because the structure was so complicated, investors often relied on the CRAs for the rating of the products and did not try to estimate the risk themselves. The FSF goes on stating that financial guarantors further enhanced the credit, which created the idea that there were unlimited investment opportunities of good quality. The credit risk became easier to trade or hedge because of the development of index markets related to the credit and the credit default swap market. This made these credit instruments seem more liquid and thus more attractive (2008, p.5).

The report goes on to mention that banks and financial institutions increased these effects by creating conduits and investment vehicles that invested in the credit

products with high rating and were not in the balance of the bank. The conduits and investment vehicles often funded themselves for a substantial part by issuing asset-backed commercial paper and mortgage-backed securities and were often highly leveraged. The growing popularity of MBSs is shown in figure 1.

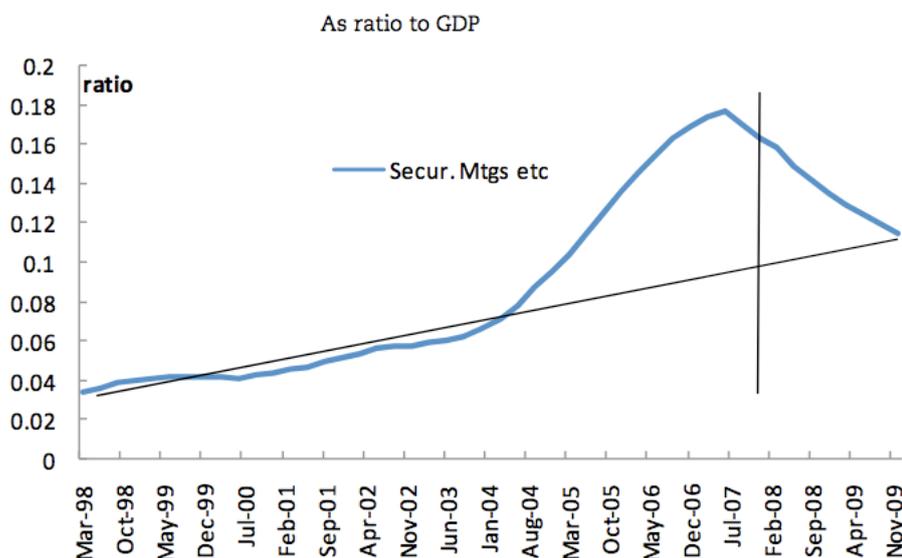


Figure 1. (Blundell-Wignall, 2008, p.38)

They did not have to comply with regulations such as Basel I and therefore were not obligated to have any capital behind their assets. Aside from that, the way they funded themselves being leveraged several times, borrowing short and lending long, created a substantial maturity mismatch and also gave a lot of liquidity risk. These risks associated with a negative event in the economy in general were not estimated correct by both the banks themselves and the CRAs. The banks also underestimated the risk from their commitment to these conduits and structured investment vehicles. (FSF, 2008, p. 5).

Credit standards became more and more loose because of the high demand for CDOs and the continues low default rates on loans. The high demand for the structured credit market made the amount of mortgages increase sharply. Figure 2 is an example of this. It shows the build-up of assets of commercial banks over the past years.

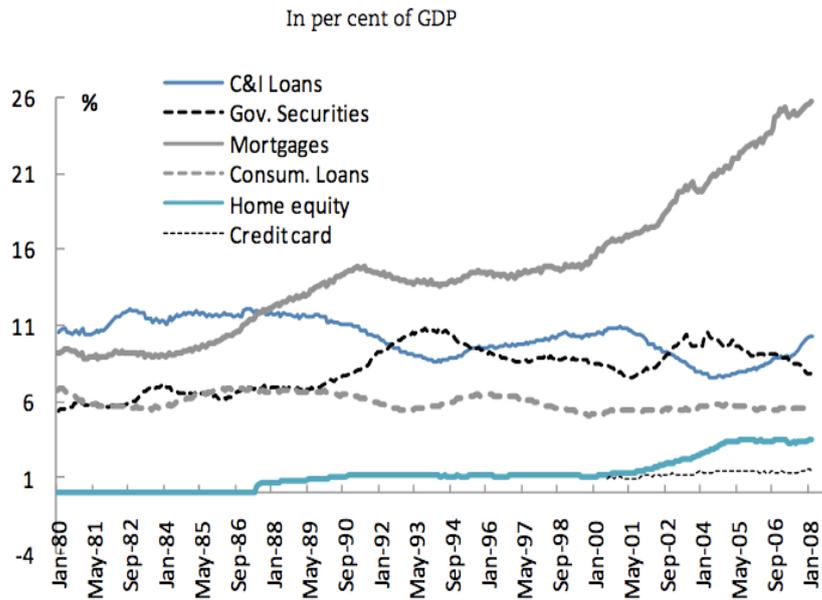


Figure 2. (Blundell-Wignall, 2008, p.41)

