Game-theoretical Approach for CEO Incentive Mechanism Improvement*

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Abstract In the paper is investigated the problem of CEO compensation value modeling. The goal of the paper is improving the mechanism of forming the variable part of CEO compensation and test the applicability of the mechanism on international public companies. For this purpose in the paper is solved the following tasks: based on the scientific literature is substantiated the requirements for the mechanism of forming the variable part of compensation; is analyzed CEO compensation value and practice of forming the variable part of compensation on example of international public companies in specific industries; is improved the game-theoretical model of forming the variable part of CEO compensation; is carry out a comparative analysis of the results of theoretical modeling and practice of forming the variable part of the CEO compensation in international public companies in IT and retail industries.

Keywords: corporate governance, agency problem, CEO compensation, optimal contracting, compensation structure and value, game-theoretical modeling.

1. Introduction

The study will deal with the problem of CEO compensation value modeling which is one of the core issues of corporate governance. Contracts should attract and retain talented CEOs, incentivize them to exert high level of efforts to implement the company's strategy and ensure its competitive advantage.

CEO compensation structure usually consists of base salary and variable part. Base salary of CEO is less dependent on performance compared to variable part of compensation and is usually determined by the reputation of a manager, his experience at managing companies, size of a considered company, certain industry specifics and the level of CEO base salary across the chosen industry. But the variable part of CEO compensation is directly dependent on company's performance. A variable part of top management compensation in form of option grants and cash bonuses has been prevalent since 1950s in the U.S. public companies (Frydman and Saks, 2010).

In researches and practice traditionally a variable part of executive compensation is considered as a tool for solving the agency problem, which is caused by the conflict of interests between an agent (CEO) and a principal (company owners).

The principal owns the capital and instructs it to manage the agent. However, an agent may have a tendency to opportunistic behavior due to the fact that there is a conflict of interests between the principal and the agent in the division of profits. That is why the mechanism of forming the variable part of CEO compensation, which eliminates motivation for opportunistic behavior, should be worked out.

There are quite a lot of scientific studies on the topic of creation and solving models of «optimal contract». However, we still do not have any models, which are practically viable and tested for real companies. Thus, the goal of the research paper was to improve the mechanism of forming the variable part of CEO compensation based on the existing theoretical models and approaches, and test the applicability of this mechanism for the international public companies.

The research problem of the paper is development of methodology for improving the mechanism of forming the variable part of CEO compensation, which should incentivize CEO to exert high level of efforts to implement the company's strategy and ensure its competitive advantage. Another words we try to construct the mechanism of forming the variable part of CEO compensation, which can be applied on practice. That is why the goal of the research paper is improving the mechanism of forming the variable part of CEO compensation and test the applicability of the mechanism on international public companies.

The following tasks were to be solved in the paper:

- Based on the scientific literature substantiate the requirements for the mechanism of forming the variable part of compensation;
- Analyze CEO compensation value and practice of forming the variable part of compensation on example of international public companies in specific industries;
- Improve the theoretical model of forming the variable part of CEO compensation;
- Carry out a comparative analysis of the results of theoretical modeling and practice of forming the variable part of the CEO compensation in international public companies in specific industries

The subject of this research is the size of the incentive part of CEO compensation and the object of the study is international publicly traded companies in specific industries.

In the paper were used the following research methods: scientific literature review, current practice review and statistical analysis, game-theoretical modeling and case study analysis.

The paper consists of introduction, four chapters, conclusions, list of references and appendices.

2.   CEO compensation problem

Significant part of scientific papers on the topic of CEO compensation focus on the analysis of differences for compensation contract values across industries and countries. But it happened to be that the best statistical data and research on CEO compensation originates from the U.S., therefore this country will be in focus of our analysis. According to publications in this field (Jensen, Murphy, 2004), (Gabaix, Landier, 2007) a substantial growth in CEO compensation in U.S. was noticed in the recent decades after a calm period of 1970-s. In their research, Frydman and

Saks, demonstrated statistics on executive compensation starting from 1930-s. It was presented that the compensation value decreased significantly after the World War II and was growing on average at 0,8% per year at the following 30 years. However, in the period of 1998-2007 froth rates were overcoming 10% per year, and the total value of compensation reached a median of $7.9 mln in 2005 (Frydman, Saks, 2007; Murphy, 2013).

Publicly traded companies with dispersed ownership structure will be in the focus of our research. When ownership and control are divided in such way, management can accumulate a significant managerial power. From the very beginning of analysis of this fact, a problem of excessive managerial power has been considered in science as agency problem (Jensen, Meckling, 1976). Management of companies can utilize their privileged position in private goals with the help of, for instance, ineffective distribution of cash flows. In addition, they can find themselves entrenched on their positions, so that it becomes difficult to substitute them even in case of low productivity. Therefore, every research in the field of managerial compensation should be conducted in the context of agency problem.

As it can be seen from the introduction, executive compensation problem requires following analysis.

2.1. Evolution of agency problem

The problem of managerial compensation is considered as one of the sides of corporate governance, which itself is a system of relationships between managers and owners of the company on the ensuring effectiveness of operations and protection of owner's rights, and other stakeholders. It is important to mention that in corporate governance a topic of interrelationships of stakeholder is one the main ones. It could be explained by the fact that stakeholders determine a success of the company in the market (for instance, suppliers and consumers), which impact the value for owners (Bukhvalov, 2012).

One of the main contradictions and classic problems of corporate governance is agency problem, which is focuses on the conflict of interest between owner and manager (Denis, McConnel, 2003). The interest of owners in company is associated with its value, which most commonly is represented as market capitalization. However, the ownerships stake in the company may be one of many investments of that owner's investment portfolio. Therefore, even a strong decrease in market capitalization of the company is only partly influence owner's wealth. The opposite position is take by the manager of the company: his reputation and wealth are closely connected with the success of that company he manages, which means that possible risks are very significant (Bukhvalov, 2012). In our case under agent we will understand CEO (Chief Executive Officer), and under principal we will understand shareholders and, as representatives of their interests, board of directors.

If we look back at the history of research of agency problem, it was firstly mentioned explained by Ross (Ross, 1973). He stated that, because of the separation of ownership and control and the inclination for opportunistic behavior, a manager can pursue an opportunity to decrease his efforts or rather make unnecessary work from principal for higher compensation. So, the manager aims to maximize his own wealth, rather than the value of shares. Thus, the key problem is how to align the interests of the principal and agent.

Utility of a principal depends on actions of the agent and he wants agent to maximize his principal's utility. Such issue as the information asymmetry prevents

the principal from interpreting the exact information on activities and decision of the principal. The utility function of the agent is supposed to be his remuneration less his costs put in the value creation. Contrary, the utility function of principal is his return from investments in the company.

Separation of ownership and control was one of the central concern from the beginning of the 20th century and one of the main topics of analysis of public companies. This problem is about difference in interests of owners and managers in public companies, and corporate governance tends to resolve this problem (Kenneth, Nofsinger, 2004).

The market capitalization value as a benefit for a principal, receives various treatments in different models. Thus, early models were aimed at seeing the company's profit as a value that needs to be maximized, while modern models usually follow the path of value-oriented management (value management). However, nowadays such metric as market capitalization gains more popularity over profits. The problem of financial effectiveness will be in detail considered by us later.

Traditionally, within an agency problem, compensation contract of the CEO is considered as the tool of the solution of an agency problem (theoretical approaches to determination of the optimum contract) or in itself as a part of an agency problem (the theory of managerial power).

To begin with, there was a concept of the optimum contract firstly time designated in works (Holmstrom, 1979), (Grossman, Hart, 1983) which claimed that the compensation contract of CEOs can be designed in such way so that interests of shareholders and the managers were equally considered. Next, free market mechanisms will allow attracting the most capable CEOs for the fair remuneration, which will bring the company a necessary combination of talent and dedication to put significant efforts to improve and the company.

On the other hand, the theory of managerial power (Bebchuk, 2003) was pushed. In that theory the main hypothesis is that that observed practice of establishment of a certain level of remuneration of the CEOs is explained better by the fact that managers are capable to influence this process in the company, and thus can establish certain amounts of remuneration, effective for them. In this case, remuneration of the CEOs can be considered as the mechanism, via which some CEOs can take a rent from shareholders. As a result, the stronger position the CEO has, the larger remuneration and smaller duties he is inclined to establish to himself (Choe, Tian, 2008). Following the assumption that there is managerial power, remuneration of top management is considered not only as the tool for the solution of an agency problem, but also as a component of this problem itself.

Therefore, considering the contract for the manager in practice, it is necessary to understand that for the solution of an agency problem we need to structure the stimulating components. In this regard, four principles of creation of the contract, which could solve an agency problem, were offered (Milgrom, Roberts, 1992):

- When the complete information about results of work of the manager is unknown, the principle of maximum informational content should be applied (Holmström, 1979). It means that any value for measurement of effectiveness of manager's, which reflects his level of the efforts, should be considered in remuneration. These metrics could include relative assessment of effectiveness in comparison with other similar to differentiate internal factors from factors of the external environment, such as, for example, fluctuations in demand in

the market. Because of the fact that influence of external arbitrary factors is omitted, the change of remuneration happens mainly thanks to actions of the manager that increases his incentives to acceptance of risk;

- However, the establishment of tough incentives for the agent is not always an optimum path for a principal. The principle of intensity of incentives claims that optimum intensity of incentives depends on four factors: the additional income created by additional efforts; accuracy with which the analyzed actions are estimated; extent of acceptance of risk from the manager and sensitivity of the agent to stimulation;
- The principle of intensity of monitoring supplements the previous principle when high intensity of incentives has big coefficient of correlation with situations when the optimum level of monitoring is also high. Thus, the principal can effectively choose strategy from sets of combinations of contributions for incentives and monitoring.
- The principle of equality of remuneration means that activities, equally valuable to a principal, shall be equally valuable to the agent. It belongs to the problem when the agent can be involved in several actions simultaneously, and, if one of them is exposed to smaller monitoring from a principal, then the agent will neglect it, as the agent prefers the actions, which are bringing him higher marginal income.

2.2. Theoretical approaches for compensation modeling

Nowadays in theoretical approaches of optimal contract determination (Core, Gray, 2001), the optimal contract is constituted in such a way that the agent earns effective reward to maximize value for shareholders, and that the optimal contract maximizes the net expected value for shareholders after all transactional expenses (such as costs of contract creation) and remuneration payments. Specialists in finance did considerable work in this direction, trying to put the theory into practice. However, it is very difficult to do because of impossibility to observe and consider all possible parameters in such model at the same time, such as a marginal product of work of the CEO, tendency of the CEO to avoid of risk, fair value of work and general wealth of the manager.

Theoretically, managers receive effective financial incentives to maximize value for shareholders through a compensation program and reduce the possibility of opportunistic behavior on the part of the manager. The optimal contract does not mean that it is ideal, but rather it simply means that it is the best of all possible alternatives chosen within the company, which would exclude the possibility of opportunistic behavior on the part of the agent and would encourage him to act in the interests of the principal. In addition, the optimal contract does not necessarily excludes agency costs, but it rather compares the marginal effect of the contract with the marginal costs of its creation. In conclusion, parameter of optimality itself may vary depending on changes in the business environment and period. All these factors, given a rise to many hardly observable variables that need to be taken into account for the formation of the optimal contract in practice, limit its implacability.

The first attempts to evaluate an optimal size of the contract began in the mid-20th century, when the main method of its study was linear programming. Later, in 1960, statistical models of the relationship between the various parameters were developed, and some research in particular (Grossman, Hart, 1983) (Holmstroem,

1979), have helped to develop a tool to solve the problem of assessing the optimal contract - to maximize the utility function of the principal depending on various limitations. However, as it was previously mentioned, it is impossible to take into consideration all the options and limitations of statistical models.

In addition, an analysis of interdependency between the management fees and the effectiveness work was conducted at that time. For this purpose, it was important to come up with the right assessment tools to evaluate managerial performance. Thus, it was demonstrated that proper material measure of CEO incentive plan is a degree of his influence on the increase in the value (size) of company (Baker, Hall, 2004). However, it was also proven that the relationship between company size and CEO remuneration is very sensitive to the selected period of the analysis, and, in general, it is not objectively possible to determine this relationship, as we have seen rapid growth in the amount of remunerations and the sizes of the companies since the 1970s (Frydman, Saks, 2010).

Moreover, a principal usually cannot directly observe the level of efforts applied by CEO because such efforts are difficult to estimate based on external analysis. It is difficult to determine the level of effort because the physical monitoring is quite expensive itself, which is especially crucial for small shareholders in the conditions of diluted ownership structure in US companies. The financial and business results of the company for these structural reasons may be subject to manipulation by the CEO. As a result, we face the problem that, in fact, it is almost impossible to observe the level of management effort, which means that there are favorable conditions for opportunistic behavior by the CEO.

Besides that, one of the problems in theoretical approaches for estimation of the level of management effort is the fact that almost all the work evaluated only by two states efforts (high and low), while, in fact, they should be described in much more complex mathematical models. The use of a high-level efforts associated with some costs (the opportunity cost of lost opportunities), and the higher the level of effort, the more significant the marginal increase in costs is

Modeling the level of effort was applied in the research, in which two levels of effort of the manager were considered: high and low, in addition to the fact that the company could get low or high income (Tirole, 1998). One of the assumption of the model was that the level of income determines the amount of remuneration of CEO, however, the considered the utility function was unchanged, which ultimately means that the CEO has no incentive to use high-level efforts.

In the 20th century, a number of theories and models that sought to determine the optimal contract were developed, but many of them turned out to be inapplicable in practice. A more detailed look at practical approaches to modeling the optimal contract is presented in the next paragraph.

2.3.   Optimal contract modeling approach

In this paragraph, we consider the theoretical works that try to explain the factors influencing constant growth of the CEO remuneration, low sensitivity of this remuneration from the actual impact and the high sensitivity from luck. This will help to form an idea of what obstacles exist in modeling the optimal contract.

To begin with, one of the biggest drawbacks of the optimal contract models is that they do not differentiate agents by their quantitative characteristics. Some researchers tried to introduce CEO talent into the model as a variable. According to the theory, CEO talent has a great value in large companies, which means that

large companies will attract more talented CEO and pay them higher remuneration (Rosen, 1981). Moreover, they developed appropriate models, which assume that the talent has a multiplier effect on the value of the company (Edmans, Gabaix, 2009). Unfortunately, any practical models that take into account the potential management talent still have not been developed.

The increasing competition between companies for managerial talent derives not only from increased size of firms. In recent studies (Murphy, Zabojnik, 2007) the theory and the empirical results were presented, that confirmed the growing importance of generic skills of CEO in comparison with specialized skills of CEO to the company. Moreover, even more detailed conclusions were obtained (Giannetti, 2012), which stated that increasing probability of possible job changes (which may be a result of the large number of generic skills) encourages managers to choose to be hired for short-term projects rather than long-term projects, which enhances their attractiveness on the labor market for CEOs. To prevent this behavior from the CEO, the shareholders should take a decision to allocate a greater portion of the company's revenue from long-term projects to CEO, which overall will increase the expected rewards to CEO. In addition, such factors as the increase in international trade volumes, contributed to the fact that foreign companies are more actively entering the labor market of CEO talent, which further stimulate the growth of managerial remuneration (Marin, Verdier, 2012).

However, increasing sizes of companies stimulate increases in the remuneration of CEOs through not only the search and hiring managers that are more talented. Thus, it demonstrated, theoretically and empirically, that large companies are more difficult to manage, and, therefore, CEO in such companies deserve a higher reward. In addition to this, the problem of agency relationships is more acute in large companies, which lead to stimulating manager with company stock, and hence the larger reward for risk-taking (Miller, Gayle, 2009).

A reversed approach was suggested in another study, showing that, if the market makes conclusions about the performance of CEO based on his remuneration, companies may intentionally increase the size of CEO pay to improve the company's image and even temporarily stimulate the growth of the share price. This leads to the fact that all firms seek to pay its CEO more than the average for the market, thereby stimulating growth to the average level of executive compensation in the industry (Schaefer, Hayes, 2008).

Another essential element in the studies of CEO pay is its (compensation) sensitivity to the performance of the company. As performance measures usually indicators of profitability and market valuation are used. However, numerous scientific papers, representing multiple attempts to figure out what is the relationship between the change in the level of remuneration of the CEO and the stock price, have been criticized, because in these models only the compensation of the current period was accounted for, not accumulated wealth of managers (Murphy, 1985). Later (Jensen, Murphy, 1990) combined several approaches in evaluation of the relationship between the effectiveness of the CEO and the wealth of large US public companies between 1974 and 1986, namely the change in wealth to changes in the value of the company counting on one US dollar.

The relatively low sensitivity of CEO welfare to the company's financial result was demonstrated by the example that the CEO loses only $ 3.25 per every $ 1,000 in the loss of value of the company (Jensen, Murphy, 1990). Also, this study was the

beginning of a number of major works, which were aimed on proving that there is a decreasing dependence of CEO welfare to the company's value in one-dollar value by increasing the size of the company.

While CEOs of companies, as it has already been shown, suffer not enough losses in the case of the low company performance, additional complexity in modeling the incentive plan is that management is often encouraged for the result triggered by growth of the market, in other words, external factors that are outside of the scope area of responsibility of management. In other words, those managers are rewarded for good luck (Bertrand, Mullainathan, 2001). This practice calls into question the theory linking the remuneration of top management with their effectiveness.

Then (Hall, Liebman, 1998) continued research in the direction of identifying the relationship between CEO ownership share in the company and the remuneration level. However, the hypothesis of the relationship between effectiveness of communication and the level of remuneration was also put under question mark, remaining one of the main problems in the theory of compensation.

Among other interesting approaches to modeling the optimal contract it is necessary to identify attempts to explain a growth of CEO remuneration in recent years through the strengthening of institutions of corporate control and closer monitoring of CEO job, which are suffering from more serious requirements (Hermalin, 2005). In addition, the relationship of remuneration CEO and the company's corporate strategy was studied. The authors of this study showed that the higher remuneration encourages managers to execute more ambitious strategies (Dow, Raposo, 2005).

