

Incentives, Risk and Compensation Schemes: Experimental Evidence on the Importance of Risk Adequate Compensation

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Abstract

Compensation schemes have been blamed for encouraging excess risk-taking on the part of managers within the financial system and real economy. In general, compensation cannot decrease below the base salary, while gains from bonuses can be limitless. The potential link between compensation and risk behavior is analyzed in this paper. A behavioral experiment with students shows that unilaterally constructed incentive schemes encourage excess risk-taking. Thus common bonus-based compensation schemes are badly constructed and risk enhancing. Unilaterally constructed compensation schemes were one reason for the financial crisis.

Keywords: Financial market compensation, financial crisis, excess risk-taking, compensation schemes, principal agent theory, moral hazards

JEL classification: J33, M52, D81, D23, G01

1. Introduction

Since the Enron, Worldcom and the financial crisis, compensation for bank managers and managers in other public companies have come under intense scrutiny. Compensation has been held responsible for encouraging excess risk-taking, particularly within the financial system. It has been asserted that bonus compensation schemes have caused asymmetries in the treatment of gains and losses, which can lead to excessively risky behavior. The purpose of this paper is to test this hypothesis. Do unilaterally constructed incentive schemes encourage undue risk-taking? This question is examined with a behavioral experiment using the game roulette. It is used to analyze how unilateral compensation affects risk behavior. In section 2 the existing literature and studies are presented and compared to the experiment presented here. Section 3 explains the experimental design of the study. Finally, the results are presented (section 4) and the conclusions drawn (section 5).

2. Related Literature

According to principal agent theory (Ross, 1973; Jensen & Meckling, 1976; Novak 1997) correlating a manager's compensation with either their performance or that of the firm promotes better incentive alignment and leads to higher motivation and thus stronger company values. However, there is an asymmetric imbalance between the term, magnitude and probability of gains and losses in common compensation schemes. Short-term results are rewarded even when these results are later reversed. This encourages risk taking by the employees – agents - at the cost of the company - the principal. The agents undertake actions that generate a high probability of gains in the short-term, while the risk of a larger loss in the longer-term is not taken into consideration, causing the principle to bear all of the long-term risk. A substantial body of literature has emerged to test the relationship between manager compensation and manager behavior and performance.

Figures of the Office of the New York State Comptroller show that bonuses in Wall Street financial institutions continued to register large positive numbers in 2007 and 2008, even while the banks suffered large losses (Sharma, 2012). Surveys by the Financial Stability Forum (2009) showed that over 80% of financial market participants and experts believe that compensation practices played a role in promoting the accumulation of risks that led to the financial crisis. Cuomo (2009) shows that bonuses and overall compensation did not vary significantly even though profits diminished during the financial crisis. Cai, Cherny and Milbourn (2010) studied the pay structures of banking executives

before the financial crisis. They found some problematic practices (such as too much bonus and stock-related compensation). These practices might have encouraged “short-termism” and excessive risk-taking.

Agarwal and Ben-David (2011) results show that the explosion in mortgage volume during the crisis and the deterioration of underwriting standards can be partly attributed to the incentives of loan officers. They studied a controlled experiment conducted by a large bank. The compensation scheme of loan officers was changed from fixed salary to commission-based compensation. Loan officers were 19% more likely to accept loan applications, approved loan amounts larger by 23%, and the loans were 28% more likely to default. The increase in default occurred primarily within the population of loans that would not have been accepted in the absence of commission-based compensation.

However, Gregg, Jewell and Tonks (2012) found that the cash-plus-bonus pay-performance sensitivity of financial firms is not significantly higher than in other sectors and concluded that it is unlikely that incentive structures could be held responsible for inducing bank executives to focus on short-term profits. This would mean that we are facing a general compensation problem.

Cooper, Gulen and Rau (2014) found evidence that industry and size-adjusted CEO pay is negatively related to future shareholder wealth changes for periods up to five years after payment. Sun reviewed the early executive compensation studies, bonus plan maximization hypotheses and equity-based compensation. Use of opportunistic management incentives encourage earnings management based on executive compensation for contracts is promoted when earnings management is driven by opportunistic management incentives. He shows that firms pay a price and its negative impact on shareholders is economically significant (Sun, 2012).

