Motivation of financial institutions' management to a crisis

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The recent financial and economic crisis highlighted the importance to better understand managers' motivation and decision making process at financial institutions. There is direct relation between liquidity developments and asset price movements and these market developments influence the decision makers' attitude and reaction. This interconnection can result in a vicious circle with devastating consequences for the financial system and real economy.

Nowadays market-based institutions overtook the dominant role in the supply of credit from commercial banks. These market-based financial institutions were deeply involved in securitisation and actively used capital and financial markets to satisfy their funding needs. This changing nature of finance is well reflected by the aggregate balance sheet of market-based financial intermediaries which in 2007 reached 17.000 trillion of dollars compared to commercial banks 13.000 trillion. This overwhelming role of broker-dealers, investment banks together with their risk and investment practices explains why the managerial decisions in this type of financial institutions have reaching consequences to the whole financial system and real economy.

Main goal is to shed light on this management behavioural phenomenon on which today's researchers and practitioners need to focus on to prevent the proliferation of overly risk taking.

Keywords: crisis, risk, compensation scheme, leverage

1. Introduction

The primary goal of this paper is not to put the blame on financial managers for the financial crisis but to shed light on their motivating factors. There is plenty of literature dealing with the causes of the current situation but little attention has been paid to psychological aspects.

Király et al (2008) provides an overview of the antecedents of the crisis emanating from the US sub-prime credit market. They conclude that the main drivers of the turmoil were a persistently low international interest rate environment and financial imbalances brought about by globalisation. The continuously rising house prices, the rapid increase of financial asset prices due to sub-prime mortgage credit securitisations (the originate-and-distribute model) and the crash of asset prices in the United States collectively were liable for the enormity of the economical distress.

But to a very important feature of the events little attention was paid to: the financial institution managers' and portfolio dealers' motivation. The recent financial and economic crisis highlighted the direct relation between liquidity developments and asset price movements. These market developments are important inputs in decision making process and contribute to the general attitude and influence reactions. This interconnection between market developments and investors feelings can result in a vicious circle with devastating consequences for the financial system and real economy.

First the financial landscape will be introduced as to understand the setting in which decision makers' manoeuvre. Only the very necessary technical aspects will be treated which are indispensable to our topic. After the regulatory issues the "this time is different" belief is treated as beliefs and ignorance are key to understand dynamics. Before ending this paper with conclusions the compensation practice at financial institutions is going to be discussed and its effect.

2. The financial landscape

To be aware of the financial landscape preceding the 2007-08 events is very helpful to understand financial managers' motivation and decision making process.

Classical financial institutions (commercial banks, saving houses, thrifts) make money by maturity transformation, that is they finance long term investments (house purchase) from short term sources (deposits). But from the 80's so called market-based financial institutions (broker-dealers, investment banks, hedge funds) overtook the dominant role in the supply of credit from commercial banks. These market-based financial institutions were deeply involved in securitisation and actively used capital and financial markets to satisfy their funding needs. This changing nature of finance is well reflected by the aggregate balance sheet of market-based financial intermediaries which in 2007 reached 17.000 trillion of dollars compared to commercial banks 13.000 trillion (*Adrian–Shin* 2008). This overwhelming role of broker-dealers, investment banks together with their risk and investment practices explains why the managerial decisions in this type of financial institutions have far reaching consequences to the whole financial system and real economy too.

Market-based financial institutions engage in very intense maturity transformation by buying long term assets on the capital markets (stocks, bonds, asset backed securities, credit default swaps, etc) and refinancing these assets from short term credits from the money markets. Money markets offer short term financing possibilities that is they lend money for one day or a couple of day. From this follows that investors have to refinance assets from time to time. Not surprisingly, refinancing conditions are vital to investors.

On money markets the primary form on lending is the repurchase agreement (repo). In a repo contract the borrower sells a security today for a price below the current market price and will buy it back in the future at a pre-agreed price. The difference between the current market price of the security and the price at which it is sold is called the "haircut". The variations of haircut largely determine the available funding to market participants, since the haircut determines the maximum potential leverage possible to borrowers. In case of 2% haircut, investors can borrow 98 dollars for 100 dollars worth of assets pledged, investing this way only 2 dollars of equity to hold 100 dollars worth of securities. Thus, in case of 2% repo haircut the greatest possible leverage (ratio of assets to equity) is 50 (*Adrian–Shin* 2009).