According to the FSF this happened especially in the subprime mortgage market in the US. The terms and standards for loans to businesses and households loosened and mortgages became more easily available. The FSF states that in these aspects the banks and CRAs misjudged the risks, especially the sensitivity of these assets to great economic factors. They give a weakening housing market or a fall in high yield debt market liquidity as examples (2008, p. 5).

The main thing that happened next according to the FSF is that the housing market weakened. The housing market has been strong and rising for a long time and according to Demyanyk and Van Hemert, this has masked the true riskiness of the mortgage market for several years (2008, p. 29). Figure 3 shows the annual change in the housing price in the US in percentages over one year. It is the first time since many years that the change is negative, so the probability of this happening was probably assumed to be low.

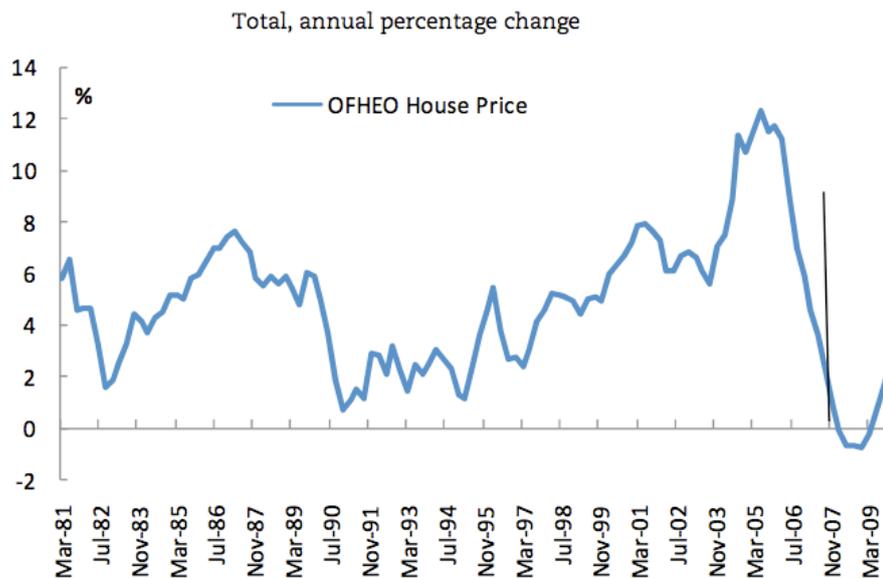


Figure 3. (Blundell-Wignall, 2008, p.36)

This, together with the deteriorated underwriting standards for mortgages caused the amount of defaults to rise substantially, especially on subprime mortgages. Organizations and credit rating agencies started noticing the danger and the prices of indices that were based on assets related to subprime mortgages fell sharply. Investment organs such as SIVs suffered losses from this and, because of their leverage, they started having trouble to roll over their short term funding. They could not get new funding because the problems of the subprime market created a sudden increase in the risk-averseness in the financial market. FSF further reports that the CRAs downgraded the subprime-backed structured products several levels, which lowered the price and investors in general lost confidence in the rating of several structures assets. In August of 2007 SIVs and conduits sponsored by banks, which were backed by structured products, were not able to roll over their asset-backed commercial paper because investors refused to roll over their investment (FSF, 2008, p. 6). This reluctance of investors to buy new asset-backed commercial paper like MBSs led to a sharp fall in the number of outstanding commercial paper which is visible in figure 4

QuickTime™ and a  
TIFF (LZW) decompressor  
are needed to see this picture.

Figure 4. (Goodhart, 2008, p. 343)

As mentioned before banks had close ties with the conduits and SIVs they sponsored and which now had liquidity problems because investors demanded their money. The banks had commitments to provide liquidity to the leveraged organizations. FSF notes that to do this, they had to build up liquidity and they refused to provide term liquidity to other financial institutions as a result of that. The report gives this as one of the reasons for the following sudden deterioration in the term interbank market, the rise of the premia requested in this market and the not functioning of short term financial markets that were related to the banks (FSF, 2008, p. 6).