Moreover, returning to the problem of managerial efforts evaluation, it is worth mentioning that it would be logical to tie CEO remuneration to shareholder value in case when a principal cannot fully observe the efforts of the agent. For comparison, in the case if a manager had only a fixed payment, it would not be enough to spur on the use of a high level of effort, which is associated with higher costs, without additional compensation (Holmstrom, 1979). Therefore, the two-part structure has been designed with two main components of the remuneration: a fixed and a variable part, which stimulates the CEO on the use of high-level efforts.

In recent years, increasing attention was addressed to such element of remuneration as severance package, especially in light of the recent financial crisis. Mostly this element is paid to the CEO, who were fired, compared with those who left the company on their own. Therefore, very often this compensation rewards CEO for the low effectiveness of the company (Yermack, 2006).

Finally, severance package can hardly be considered in the context of agency problem, when the CEO controls only its own level of effort, but can be explained by a broader approach. It was shown that the possibility to get a severance package may hold the CEO from entrenchment by him concealing negative information, which may lead to the dismissal (Inderst, Mueller, 2008). However, for example, some cases were also considered, when search for and introduction of new technologies compared with existing ones were considered as more important element in the work of the CEO, and, moreover, allowed sometimes a compensation for non-successful results (Ederer, Manso, 2008).

2.4. Managerial power approach

On the example of works by Jensen and Murphy in the previous section we saw that only weak dependences between company performance and executive compensation were discovered in 1990s. So this conclusion led to new approaches which focus

on different aspect of principal-agent problem. Due to the fact that in the case of weak corporate governance, a powerful CEO can extract additional bonuses from his position and independently establish the desired compensation, in executive power executive compensation is considered as part of the agency's own problem.

In this approach it is assumed that CEO is «controlling» the board of directors and that board and CEO are cooperating with each other, setting each other extra compensation (more that needed to provide rational incentive for CEO to work successfully), and protecting each other. Possible constraints include reputational loss for CEO in case of being caught extracting excessive compensation. The real life form of that is market cost of reputation devaluation and other social costs.

Some of researches looked at how managerial power influence on executive compensation design. In the management power hypothesis (Bebchuk, Fried, 2004) it is said that the form of compensation, which allows to extract from the rent, is either related to the value (options for shares, fund rewards, pensions), or not observed. When stock options are given to general directors before the release of good reports or news, the phenomenon of denial takes place (Yermack, 1997).

There are multiple studies where various aspects of managerial influence over their own compensation are examined. In one of those, researchers came to the conclusion that companies where CEO just receives his compensation for siting out have a negative influence on the companies with strong corporate governance in the labor market for CEO (Acharya, Volpin, 2010). Another one tends to explain that companies select highly paid peers for selecting CEO compensation at the competitive level. The effect gets even stronger in case CEO is a chairman of the board of directors or peer group is too small (Faulkender, Yang, 2010).

In addition, some researchers are considering cases of forgery of reporting documents. CEO may try to manipulate the disclosed reports with necessary results if his compensation depends on company performance. Some authors present the evidence that there is a positive relationship between using stock-based awards and manipulation of reporting (Burns, Keida, 2006).

Recent studies argue that payment of performance and corporate governance are in addition to solving the agency problem, thus harmonizing managerial authority and optimal approaches to contracts (Dicks, 2012). As a conclusion, the companies with weak governance provoke usage of excessive compensation.

Also, more and more attention is paid upon CEO's bargaining power. Thus, it was shown that corporate strategies that increase CEO bargaining power relative to other stakeholders, will lead to an increase in CEO equity, cash and total compensation (Pandher, 2013).

There is a large amount of research papers on modeling the value of CEO remuneration and, in particular, the size of the variable part of the remuneration, through the studies of the structure and determinants of compensation. However, there is still a number of contentious issues.

Based on the analysis of theoretical approaches, we can formulate some of the requirements for the procedure of formation of the variable part of the remuneration CEO.

First, game-theoretic approach should be chosen as a method of modeling the variable part of the CEO compensation. This decision is motivated by the fact that determining the size of the variable part of the CEO compensation is directly connected with solution of opportunistic behavior problem, which is better simulated

by game-theoretical models. In our analysis, it was also shown that the statistical model estimating the size variable remuneration CEO showed the inconsistency.

Second, it worth mentioning that some of the actions of an agent cannot be observed, and the results of his actions can be random. Moreover, the amount of remuneration is affected by a large number of specific conditions, such as industry affiliation, time interval of solution, changes in the legal environment, fluctuations in market conditions, changes in technology, etc.

The model should also take into account the personal characteristics of the CEO such as talent or reputation that affect the value of the manager and, thus, the expected rewards to achieve high performance of the company. There are currently no practical models that take into account the talent of manager. Therefore, a chosen model should take into account, at least, the reputation of CEO in a historical perspective.

3. Research methodology

The purpose of this chapter is to discuss and justify research methods to be used in the empirical part of the thesis. As was discussed in the previous chapter, most of current research studies on executive compensation present various dependencies of compensation on other variables. An obvious limitation of these studies is that these models are used for theoretical purposes to obtain qualitative results. Consequently, there is a lack of studies which explain the compensation evolution starting from 1960s-70s and present practical recommendations for constructing compensation packages.

In accordance with the requirements mentioned in the first chapter of the document, a special theoretical model developed by Casamatta and Guembel (2010) will be used.

3.1. The game-theoretical compensation model

In their paper (Casamatta, Guembel, 2010) is considered two variants of compensation models. The first model assumes that the company performs the same strategy for two periods. The second one assumes that the can change a manager or strategy after the first period. We will use the second model, since it is more realistic in view of the fact that usually after the first phase of execution of the strategy board of directors may call into question the efficacy of the strategy itself and the level of effort of the company's CEO in the event of failure to achieve their strategic goals. However, some of the conclusions of the first models will be also used by us in the analysis, and the model itself will be presented in the Appendix later.

As was shown in the previous paper (Syrunina, Yanauer, 2016), this model represents a theoretical interpretation of the game of agency problem, whose goal is to simulate the incentive compensation plan for the CEO (based on the efficiency component of the payroll) to encourage the implementation of the strategy. The principal (owner, shareholder, investor) hires an agent (CEO, manager) who select the company's strategy to be implemented in the following period, and then by a decision of the principal contract with current CEO is to terminated or not. To develop the model, the following assumptions have been considered:

1. The game involves two players - the principal (owner / investor / shareholder; in some cases, the board of directors) and the agent (CEO, manager). All interactions between them occur within the company itself.

2. All communication between two players (principal and agent) happens during two periods, $t \in \{1, 2\}$.

3. The principal hires the agent at the start of the first period and arranges a contract with certain amount of compensation, $w(R)$, where w is an incentive part of overall compensation of agent and R is the performance of the company in the first period.

4. The hired agent can be of two types: H – high type and L – low type. A high-level manager always chooses a successful strategy $S_0 = G$ whereas a low-level manager chooses a poor, unsuccessful strategy $S_0 = B$. The likelihood that the CEO has a high type of H (prior to the implementation of the strategy in the Company) is referred to as the reputation of the CEO $q_0 \geq 0.5$ and called CEO reputation. The type of CEO is unknown to the principal or agent. The agent's reputation after the 2nd and 1st periods is denoted as follows:: $q^{i,j} = prob\,(M = H \mid R_1 = R_i \text{ and } R_2 = R_j)$ and $q^i = prob\,(M = H \mid R_1 = R_i)$, $i, j \in \{l, h\}$ respectively.

5. To execute the chosen strategy, the agent must choose whether to undertake high or low efforts $e_1 \in \left\{\underline{e_1}, \overline{e_1}\right\}$; For the principal there are no efforts (which reflect the essence of the problem). High level of efforts $\overline{e_1}$ means individual costs c for the manager. The difference between high and low levels of effort is expressed by the following formula:

$$\Delta e_1 = \overline{e_1} - \underline{e_1}.$$

6. If CEO chooses the successful strategy $S_0 = G$, then the Company performance is high R_h with probability e_1 and low $R_l = 0$ with probability $(1 - e_1)$. If the chosen strategy is unsuccessful, $S_0 = B$, the Company performance is low $R_l = 0$ with probability equal to 1.

7. At the end of the 1st period the principal receives an information signal s_G with respect to the needed strategy. We assumed that $p_G = Prob(s_G = G)$ is probability that the signal identifies the successful strategy.

8. The principal decides on the choice of strategy for the second period. If the Company's performance after the 1st period is high R_h, there is no value in changing the strategy, thus $S_1 = S_0 = G$. However if the Company performance is low $R_l = 0$, the principal considers the signal s_G: he observes whether the signal confirms the choice of the strategy. If $s_G = S_0$, the strategy is not to be amended; otherwise $S_1 \in \{s_G, S_0\}$.

9. Subsequently, the owner decides whether to leave the CEO or to terminate the contract with him, and hire a new CEO.

10. In the second period, the CEO (old or new) decides whether to undertake high or low efforts $e_2 \in \left\{\underline{e_2}, \overline{e_2}\right\}$; A similar effort for the owner is not observed. Again, the manager's high efforts correspond to the individual expenses c for the manager. The difference between high and low levels of effort is expressed by the following formula:
$$\Delta e_2 = \overline{e_2} - \underline{e_2}.$$

11. If the applied strategy is successful $S_1 = G$, the Company performance is high R_h with probability e_2 and low R_l with probability $(1 - e_2)$. In case of the unsuccessful strategy $S_1 = B$ the Company performance is low R_l with probability equal to 1.

As already mentioned, the CEO cares not only about his monetary contract, but also about his reputation after the implementation of the strategy or termination of the contract. Denote the CEO's reputation after period i as q_i, the definition of reputation is the likelihood that the manager has a high type H, if the Company will work well or badly (R_h or R_l respectively) and whether the Company's strategy is changing or not in the second period.

Denote the CEO value as $f(q)$, provided that he/she has a reputation for q; the formula is presented below:

$$f(q) = \alpha q, \tag{1}$$

where $\alpha > 0$.

The agent's reputation is constantly updated, even if the contract with him was terminated after the 1st period. The model considers only the reputation of the first, "old", CEO, who made a strategic decision to implement. The "new" CEO does not have reputational risks, because he does not choose a strategy.

Let us find the value of reputation q with Bayes' formula:

1. If $R_1 = R_h$, also $S_1 = S_0$ and $R_2 = R_h$, then $q = q^h = 1$.
2. If $R_1 = R_l$, $S_1 = S_0$ and $R_2 = R_l$, then

$$q = q_0^{l,l} = \frac{q_0(1 - e_1)(1 - p_G)(1 - e_2)}{q_0 (1 - e_1) (1 - p_G) (1 - e_2) + 1 - q_0}. \tag{2}$$

3. If $R_1 = R_l$, $S_1 \neq S_0$ and $R_2 = R_l$, then

$$q = q_1^{l,l} = \frac{q_0(1 - e_1)(1 - p_G)}{q_0 (1 - e_1) (1 - p_G) + (1 - q_0)(p_G (1 - e_2) + (1 - p_G))}. \tag{3}$$

4. If $R_1 = R_l$, $S_1 \neq S_0$ and $R_2 = R_h$, then $q = q_1^{l,h} = 0$.

The interaction between the owner and the CEO is presented in the form of a decision tree in Appendix 1. Dotted lines include the same sets of information, in other words, a player with a stroke can not distinguish nodes in a set of information. Several branches are not shown in detail because the result will never happen. Branches where the CEO makes small efforts are similar to those in which he makes great efforts; the only difference in probability. Also. There are 4 alternatives for the owner: A - do not change the strategy, nor the CEO; B - do not change strategy, hire a "new" CEO; C - change the strategy and hire a "new" CEO; D - change the strategy, leave the "old" CEO.

Payoffs of each player are described as follows:

1. If the contract with the agent does not stop, he receives the amount of payments for two periods. If he is dismissed, he receives compensation only for the first period, and the "new" manager receives compensation for the 2nd period.
   Let us denote the following:
   w^i is CEO's compensation for the 1st period provided $R_1 = R_i$, where $i \in \{h, l\}$;
   $w^{i,j}$ is CEO's compensation for the 2nd period provided $R_1 = R_i$, $R_2 = R_j$ where $i, j \in \{h, l\}$;
   $w_{new}^{i,j}$ is a «new» CEO's compensation for the 2nd period provided that a «new» manager is hired and $R_1 = R_i$, $R_2 = R_j$ where $i, j \in \{h, l\}$.
2. The principal payment is equal to the sum of the Company's performance indicators for two periods, less the remuneration of the agent(s).

Solution of the model.   Compensation contract takes into account the decision of the model. Equilibrium strategies for the principal and the agent form the general equilibrium of Nash; the model is solved by inverse induction.

Let's look at the last move of the game, where the top manager makes a decision about the level of effort. In each subhead, the manager has 2 alternatives: exert high level of efforts $\overline{e_2}$ or exert low level of efforts $\underline{e_2}$. High efforts mean higher returns for the principal.

Let's designate the conditional probability that the executed strategy of the second period is successful (taking into account the Company's performance in the 1st period and the fact of the strategy change or not) as p:

$$p = \begin{bmatrix} 1 & \text{if} & R_1 = R_h & \text{or} & s_G = S_0 \\ p^0 & \text{if} & R_1 = R_l,\ s_G \neq S_0 & \text{and} & S_1 = S_0 \\ p^1 & \text{if} & R_1 = R_l,\ s_G \neq S_0 & \text{and} & S_1 = s_G \end{bmatrix} \tag{4}$$

where

$$P^0 = \frac{q_0(1 - e_1)(1 - p_G)}{q_0\left(1 - e_1\right)\left(1 - p_G\right) + 1 - q_0}, \tag{5}$$

$$P^1 = \frac{p_G(1 - q_0)}{q_0\left(1 - e_1\right)\left(1 - p_G\right) + 1 - q_0}. \tag{6}$$

To find the compensation value, we need to solve the linear programming problem: the principle maximizes the expected gain in the second period, minimizing the expected compensation of the agent. The objective function is as follows:

$$\min\left[p\left(\overline{e_2}w^{i,h} + (1 - \overline{e_2})\,w^{i,l}\right) + (1 - p)w^{i,l}\right].$$

Subject to:

$$w^{i,h} - w^{i,l} \geq \frac{c}{p\Delta e_2} - \Delta f,$$

$$p(\overline{e_2}w^{i,h} - (1 - \overline{e_2})\,w^{i,l} + (1 - p)w^{i,l} \geq c,$$

$$w^{i,h} \geq 0,\, w^{i,l} \geq 0.$$

There are four possible outcomes:

1. $R_1 = R_h$. It is not feasible to change the strategy and therefore results are equivalent to the Base game:

$$w^{h,h} = \frac{c}{\Delta e_2}, \tag{7}$$

$$w^{h,l} = 0. \tag{8}$$

Compensation is the same for the «old» and «new» CEOs.

2. $R_1 = R_l$, $s_G = S_0$, then $p = 1$. Compensation for the «old» CEO is the following:

$$w^{l,h}_{S_1 = s_G = S_0} = \max\left[\frac{c}{p\Delta e_2} - \Delta f; \frac{c}{\overline{e_2}}\right], \tag{9}$$

$$w^{l,l}_{S_1 = s_G = S_0} = 0. \tag{10}$$

3. $R_1 = R_l$, $s_G \neq S_0$ but $S_1 = S_0$, then $p = p^0$, compensation for the «old» CEO is:

$$w^{l,h}_{S_1 = s_G = S_0} = \max \left[\frac{c}{p^0 \Delta e_2} - \Delta f; \frac{c}{p^0 \overline{e_2}} \right], \tag{11}$$

$$w^{l,l}_{S_1 = S_0} = 0. \tag{12}$$

4. $R_1 = R_l$ and the strategy was changed ($S_1 \neq S_0$).

The contract with «old» CEO is not terminated:

$$w^{l,h}_{S_1 \neq S_0} = \frac{c}{p^1 \Delta e_2} - \Delta f, \tag{13}$$

where

$$\Delta f = f \left(q^{i,h} \right) - f \left(q^{i,l} \right), \tag{14}$$

$$w^{l,l}_{S_1 \neq S_0} = 0. \tag{15}$$

The contract with «new» CEO is the following:

$$w^{l,h}_{S_1 \neq S_0, new} = \frac{c}{p^1 \Delta e_2}, \tag{16}$$

$$w^{l,l}_{S_1 \neq S_0, new} = 0. \tag{17}$$

In accordance with these values of compensation for the 2nd period, the CEO will always make great efforts, as his expected gain is high effort than in the case of low efforts. Now let us consider the principal's move.

1. If after the 1st period the Company performance is high R_h or the performance is low $R_l = 0$ but the signal identifies that the initial strategy should be maintained $s_G = S_0$, the owner has two alternatives: pursue the initial strategy with the "old" or "new" CEO. The basic solution for the game shows that hiring a new manager within the initial strategy is not optimal; so we assume that in this case the owner always prefers to leave the "old" CEO in the Company.
2. If or the performance is low R_l and the signal confirms that the initial strategy will fail $s_G \neq S_0$, the owner has four alternatives:

A – not change the strategy nor the CEO
B – not change the strategy, hire a «new» CEO (non-optimal)
C – change the strategy and hire a «new» CEO
D – change the strategy, leave the «old» CEO (non-optimal)

The decision of the base game, presented in the study, demonstrates that option B is not optimal. Consider alternatives C and D, provided that the strategy is changed, $S_1 \neq S_0$. In this case compensation for the «old» and «new» CEOs should be compared (formulas (15) and (19) respectively, taking into account $\Delta f < 0$ in formula (16)). Compensation of the "old" CEO is higher than for the "new" CEO; therefore, when a new strategy is adopted, the owner prefers to hire a new manager. Therefore, alternative D is not optimal, so the owner chooses between options A and C.

Provided that the expected gain of the owner in the case of the initial implementation of the strategy is higher than if the new strategy is implemented in the second period, he decides to follow the original strategy (and leave the old CEO).