The evolution of factors influencing liquidity conditions shows pro-cyclicality which means that liquidity is plenty when markets are calm and prices of assets are rising. In these conditions lenders feel safe from losses as they keep the collateral. The value of collateral in favourable conditions, when optimism is reigning, usually is rising. Volatility is low as investors are calm. Several other factors have influence on short term liquidity conditions and implicitly on balance sheets of financial institutions. As portfolio managers react to every change in asset and money market conditions balance sheets reflect all this adjustment. As a consequence investment banks aggregated balance sheets is a good proxy for general liquidity conditions (*Adrian–Shin* 2008).

It is important to write about financial developments. Financial engineering created new highest qualified investment graded (AAA) assets which became eligible for repo. As the real value of these securities got questioned they lost their high level status and a haircut of 100% was applied to them. These papers became ineligible for refinancing in practice which put additional pressure on their prices.

3. Regulation

Investment companies, broker-dealers have to follow mark-to-market accounting rules to reflect the true and updated value of the balance sheets of financial institutions. It means that

these companies day-by-day have to update their balance sheet items. This methodology should allow investors and policy makers to better assess risk profiles and make corrective actions in financial regulations. Opponents of this accounting practice argue that mark-to-market accounting leads to excessive and artificial volatility of market prices and balance sheets. As a consequence, short-term fluctuations have serious effects on the value of the balance sheets of financial institutions. This way an accounting rule drives markets instead of the fundamentals and the value at maturity of assets and liabilities (*Allen–Carletti* 2007).

This mark-to-market accounting rule is exacerbated by value-at-risk (VaR) risk management. VaR is defined as a threshold value that the losses should not exceed in a given time period with a given confidence level. The main input in VaR values is the volatility of time series of daily equity returns. To put it simple, VaR is high when the market prices change with big amplitudes. In compliance with VaR risk management practice exposures are adjusted continuously to be matched with available capital, so to leave the probability of default constant. But market prices change in the same time for every financial investor which means that they have to de-leverage (sell assets) at the same time to contract their balance sheets. In other words, balance sheet must shrink or expand simultaneously to keep probability of solvency fixed over time. Thus, when after a shock the overall risks in the financial system increase, the intermediary must decrease its exposure in order to maintain the probability of default unchanged to additional arriving shocks. On the contrary, when the economic situation is more benevolent and anticipated risk declines, the financial companies will expand balance sheets by buying risky assets to keep the probability of default constant (*Adrian–Shin* 2008).

From the above mentioned follows that the assets to capital ratio moves hand-in-hand with VaR. Intermediaries are buying risky assets when the risk measured by VaR is low and selling assets when measured risk is elevated. To put it in different way leverage is pro-cyclical in the sense that leverage grows when balance sheets are expanding, and then contracts when balance sheets are shrinking (*Adrian–Shin* 2008). Figure 1 and figure 2 help to explain this relationship, between VaR, leverage and volatility, where the latter is represented by the VIX[1] index.

On Figure 1 the relationship between the equity of the 4 largest US investment bank, value of VaR (the ’06 May value set to unity) and S&P500 stock prices can be seen. Equity is responding not only to stock prices but VaR too and that is the reason that the value of banks equity can diverge from the course of stock prices. Obviously the change of equity can overreact the change of stock prices in benign conditions when VIX declining.

On Figure 2 the countercyclical nature of connection of price volatility (VIX) and banks leverage ratio (lev) is visible. The effect of suddenly falling prices to leverage is dramatic in 2008. The explanation is that crashing prices wiping out bank equity (Figure 1) faster than banks can adjust leverage to new conditions. Liquidity[2] conditions were stressed from two main directions. First asset liquidity deteriorated on markets[3]. It means that when financial companies sell stock they want to exit the same door at the same time but simply enough buyers can be found only at markedly lower prices. The final consequence is devastating and demonstrated by leverage value. It has reached nearly 100 which imply that against equity of