Schotter and Weigelt (1992) use four different compensation schemes to demonstrate that a compensation scheme that induces behavior consistent with lower discount rates is a necessary condition for reconciling divergent time preferences between principals and agents, and that subjects become more myopic in their investment decisions if compensation contracts are incorrectly structured.

Colesa, Danielb and Naveenb (2006) found that higher sensitivity of CEO wealth to stock volatility encourages riskier policy choices, including relatively more investment in R&D, less investment in PPE, more focus, and higher leverage. They also provide empirical evidence of a strong causal relation between managerial compensation and investment policy, debt policy, and firm risk. Cheating is also influenced by compensation schemes. Gilla, Prowseb and Vlassopoulusc (2013) show that exposing workers to a compensation scheme based on random bonuses makes them cheat more but has no effect on their productivity.

Andersson, Holm, Tyran and Wengström (2013) studied risk-taking on behalf of others in an experiment. The decision makers were facing high-powered incentives to increase the risk on behalf of others through hedged compensation contracts or with tournament incentives. The decision-makers responded strongly to incentives that result in an increased risk-exposure for others. There have also been experimental studies concerning the binary choice task and the study concerning the binary double gamble to explore the predictive validity of dispositional traits and affective states in decision making under risk and uncertainty (Papaconomou, 2012).

This paper provides a simple incentive-based experiment regarding unilateral bonus compensation schemes based on the game roulette. There have been several experiments with roulette but with the objective to scrutinize the gambling behavior (Rubio; Hernández & Santacreu) and guessing tendencies (Rubio; Hernández; Zaldívar; Márquez & Santacreu, 2010). The following experiment simulates most common short-term bonus compensation schemes without accountability. They were also the dominating compensation schemes before and during the financial crisis.

3. Experimental Design Roulette

The purpose of this paper is to test the hypothesis that unilaterally constructed incentive schemes encourage excess risk-taking. The methodology is to simulate decision-making under asymmetric incentive structures. Therefore an experimental environment similar to the compensation schemes had to be constructed. Roulette has the advantage of clearly demonstrating the probabilities for gains and losses. In the game Roulette the probability of losses is compensated with higher payouts (apart from zero). A higher risk has an equivalent higher payout. In order to simulate behavior with different incentive and risk structures, decision-makers have to be exposed to different remuneration schemes, which is why there were game rounds with different considerations of gains and losses. The experiment was started with symmetrical incentive structures. Round A and B had identical incentive structures. But the results of round A were not taken into consideration for calculating the highest total game result which was rewarded with €10 real money. Round A served as an exercise round and a control round for B. Finally in round C a unilateral consideration of the profits took place and the changes in the betting behavior were recorded. An indicator for higher risk-taking would be a higher capital set even though the winning probability stayed the same.

The experiment was conducted with 69 students from different Business Bachelor and Master courses at the University of Applied Science HTW at Saarbrücken. The students played 3 rounds Roulette (A, B and C), each with three games.

They could bet on red or black, on one of the three thirds of the 36 numbers or on one number. The winning number and color was determined by the roulette wheel. If it was zero, the game was repeated and not registered. The payouts were distributed according to the probability of winning (x2, x3, x36) and accumulated in each round.

In round A, the students were able to play Roulette with an initial play capital of €1,000. Losses and gains were credited with 100%. The students were asked to check each other's calculations after each game.

In the round B the gambling losses and gains were counted each with 50% and were added to the initial capital of €1,000. Thus there were still no conflicting interests and no asymmetries in the treatment of gains and losses. Round B therefore had identical incentive structures as round A. But the results of round A were not recorded for the determination of the final game winner. Round A served as an exercise round and control round for B.

In round C a unilateral consideration of the profits took place. The set capital was not deducted, if the roulette bet was wrong. Conversely, the payout was credited with 50%, and added to the €1,000 of initial capital. The results of the rounds B and C were added, starting from an initial capital of €1,000 each and the player with the highest result was rewarded with €10 real money. The rules were explained to the students before starting the experiment.