Consider the first step of the manager. He has 2 options in 2 subgames: apply high or low effort. To find the optimal compensation, stimulating efforts, it is necessary to solve the following linear programming problem:

$$\min \left[q_0 \left(\overline{e_1} w^h + (1 - \overline{e_1}) w^l \right) + (1 - q_0) w^l \right].$$

Subject to:

$$w^h - w^l \geq \frac{c}{q_0 \Delta e_1} - \overline{e_2} \left(w^{h,h} - w^{l,h}_{S_1 = S_0} \right) - (1 - \overline{e_2}) \Delta f,$$

$$w^h \geq 0,$$

$$w^l \geq 0.$$

The problem solution is the following:

$$w^h = \max \left[0; \ \frac{c}{q_0 \Delta e_1} - \overline{e_2} \left(w^{h,h} - w^{l,h}_{S_1 = S_0} \right) - (1 - \overline{e_2}) \Delta f \right], \tag{18}$$

$$w^l = 0. \tag{19}$$

Given these results, it is transparent that the manager will make great efforts in every subheading in the first period in order to maximize the expected compensation. Therefore, the Nash equilibrium strategies for both players look like this:

1. For the manager: in both periods he should exert high efforts $\overline{e_1}$ and $\overline{e_2}$.
2. For the owner: accounted for

$$P^0 \geq P^1 - \frac{P^1 w^{l,h}_{S_1 \neq S_0, new} - P^0 w^{l,h}_{S_1 = S_0}}{R_2}. \tag{20}$$

He should not change the strategy or the manager. Otherwise, he should change the strategy and hire a new manager.

Let us calculate expected payoff for the owner for both periods:

1. If $S_1 = S_0$:

$$q_0 \left(\overline{e_1} \left(R - w^h + \overline{e_2} (R - w^{h,h}) \right) + \right.$$
$$\left. + (1 - \overline{e_1}) \left(p_G \overline{e_2} (R - w^{l,h}_{S_1 = s_G = S_0}) + (1 - p_G) \overline{e_2} (R - w^{l,h}_{S_1 = S_0}) \right) \right). \tag{21}$$

2. If $S_1 \neq S_0$:

$$q_0 \left(\overline{e_1} \left(R - w^h + \overline{e_2} \left(R - w^{h,h} \right) + (1 - \overline{e_1}) p_G \overline{e_2} \left(R - w^{l,h}_{S_1 = s_G = S_0} \right) \right) \right) +$$
$$+ (1 - q_0) p_G \overline{e_2} (R - w^{l,h}_{S_1 \neq S_0, new}). \tag{22}$$

The presented above game composition and solution was based on the previous paper on the topic (Syrunina, Yanauer, 2016).

3.2. Specification of parameters for the model

To make the appropriate calculations using the model, we needed to get data for the corresponding variables or to develop methods for approximating some variables.

Principal role. In the theoretical model, we assume that the director can take an active part in the game and can make decisions regarding the choice of strategy and the CEO. Let's start with the fact that in the real practice of corporate governance the shareholders have the right to monitor the activities of CEO but with significant limitations. If the company has a major shareholder that owns more than 50% of the company, there is an opportunity to assess the likelihood of intervention in the above-mentioned strategic decisions based on the individual characteristics of behavior, such as participation in strategic decision-making in the company in previous years. However, as mentioned the US public companies have almost always dispersed ownership structure, and therefore do not have the majority shareholder.

For the above mentioned reason, the function of the operational monitoring of the management activities are transferred to Board of Directors, therefore, we accept the Board of Directors as a principal, as it is obliged to act in the interests of shareholders. Moreover, there are certain expectations of shareholders in relation to the activities of the members of the Board of Directors: proper care (duty of care), loyalty (duty of loyalty), disclosure (duty of disclosure) (Forrester, Ferber, 2011). We can get information on whether the chairman of the independent director of the Board of Directors and on the term of his tenure, to test the hypothesis that the independent directors act solely in the interests of shareholders and are not subject to undue influence by the CEO (Gutierrez-Urtiaga, 2000). The initial hypothesis is the that the longer the chairman of the board of directors retains its place, the more entrenched and dependent becomes CEO.

In each of the practical cases, we will analyze the ownership structure individually.

Agent role. In the theoretical model, by the agent we understand a member, which has been delegated the asset management of the principal in order to maximize the utility (value) for the principal, such as to increase the value for shareholders. Therefore, we make a valid assumption to understand CEO as agent in the model.

Strategy. To apply the model considered necessary to define the difference between a successful and unsuccessful strategies. The high economic results depend not only on the chosen strategy, but also on the external (economic, political, social and technological) factors, and various internal factors (eg, the level of efforts being made). In fact, as a result of a successful strategy, we understand some long-term (more than 3 years) performance of the company that exceeds the industry average performance in the same period of time. More precisely, in order to apply the model, we are interested in financial incentives CEO on strategy execution.

There are different classifications of strategies that can be found in academic sources on strategic management. Thus, in public companies, strategies can be divided into four levels of strategy (with an indication of responsible parties in brackets): corporate (CEO), divisional (business unit manager or executive vice president (the VP)), functional (director of marketing, finance, logistics and so on) and operational (plant manager, office, branch, etc.). Of course, the strategy should be coordinated at all levels, from operational to corporate levels. In our research we focus on corporate strategies in public companies.

In other approaches, the strategy is divided into the following types depending on the scale of coverage of markets (market penetration, market development, product development, market development, diversification), from the vertical and geographical scale (vertical integration "forward" and "back", the geographical ex-

pansion), the degree of diversification (related, unrelated), the elimination strategy, cost savings and reductions and combined strategies (Grant, 2010).

According to another classification (Porter, 1980), there are four basic competitive strategies in the industry: cost leadership, differentiation, focus on costs and focus on differentiation. Leadership Strategy in cost or price leadership refers to the ability of the company to provide low costs, differentiation strategy is focused on creating a unique product in the industry and competitive strategy focus is the concentration of all the company's efforts on a specific niche of consumers.

The model helps to stimulate the CEO for the implementation and enforcement of effective and successful strategies.

Financial performance.   In general, shareholders pay attention to two aspects, evaluating the performance of the company: their income (current and future) and the riskiness of their investments.

To assess these parameters, it is necessary to measure the company's financial or non-financial performance. However, we assume that the company's non-financial performance can be indirectly assessed from a financial point of view; therefore, continue to consider the types of financial indicators. Also it is worth noting is that in the model, at the end of the period, financial results will be evaluated in relation to the targets. Typically, the operating performance of the company is measured by profitability, such as operating income or revenues and are used for setting targets for the monetary incentive programs. With regard to the shares and options on shares of the company, in this case, it is generally considered market indicators, such as earnings per share.

There are several possible groups of financial indexes. The first group profitability indicators (EBIT, operating income, net income, revenues, cost), including profitability (ROI, ROE, ROA, ROIC) and market indices and multipliers (EPS, P / E, P / B). You can also select value-oriented indicators, such as a fundamental value, market capitalization, cash flow. Operating indicators include indicators of business activity, liquidity, efficiency and independence. In addition, some companies measure results of operations in terms of the ratio of borrowed funds and equity.

Compensation . There are two approaches to identify the unknown variable that is responsible for the material rewards:

1. If it is directly connected to performance (short or long), and targets are clearly mentioned in the form of annual reports (DEF 14A) to the Securities and Exchange Commission of the USA, it is considered a cash incentive fee (Non-equity incentive plan) (SEC);
2. We consider a monetary incentive fee (Non-equity incentive plan) and remuneration in the form of equity, depending on the result (Performance-based stock units), as elements of a single stimulus package. The targets for the company's shares are also listed in our reports to the SEC.

Other components of the remuneration, such as options on the company's shares (stock options) and shares of restricted circulation period (time-based restricted stock units) are not considered in this study due to the fact that, as a rule, are used as periodic encouragement CEO of, and not connected directly to performance.

To calculate the size of the incentive fee for the initial CEO after the 1st and 2nd periods using the formula (7) - (14) and (18) - (19). In order to calculate the

remuneration for the new CEO's remuneration by formula (16) - (17), if it was decided to reject the initial CEO after the 1st period.

Other variables. A full list of variables that are used in the model can be found in Tab. 1.

Table 1. Additional model variables. Source: (Syrunina, Yanauer, 2016)

Variable	Description	Calculation method
q	CEO reputation	See additional calculation methods for q^0 below; Formulas (2) and (3)
f	CEO value	Formula (1)
Δf	Change in CEO value	Formula (14)
c	Cost of using high efforts	Bonus (planned) the relevant period In the absence of bonus payments, use the average bonus in the industry
e	Efforts exerted by CEO	See additional calculation methods below
p	The conditional probability of implementing a successful strategy in the second period	Formulas (4) - (6)
p_G	Probability of successful strategy identification through signaling	See additional calculation methods below
Condition for changing the strategy		Formula (20)

Further clarifications should be made regarding evaluation of probabilities in the model.

Reputation of CEO. Here are two methods of estimating the parameter:

1. It is estimated the entire previous history of the manager's job at the post CEO. In this case, the following parameters should be calculated:
   - The total number of years during which the company, in which the manager worked as the CEO of, have been successful;
   - The total number of years during which the manager worked as CEO of various companies.

   The ratio of these two parameters is the desired probability.
2. Evaluated only the last place of the manager to the position of CEO. Similarly, we find additional options:
   - The number of years during which the latter company, in which the manager worked as the CEO of, has been successful;
   - The number of years during which the manager worked as the CEO of the latter company.

The ratio of these two parameters is the desired probability.

However, these methods have some practical limitations. Thus, in the analysis of real-world examples using the model we found that some CEO until his appointment worked on less high managerial positions, such as, for example, the CFO or vice

president. Therefore, we have adapted the calculations and calculate the probability based on experience in other positions, and where possible to use the corresponding target metrics.

Also, there were cases when some CEO before taking the office of public company, worked in private structures, respectively, the information on them is very small. In that case only information from the last place of work is used for the calculation, if possible.

In addition, if the manager considered in the period of time the model and responsible to the implementation of the strategy has worked in the same company, we evaluated his performance in the previous period as if he worked in a private company (relative to the number of successful and unsuccessful years).

Efforts of CEO. For this variable may allocate two evaluation methods:

1. Similarly, to CEO to reputation calculation, we estimate the historical success of the companies that the manager led. We believe that in order for the company to be successful, it should show results above the industry average. Therefore, you must use the following additional parameters:
   - The number of years over which the company, led by CEO of, shows the result of higher than average for the industry;
   - The number of years during which the manager worked as the CEO of the company.

   The ratio of these two parameters is the desired probability. Such calculations are made for a number of indicators, and we pick the highest probability as the probability of high effort and the least, as the probability of low effort.
2. In accordance with the fact that a high level of effort leads to additional costs from the CEO , we can assume that during such periods the manager is paid with a cash bonus. Accordingly, we can estimate the probability as the ratio of years, when the bonus has taken place to the total number of years. Maximum likelihood will give us the highest probability of effort and the least - the likelihood of low effort.

You can also highlight some of the limitations of the methods used. Thus, in some cases, the available information may only allow to evaluate the performance of the CEO at the same place. In that case we compare results with that of industry average. Then, by analogy with the above methods, we take the highest probability for probability of high effort and the least - the likelihood of low effort. Similarly, with the CEO reputation, if he worked for the company before the period considered in the model, we take some time back, as if he was working in another company and assesses the performance of these years.

Probability of successful strategy identification. This option is estimated on the basis of the analysis of the Board of Directors. That proportion of independent directors on the total number of Board of Directors can give us an approximate probability of correct strategy recognition. Such authors as (Core, 1999) and (Gutierrez-Urtiaga, 2000) state that the independence of directors stimulates the improvement in implementation of responsibilities of the executive. And, since, their area of responsibility includes monitoring the strategy and CEO of compensation, we assume that the corresponding coefficient reflects the desired probability.

Adjustment coefficients. The fact that the model considers the finished game within two periods determines the distribution of high reputational risks for these periods. In real practice, strategies are introduced over a longer period and it is worthwhile to consider several more periods in order to more accurately assess the probability of outcomes and more accurately predict the outcomes for the players and distribute the reputation risks more evenly. Also, because of the limited play in two periods, the reputational stimulation of the second period is significantly less than the first, but, in fact, it is similarly important for the CEO to show a high result both in the first and second period in order to receive a greater compensation.

In order for the theoretical model to be more accurate in cases of a low result in the company's current operations, it may be necessary to introduce an additional parameter that determines the degree of payment of the monetary bonus depending on the degree of achievement of the targets individually for each company.

So, we can consider a situation in which the company receives a low income of 0, which does not imply the payment of incentive compensation, the target minimum income level of the company R^l, established by the company itself as satisfactory, and also the desired target level of income R^h. The company can determine the coefficients ε and E, which would establish the percentage of the remuneration paid from the target value $w\left(R^h\right)$.

Thus, if the company receives an income equal to $R^l < R < R^h$, then the expected size of the CEO incentive reward in a particular period will be:

$$w^i = \varepsilon\left[w\left(R^h\right)\right],\tag{23}$$

$$0 < \varepsilon \leq 1.$$

In the event that the high income of the company R^h was observed, then the expected size of the CEO's incentive reward in a particular period would be:

$$w^i = E[w\left(R^h\right)],\tag{24}$$

$$E \geq 1.$$

Note that the coefficients, as well as the possible more detailed description of targets, are established by each company and are subject to individual adjustment. As a result, such a modification of the considered model will allow to adapt the model to modern incentive reward practices, considered in Chapter 5 of this paper, and to increase the practical applicability and accuracy of the model.

4. Practical aspects of CEO compensation on the example of U.S. public companies

In this chapter we will consider general formation principles of corporate governance system and executive compensation in the U.S. public companies, main regulatory documents and industry specificity. We chose this country for a detail analysis, because it has by far the most mature and regulated approach to executive compensation in public companies. Besides that it is possible to extract substantial sample of comparable public companies within one industry to be able to make general conclusions. Paragraph 4.1 represents the definition of public company and considers major roles in a system of corporate governance. Paragraph 4.2 represents the analysis of historical development and current state of executive compensation regulation in US public companies. In the paragraph 4.3 we will more closely consider

the procedure of decision making as for financial stimulation of CEO. Paragraphs 4.5 and 4.6 will be devoted to the industry analysis of the formation of material remuneration of CEOs in the retail and IT industries.

4.1.   Introduction into corporate governance system of US public companies

Under the new definition of 2013 from the FASB (Financial Accounting Standards Board), an organization that sets GAAP standards in the United States, a public company is a company that meets at least one of the following criteria:

- The company is required to publish its financial statements or provide for subsequent publication in the Securities and Exchange Commission (SEC);
- In accordance with the Securities Exchange Act of 1934 (the Securities Exchange Act of 1934), as well as its amendments and related statutory acts, the company is obliged to provide its financial statements to state regulatory bodies;
- The company is obliged to provide financial reporting to state regulatory authorities in case of sale of existing shares or issue of new shares;
- Securities of the company are traded freely and without restrictions on the stock market;
- If the securities of a company's paper are freely traded on the stock market, it regularly publishes its financial statements in accordance with US GAAP and other legal regulations (FASB - proposed guidance, 2013).

More briefly, a public company is a company that issued securities during in the IPO process and trades on at least one stock exchange or over-the-counter market. Although a small percentage of shares could initially be traded, a company becomes fully public when the market determines the value of the entire company as a result of daily trading (Public Company, Investopedia).

The first regulatory document regulating public companies in the United States was the 1933 Securities Act of 1933, issued after the Great Depression crisis (The Securities Act of 1933) [Federal regulation of publicly traded companies, Reporters Committee]. According to this law, investors could obtain financial, as well as other information about the company that issued securities to the stock exchange. The law forbade the publication of incorrect or distorted information (Act of 1933, SEC U.S.).

Further, the Securities Exchange Act of 1934 was adopted, which enforced the mechanisms of the 1933 law in the activities of the established Securities and Exchange Commission. Also, this law tightened the requirements for reporting of public companies. The size of the companies to which this law applies has changed over the years, but at the moment it is applied to public companies with more than 500 shareholders and a total assets value of $ 10 million. Currently the law also requires the company to provide annual (10-K) and quarterly 10-Q) reports to EDGAR's open electronic database on the website of the Securities and Exchange Commission (Act of 1934, SEC US).

Before moving to description of organizational structures, it is necessary to make a note on the structure of ownership in public companies in the United States. Historically, a high level of shareholder protection was provided, which contributed to a gradual shift from concentrated ownership to dispersed one. According to the mid-1990s, the United States was ranked first in the world in terms of the share of

companies with dispersed ownership structure (90%), while the share of companies with concentrated (family property) was 10%.

One of the reasons for this type of distribution was, among other things, the adoption of the Glass-Steagall Act in 1933, which divided banks into commercial and investment banks and limited the ability of banks, engaged primarily in credit and deposit operations, to deal with securities and investment transactions. Thus, institutional restrictions were imposed on the development of the banking-oriented system in the US, and the departure from the European model of property in companies (Bukhvalov, 2012).

By the 1990s, through the definition of a controlling owner through ownership of at least 20% of the company's shares, the percentage of companies with dispersed property among the 500 largest US companies was 80% (Gadhoum, Lang, Young, 2009).

The development of the corporate governance system in the United States was also influenced by the growth of the share of professional portfolio investors among shareholders. So, by the beginning of the 1990s institutional investors as a whole owned 45% of shares outstanding in the US market (Bukhvalov, 2012).

Due to the prevalence of companies with dispersed property in the US, it is necessary to examine in detail the corporate governance system as a system of interaction between the owner and the manager of the company on ensuring efficiency and its functioning and protecting the interests of the owner and other interested parties, as well as the stakeholders themselves. In corporate governance, it is common to consider the "shareholders - board of directors - management" triangle (including the CEO), in which the role of the principal relates to the shareholders, and the role of the agent in the company to CEO. However, the interaction between shareholders and the CEO is not direct, and the responsibility for resolving the conflict of interests between these stakeholders lies with the board of directors. Therefore, in the future, we will treat shareholders and the Board of Directors equally as a principal. We will look at all three stakeholders separately.