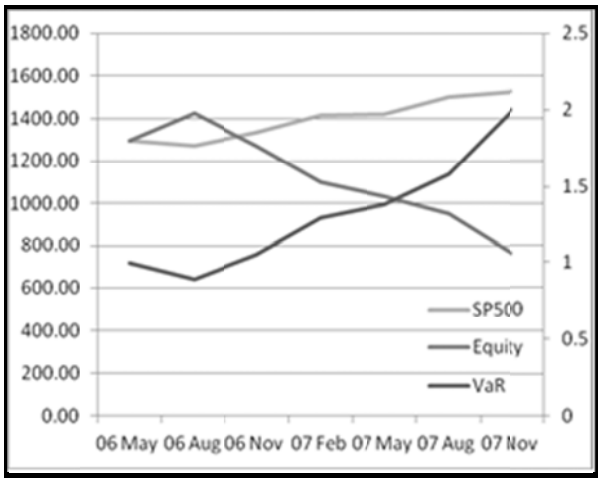
[1] The CBOE Volatility Index® (VIX®) is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices. Since its introduction in 1993, VIX has been considered by many to be the world's premier barometer of investor sentiment and market volatility. http://www.cboe.com/micro/VIX/vixintro.aspx

[2] About likuidity effect see *Ács* 2011. http://www.bankszovetseg.hu/anyag/feltoltott/HSZ_0311_5.pdf

[3] A market is liquid if transactions can take place rapidly and with little impact on price. So defined, market liquidity has several dimensions.20 Tightness refers to the difference between buy and sell prices, for example the bid-ask spread in a quote-driven market. Depth relates to the size of the transactions that can be absorbed without affecting prices. Immediacy denotes the speed with which orders can be executed, and resiliency the ease with which prices return to “normal” after temporary order imbalances (*Borio* 2000).

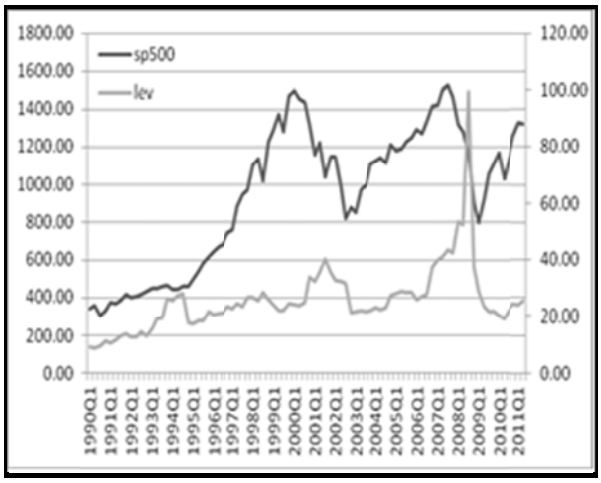
1 there were assets of 100; only an additional 1% decrees in value wiped out totally the remaining equity of banks resulting in€ bankruptcy.

Figure 1. Relationship between S&P500 stock prices (lhs), equity of banks (lhs), and VaR (rhs)



Note: Index comprised of Bear Stearns, Goldman Sacs, Lehman Brothers, and Morgan Stanley.
Source: Shin et al (2008)

Figure 2. Relationship between S&P500 stock prices (lhs) and leverage ratio (rhs)



Source: Yahoo Finance

4. Beliefs and ignorance: this time is different

The roots of the problems stretch back to the preceding years of low interest rates and high world growth. The main driver of developments was the search for yield further down the credit quality curve. Stock prices were kept on rising and volatility was subdued simultaneously leading to overoptimistic assessments about the risks ahead. At the same time financial system developed new investment graded (AAA, that is the highest quality) financial instruments that seemed to offer higher risk-adjusted yields, but in reality their risk was understated due to lack of knowledge and negligence. In this environment prevailed by optimism market discipline failed (*IMF* 2009a). Not surprisingly "this time is different" attitude reigned across the financial system. The belief in financial innovations was unlimited blurring even the supervisors' vision too in many cases. The decisive moment in the period before crisis was when the newly created investment graded securities appeared on the

markets and got refinanced in repo transactions at a much lower haircut than otherwise would have been reasonable.