Round C thus corresponded to the unilateral performance-based remuneration of the common bonus-based compensation schemes. Loss and profit incentives were not equally distributed. Losses are borne by the companies and profits are rewarded with bonuses. This simple experiment shows clear results.

4. Results

In round C, the sum of the average capital set rose from €1,361.88 in round B to € 3,899.28, by 186%. The highest possible profit (calculated as the product of the set capital and the possible payout) in all three games rose to €30,000.72 (see figure 1 and 2).

If you set the maximal possible gain in relation to set capital as a risk measurement indicator, the willingness to take risks increased from 5.05 to 7.69 (see table 1). The significantly higher standard deviation in round C shows that some players were more willing to take risks than the average (see figure 3 and 4).

Table 1. Statistical data

	Round A	Round B	Round C
Average set capital	€1,252.63	€1,361.88	€3,899.28
Average maximal possible gain	€5,946.83	€6,874.49	€30,000.72
Risk as max. possible gain/set capital	4.75	5.05	7.69
Standard deviation average set capital	€779.65	€650.32	€2,408.89
Standard deviation maximal possible gain	€634.21	€9,687.06	€31,585.46

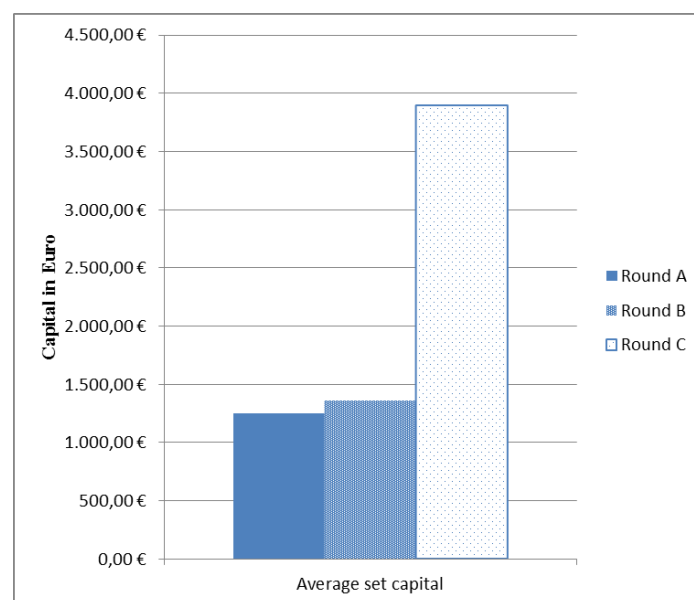


Figure 1. Set capital

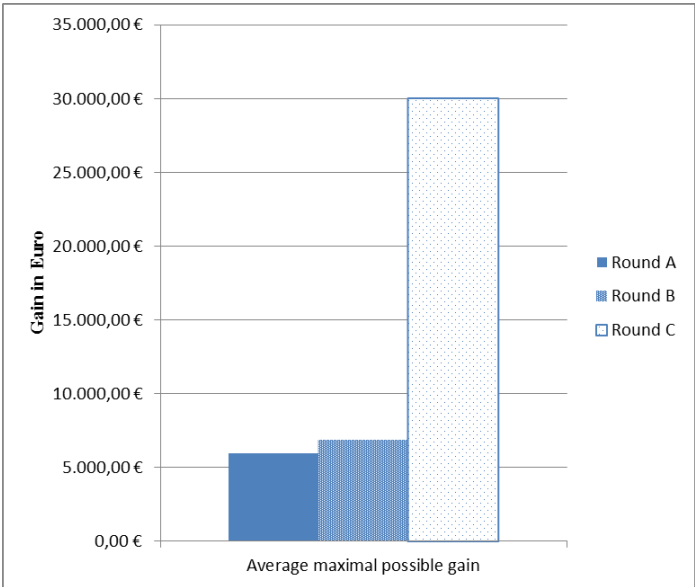


Figure 2. Maximal possible gain

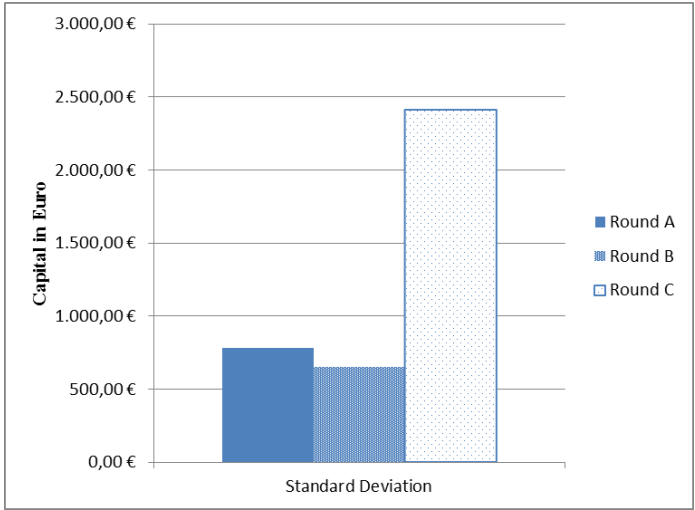


Figure 3. Standard deviation set capital

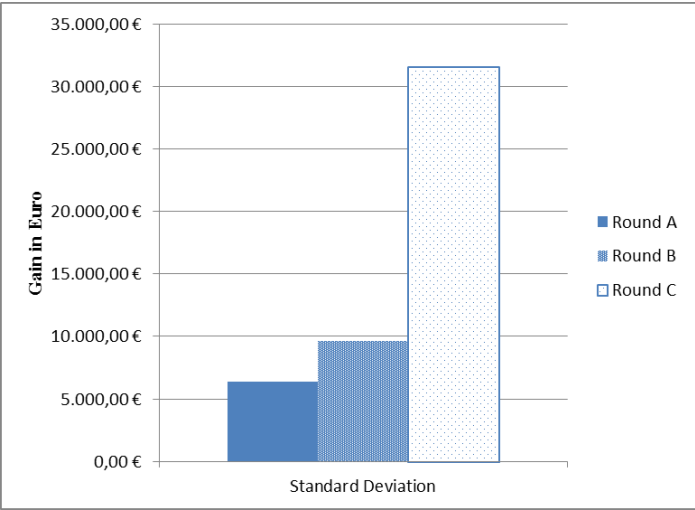


Figure 4. Standard deviation maximal possible gain

5. Conclusion

The experiment showed that unilaterally constructed incentive schemes encourage excess risk-taking. This would indicate that common bonus-based compensation schemes are not a good idea and in fact enhance risk because of the asymmetries in the treatment of gains and losses. In most cases compensation can only decrease down to the base salary while gains from bonuses can be limitless. Short-term results are rewarded even when these results are subsequently reversed. This