Shareholders (investors) of the company are the owners of the company, and can be either individuals, financial institutions or the state. All these shareholders can have different priorities and strategic vision, but, in general, they expect that they will receive a return on invested capital, which they can control through the shareholders' meeting. At the shareholders 'meeting, the results of the company's activities are monitored, nominees are approved for positions on the board of directors, questions regarding directors' remuneration and other issues are resolved. Shareholders have the right to exercise their voice through the board of directors, which, among other things, establishes a system for remuneration of the CEO in the company, and generates performance targets for management.[1]

A board of directors, on the one hand, is the highest level of management in the company, on the other hand, it acts in the interests of shareholders and is monitored by shareholders. Moreover, shareholders have expectations about the activities of the board of directors: proper care of duty, duty of loyalty, duty of disclosure (Forrester, Ferber, 2011). In general, the following functions of the board of directors can be distinguished: approval of the company's strategy, identification of key performance indicators, identification of risks for the company, appointment of new managers, determination of management fees, ensuring reliability of published

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[1] Based on the analysis of the researched companies in the paper

reports, approval of major transactions, protection of the company's reputation, representation of shareholders' interests and ensuring activities in accordance with the current laws (Larcker, 2011).

Directors are elected by voting at a meeting of shareholders. The board consists of 5 to 20 members, depending on the company, which are then divided into executive directors (directly hired by the company, for example, the CEO) and independent directors, who should constitute the majority of the board, for example, according to the rules of the NYSE and NASDAQ (SEC Approves NYSE and NASDAQ Proposals Relating to Director Independence, Findlaw).

The compensation committee on the board of directors determines the remuneration of the CEO and suggests it for approval by all independent directors or shareholders (using the Say on Pay system, introduced under the Dodd-Frank (Wall Street Reform and Consumer Protection Act, SEC U.S.). Therefore, the reward system should be built in such a way as to promote the creation of additional value for shareholders.

Finally, the CEO of the company, as a representative of management, is a third party in the triangle of corporate governance. He is appointed by the board of directors in order to directly perform administrative and representative functions in the company's activities and be responsible for them, to choose the strategic direction of development. In US public companies, as a rule, CEO performance is assessed on the basis of the targets set by the remuneration committee. The following main functions of the CEO can be singled out: development and implementation of the company's strategy, risk management of the company, monitoring and management of operational activities, execution of decisions of the board of directors, ensuring the reliability of the internal reporting and control systems (Roles and Responsibilities CEO, Electronic resource).

4.2.   Evolution of CEO compensation in US public companies

Until the 1950s, remuneration of executives was formed mainly in the form of wages and annual bonuses, which were paid in the form of cash or shares. In addition, the size of bonuses was set objectively according to a predetermined scale of compliance with the results of operating activity (Frydman, Saks, 2010). In the 1960s, long-term incentive payments, based on performance over several years, became a significant element in the compensation system.

It can also be noted that before the year of 1950, a practice of using options as a reward was unpopular, but this pattern changed with the introduction of a tax reform that established a much lower capital gains tax. In general, the average remuneration of directors of companies remained unchanged until the 1970s. So, as shown in Figure 1, the increase in the average (median) reward was 0.8 (0.7) percent per year from 1946 to 1976, but then showed a significant increase of 6.5 (5.3) percent annually during the period from 1976 to 2003. By the end of the analyzed period in 2003, the real size of the total remuneration was more than 5.5 times higher than in 1940.

In comparison with the average level of wages in the US before the World War II, the average compensation of top management was 63 times higher than that. This ratio declined sharply during the war, amounting to only 41 times. Then, after such a significant decrease, the ratio continued to decline gradually until the mid-1970s, when it was half the pre-war level. Inequality in the remuneration of ordinary workers and top management continued to grow and overcame the importance of
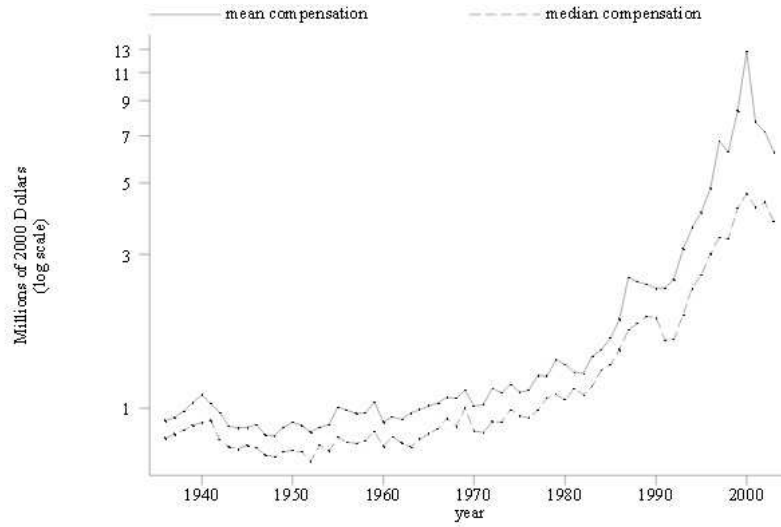
Fig. 1. The median and median values of the CEO's total compensation in the United States, 1936-2003. Source: (Frydman, Saks, 2005)

the Great Depression in 1987, but showed the maximum historical value in 2000, when the ratio became 330 to 1.
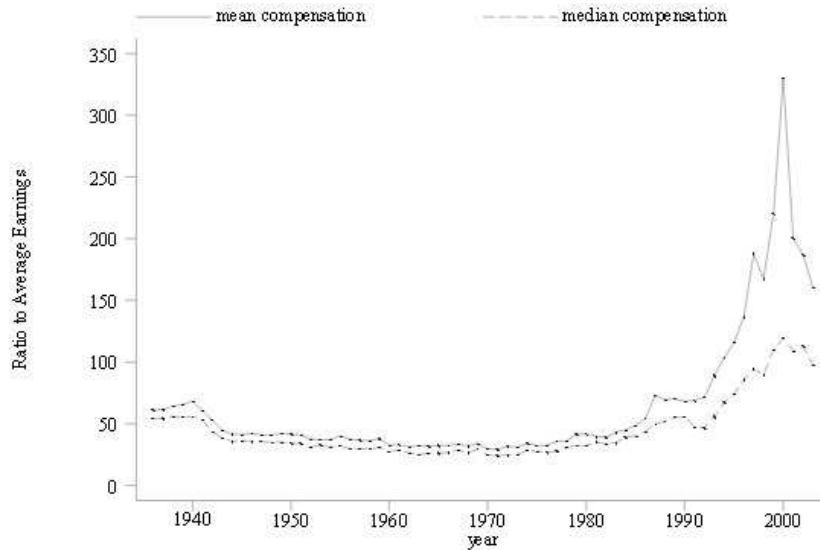

Fig. 2. The median and median values of the CEO's total compensation in the United States relative to the average wage, 1936-2003. Source: (Frydman, Saks, 2005)

Such a significant increase in compensation in the 1990s is due, in large part, to the growth in option payments to CEOs, as can be seen in Figure 2, which shows

the structure of the median compensation of companies included in the S&P 500 index. This incentive reward element was considered extremely effective for reasons that it was directly related to the market price of the company's shares.

The crisis in the stock market in the early 2000s led to a decline in remuneration, however, by 2007, when it seemed that the markets had fully recovered, the growth rate returned to its pre-crisis levels. However, the financial crisis in 2008 contributed to a reduction in the amount of CEO compensation by various estimates up to 45% by 2009. In 2012, the stock market recovered its position, as well as the CEO's remuneration, whose median value, as seen in Figure 3, was $8.9 million. This value is not a historical high, but still exceeds the values of the mid-1990s.
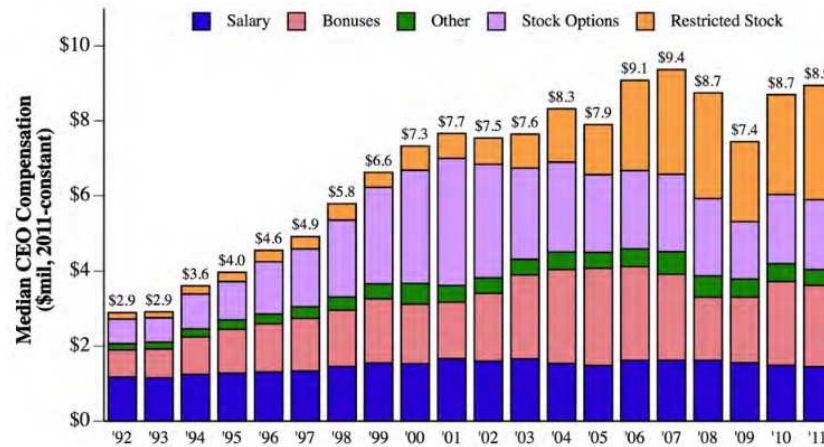
Fig. 3. The structure of the median compensation of the CEO of the companies included in the S & P 500 index, 1992 - 2011. Source: (Murphy, 2013)

The significant increase in the CEO's remuneration since the mid-1980s, as already discussed, is directly related to the growth in the popularity of option incentive schemes. However, it is possible that this trend has institutional reasons, and the growth in the popularity of options is related to the benefits in terms of taxes and accounting (Murphy, 2002). But, as can be seen in Figure 3, the options fee has become less popular in recent years, and a certain reason for this is difficult to be called.

4.3. Normative regulation of CEO compensation in the US public companies

Apart from the already mentioned Securities Act of 1933 and the Securities Exchange Act of 1934, there are also other laws regulating financial law in the United States of America. For example, the most significant law since the Great Depression, the law that amended the regulation of remuneration for top management, was the Dodd–Frank Wall Street Reform and Consumer Protection Act adopted in 2010 and designed to reduce the risks to the US financial system.

In particular, the section E - Accountability and Executive Compensation (paragraphs 951-953) states that at least every 3 years the shareholders meeting should review or approve the executive directors remuneration system. Also, the Dodd-

Frank law approved the mandatory Say on Pay procedure, which means that not less than every 3 years, shareholders must approve a specific amount of remuneration for the CEO at a general meeting (Dodd-Frank Wall Street Reform and Consumer Protection Act, SEC US). As the analysis of companies in Chapter 4 has shown, this practice is often of an annual nature, and, unfortunately, targets are set increasingly as targets for the next year ahead, which may be negative for the introduction of long-term strategies. Also, the law ruled that the Securities and Exchange Commission should check the transparency and fairness of incentive reward systems in the US public companies.

In addition to federal legislation, this area is directly regulated by the rules of listing on the US stock exchanges. Thus, the New York Stock Exchange (NYSE) and the NASDAQ established that executive directors' compensation should be approved only by independent directors (New York and Nasdaq Compensation Committee Listing Standards, LexisNexis). Moreover, the NYSE requires that the compensation committees in companies consist of only independent directors. For example, NASDAQ understands an independent director as a director who does not accept any additional reward in any form from the company as a member of the compensation committee, with the exception of the fixed salary of a member of the board of directors of that company. Both stock exchanges also consider as a factor of independence the absence of any material interest of the director in the company's ownership.

Besides the conditions for the independence of directors in a compensation committee, from July 1st of 2013, a compensation committee should annually assess the independence of its external consultants on the basis of the degree of interaction between the consultant company and the public company, ownership interest, and close relations with committee members (New NYSE and Nasdaq Compensation Committee Listing Standards, LexisNexis).

Also, the Sarbanes-Oxley Act, adopted in 2002, could be noted, which established that the CEO and CFO of the company may be deprived of cash, securities, as well as income from the sale of the company's securities for a period of 12 months in case of inadequate financial reporting to the SEC because of the malfeasance. If the compensation was received before the SEC makes an indictment, then the directors are required to return the full amount of the received compensation (Sarbanes-Oxley Act of 2002. SEC U.S.).

In general, the following state bodies are responsible for regulating the remuneration of executive directors of public companies in the US (Government Regulation of Executive Compensation, Execomp.org):

- US Department of Labor. The Employee Retirement Income Security Act establishes basic rules and norms for remuneration of labor in the United States, including the fiduciary duties of pension funds to act in the interests of their beneficiaries.
- US Treasury Department. Primarily, the influence of this body is limited to testing the system of remuneration for compliance with US tax law in matters of remuneration with deferred payment of taxes, as well as other ways of avoiding taxation.
- US Internal Revenue Service is a division of the US Treasury Department, and one of the key tasks in regulating the remuneration of top management by this body is to verify compliance with the IRC (Internal Revenue Code) princi-

ples. In accordance with Section 162 (m) of the IRC, remuneration of executive directors in public companies may not exceed $ 1 million, unless there is a qualified incentive system in the company, which implies: the existence of targets, a compensation committee, shareholder approval, Certification committee remuneration (Section 162 (m): Limit on Compensation, Practical Law Company).

- Securities and Exchange Commission. The functions of the body include general supervision of public companies, observance of federal laws that we have previously considered.

As a result, we see that in the last 20 years due to the increase in the volume of compensation managers and the number of corporate scandals, for example, in the company Enron, the US government introduces increasingly stringent laws that establish requirements for the process of forming remuneration for top management, especially focusing on the independence of directors on the compensation committee of public companies.

4.4.   The decision making process for material compensation of CEOs in the US public companies

Usually CEOs of public companies receive compensation comparable to competitors in the industry, so that the company can retain a talented manager; reward, in its structure that takes into account the interests of both the manager and shareholders.

As previously discussed, a decision on the appointment of a specific remuneration to management is made by the board of directors. Thus, the committee on remuneration of the board of directors prepares recommendations on the structure and size of the compensation package of the CEO (usually with the help of independent external consultants and with the help of benchmarking for remuneration in competitive companies). Then these recommendations are reviewed and approved at a meeting of independent directors at the next meeting of the board of directors.

Besides the internal approval, public companies are required to disclose information on management's remuneration to the Securities and Exchange Commission (SEC). In accordance with the requirements, the information in full, accessible form should be presented in the following forms of public reporting (Forms List, SEC U.S.):

1. Form Report DEF 14A. Annually published report, which contains information on all issues requiring the vote of shareholders. Including, discloses information on the formation, size and type of remuneration for management. It is in the report DEF 14A that the summary tables on the remuneration components of all executive directors for the last 3 years are presented (if the company is public for more than 3 years). These tables were actively used by us during the implementation of the theoretical part of the study.
2. Annual report form 10-K and quarterly report form 10-Q. Disclose information on annual and quarterly remuneration, respectively.

4.5.   The structure of material compensation of CEOs in the US public companies

Typically, the CEO's compensation consists of a fixed and a variable part. The fixed part is a well-known salary in Russia, which is established by contract and paid in cash annually. At the same time, the variable part is designed to stimulate the CEO

to improve management effectiveness and improve the company's performance, and represents two elements: short-term and long-term incentives.

Table 2. CEO compensation structure in the U.S. public companies (Taxes and executive compensation, Economic Policy Institute

Components of compensation	Elements of compensation
Fixed compensation	Base salary
Short-term and long-term incentives	Cash Bonus
	Non-equity incentive plan
The long-term incentives	Restricted Stock Units, Performance Stock Units, Stock Grants
	Stock Options
Other compensation	Pension and deferred compensation
	All other compensation

In more detail, consider the elements of each category (Taxes and executive compensation, Economic Policy Institute):

1. Base salary is a fixed compensation component, the size of which does not depend on the effectiveness, therefore it is not included in the list of tax exemption in accordance with Section 162 (m) of the IRC (the amount of remuneration not depending on the effectiveness and not exceeding 1 million dollars in the amount, is not subject to taxation). The size of wages, as a rule, is determined by the level of responsibility, previous experience and the level of wages in competitive companies.
2. Bonuses can depend on the effectiveness of a particular manager, a group or the whole company. Also one of the peculiarities of them is that they depend on the performance in the past period and are accordingly paid at the beginning of the next year. But despite the dependence on the results of the activity, bonuses can be assigned without approval, which means that this element is not legally dependent on the result in accordance with Section 162 (m) of the IRC.
3. Non-equity incentive plan may also depend on the effectiveness of a particular manager, group or the whole company. But the difference from the bonus is that the targets are spelled out in the company's reports (can be found in the form of DEF 14A), which means that this element of compensation will be treated as a performance-based compensation in accordance with the Section 162 (m) IRC.
   Prior to the introduction of the relevant rule, companies indicated a cash bonus and a cash incentive reward under one category, but under the new rule, companies should share the bonus paid at the discretion of the board of directors and incentive compensation paid strictly in accordance with the documented performance targets. Moreover, companies began to divide the monetary (non-equity incentive plan) incentive compensation and remuneration in the form of equity-based incentives.
4. Stock remuneration means that literally a manager is assigned a share of the company's shares that have some value while their market price is greater than zero. Such shares may be free or restricted (Restricted Stock Units), which is the

most popular option (in this case, you can sell shares only after a certain period, for example, 3 years). There is also a scheme according to which a manager can receive shares only upon achievement of performance targets (Performance Stock Units). Moreover, at achievement of indicators and reception of actions in the property, the manager can dispose of them at once. In accordance with Section 162 (m) of the IRC, the type of remuneration dependent on the result is only Performance Stock Units, which fall under the abbreviation PBRSUs (Performance based restricted stock units).

5. Stock options act like ordinary options, that is, in the case of an option call, the manager is profitable to execute it if the strike price is less than the market price, and vice versa in the case of a put option. If the option fee program is approved by shareholders, then such consideration will be treated as a performance-based remuneration in accordance with Section 162 (m) of the IRC.

6. Deferred compensation is a reward earned in one period, but paid in another period in the future. A classic example of deferred remuneration is a pension. It is worth noting that such a remuneration is taxable if it is received before retirement, and is not taxed upon receipt after formal retirement under the law.

Other types of benefits, such as the use of personal transport, travel expenses, etc., that do not depend on the results of activities, also apply to other remuneration.

4.6. The practice of forming the material remuneration of CEOs in the IT and retail industries

In order to illustrate the applicability of the theoretical approach considered in the paper, it is necessary to narrow the field of research and select several industries for a deeper analysis. Despite the fact that a particular company is being considered for modeling, it is necessary to obtain the entire data for the industry in order to obtain industry-wide indicators, as well as to select companies for analysis in empirical part of the work. As the remuneration features may differ from industry to industry, we decided to choose two industries, and then compare the results of the analysis.