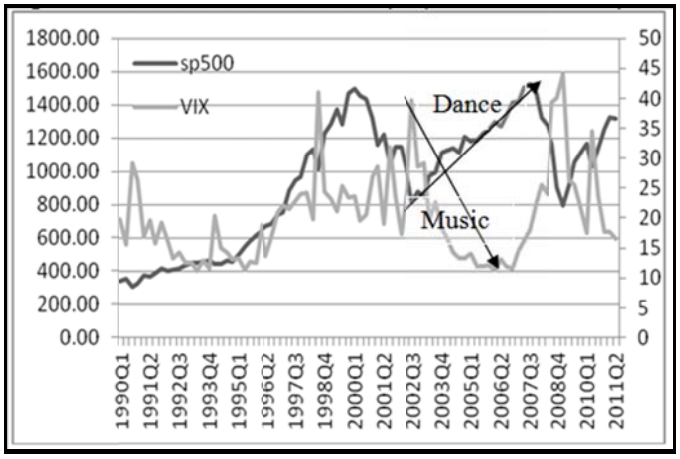
The US Office for the Comptroller of the Currency from 2004 through 2007 provided timely warning. Tried draw attention to a) imprudent credit decision practices fostered by ambitious growth goals, b) the need of better credit risk management practices, c) the liability of managers for both the quality and the quantity of their deals, d) "the worst of loans are made in the best of times", e) changing risk selection practices and underwriting standards, and emerging concentrations of risks, f) unsustainable appreciation of house prices and overvalued markets, g) increasing credit risk due to weakening of underwriting standards (*IMF* 2009b).

Rajan (2009) is pointing to cyclical euphoria. It is not completely surprising that bad investments are done in good times. But what was astonishing was that the originators of securities with questionable values held in their own portfolios so many of them. At least the financial institutions should have understood the deterioration of the underlying quality of assets (mortgage backed securities, MBS). The justification has to be that somebody in these financial institutions considered these securities worth of investment. Buying mortgage backed securities seemed to be became part of an investment culture characterised by excessive risk-taking. To timely recognise this abnormality, it is extremely difficult, especially in the case of new products (*Rajan* 2009). As these assets were widely accepted in repo at a relatively low haircut indeed they were attractive.

Another issue is related to performance evaluation. To judge whether a financial manager is generating real risk adjusted excess returns or whether the current returns are simply compensation for an uncovered risk that can later materialize is a tough task. In addition head of financial companies are evaluated in part on the basis of the earnings they generate relative to their peers. This is a very competitive business and the pressure is always high to generate high returns. To managers of follower banks have no option but to engage in risky investments to improve various observable measures of performance. Even if they recognize the doubtfulness of this type of strategy, the temptation to increase their bank's stock prices and their own reputation is a strong appeal. There is anecdotal evidence of this type of managerial attitude. The most frequently cited is the chief executive officer of Citigroup, Chuck Prince. In his infamous sentence gave explanation why Citigroup continued the same investment practice to buy assets from credit despite rising risks: "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" (*Rajan* 2009).

This "dance" is highlighted on Figure 3, where the simultaneous development of S&P500 stock index and market volatility (VIX) is observable. Nicely discernible is a change in the relationship between S&P500 and VIX from 2002 onwards. Volatility was diminishing and stock prices were kept on rising. VIX reached its bottom in 2006q4 but stock prices were rising for an addition half year. Liquidity conditions changed in response to varying volatility and asset prices. When both were deteriorating liquidity conditions answered in accordance by rising haircuts and shrinking number of eligible assets. Then the stock index bottomed and volatility topped at the same time in 2009q1.

Figure 3. The S&P500 stock index (lhs) and VIX volatility index (rhs)



Source: Yahoo Finance

In every investment institution there is internal risk management. Risk managers repeatedly warned of risk building up in the financial system but that risk had not materialized in the upswing period. These so called tail-risks by their characteristic happen rarely and therefore hard to quantify with precision their occurrence. That is the reason why risk managers could not put a limit on the investment managers' activity. Investment managers were so profitable for an extended period of time that hardly any chairperson at investment banks were ready to bring to an end such profits. Keep in mind that top managers were pressured for profits by stockholders. So these warnings were left out of consideration and had little influence. To bet against the boom is a very risky strategy because, as Keynes said, the market can stay irrational longer than investors can stay solvent (*Rajan* 2009).