The fall in the availability of credit and the high leverage of some firms increased the contraction of the market according to the FSF. Because many investors feared the hasty sales at very low prices, credit spreads went up, while for investors it is good if the credit spread is low. This caused losses related to the valuation of different kinds and qualities of assets in various countries. The primary and secondary market liquidity for structured credit product dried up and banks started having more difficulties to value their holdings. They also lost confidence in the capital strength and exposure to credit risk of others, because it was unclear how much other banks were related to the variety of credit products (FSF, 2008, p. 6). Greenspan notes in his article that the interbank market stopped and it was almost impossible for systematic borrowers in this market to obtain funding unless against exceptionally high rates (2008, p. 344). The disturbance in this market lasted longer than banks were prepared

for according to the FSF (2008, p. 6). The report of the FSF goes on to describes the reduction in the market:

As the turmoil spread, increased risk aversion, reduced liquidity, market uncertainty about the soundness of major financial institutions, questions about the quality of structured credit products, and uncertainty about the macroeconomic outlook fed on each other. New issuance in securitization markets fell sharply. As large banks reabsorbed assets and sustained large valuation losses, their balance sheets swelled and their capital cushions shrank. This caused banks to tighten lending conditions. Both bank-based and capital-market channels of credit intermediation slowed. (FSF, 2008, p. 6)

What this means is that there was too much uncertainty to lend to other financial institutions and the lending standards that were so loose a short time ago tightened. The whole financial system basically slowed down and became less efficient.

Even though most investors think the worst of the crisis is over (Henry, Goldstein, 2008, p 22). The present problems according to the FSF are: challenges faced because of continuous de-leveraging in several countries, uncertainty about the health of financial institutions and the quality of their assets and the downward pressure of the difficulties in the financial system on the real economy (2008, p. 6).

Blundell-Wigmall gives an estimate of the total loss to the financial sector as a result of the mortgages in the subprime crisis. According to the author, the total loss in the crisis related to the defaults in subprime loans, estimated in June is between 352 and 422 billion US Dollar. This estimate is made with several assumptions including a recovery rate between 40 and 50 percent. The recovery rate is the percentage of the outstanding loan that is recovered after it is defaulted and foreclosed. Blundell-Wigmall didn't use market prices for his estimate because he believes that these are not a correct representation in the current situation (2008, p.38)

## **5. The influence of bankers**

Turning back to the behavior of managers, the aspects where managers could have had an influence are now discussed. Focus will be on how risk-taking behavior caused

by the asymmetric compensation system could have influenced the events and factors mentioned in the previous chapter.

There are many factors where managers could not have had influence on. Some exogenous factors like low interest rates and the believe that some financial organizations would always be helped by in case of financial trouble, are more caused by the behavior of the federal reserve. Failure of the credit rating agencies can also not be assigned to the managers in banks and other investment institutions either.

Managers and executives of funds and banks decide what to invest in and how they raise the money. Therefore, the aspect that managers could have had the most influence in is the growing demand of structured credit products. For a long time CDOs where seen as a secure good investment opportunity which also created a high yield while not being very risky at first sight. Managers in funds, structured investment vehicles set up by banks and conduits sponsored by banks created a high demand for these products. For managers who were being rewarded for performance over a year it was an easy way to increase their pay since these CDOs were bundled loans and the default rate was therefore much lower than with an individual loan.

The argument of Rajan mentioned earlier also comes into place here. Managers were able to only show the credit rating of their CDOs while they might have know very well that a triple a CDO was still of lower quality then a triple a government bond. Rajan argues that managers were aware of the tail risks they took but they were not visible to the investor (2006, p. 516). Basically managers were getting high returns on the short run, which is their evaluation period, but where taking risks which could materialize on the longer term leading to a catastrophe. In another article From Rajan he also notes this possibility. Going back to the reward system that is based on a certain benchmark, he explains that managers get rewarded for the money they earn above the return they is expected at the risk they take. Investing in CDOs and only showing the rating to investors, but receiving the revenue for also holding tail risk is a way of cheating the system (Rajan, 2008).

A lot of the SIVs and funds did not have to abide by regulations, which the banks sponsoring them did. The managers therefore had the possibility to leverage their organization several times without having a large amount of capital behind their assets. If everything goes well at least within the year where his performance evaluation is about, the manager boosts profit. He does take on more risk to do this again, especially over the long term there is liquidity risk. The way the firm was

leveraged could also be a decision of the manager. As said before, firms often borrowed short while lending long. Issuing asset backed securities, which had to be rolled over several times over the time of an average investment. Borrowing short and lending long is normally seen as good financial practice, but it creates a maturity risk which has been revealed by the trouble the firms got in when they could not roll over the issued asset backed securities because investors got reluctant to reinvest.