The industry should be representative, which means that companies need to vary in size. Thus, that conclusions can possibly be extrapolated to other industries.

In reality, not only public companies are included in specific industries. However, information on the results of activities, as well as compensation of management of private companies is not available in public, so the subject of our analysis are public companies in the United States. Moreover, corporate conflicts in private companies, as a rule, are not so serious because of the more concentrated nature of property.

In addition, for a serious industry analysis, it is necessary to compile an extensive sample of performance and reward in the company, which is hindered by the lack of access to relevant databases, for example, ExecuComp. As a result, because of the complexity in the collection of data, a sample was collected that, with certain assumptions, can be considered representative.

Also, it is necessary to consider a stable period of time in the absence of any major crises. Therefore, in this section we use for analysis the period from 2011 to 2013, which is characterized by the recovery of the US economy without significant market fluctuations. In Chapter 5, in analyzing specific situations, the time period can be extended because the model discussed in Chapter 3 assumes analysis over two periods.

So, all public companies in the U.S. can be divided on average in 14 key industries, when analyzing which, the largest number of "external[2]" CEOs we observed in industries such as retail and the IT industry.

The choice in favor of retail and the information sector was made because retail is a fairly mature industry with well-established players, while the IT industry is a fast-growing segment. Therefore, parameters such as demand, competition and the products themselves are very different, hence the factors and strategies necessary for success will also differ. It is generally accepted that the key factors of success in developing industries are: brand development, rapid product development and marketing, innovations, while for mature industries such factors as efficiency from scale and diversity, low costs can be key success factors. We will analyze the various strategies of the company, illustrating their diversity.

In the retail industry, we considered 80 companies from such sectors as Hypermarkets & Super Centers, Home Improvement Retail, General Merchandise Stores, Apparel Retail, Automotive Retail, Department Stores, Computer & Electronics Retail, Specialty Stores, Homefurnishing Retail, Food Retail[3]. These industries in themselves are also very different in terms of demand, marginal, cost structure, but we decided to merge them, because in case of considering individual sectors, the number of companies in the sample would be too small.

The following information on companies' performance in the period from 2013 to 2015 was taken from the sources of Yahoo Finance and Thomas Reuters Datastream:

- Market capitalization, billions of USD
- Return on assets, %
- Total Assets size, billions of USD

Data on the CEO's compensation in the period from 2013 to 2015 were obtained and independently aggregated on the basis of the EDGAR database of the Securities and Exchange Commission (SEC) of the USA:

- Base Salary, USD
- Bonus, USD
- Stock Awards, USD
- Stock Options, USD
- Non-equity incentive plan, USD
- All other compensation, USD
- Total compensation, USD

The table below presents the statistics on a sample of 77 retail industry companies for the year of 2015:

As can be seen from Table 2, the gap in the amount of total remuneration in the industry is very significant. So in TJX Companies Inc. CEO in 2015 received 21.77 million dollars, and in Alco Stores Inc. - 0.64 million dollars. In general, there is a normal distribution according to industry data.

It is also worth noting that the data provide information on the personal characteristics of the CEO, who will also help in the analysis of practical situations. So, in 2015, in the retail industry, the average age of the CEO is 58 years, the seniority

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[2] It is about the CEO, who had not work in the company before
[3] In accordance with the Global Industry Classification Standard (GICS)

Table 3. Descriptive statistics on the compensation of CEO in the retail industry. Source: compiled independently

	Base Salary, USD	Bonus, USD	Stock awards, USD	Stock options, USD	Non-equity incentive plan, USD	All other compensation, USD	Total compensation, Million USD	Market capitalisation, Billion USD	Age of CEO, years	CEO tenure in the company, years	Total CEO tenure, years
Average value	999123	188699	3194794	1130309	1105263	237617	7,26	9,80	58	7	9
Median value	1000000	0	2070029	86747	630000	86573	6,01	2,62	58	5	8
Standart dev.	486061	578554	3681209	1573433	1230439	447952	5,45	25,65	8	6	6
Minimum	1	0	0	0	0	0	0,64	0,03	42	0	0
Maximum	3867981	3500000	14200512	6750011	6050370	3033082	21,77	207,54	86	29	29
Quantity	77	77	77	77	77	77	77	77	77	77	77

in the position of CEO in the company in question is 7 years, and the total seniority of management of various companies is 9 years.

The distribution of remuneration components in the industry is as follows (average values for 2013): 13.7% - wages, 2.6% - bonus, 44% - shares, 15.6% - options, 15.2% - incentive reward, 8.9% - another reward. This information does not repre-

sent an accurate distribution, but it allows us to draw conclusions about the main trends. So, still, one of the main types of remuneration in retail is rewarding shares.

Next, consider the descriptive statistics for a sample of 82 companies in the IT industry in 2015:

Table 4. Descriptive statistics on the remuneration of CEO in the IT industry. Source: compiled independently

	Base Salary, USD	Bonus, USD	Stock awards, USD	Stock options, USD	Non-equity incentive plan, USD	All other compensation, USD	Total compensation, Million USD	Market capitalisation, Billion USD	Age of CEO, years	CEO tenure in the company, years	Total CEO tenure, years
Average value	513461	230592	3345314	2449150	500078	84331	7,13	14,22	52	7	10
Median value	491806	0	1415501	475463	305000	19018	4,05	1,67	52	6	9
Standart dev.	290022	806000	5676549	5942644	866273	228035	9,99	49,26	9	6	7
Minimum	1	0	0	0	0	68432	0,25	0,19	30	0	0
Maximum	1500000	5969863	38035712	38054126	6500000	1645421	57,81	376,40	72	19	37
Quantity	82	82	82	82	82	82	82	82	82	82	82

Here the distribution of remuneration components in the industry is as follows (average values for 2015): 7.2% - wages, 3.2% - bonus, 46.9% - shares, 34.3% - options, 7% Incentive reward, 1.4% - another reward. This information does not represent an accurate distribution, but it allows us to draw conclusions about the main trends. So, still, one of the main types of remuneration in the information industry is remuneration with shares and options, as, in general, many of the companies under consideration are young enough.

It is also interesting to consider the fact that the average age of the CEO in the IT industry is 52 years compared to 58 years in the retail industry, which confirms our assumption that the industry itself is younger, dynamic and requires management of the company knowledge and application of modern information technologies. We also see that here a greater part of the remuneration is paid to shares and options - 81.2% compared to 60.6% in the retail industry, and a fixed part of the reward is almost 2 times less. But, on the whole, the average value of total remuneration is comparable in both sectors.

4.7. Practical comments

In the Chapter is analyzed the practice of forming a material compensation for CEOs of the U.S. public companies in terms of regulation, decision-making process for the amount of material incentives for CEOs, and its structure in US public companies. Separately, the analysis of the practice of material compensation of CEOs in the retail industry and the IT industry of the United States was conducted.

For further research, two industries have been selected: the retail industry and the IT industry. In these industries, there is a high level of income and growth rates. However, the compensation of CEO in the industries is structured differently in many ways because of differences in the stages of the life cycle of companies. The size of the remuneration in the retail industry, where mature companies predominate, are different from those in the growing information technology sector.

In addition to the requirements for the model for forming the variable part of the CEO's remuneration in Chapter 2, you can add the following:

First, in the theoretical model it makes sense to consider the company's strategy, the results of its implementation in quantitative form and their comparison with the target performance of the company. As it was shown, the remuneration committee establishes such indicators for performance evaluation in order to reconcile the amount of incentive reward depending on the degree of achievement of the targets.

Secondly, the model for the formation of the variable part of the CEO remuneration should be specified to one or more elements of the structure of the variable part of the remuneration. Here it is a question of monetary stimulating remuneration, or compensation of shares and bonds of the company.

In practice, the size of CEO compensation is affected by random factors in the macro environment. Therefore, it is highly desirable that the desired theoretical model takes into account the influence of such external factors.

Taking into account all the requirements for the model for the formation of variable part of remuneration, for the further comparative analysis, a game-theoretic model was chosen, which is an application of modeling the size of the incentive reward to the CEO, which would stimulate him to successfully execute the company's strategy (Casamatta, Guembel, 2007).

5. Modeling of CEO incentive plans on the example of the U.S. public companies

In this chapter, we will consider several examples of the game-theoretical model application for modeling compensation size for general directors on examples of the retail industry and the IT industry (case analysis method). A retrospective application of the model to specific situations will be presented and a comparison will be made with real historical compensation data in order to test the practical applicability of the model and evaluate the reward system in the particular situation under consideration. In conclusion, recommendations for improving the remuneration systems under consideration in the cases in question will be presented.

Each case will be considered according to the following plan: company description, ownership structure, description of the board of directors in the company, biography and profile of the general director, description of the situation, reward system at the time of analysis, solution of the theoretical model and comparison of its results with real historical data. At the end of the section, a conclusion will be presented based on the results of the analysis.

5.1. Game-theoretical modeling of CEO incentive plans for the companies of IT industry

The compensation system at Yahoo Inc. Until the buyout from Verizon Communications in 2017, Yahoo was a public company headquartered in Sunnyvale, USA and one of the world leaders in the Internet services industry. Search engine Yahoo took the 4th place in the world with a market share of 7.68% (as for 2015) on the personal computer platform and the 2nd place in the world with a market share of 5.2% (as for 2015) on the mobile platform Devices [Desktop Search Engine Market Share]. Yahoo was founded in 1995 and is one of the oldest companies in the Internet services market. Later in 1996, the company began to bargain on the US NASDAQ. In addition to the search engine, Yahoo offers users more than 60 other services [Yahoo Finance], such as, for example, financial portal (Yahoo! Finance), service for storing photos (Yahoo! Flickr), instant messaging (Yahoo! Messenger).

Ownership structure. At the moment of the case, 69.7% of the company's property belonged to institutional investors, 29.8% to mutual investment funds and only 0.5% belongs to the company's insiders. The top 20 shareholders held 34% of the company, while the largest shareholder - Vanguard Group, Inc. - does not exceed 5% [Morningstar]. Thus, we can conclude that the concentration of property was rather low. Due to the dispersed ownership structure, we will use the board of directors as the principal when using the theoretical model.

The annual shareholders' meeting mainly addresses the issue of selecting board members by a majority vote, recommendations on remuneration to members of the board of directors, approval of an external auditor, review and approval of various other policies and decisions [10-SEC Filings Yahoo Inc.]. However, due to the low concentration of ownership and the frequency of meetings, it is difficult to consider the shareholders meeting as a management body actively involved in strategic planning.

Board of Directors. During 2010, the Board of Directors meeting took place 10 times, and the number of its members was equal to 10. According to the guidelines of the company's management, members of the board of directors must attend at least 75% of all meetings for the duration of their mandate.

According to the Company's Management, the compensation committee consists of four independent directors who are engaged in the issues of reviewing and proposing to the general meeting of compensation systems for executive directors in accordance with the company's goals and objectives, options and share compensation systems, evaluation of the work of the CEO and other executive directors for the past period, the establishment of target criteria for the payment of remuneration, the conclusion of the extension and cancellation of contracts with potential and current executives E directors. Also, the remuneration committee deals with the remuneration for independent directors.

From June 2007 to April 2011, all members of the board of directors, with the exception of the CEO and COO of the company, were independent directors. Also, according to the company's management, each member of the Remuneration Committee, the Audit and Management were independent directors. In total, 8 out of 10 Directors are independent. The share of independent directors on Yahoo's board of directors will be used by us as the probability of recognizing a successful strategy for the theoretical model in this case (DEF 14A SEC Filings Yahoo Inc.).

Description of the problem. Carol Bartz was appointed CEO for Yahoo Inc. In 2009, as a candidate with a brilliant resume and successful work experience for 14 years as CEO in the IT industry (Autodesk), in order to bring new ideas to the company and return it to one of the leading positions in the market. After joining the company, Carol took over the negotiations with Microsoft, which tried to buy Yahoo, but, as a result, it turned into a partnership agreement between the companies. Under this agreement, Yahoo refused to use its own search engine, and used the Microsoft Bing search system, which, moreover, transferred all the technology, and would receive 12% of the total revenue generated in the search and advertising services [The Microsoft-Yahoo Search Deal, In Simple Terms]. Thus, Carol Bartz planned to focus the company's development on third-party services and invest in them, and give back the development of Microsoft's search engine. In addition to this strategy, Bartz has introduced a number of innovations aimed at saving, and cuts, which left the company many talented managers and developers [Carol Bartz Fired as Yahoo's CEO]. In the end, despite the agreement with Microsoft, the company's revenue continued to fall, new products were not so successful, and experts noted the strategic shortsightedness and inability of Bartz to retain leading specialists and overcome the organizational crisis.

The new strategy in 2013: after the dismissal of Carol Bartz, under the management of the new CEO, Yahoo bought about 40 promising start-up companies in order to develop new services on the market, with the same purpose increased the headquarters of mobile platform engineers in 10 times.

Profile of the general director. Carol Bartz, 60, CEO at Yahoo from 2009 to 2011. Fortune magazine included Bartz in the list of the most influential women in the global business, both during her work in Autodesk and after joining Yahoo! [Carol Bartz dismissed from the post of Yahoo! CEO].

Experience [Bloomberg]:

Jan. 2009–Sep. 2011 — CEO of Yahoo Inc.

2008–2009 — Director, Member of the Audit Committee and Finance Committee of Intel Corporation

Apr. 2006–Jan. 2009 — Chairman of the Board of Directors of Autodesk, Inc.

1992–Apr. 2006 — CEO, Chairman of the Board of Directors and President of Autodesk, Inc.

Based on these data, the reputation and likelihood of making high and low efforts for the theoretical model were calculated.

Table 5. CEO compensation structure in Yahoo! Inc. In US dollars. Compiled by: Annual Proxy Statements (DEF 14A) Yahoo Inc., 2009-2011

Type of compensation	2009	2010	2011	2012	2013
Base Salary	969,872	1,000,000	735,025	454,862	1,000,000
Bonus	0	0	0	0	2250
Stock awards	12,974,722	6,626,995	9,414,211	35,000,002	8,312,316
Stock Options	29,169,334	2,114,474	2,601,376	0	13,847,283
Non-equity incentive plan	1,500,000	2,000,000	477,534	1,120,000	1,700,000
All other compensation	2,615,345	5,365	3,141,389	40,540	73,863
Total compensation	47,229,273	11,946,834	16,369,535	36,615,004	24,936,000

Non-equity incentive plan. Additional material remuneration in the form of cash bonuses is established by the compensation committee in accordance with the developed program EIP (Executive Incentive Plan), by which the cash bonus is determined by 70% of the company's operating cash flow, and by 30% - by individual performance. In accordance with this plan, each executive director is assigned a target value of the monetary bonus as a percentage of the base salary by category. This distribution by category occurs depending on the size of the actual operating cash flow at the end of the period. For 2010, the scheme for determining the monetary incentive fee is as follows (Annual Proxy Statements (DEF 14A) Yahoo Inc.):

Table 6. Yahoo! Inc.: scheme of non-equity incentive plan distribution. Compiled by: Annual Proxy Statements (DEF 14A) Yahoo Inc., 2009-2011

Result/Target KPI	EIP bonus coefficient
85% or less	50%
100%	100%
105%	120%
115%	170%
120% or above	200%

Individual performance indicators are set jointly by the compensation committee and management. In general, these indicators include the achievement of strategic goals for the planning period and general estimates with recommendations on the results of the CEO (Annual Proxy Statements (DEF 14A) Yahoo Inc.).

Long-term incentives through stock awards and stock options. Historically, the company has attached great importance to this type of remuneration of executive directors in order to motivate them to achieve long-term financial goals. In assessing the size of this kind of compensation, Yahoo is guided by the best practices of other public companies. Just as for the cash bonus (EIP plan), the company used a target of $ 1.825 billion in operating cash flow at the end of 2009,

Target and historical indicators for the CEO in the period from 2009 to 2011:

Table 7. Yahoo Inc! Target and historical indicators for the CEO. Compiled by: Annual Proxy Statements (DEF 14A) Yahoo Inc., 2009-2011

Year	Index	Target value	Historical value	Weight
2009	Operating cash flow	1,825 USD Billions	1,688 USD Billions	100%
2010	Operating profit	630 USD Billions	748 USD Billions	50%
2010	Revenue	6,625 USD Billions	6,548 USD Billions	50%
2013	Revenue growth rate ex-TAC	3.4%	6.1%	50%
2013	Operating profit margin ex-TAC	19.6%	17.6%	50%

Solution of the model and comparison of the results. This case was divided into two periods: the first period from 2009 to 2010, the second period - 2012 - 2013 years.

In accordance with the model presented in Chapter 2, we introduced the parameters necessary to assess the material remuneration of the CEO and assess the likelihood of changing the strategy and changing the CEO.

So, in order to assess the reputation of the CEO, Carol Bartz, we used data on revenue and operating profit of Autodesk, Inc., in which the CEO worked earlier. The initial reputation of the general director is $q_0 = 0.67$ (8 successful years out of 12). As successful years, we consider the company's growth period.

The level of effort is estimated by industry average indicators in terms of growth rates and operating margin of profit. The probability of applying high effort is $\overline{e_1} = 0.83$ (10 successful years out of 12), and $\underline{e_1} = 0.67$ (8 successful years out of 12). In the second period, we use the level of effort of Marissa Mayer, the new CEO of the company, for which $\overline{e_2} = 1$, and $\underline{e_2} = 0.83$.

The company did not pay cash bonuses (as implied in the model), so the average cash bonus for the industry was selected from the sample in (c = 0.19).

As a result of the solution of the model, which is presented in Table 8, the company's board of directors was to fire the CEO and change the strategy to improve the financial performance of the company. In addition, the board of directors had to hire a new CEO, who could implement a new successful strategy. The material reward for the current CEO in the first period was 0, while for the new CEO it could be \$ 1.490 million (the company showed an operating profit growth of up to \$ 800 billion and a successful strategy in the second period).