encourages risk-taking by the employees (agents) at the cost of the company (the principal). They undertake actions that generate a high probability of gains in the short-term while the risk of a larger loss in the longer-term is not taken into consideration, thus becoming a liability to the principal. This does not align with the basic idea of principal-agent theory. Of course a connection between a manager's compensation and a firm or manager's performance will promote better incentive alignment and lead to higher motivation, which increases firm value, but only if losses and profits are remunerated symmetrically.

The existing asymmetries of bonus compensation schemes have led to a divergence of interests between employees on the one hand and the health of financial institutions and other companies at large on the other hand. Compensation packages for CEO's and other managers have gotten out of control. Remuneration and bonuses depend on short-term profitability, which increases share prices in the short-term, but not the long-term health of the company. In the financial system, investment managers increased the risks for their employer by buying highly profitable but risky assets and were rewarded with high bonuses which led to the financial crisis in the long term. In addition, the review of research literature showed that cheating is promoted by high and unilateral variable compensations. CEOs have incentives to manipulate earnings if executive compensation is strongly linked to performance. Opportunistic earnings management behavior has been detected.

Risk adequate compensation is therefore an important prerequisite for good performance in all risk-handling professions. Without accountability variable compensation schemes become unilateral bonus maximization schemes with negative effects for the company and the principal. It means risking other people's money which will generally be abused (moral hazards) (Andersson, O., Holm, H. J., Tyran, J., & Wengström, E., 2013).

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