One could reason that from the behavior of the managers, concerning the factors that they could influence directly, a certain ripple effect has come forth. Bankers got incentives to take more risk because they would get paid more. They invested in riskier assets and took on high leverage ratios to boost revenue and their own pay. The demand for these assets like CDOs grew a lot as was visible in figure 1. Because of this high demand, banks got an incentive to issue more mortgages and loosen their customer ratings and standards to obtain mortgages. More mortgages were issued and credit rating agencies gave them high ratings. It was possible to invest in these products and be highly leveraged, lending long, borrowing short and earn high profits, which were actually compensation for bearing the tail risk. Banks created off balance sheet vehicles to be able to invest in these products and get the risk off their balance sheet while still being influenced by it. When the tail risk finally got triggered by the fall in the housing prices and the following rating adjustment of the structured credit products, many firms had to deal with liquidity issues and the whole market tightened. Uncertainty and liquidity problems made the market tighten and fall into the subprime crisis.

The ripple effect that one could reason is that in case managers did not have an incentive to take on the excess risk or if they were more focused on long term, it would have reduced the complete effect of the crisis by affecting every step in it. First off all, if the incentive to invest in these structured credit products had not been so strong and bankers would be more reluctant to invest in them, the demand for the products would have been lower. Banks would then not have had a possibility to move so much risk off their balance sheet and therefore would not be so eager to issue loans. The lending standards banks use could maybe have stayed up because of this and not so many loans would have been issued to people that had a high default possibility. Second, firms that still owned a lot of assets in the form of structured credit products would not have had the possibility to leverage themselves because the true riskiness of CDOs would not have been so hidden. Therefore, in case the tail risk got triggered

by a fall in the housing price, not so many firms would have been affected so greatly, the adjustment in the rating would have been less severe and liquidity problems would also have been less. The effect of the subprime crisis would have been less.

The Financial Stability Forum report agrees that part of the crisis is caused by the compensation structure that causes excessive risk taking with too little regard to the risks in the long term (2008, p.8). In their advice to increase financial stability in the future they note:

The financial industry should align compensation models with long-term, firm wide profitability. Regulators and supervisors should work with market participants to mitigate the risks arising from inappropriate incentive structures. (2008, p. 20)

In this literary research the articles researching the behavior of managers and executives receiving performance pay in the financial industry has been linked to causes of the subprime crisis. An actual research comparing firms that use these pay-for-performance schemes with firms that do not use them or have them aligned in a better way has not yet been done. It would be a good thing to be able to see in how far the compensation structure in the financial industry has affected the crisis. This paper does not do that. It is pointed out from the articles discussed here that the pay-for-performance structure of bankers has augmented the subprime crisis, but not by how much.

## **6. Conclusion**

In this literary research the question if the reward structure of bank managers and executives increased the financial crisis has been addressed. It is pointed out that the compensation of managers and executives in the financial industry is related to firm performance and how much revenue they create. Because of these incentives in their compensation scheme, bankers show certain behavior. From the articles discussed it is seen that, even though these reward structures can help align the interests of owners and managers, the incentives lead bankers to take more risk, focus on short term and show certain perverse behavior like taking on hidden tail risk.

The subprime crisis was caused by many factors. A failing of the credit rating agencies, too loose lending standards of banks and too much leverage taken on by firms are some of them. The risk taking behavior of bankers could have increased the crisis substantially. Because of the risk appetite of bankers, whole firms became more risky. Assets were bought that contained more risk and firms leveraged themselves several, lending long while borrowing short times to boost profits. CDOs increased in use. These CDOs bare tail risk, giving high short term revenue in return for holding this risk, but they could possibly lead to large losses in long term. This increased market risk, liquidity risk and maturity mismatches. When these tail risks got triggered and materialized by a fall in the housing price, the prices were adjusted suddenly. The following liquidity problems and insecurity in a market that is sensitive to reputation and confidence lead to the subprime crisis.

If bankers would not have taken on so much risk to boost their firms' and their own profit the effects of the crisis would not have been so large. Therefore it is concluded that the reward structure of bankers has indeed increased the financial crisis.

One could even argue that a ripple effect could have been in place with increasing demand for CDOs leading to loosened credit standards and to a high value of these CDOs. The low standards lead to more people, likely to default, having loans and the entire system becoming more risky. If the demand in these structures products would have been less, all these effect could also have been less.

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