In reality, Yahoo, as it follows from the simulation results, dismissed the company's CEO, Carol Bartz, and hired Merissa Mayer as CEO. This appointment had a positive effect on the company's value (the stock price increased by 37%), and the financial targets were met (operating profit margin of 16.4% vs. the target value of 13.3% %). The amount of real material non-issue incentives Melissa Mayer made in the second period 1.7 million dollars (against 1.490 million dollars on the theoretical model). However, despite the first signs of recovery, Yahoo is still lagging behind its main competitors and has not achieved high financial performance indicators.

Applying adjustment coefficients, first period compensation of Carol Bartz should be equal to \$1,90 million due to the 118% beat on KPI of Operating profit in 2010, which results in the coefficient of 170% due to the table presented before multiplied by 1.117 modeled $\left(\varepsilon [w \left(R^h \right)] \right)$. The second period compensation of Merissa Mayer should be equal to 1.788 million dollars (120% EIP bonus coefficient, due to operating profit margin beat in 2013, multiplied by the modeled value of 1,490).

Table 8. Results of modeling for Yahoo! Inc.

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,66667	0,833333	0,666667	1	0,83	0,8	190	30	748

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,16667	0,17	0,0625	0,75	0	0	30	0,25	7,5

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1\neq S_0,\ new}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
1117,65	17852,35	1490,196	18444,7	1460,2	Yes

The compensation system at Blackbaud Inc. Blackbaud was founded in New York in 1981, and from the very beginning it focused only on non-profit organizations, and has such clients as social and educational institutions, hospitals, cultural, religious, art institutions, etc. The company is the world leader in software development for this type of customers. After a series of mergers and acquisitions, Blackbaud expanded its activities to charitable funds and corporate CSR programs. At the end of 2015, the company had more than 30,000 customers in 69 countries.

Ownership structure. Institutional investors of the company own 65% of the property, mutual investment funds - 34.5%, insiders - 0.5%. Considering the list of the 20 largest shareholders, it should be noted that only three of them have a share exceeding 5%, with a maximum value of 6.39% [Morningstar]. This information may lead to the conclusion that in the company the property is sputtered. As already mentioned in Section 2.2., we then use the company's board of directors as a principal for use in the model of the theoretical modeling of the CEO's material compensation.

Board of Directors. The size of the board of directors of the company is 7 people. It includes audit committees, remuneration, corporate governance, whose members are exclusively independent directors. Only 6 out of 7 members of the board of directors, except for the CEO and the company's president, are independent directors of [Annual Proxy Statements (DEF 14A), Blackbaud Inc,].

Blackbaud has adopted the Say-on-Pay rule, which consists in the fact that the board of directors prepares recommendations for the remuneration of executive directors, which are then considered at a shareholders' meeting, which in turn can vote for certain amendments. Due to the fact that the ownership structure is deferred, the practice of applying such a mechanism for determining remuneration has proved to be the best.

Description of the problem. In January 2012, Blackbaud entered into an agreement worth \$ 293.9 million to buy a competitor, Convio, which also deals with software for non-profit organizations. As a result of this transaction, the management of Blackbaud intended to significantly improve its client services to raise funds in the Internet, the most growing segment in this market. It is also worth noting that the main customers of Convio were large customers, while Blackbaud concentrated on medium-sized organizations.

However, the results at the end of 2012 showed that the financial result of the merged company went below the planned level, although this deal was originally considered as an investment with a long payback period. The company announced its plans to grow into a company with revenues of \$ 1 billion, but this forecast did

not come true. Mark Chardon has been at the head of the company since 2005, and since then the company more than tripled its revenue and became the world leader in its industry, however, in the last year the company's growth slowed and internal organizational problems arose in connection with the acquisition of Convio.

Profile of the general director. Mark Chardon, 57, CEO of Blackbaud Inc. From 2005 to 2013 Experience [Bloomberg]:

2005–Aug. 2013 — CEO and President, Blackbaud Inc.

2001–2005 — CFO, Microsoft Information Worker Business

1998–2011 — GM and VP, Microsoft France

1984–1996 — Partner (office of CEO), Digital Equipment (HP)

The structure of compensation. Compensation package of the company is designed in such a way that all types of remuneration, with the exception of wages, are associated with clear quantitative metrics that are associated with creating value for the shareholders of the company, and that the company remains competitive in the labor market of highly professional managers. These metrics will be mentioned in the following sections.

Table 9. Structure of CEO compensation, Blackbaud Inc, in US dollars. Compiled by: Annual Proxy Statements (DEF 14A), Blackbaud Inc, 2012-2014

Type of compensation	2012	2013	2014
Base Salary	608,925	408,933	600,000
Bonus	0	0	0
Stock awards	942,827	0	1,500,000
Stock Options	0	0	2,000,000
Non-equity incentive plan	589,421	436,693	870,000
All other compensation	42,026	30,340	0
Total compensation	2,183,199	875,966	4,970,000

Non-equity incentive plan. This type of compensation is indicated in the company's reporting as non-issue material incentives. In 2013, the compensation committee set a 100% bonus to the CEO's salary to meet the planned targets.

Long-term incentives through stock awards and stock options. Based on the recommendation of shareholders in the process of Say-on-Pay program implementation, since 2010 the compensation committee has been paying considerable attention to this type of material incentive for the general director. The size of the compensation package is determined based on the results of work for 3 calendar years (for example, 2011-2013), and is determined by the achievement of targets in the following categories: annual growth rate of revenue, EBIT at the end of the year, retention rate.

Solution of the model and comparison of the results. By the first period we referred the period from 2012 to 2013, and to the second period - 2014. Similar to the example of Yahoo, we assessed all the parameters based on the information on the CEO's biography and the remuneration history (Table 9) and financial performance at Blackbaud (Table 10). The level of effort for the second period was calculated for the new CEO of the company - Mike Gianoni. The cash bonus in the company was not paid, therefore

Based on the results of the simulation, we can conclude that the company should have changed the strategy and the CEO. The revenue used as a financial result

Table 10. Performance targets for Blackbaud Inc. Compiled by: Annual Proxy Statements (DEF 14A), Blackbaud Inc, 2012-2014

Year	Index	Target value	Historical value	Weight
2012	Revenue	197,7 USD millions	193,35 USD millions	25%
2012	EBIT	106.7 USD millions	108.94 USD millions	50%
2012	Orders for next year	95,0 USD millions	92,245 USD millions	25%
2013	Revenue	516 USD millions	498,98 USD millions	50%
2013	EBIT	282.2 USD millions	274 USD millions	50%

showed that the strategy was unsuccessful in the first period (498 out of 516 million dollars), and in the second period was more successful, as the revenue was already 564 million dollars.

In reality, Mark Chardon was also dismissed after the first period in 2013 with a cash bonus of 0 and an ineffective incentive fee of \$ 437 thousand, whereas according to the theoretical model his incentive reward should be 0. New CEO, Mike Gianoni received an incentive fee of \$ 870 thousand in the second period, while the theoretical model offers him \$ 1.37 million. This discrepancy could have occurred because we used the average cash bonus for modeling, while Blackbaud is a relatively small company in the sample.

Applying adjustment coefficients, first we see from the form DEF 14A of the year 2013 that the achievement against the corporate performance measures was 96.7% with respect to Adjusted Revenue and 97.5% with respect to Adjusted EBIT, for a corporate performance factor of 97.1% [Annual Proxy Statements (DEF 14A), Blackbaud Inc, 2013]. Thus, for the first period we can apply apply the average coefficient of 97% to the modeled result of 0,23, getting \$0,22 million. As for the second period, in 2014, the result against the corporate performance measures was 101.5% with respect to Adjusted Revenue and 104.3% with respect to Adjusted EBIT, for a corporate performance factor of 102.7% [Annual Proxy Statements (DEF 14A), Blackbaud Inc, 2014]. Thus, for the second period we can apply apply the average coefficient of 103% to the modeled result of 1,37, getting 1.41 million dollars.

Table 11. Results of modeling for Blackbaud Inc

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,71429	0,857143	0,428571	0,85714	0,71429	0,85714286	0,16	31,67	498

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,42857	0,142857	0,048544	0,81553	0,00724	0,22916064	31,4408	0,16129	5,10806

$w^{h,h}$	$w^{l,h}_{S_1=S_0}$	$w^{l,h}_{S_1 \neq S_0,\ new}$	$w^h_{S_1=S_0}$	$w^{l,h}_{S_1=S_G=S_0}$	Change?
1,12	3,845333	1,373333	0	0,22889	Yes

The compensation system at Blucora Inc. The company Blucora (until 2012 Infospace) is a public company that was founded in 1996, its headquarters is in Delaware, USA. Blucora is represented in three segments of Internet services: information retrieval (three leading sites: Dogpile, WebCrawler and MetaCrawler),

preparation of tax reporting (through the TaxACT unit) and e-commerce. The company cooperates in the field of search engines with such players of the market as Google.

Ownership structure. Institutional investors own 61% of the company's ownership, mutual investment funds - 38%, company insiders - 1%. Of the 20 largest shareholders of Blucora, only two own shares that exceed 5% of the property, and respectively equal to 5.02% and 5.01% [Morningstar]. From these data, you can draw a preliminary conclusion about the dispersed nature of the ownership in the company. Accordingly, we consider it legitimate to use the board of directors as a principal in the model of theoretical modeling of the amount of material incentives for the CEO.

Board of Directors. The board of directors includes 9 people who are on such committees as an audit committee, a remuneration committee, a corporate governance committee, and a committee on mergers and acquisitions. According to the requirements of the Securities Commission (SEC) and the NASDAQ exchange, all members of the committees are independent directors, of whom 8 out of 9 are on the Board of Directors ($p_G = 0,89$).

The compensation committee evaluates the activities and contributions to the overall performance of the company's executive directors, the recommendations to the general board of directors on changes in the structure of fees, the tracking of compensation trends in other companies, and the involvement of external consultants to assist in the previously listed responsibilities [Annual Proxy Statements (DEF 14A), Blucora Inc].

Description of the problem. During and after the end of the World Financial Crisis, Infospace's performance was extremely low, numerous reductions followed, and business, due to its lack of diversification, was threatened by the sale. For example, revenue in 2008 in percentage terms was 50% of 2005 revenue, in 2009 - 60%, and in 2009 - 65% [Thomson Reuters Datastream]. The company needed to find new growth drivers, one of which was entering the emerging market of tax services through the purchase of TaxACT Holdings, Inc. in 2011. However, this transaction was more expensive than anticipated (\$ 287.5 million), and its effectiveness was only to be assessed in the coming year. In addition, it was after the purchase of TaxACT that the company changed its name to Blucore and re-branded it.

Profile of the general director. William Rukelshaus, 47, CEO of Blucora Inc. Since 2010. Experience [Bloomberg]:

2010–Present — CEO and President, Blucora Inc.

2007–2010 — Director, Blackbaud Inc.

2002–2006 — Senior Vice President, Corporate Development, Expedia Inc.

The structure of compensation.

Non-equity incentive plan. The target value of the bonus, as a certain percentage of the base salary, is consistent with the executive director at the conclusion of the contact. Thus, managers who have greater responsibility and weight in making operating decisions, in general, have a higher percentage of the cash bonus on the company's performance. The targets for the 2011 results were revenue and EBITDA [Annual Proxy Statements (DEF 14A), Blucora Inc.]

Long-term incentives through stock awards and stock options. As an incentive reward for the long-term perspective, three elements are used: Restricted Stock Units, Performance Stock Units, Stock Grants.

Table 12. Blucora Inc.: CEO's compensation structure in US dollars. Compiled by: Annual Proxy Statements (DEF 14A), in Blucora Inc, 2012-2014

Type of compensation	2011	2012	2013
Base Salary	400,000	415,192	450,000
Bonus	150,000	0	0
Stock awards	371,200	506,800	823,140
Stock Options	2,325,087	634,379	1,094,270
Non-equity incentive plan	540,000	613,311	450,450
All other compensation,	8,748	4,873	10,515
Total compensation	3,795,035	2,174,555	2,828,375

Table 13. Performance targets in Blucora Inc. Compiled by: Annual Proxy Statements (DEF 14A), in Blucora Inc, 2012-2014

Year	Index	Target value	Historical value	Weight
2011	Revenue	198,147 USD millions	193,35 USD millions	50%
2011	EBITDA	21,830 USD millions	33,783 USD millions	50%
2012	Revenue	260,264 USD millions	344,814 USD millions	50%
2012	EBITDA	31,213 USD millions	50,648 USD millions	50%

Solution of the model and comparison of the results. As the first period we accept 2011, and as the second period - 2012. All parameters were evaluated similarly to other cases and in accordance with the model specifications given.

According to the results of the theoretical simulation, we can see that the non-equity incentives of William Rukelshaus should be equal to 216.8 thousand dollars, while in real life it was equal to 540 thousand dollars. Thus, the model showed that in a situation where potentially successful strategy did not show itself in the first period, the board of directors could overestimate its potential, or the CEO's contribution. However, such a strategy paid off to the company, as in 2012 it showed a significant increase in financial results.

As we can see from the form DEF 14A for 2011, EBITDA was used as the two Company-based performance measures of the annual bonus plan with the maximum maximum target of 135% [Annual Proxy Statements (DEF 14A), Blucora Inc, 2011]. Using the data from the table on performance targets, we can extract that EBITDA in 2011 was 1,54 times higher the target value, so the maximum bonus of 135% should be applied in this case. Applying adjustment coefficient, we get the compensation for the first period equal to 337,5 thousand dollars. As for the second period, the maximum possible bonus target was increased to 150% by the compensation committee [Annual Proxy Statements (DEF 14A), Blucora Inc, 2012]. EBITDA for the year of 2012 was 1,54 times higher the target value leading to a 50% bonus over the modeled value of 216 thousand dollars resulting in 325 thousand dollars.

The compensation system at Linkedin Corporation. Linkedin Ltd was founded in 2003, then changed its name to Linkedin Corporation in 2005, and acquired its public status after entering the IPO in 2011 on the NYSE. The company represents the world's largest professional social network with more than 300 million users in more than 200 countries. Linkedin allows users to create and maintain

Table 14. Result of modeling for Blucora Inc.4

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,5	0,75	0,2	0,8	0,2	0,88888889	0,15	31,67	238

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,55	0,6	0,027027	0,86486	0,00552	0,17497238	31,495	0,08772	2,77807

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1 \neq S_0,\ \mathrm{new}}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
0,25	6,9375	0,289063	0	0,2168	No

a list of business contacts. The company divides its profit sources into three areas: solutions for companies to search for employees (placement of vacancies, access to the resume database, official page of the company), marketing direction (mainly contextual advertising), premium subscription (special status that opens additional capabilities). On average, over the past 3 years, these directions create, respectively, 50%, 30% and 20% of the company's total revenues. Linkedin is the leader in its field, far ahead of its competitors, for example, Viadeo c 50 million users [Annual Proxy Statements (DEF 14A), Linkedin Corporation].

Ownership structure. Institutional investors own 64.5% of the company's ownership, mutual investment funds - 35%, company insiders - 0.5%. Of the 20 largest shareholders of Linkedin Corporation, 14 own shares of less than 1%, and the largest shareholder holds 2.93% [Morningstar]. In general, we can draw a preliminary conclusion about the dispersed nature of property in the company. Accordingly, we will use the board of directors as a principal in the model of theoretical modeling of the amount of material incentives for the CEO.

Board of Directors. This management body of the company is represented by 7 directors. According to the company's corporate agreement, the board of directors is divided into three sub-groups, whose directors' powers expire with a difference of one calendar year. As in many of the companies under consideration, the members of the board of directors represent three core committees: an audit committee, a remuneration committee, and a corporate governance committee. In addition, 5 out of 7 members of the board of directors are independent directors ($p_G = 0,71$) [Annual Proxy Statements (DEF 14A), Linkedin Corporation].

Description of the problem. Linkedin successfully listed its shares during the IPO in 2011 at a price almost 3 times higher than the placement price. However, many analysts were skeptical about this assessment of the company due to the lack of its real prerequisites and new sources of revenue for LinkedIn [LinkedIn share price more than doubles in NYSE debut]. At the same time, the company itself noted that almost all revenue in previous years came from companies interested in recruiting services on the site. A paid subscription service existed, but only 1% of users used it, while the main competitors of Viadeo and Xing had 10% and 18% of subscribers, respectively [Does it beat global in the professional-networking business?]. Linkedin decided to develop this direction, however, it was necessary to find a balance between free and paid services, and not to lose users.

Profile of CEO. Jeffrey Weiner, 42, CEO of LinkedIn since 2009. Experience [Bloomberg]:

2009–present — CEO, Linkedin

2008–2009 — Executive Director, Greylock
2001–2008 — EVP, Yahoo!
1994–2000 — VP Online, Warner Bros.

Table 15. Linkedin Corporation: the structure of the CEO's compensation in US dollars. Compiled by: Annual Proxy Statements (DEF 14A), at Linkedin Corporation, 2011-2013

Type of compensation	2011	2012	2013
Base Salary	422,500	535,000	450,000
Bonus	0	0	0
Stock awards	6,638,000	0	18,709,690
Stock Options	0	0	28,678,729
Non-equity incentive plan	507,000	636,650	1,094,531
All other compensation,	3750	3750	4664
Total compensation	7,571,250	1,175,400	4,907,1363

In accordance with the company's 2011 Executive Bonus Plan, half of the CEO's targeted remuneration was based on the achievement of corporate goals, and the other half on achieving individual goals. As corporate goals metrics such as revenue for the year, the number of users of the social network, the number of unique visitors to the site, the number of page views, and EBITDA were used. Individual results were evaluated by the remuneration committee on the basis of subjective assessments with an emphasis on such a CEO quality, as a manifestation of leadership abilities.

Non-equity incentive plan. In accordance with the company's 2011 Executive Bonus Plan, half of the CEO's targeted remuneration was based on the achievement of corporate goals, and the other half on achieving individual goals. As corporate goals metrics such as revenue for the year, the number of users of the social network, the number of unique visitors to the site, the number of page views, and EBITDA were used. Individual results were evaluated by the remuneration committee on the basis of subjective assessments with an emphasis on such a CEO quality, as a manifestation of leadership abilities.