5. Compensation practice

There is competition even for traders. To get the best investment managers (traders) an attractive compensation scheme is essential. But the bulk of the compensation paid for short-term, risk-adjusted performance. In this setting to maximize long-term bank value is extremely difficult. As mentioned, to identify so called tail-risks in benign conditions is enormously complicated and this circumstance give traders an incentive to take risks that not fully recognized by the system and prices. By taking advantage from lack of knowledge superior income could be generated that appeared to stem from superior investment abilities, even though extra profits were in fact only market-risk premiums. The typical way to exploit this situation is to write insurance on rare events such as defaults, assuming what is termed "tail" risk. If insurance premium entirely recognised as income for portfolio managers' trading activity than part of this money can be paid off as bonuses. In reality the significant fraction of the generated income should be set aside as reserve for an eventual tail-risk event. For example at AIG's financial products division this became a general practice by investment managers to wrote out credit default swaps (CDS) and take the extra income as bonuses. Not bothering with the consequences no reserves were left for default and the company got to the brink of bankruptcy (*Rajan* 2009).

Another flawed widespread compensation practice based on the generation of annual profits with similar destroying effects. In the run-up to the crisis payouts to traders and managers were abundant. The source of extra yield was achieved by engaging in leveraged positions buying multiple quantities of risky assets from capital. But dealers did not face the losses in the downturn together with top management (*IMF* 2009a).

To bring to an this erroneous bonus system and far reaching consequences for the financial system IMF and Bank for International Settlements is developing principles for

sound compensation practices in large financial institutions (*IMF* 2009c, *Basel-BIS* 2010). Supervisors may have to to include compensation schemes to their general review of risk-management and governance at financial companies. New so called best practices would be introduced at international level to make compensation structure more risk based and consistent with the long-term objective of maintaining the company as a going concern. The most logical first step is to stop paying bonuses from annual results and short-term indicators. In this sense deferred pay-outs should be introduced and enough time should be left for potential risk to realise. An alternative choice is to make compensation conditional on medium-term return on assets rather than equity price of the financial institution. This way the bias to create leverage when volatility is low and economical future looks bright could be dampened (*IMF* 2009a).

6. Conclusions

This writing intentionally took into consideration only the most relevant technical issues pertinent to out topic. The author's intention with this short paper is to shed light on soft issues like psychological factors and compensation schemes and their role in financial developments. The shortcomings of the financial system create incentives for investment managers and chairmen for crisis. Undoubtedly these peoples do not want to generate financial meltdown but there is the temptation. This temptation is incarnated in short-term measurement of success and fierce competition between investment companies. This structure is built on money but interestingly portfolio managers and decision makers rarely risk their own wealth. They play a win-win game and in worst case they do not get the year-end bonus but their unresponsive strategy brings about externalities in the real economy. The answer at first glimpse seems simple: stop concentrating only on short term performance measurement and have a longer term investment horizon. But unfortunately it has been proved several times that the creativity of the financial world is limitless and financial regulators lag behind markets.

Regulators and policy makers have to be ready to stifle affluent psychological factors. What really creates an explosive blend ("this time is different") of factors is their pro-cyclicality and co-movement. The source of the liquidity glut in the run-up to the crises was the "collateral bubble" originating from the pro-cyclicality of the financial word. In the years preceding the financial crisis security markets were characterised by inflated prices as the real value of the securities deviated away from fundamental values. Spreads narrowed, market uncertainty measured by volatility remained low, refinancing was cheap and plenty by repurchasing agreements. The range of assets eligible for collateral (warranty) in refinancing operations widened and these collaterals were refinanced close to 100 percent (*Gorton–Metrick* 2010). As broker-dealers' balances on paper remained strong maturity transformation intensified creating an inextricable relationship between different market participants.

In theory compensation deficiencies have been recognised and widely dealt with. Bank for International Settlements (BIS) formulated effective alignment of compensation with prudent risk-taking and effective supervisory oversight and engagement by stakeholders. Not only the firm's directors must actively oversee the compensation system's design and operation but relevant board members and employees must have independence and proficiency in risk management and compensation (*Basel-BIS* 2010). Hopefully these changes will be effective.

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