Table 16. Performance targets for Linkedin Corporation. Compiled by: Annual Proxy Statements (DEF 14A), at Linkedin Corporation, 2011-2013

Year	Index	Target value	Historical value	Weight
2011	Revenue	450 USD millions	522 USD millions	20%
2011	Number of users	133 millions	145 millions	20%
2011	Number of unique visitors (per month)	38 millions	44 millions	20%
2011	Page views	28,000	33,000	20%
2011	EBITDA	48 USD millions	99 USD millions	20%

Solution of the model and comparison of the results. This case was divided into two periods: the first period in 2011, the second period in 2012. All parameters were evaluated similarly to other cases and in accordance with the model specifications provided.

Based on the results of theoretical modeling, we can see that the company (the principal) should not have changed either the strategy or the CEO after the first period. However, the model indicates that Jeffrey Weiner's remuneration in the first period should be equal to 0, despite the high performance. In fact, he received a cash incentive fee of $ 507 thousand dollars. This discrepancy may be connected with the fact that the element of reputational risk for Jeffrey Weiner is very high (initially high reputation and effort level), therefore irrespective of the size of the incentive reward, he will seek to maintain and improve its reputation in the second period. In such a situation, it is more profitable for a principal (board of directors) not to pay a bonus to the general director.

In the second period Jeffrey Weiner received a non-equity incentive fee of $636 thousand, whereas according to the modeling results we got a value of $450 thousand. This discrepancy can be explained, firstly, by the fact that the average bonus size was used for calculations of cash bonus in the industry, as well as the fact that the company has recently become public and does not yet have a well-functioning mechanism for remunerating top management in accordance with the rules of public companies in the United States.

Due to complicated system of individual performance metrics based on 5 KPIs for each executive, we just see from the report that Jeffrey Weiner was assigned a 120% bonus to his base cash incentive [Annual Proxy Statements (DEF 14A), at Linkedin Corporation, 2011]. Applying this coefficient to our resulting value of 0,450 we got that he should have received a non-equity incentive of 540 thousand dollars in the first period. As we the next year, Jeffrey was assigned with 119% bonus [Annual Proxy Statements (DEF 14A), at Linkedin Corporation, 2012], resulting in 535 thousand dollars of non-equity incentives.

Table 17. Simulation results for Linkedin Corporation

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,875	0,875	0,500	0,889	0,556	0,714	0,150	31,670	500,000

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,375	0,333	0,200	0,571	0,027	0,856	30,814	0,406	12,872

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1\neq S_0,\ \text{new}}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
0,450	0,844	0,788	0,000	0,295	No

The compensation system at CA Technologies Inc. CA Technologies is a public American company founded in 1973, headquartered in New York. The company is developing software for managing the information infrastructure of enterprises, operations, databases, portfolios of projects in order to increase the productivity and efficiency of these systems. The company's clients are more than half of the representatives of the Global Fortune 500 list, 20 largest global banks and 25 largest federal agencies. CA Technologies manages a development team of 13,000 people in 45 countries worldwide [Company Information, CA Technologies].

Ownership structure. Institutional investors own 64% of the company's property, mutual investment funds - 35.8%, insiders of the company - 0.2%. The largest shareholder of CA owns a share of 2.15%, and the average share of the top 20

shareholders does not exceed 1% [Morningstar]. From this we can conclude that the dispersed nature of ownership in the company.

Board of Directors. In 2011, 10 out of 11 directors were independent on the company's board of directors ($p_G = 0,91$). The governing body itself is divided into four core committees: Audit, Compensation and Human Resource Management Committee, Corporate Governance, Legal Affairs and Risk Management [Annual Proxy Statements (DEF 14A), CA Technologies].

Description of the problem. William McCracken joined the company in 2005 and became CEO in 2010. At that time, the company had a number of developments and patents in the field of information technology, but existing products did not allow it to increase revenue. Therefore, CA spent more than $500 million on the purchase of 3 promising companies (the most well-known - 3Tera) in 2010, working in the field of cloud services, storage and protection of information [Our strategy's to both build and buy: CA Tech's McCracken]. Thus, the company changed its course from the large-scale development and sale of universal software to the provision of cloud services and virtualization services [CA to acquire cloud platform provider 3Tera]. It should be noted that the market reacted negatively to this strategy of the company, and its shares fell in price by 20% in 2011.

The new strategy in 2012: with the arrival of Michael Gregoire as CEO, the company once again focused on internal development and development (the creation of 40 profile research units), introduced a program to attract talented engineers, began adapting products from large companies to medium-sized businesses, improving the software itself, rather than cloud services [Q&A: CA CEO Gregoire at the one-year mark].

Profile of CEO. William McCracken, 69, CEO of CA Technologies since 2010. Experience [Bloomberg]:

2005–2012 — Director and CEO, CA Technologies, Inc.

2002–2010 — President, Executive Consulting Group, LLC.

1993–2001 — Various management positions, IBM Corporation

Michael Gregoire, 46, CEO of CA Technologies since 2012. Experience:

2005–2012 — CEO and Chairman of the Board of Directors, Taleo Inc.

2000–2005 — EVP Global Services, PeopleSoft / Oracle

1998–200 — Managing Director, EDS Information Solutions Organization

The system of compensation. The company in its compensation strategy adheres to the principle of stimulating the long-term performance of executive directors, for example, by replacing the remuneration with shares by the results of one year for a reward based on the results of three years. Also, on average, only 18% of the total remuneration is wages, and 82% (20% - monetary bonus, 67% - shares and stock options) depend on the achievement of the directors of the delivered indicators.

Non-equity incentive plan. The compensation committee at the end of the year reviews and coordinates with the CEO and CFO performance targets needed to determine which bonus awards are divided into corporate goals (operating income and revenue growth rate) and separately the same indicators for the technology development group and client solutions. In addition to financial results, some qualitative or visual goals are taken into account, such as observing delivery dates, localizing products, adding new options to applications, and so on. [Annual Proxy Statements (DEF 14A), CA Technologies].

Table 18. CA Technologies: CEO compensation structure in US dollars. Compiled by: Annual Proxy Statements (DEF 14A), at CA Technologies, 2010-2012

Type of compensation	2010	2011	2012
Base Salary	1,114,584	1,000,000	1,000,000
Bonus	1,300,000	0	0
Stock awards	561,879	4,073,518	3,909,219
Stock Options	492,621	1,473,826	821,710
Non-equity incentive plan	242,507	1,266,000	1,764,000
All other compensation,	36,627	214,091	282,672
Total compensation	3,748,218	8,027,435	7,777,601

Long-term incentives through stock awards and stock options. The company is moving from a one-year to three-year program of capital incentives. As the metrics for payment of options is the company's share price, for the payment of shares - revenue growth rate, operating profit margin, operating cash flow [Annual Proxy Statements (DEF 14A), CA Technologies].

Table 19. Targets in CA Technologies. Compiled by: Annual Proxy Statements (DEF 14A), at CA Technologies, 2010-2012

Year	Index	Target value	Historical value	Weight
2011	Operating profit	1,527 USD Billions	1,498 USD Billions	60%
2011	Revenue growth rate	6,0%	4,3%	40%
2012	Revenue growth rate	8,3%	8,1%	40%
2012	Operating profit margin	34,1%	34,8%	60%

Solution of the model and comparison of the results. This case was divided into two periods: the first period in 2010-2011, the second period in 2012. All parameters were evaluated similarly to other cases and in accordance with the model specifications given. The level of efforts for the second period was calculated for the new CEO.

Based on the results of the modeling, we conclude that the former CEO's compensation in the first period should be 0 due to the execution of the unsuccessful strategy. However, the company, according to the rules of remuneration, pays a bonus in any case, which is equal to the proportional value of the achieved result from the target value. In fact, in 2010 and 2011, William McCracken received a cash award of $ 1.5 million. After the second period, the new CEO (Michael Gregoire), according to the model, was about to receive 1,79 million dollars, while in fact received $1,764 million in cash financial compensation.

Applying adjustment coefficient approach for the first period, we took an operating profit and revenue growth rate as main KPIs stated by the company for determining «Annual Performance Cash Incentive Award Payouts» [Annual Proxy Statements (DEF 14A), CA Technologies, 2011]. The final weighted average coefficient for modeled value of 1,157 is 87,5%, therefor the payout of the first period should be equal to 1,33 millions of dollars. As for the second period, the weighted average coefficient is equal to 100%, which implies that the payout will remain equal to 1,79 million dollars.

Table 20. Results of modeling for CA Technologies Inc.

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,8	0,8	0,4	0,857	0	0,909	1,3	31,67	1500

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,4	0,857	0,068	0,847	0,010	0,326	31,344	0,248	7,847

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1 \neq S_0,\text{ new}}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
1,517	22,371	1,790	17,460	1,790	Yes

5.2. Game-theoretical modeling of CEO incentive plans for the companies of retail industry

The compensation system at Fred's Inc. The company Fred's was founded in 1947 as a regional chain of low price stores in the southeastern United States. To date, the trading network has approximately 700 stores, 300 pharmacies in 15 US states, and Fred's headquarters are located in the city of Memphis, Tennessee. As follows from the description, the chain stores serve low- and middle-income families in small towns (85% of stores are located in towns with a population of less than 15,000 people). The company's product portfolio includes pharmaceutical products (36.3%), household goods (22.6%), food and tobacco products (16.7%), cleaning products (8.8%), beauty and health products (7,5%), clothing (6.3%), sales to other franchise stores (1.8%) [10-to SEC Filings Fred's Inc.].

Ownership structure. The most significant part of the shares belongs to institutional investors - 60%, mutual investment funds - 36.5%, insiders of the company - 3.5%. Of the company's 20 largest shareholders, 8 hold stakes of 5% or more, with the largest share of 11.68% [Morningstar]. Thus, we can conclude that the dispersed nature of ownership in the company, and this means that there is reason to consider the board of directors of Fred's as a principal in the implementation of game-theoretic modeling.

Board of directors. The board of directors includes 7 people, including the Chairman of the Board of Directors and the CEO of the company. Members of the Board of Directors represent committees on corporate governance, on elections, on audit, on compensation, on pharmaceutical issues (deals with the strategy and development of the pharmaceutical business of the company). The compensation committee is responsible for establishing a unified system of material remuneration in the company, as well as for monitoring and evaluating the activities of the directors and management of the company. In the board of directors, 5 out of 7 directors are independent ($p_G = 0,71$).

Description of the problem. Due to increased competition and the specifics of its business model, by 2010 Fred's faced extremely low profitability of the business (operating margin of 2.4%) for the possibility of further expansion. Therefore, under the guidance of the CEO, the introduction of a strategy was made focusing on 5 key areas (Core 5 Program), such as interior items, holiday products, pet products, pharmaceuticals, chemicals and cleaning products, in which the company still had competitive advantages over independent sellers in small settlements. The company was moving away from daily consumption goods to more marginal and expensive categories. For this purpose, within two years the company has planned significant

capital expenditures to increase the floor space for expensive types of goods by 50% [10-SEC Filings Fred's Inc.].

Profile of CEO. Bruce Efird, 52, CEO of Fred's since 2010. Experience [Bloomberg]:

2007–2014 — President and CEO, Fred's, Inc.

1998–2005 — Executive Vice President, Merchandising, Mejer, Inc.

The structure of compensation.

Table 21. CEO compensation structure in Fred's, Inc. In US dollars. Compiled by: Annual Proxy Statements (DEF 14A), in Fred's, Inc, 2010-2013

Type of compensation	2010	2011	2012	2013
Base Salary	650,000	650,000	682,692	700,000
Bonus	0	0	0	0
Stock awards	318,138	340,379	395,000	0
Stock Options	0	106,500	965,000	0
Non-equity incentive plan	354,250	227,500	0	0
All other compensation,	13,742	14,483	44,464	22,277
Total compensation	1,336,130	1,338,862	2,087,156	722,277

Non-equity incentive plan. The company has approved a special program for financial incentives management (MIP), which sets the target value of the bonus for CEO, CFO, EVP and SVP, depending on the value of earnings per share (EPS).

Long-term incentives through stock awards and stock options. Fred's pays options to top managers based on performance (EPS) this year. Call options can be executed by the manager when the same EPS target is reached in the future.

Table 22. Targets in Fred's, Inc. Compiled by: Annual Proxy Statements (DEF 14A), in Fred's, Inc, 2010-2013

Year	Index	Target value	Historical value	Weight
2010	EPS	0,86 USD	0,75 USD	100%
2011	EPS	0,86 USD	0,86 USD	100%
2012	EBIT	59,6 USD millions	51,31 USD millions	100%
2013	EBIT	48.9 USD millions	39,08 USD millions	100%

Solution of the model and comparison of the results. This case was divided into two periods: the first period from 2010 to 2011, the second period - 2012 - 2013 years. The results of theoretical modeling show that after the first period the CEO had to receive a reward of $1,3 million, while in fact his cash bonus for 2011 was $ 0.23 million, in the whole variable part of compensation for 2010-2011 is $ 1,345 million. In the second period, due to poor performance, the CEO remuneration should be equal to 0, as in reality the board of directors considered that the strategy was unsuccessful, and the CEO does not need to be stimulated financially.

Applying adjustment coefficients, EPS is the only target KPI used for determining cash incentives for executives in the company in 2011 and EBIT in 2012 and 2013 [Annual Proxy Statements (DEF 14A), in Fred's, Inc, 2010-2013]. As for the first period, we see that the target EBIT and historical EBIT are equal, therefore

the bonus will have the adjustment coefficient of 1 and is not changed from \$1,3 million. However, in the second period, as EBIT for both 2013 and 2012 is less than target value, the average coefficient is 0,83. Taking the maximum possible reward from the model of \$0,25 million multiplied by 0,83, we get \$0,2 million.

Table 23. Results of modeling for Fred's Inc.

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,750	0,750	0,250	0,800	0,200	0,714	150	30	500

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,500	0,600	0,176	0,588	0,041	1,233	28,767	0,333	10,000

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1 \neq S_0,\ new}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
250,000	1387,900	425,000	1304,566	396,233	No

The compensation system at Dollar Tree Inc. Dollar Tree Inc. - an American company included in the list of Fortune 500, which owns a network of inexpensive stores, in which goods cost \$ 1 or less. For 2016, the company has about 5100 stores in 48 US states and in Canada, as well as 10 major distribution centers. Dollar Tree is one of the most growing companies in the retail industry in the US, opening every year from 2011 to 2016. About 300 stores. In addition, since 1995, the company bought 695 stores from local competitors through acquisitions. In the grocery portfolio, the store chain has home care products, decorations, gifts, beauty and health products, various stationery products and fast food products [10-SEC Filings Dollar Tree Inc.].

Ownership structure. Institutional investors own 67.5% of the company's property, while mutual investment funds - 31%, and company insiders - 1.5%. Among the twenty largest shareholders of the company Dollar Tree, only one has a share of property exceeding 5% and equal to 7.2% [Morningstar]. According to this information, it can be concluded that the property in the company is sprayed, which means that for the purposes of theoretical modeling, we can accept the board of directors as a principal from the company.

Board of directors. The principles of corporate governance of the company establish rules for the board of directors, according to which they must act in the interests of the company and its shareholders. The size of the board of directors is dictated by the need of the company at a particular moment in time. Also, according to the norms of public companies, the majority of the board of directors should consist of independent directors. In addition, the board of directors includes the CEO and several other executive directors, which ensures the representation of management on the board of directors [Annual Proxy Statements (DEF 14A), Dollar Tree Inc].

The board of directors has the following committees: Audit Committee, Compensation Committee, Corporate Governance Committee. According to the charter of the board of directors, the compensation committee establishes remuneration for the CEO, conducts an evaluation of his activities with the involvement of external consultants.

For 2010, the board is represented by 11 directors, 8 of which are independent $(p_G = 0,73)$. This parameter will be used as the probability of recognizing a successful strategy in the theoretical model. In particular, therefore, the CEO, Bob Susser, is not the chairman of the board of directors, since this would reduce the likelihood of correctly recognizing the nature of the strategy, as the CEO was able to dictate his terms.

Description of the problem. Due to the high concentration of other low-cost stores of companies such as Dollar General Corporation and Family Dollar Stores Inc., Dollar Tree is forced to look for additional ways to expand its business. One such path was the entry into the Canadian market in 2010, where the company had not previously been introduced. This exit came through the purchase of the Canadian company Dollar Giant with 86 stores in 4 provinces of the country. By the end of 2011, the number of stores in Canada increased to 99 [Dollar Tree's Canadian expansion plans a good sign for Dollarama]. The company's management plans to expand its presence in this market to 1,000 stores in the next five years.

Profile of CEO. Bob Sasser, 60, has been CEO of the company since 2004. Experience [Bloomberg]:

2004–2014 — CEO and President, Dollar Tree, Inc.

1999–2004 — COO, Dollar Tree, Inc.

1994–1996 — VP, General Merchandising, Michaels Stores, Inc.

The structure of compensation. The company practices a system known as "Say on Pay," when the board of directors asks shareholders to approve the remuneration of an executive director. For 2011, the company used the following compensation structure: basic salary (17.6%), cash bonus (29.5%), long-term capital compensation (52%) and other types (0.9%).

Table 24. Dollar Tree Inc.: the structure of the CEO's compensation in US dollars. Compiled by: Annual Proxy Statements (DEF 14A), Dollar Tree Inc., 2010-2013

Type of compensation	2010	2011	2012	2013
Base Salary	971,154	1,080,769	1,301,923	1,410,577
Bonus	0	0	0	0
Stock awards	2,178,000	3,193,858	13,676,384	3,839,768
Stock Options	0	0	0	0
Non-equity incentive plan	1,948,750	1,813,020	1,847,813	1,909,929
All other compensation,	58,236	56,769	63,670	58,089
Total compensation	5,963,640	6,144,416	16,889,790	7,218,363

Non-equity incentive plan. In accordance with the Management Incentive Compensation Plan (MICP), the bonus is paid at the beginning of the next year based on the results of achieving personal targets and the company's performance. This bonus is expressed as a percentage of wages.

Long-term incentives through stock awards and stock options. The compensation committee appoints this type of remuneration based on the Omnibus Incentive Plan. Since 2009, the main element of long-term incentives has been restricted stock units. These shares are paid on the basis of achieving the target results (operating profit) for the last 3 years, which helps the company to ensure a stable growth of value for shareholders in the interests of executive directors.

Table 25. Targets in Dollar Tree Inc. Compiled by: Annual Proxy Statements (DEF 14A), in Dollar Tree Inc., 2010-2013

Year	Index	Target value	Historical value	Weight
2011	Operating income	727,572 USD millions	782,1 USD millions	100%
2013	Operating income	992,492 USD millions	993,6 USD millions	100%

Solution of the model and comparison of the results. This case was divided into two periods: the first period from 2010 to 2011, the second period - 2012 - 2013 years.

Based on the results of theoretical modeling, we can say that the CEO should receive a non-equity compensation in both the first and second periods. So, after the first period, he should get $3 million, and after the second - $0,45 million, while in reality these amounts were equal to $1,8 and $1,9 million. It is worth noting, that in sum the model gives a result of $3,45 million for 2 periods, while the historical value is $3,7 million. A significant difference in the second period is due to the fact that the theoretical game is limited to two periods, and in life the principal continues Stimulate the CEO for further periods.

With the application of adjustment coefficients, we took operating income as a performance target for both periods. As you can see from the table presented above, the company achieved its target performance metric with the coefficient of 1,07 in 2011, so that the adjusted incentive become $3,21 million. As for the second period, the coefficient is 1, therefore the payout remains $0,45 million.

Table 26. Results of modeling for Dollar Tree Inc.

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,545	0,909	0,545	0,917	0,583	0,727	0,15	30	780

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,364	0,333	0,029	0,706	0,002	0,074	29,926	0,082	2,458

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1 \neq S_0,\ \text{new}}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
0,450	5,66	0,637	3,042	0,232	No

The compensation system at Kohl's Corporation. Kohl's Corporation was founded in 1988 in Wisconsin, USA, and is the largest chain of department stores in the country. In 1998, the company's shares were included in the S & P 500 index, and also Kohl's Corporation is on the Fortune 500 list. By 2017, this chain of department stores has 1162 stores in 39 states of the United States, as well as the popular online store of the same name. Kohl's product portfolio includes the clothing of well-known brands, footwear, accessories, beauty products and household goods [10-SEC Filings Kohl's Corporation].

Ownership structure. In Kohl's Corporation, 63.7% of shares belong to institutional investors, 36% to mutual investment funds, and only 0.3% to company insiders. Among the 20 largest shareholders, 4 have a share exceeding 5% with

the largest value of 9.28%, which indicates a dispersed ownership structure in the company. Thus, we can once again use the board of directors as a principal role.

Board of directors. The board consists of 12 directors, 10 of whom are independent directors ($p_G = 0,83$). Members of the board of directors hold positions in the committees on audit, corporate governance and remuneration. In turn, the duties of the compensation committee include setting up a remuneration structure and evaluating the CEO's performance in accordance with the key objectives of personal and corporate performance [Annual Proxy Statements (DEF 14A), Kohl's Corporation].

Description of the problem. Kohl's Corporation needed new drivers for growth, as every year the opportunity to open a new store in a good location is getting harder. So the company planned to open only 20 small shops (from 55 to 68 thousand square pounds). However, the main strategy for 2011 was the gradual re-planning of all the chain stores in a fast scheme, which reduces construction and repair work by more than 50% compared to 2007. The main idea was to reduce the warehouse space to increase the sales area, organize additional fitting rooms, and re-design the store for the new design of the company. Strategically, the company decided to invest in the renovation of existing assets to ensure a steady increase in sales and success in the competitive struggle in the future. By 2012, the company has updated 200 of its stores, and plans to complete the management program by the end of 2013 [10-SEC Filings Kohl's Corporation]. The first reports say that this strategy has made it possible to achieve significant sales growth in the cosmetic departments [Kohl's Gets a Beauty Boost from the Store Remodels Dollarama].

Profile of CEO. Kevin Mansell, 61, CEO of Kohl's Corporation since 2008. Experience [Bloomberg]:

2008-present - CEO, Kohl's Corporation

1999-present - President, Kohl's Corporation

1982-1999 - Various managerial positions, Kohl's Corporation

The structure of compensation. In 2011, the remuneration structure of Kevin Mansell looked as follows: 14.2% - basic wage, 59.5% - long-term incentives, 22.7% - short-term monetary incentives, 3.6% - another compensation.

Table 27. The compensation structure of the CEO in Kohl's Corporation. Compiled by: Annual Proxy Statements (DEF 14A), at Kohl's Corporation, 2011-2013

Type of compensation	2011	2012	2013
Base Salary	1,339,300	1,329,300	1,339,300
Bonus	0	0	0
Stock awards	2,799,984	2,800,011	6,000,119
Stock Options	2,806,198	2,800,003	0
Non-equity incentive plan	2,145,000	531,720	535,720
All other compensation,	371,261	355,758	303,165
Total compensation	9,422,443	7,816,792	8,178,304

Non-equity incentive plan. The main idea of short-term cash reward in the company is to stimulate the CEO to achieve the set performance targets. In accordance with the Annual Incentive Plan for 2011, the net profit and the competitor selection index were chosen as indicators, which should be lower than Kohl's effectiveness for obtaining the Annual Proxy Statements (DEF 14A) bonus, Kohl's Corporation]

Long-term incentives through stock awards and stock options. Determination of annual long-term incentives occurs through the same targets as in the case of short-term bonuses, however, they are considered over a longer time period of 3 years [Annual Proxy Statements (DEF 14A), Kohl's Corporation].

Table 28. Targets in Kohl's Corporation. Compiled by: Annual Proxy Statements (DEF 14A), at Kohl's Corporation, 2011-2013

Year	Index	Target value	Historical value	Weight
2011	Net profit	1,050 USD Billions	1,196 USD Billions	50%
2011	ROI	17,92%	18,65%	30%
2011	The company is ahead of the competitors' performance index	N/A	N/A	20%
2013	Net profit	1,045 USD Billions	0,889 USD Billions	50%
2013	ROI	17,22%	15,5%	30%
2013	The company is ahead of the competitors' performance index	N/A	N/A	20%

Solution of the model and comparison of the results. The period of the case analysis was divided into two periods: 2011 and 2012-2013. All parameters of the model have been estimated in accordance with the procedure dismantled in Chapter 2.

Based on the results of the game-theoretical modeling, we received that due to the implementation of a successful strategy in the first period (2011), in which the CEO surpassed the established targets for net profit and return on investment, Kevin Mansell was to receive a reward of \$1,75 million. whereas in real life it short-term stimulating bonus was \$2,145 million in the second period due to lack of effectiveness and completeness of the game, the model assumes a fee 0, whereas in reality principal left the agent and continued to encourage a high level of effort for a further period of \$0,535 million.

With the application of adjustment coefficient method for this case, we can calculate weighted average coefficients for both periods given the data for performance metrics. Therefore, for the first period the weighted average coefficient (without «The company is ahead of the competitors' performance index») is 1,1 and for the second period is 0,87, while the adjusted payouts are \$1,9 million and \$0,84 million respectively.

Table 29. Results of modeling for Kohl's Corporation

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,750	0,917	0,750	0,923	0,769	0,833	0,15	30	1100

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,167	0,154	0,040	0,800	0,003	0,096	29,904	0,153	4,588

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1 \neq S_0,\ new}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
0,975	4,06	1,219	1,750	0,203	No

The compensation system at Barnes & Noble, Inc. Barnes & Noble, Inc. is included in the Fortune 500 list and is the largest book sales network in the US and the leading player in the market for sales of information, electronic media products and educational benefits in the country. As of May 2017, the company serves 1,361 bookstores in 5 US states, including 700 stores on university campuses, and also sells through one of the largest themed online stores in the country. In addition, the company owns the publishing company Sterling Publishing Co., Inc., a division of NOOK, which develops e-books, sells and adapts content, and develops reading software for mobile and fixed platforms [10-SEC Filings Barnes & Noble, Inc].

Ownership structure. Institutional investors own shares of the company in the amount of 62%, mutual investment funds - 26%, company insiders - 12%. Only 3 of the 20 largest shareholders hold a stake with a stake of more than 5%, with a maximum value of 8,19%, from which it can be concluded that the ownership structure is dispersed in the company [Morningstar]. This means that, similar to other examples of theoretical modeling, we will take the board of directors of the company as a principal.

Board of Directors. The board of directors includes 10 directors, 8 of whom are independent directors ($p_G = 0,8$) [Annual Proxy Statements (DEF 14A), at Barnes & Noble, Inc.], excluding the company's CEO and chairman of the board of directors. Traditionally, three profile committees have been singled out in this corporate governance structure: audit committee, competition committee, corporate governance.

Description of the problem. As you know, sales of print media are shrinking yearly due to the appearance of electronic reading formats. In such circumstances, Barnes & Noble, Inc. were forced to change their expansion strategy to cut more than 10 stores annually from 2009, and focus on their e-book business as publications and devices (NOOK). In 2012, Barnes & Noble entered into an agreement with Microsoft Corporation, in which it sells a stake in NOOK, affiliated with the technology giant, for the right to create official software for reading. Under this agreement, NOOK will receive $ 60 million annually from Microsoft. After a number of other deals, it was safe to say that Barnes & Noble, Inc. focused on e-commerce with printed materials and device development, and reading software [10-SEC Filings Barnes & Noble, Inc].

New strategy in 2014. The new CEO came to the company when the NOOK division showed a serious drop in sales. It was decided to divide the printed and electronic business into different companies [Barnes & Noble Heads Back to the Future]. At the same time, management Barnes & Noble believed that it is possible to restore sales of printed books due to large marketing efforts and new ideas in merchandising. This year may become decisive in the further development of the company.

Profile of CEO. William L. Lynch, J, 42, CEO of the company since 2009. Experience [Bloomberg]:

2009–2013 — CEO, Barnes & Noble, Inc.

2004–2008 — CEO, Gifts.com (a division of IAC Inc.)

Michael Huseby, 58 years old. Experience:

2013–present time — CEO, Barnes & Noble, Inc.

2004–2011 — EVP and CFO, Cablevision Systems Corporation

1999–2002 — EVP, AT & T Broadband

The structure of compensation. In the structure of the CEO's remuneration in 2011, the base salary is 12%, the short-term incentive package 4.5%, the long-term incentive package 83.2%, the other compensation 0.3%.

Table 30. CEO remuneration structure in Barnes & Noble, Inc. In US dollars. Compiled by: Annual Proxy Statements (DEF 14A), at Barnes & Noble, Inc., 2012-2014

Type of compensation	2012	2013	2014
Base Salary	1,142,308	850,000	997,208
Bonus	450,000	1,275,000	0
Stock awards	3,098,340	500,000	6,637,500
Stock Options	5,285,000	0	0
Non-equity incentive plan	0	0	2,604,000
All other compensation,	32,750	35,783	41,025
Total compensation	10,008,398	2,660,883	10,279,733

Non-equity incentive plan. The compensation committee appoints bonuses to the CEO depending on the achievement of EBITDA targets for the company as a whole, and separately for business lines such as Retail, Digital, College. In addition to the incentive bonus, the company sometimes pays a so-called trust bonus, which managers can be encouraged, for example, successfully implementing a successful transaction.

Table 31. Targets in Barnes & Noble, Inc. Compiled by: Annual Proxy Statements (DEF 14A), at Barnes & Noble, Inc., 2012-2014

Year	Index	Target value	Historical value	Weight
2012	Consolidated EBITDA	242,3 millions $	164,4 millions $	100%
2014	Consolidated EBITDA	148 millions $	251 millions $	100%

Solution of the model and comparison of the results. The period of analysis of the case was divided into two periods: 2012 and 2013-2014. All parameters of the model have been estimated in accordance with the procedure presented in Chapter 2.

Based on the results of game-theoretic modeling, we received that, as a result of the unsuccessful implementation of the strategy in the first period, the CEO should have received a short-term incentive reward equal to 0. In fact, the board of directors was also not impressed with the performance for 2012 and did not reward William L. Lynch. Further to the end of the second period, the company's profitability situation improved and, as a result of the overfulfilment of the plan, the new CEO, Michael Huseby, was to receive a compensation of $2,848 million, while the board of directors was more cautious and rewarded the CEO of $ 2.604 million.

Applying adjustment coefficients approach and consolidated EBITDA as a main performance metric, we got the coefficient be equal to 0,68 and 1,17 (1,17 is a limit set by the compensation comittee) respectively, while the final adjusted payouts are $0,1 million and $3,33 million.

Table 32. Simulation results for Barnes & Noble, Inc.

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,625	0,625	0,00	0,889	0,667	0,800	0,45	30	160

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,625	0,222	0,111	0,711	0,014	0,411	29,589	0,302	9,060

$w^{h,h}$	$w_{S_1=S_0}^{l,h}$	$w_{S_1 \neq S_0,\ new}^{l,h}$	$w_{S_1=S_0}^{h}$	$w_{S_1=S_G=S_0}^{l,h}$	Change?
2,025	4,56	2,848	0,114	0,712	Yes

The compensation structure at Lowe's Companies, Inc. Lowe's Companies is an American public company (since 1961), which is on the Fortune 500 list (# 43) and is the world's second-largest retailer of materials for construction and repair. As of January 2017, the company had 1,749 stores in the US, 37 in Canada and 10 in Mexico, its staff employs more than 175,000 employees. The main competitor of Lowe's and part-time world leader in the industry is the American Home Depot [10-SEC Filings Barnes & Noble, Inc].

Ownership structure. Institutional investors own 66.5% of the company's shares, mutual investment funds - 33.3%, company insiders - 0.2%. Of the 20 largest shareholders of Lowe's Companies, three hold stakes in excess of 5%, and the largest shareholder holds a 6.08% stake [Morningstar]. In general, we can draw a preliminary conclusion about the dispersed nature of property in the company. Accordingly, we will use the board of directors as a principal in the model of theoretical modeling of the amount of material incentives for the CEO.

Board of Directors. The board of directors includes 11 people who are on such committees as an audit committee, a remuneration committee, a committee on corporate governance. All members of the board, with the exception of the company's CEO, are independent directors, of whom 10 out of 11 are on the board of directors ($p_G = 0,91$).

The compensation committee evaluates the activities and contributions to the overall performance of the company's executive directors, recommendations to the general board of directors on changes in the structure of fees, monitoring remuneration trends in other companies, and by recruiting external consultants to assist in the previously listed responsibilities [Annual Proxy Statements (DEF 14A), Lowe's Companies].

Description of the problem. After being appointing Robert Niblock as CEO in 2005, the company pursued an aggressive expansion strategy, increasing the number of chain stores from 1,300 in 2007 to 1,700 in 2011. And this strategy showed itself successful before the crisis in 2008-2009, which had a particularly strong impact on the real estate market. However, despite the obvious signals of declining demand, Lowe's Companies continued aggressive expansion, which led to a record fall in margins in 2009-2011. In this situation, investors decided to invest in a more profitable Home Depot, which in time adapted to the new market conditions.

New strategy since 2011. The company almost ceased to implement capital expenditures for the construction of new stores, and for the first time in 8 years the number of stores decreased compared to last year. Lowe's Companies have changed their strategy from increasing sales and places to the development of e-commerce.

For example, the mobile application MyLowes, which allows you to order goods and services via the Internet [Why Lowe's Is One For The Future], has become very popular.

Profile of CEO. Robert Niblock, 49, has been CEO of Lowe's Companies since 2005. Experience [Bloomberg]:

2005–present — CEO and President, Lowe's Companies

2000–2003 — CFO, Lowe's Companies

1999–2000 — Senior Vice President of Finance, Lowe's Companies

1997–1998 — Vice President & Treasurer, Lowe's Companies

The compensation structure. Lowe's Companies apply the practice of Say-on-Pay for additional approval of shareholder compensation programs. What distinguishes the company from its competitors is that the remuneration committee set a fixed ratio in the remuneration structure of the CEO in 2010: the base salary is 10%, the target cash bonus is 20%, the target long-term incentive is 70%. According to the committee, it is this structure that allows maximally stimulating the CEO to increase value for shareholders through their own performance.

Also, the company attracts consultants from Farient Advisors so that they annually assess how much the Performance-Adjusted Compensation (PAC): 1) is adequate in comparison with the growth of the company's revenue and competitors; 2) is sensitive in the total return of shareholders. These indicators are estimated on the basis of the last three years [Annual Proxy Statements (DEF 14A), Lowe's Companies].

Table 33. Structure of CEO compensation in Lowe's Companies in US dollars. Compiled by: Annual Proxy Statements (DEF 14A), in Lowe's Companies, 2009-2012

Type of compensation	2009	2010	2011	2012
Base Salary	1,100,000	1,100,000	1,155,000	1,185,000
Bonus	0	0	0	0
Stock awards	3,864,960	4,340,380	5,599,700	5,343,893
Stock Options	3,658,200	4,189,230	2,232,749	3,740,675
Non-equity incentive plan	2,839,683	2,225,036	1,494,732	1,664,996
All other compensation	204,515	195,052	160,562	201,878
Total compensation	11,667,358	12,049,698	11,642,743	12,136,442

Non-equity incentive plan. In the last few years (in 2010 and onwards), the company used EBIT (75%) and revenue (25%) as metrics to reward the CEO of the company with a cash bonus. The Remuneration Committee believes that these indicators are an effective performance evaluation, as they assess the overall profitability of the company and encourage management to both revenue growth and cost optimization. In 2011, the committee added three additional strategic goals, set at the beginning of the year, as an additional metric. So in 2011 the strategic goals were: the hobby of the share of Internet sales in the revenue structure, the increase in the productivity of operational personnel, effective leadership.

Solution of the model and comparison of the results. As a first period, we accept the period of analysis of the first strategy - 2009-2010, and as the second period - 2011. All parameters were evaluated similarly to other cases and in accordance with the model specifications given.

Table 34. Targets in Lowe's Companies. Compiled by: Annual Proxy Statements (DEF 14A), in Lowe's Companies, 2009-2012

Year	Index	Target value	Historical value	Weight
2010	EBIT	3,487 USD Billions	3,560 USD Billions	75%
2010	Revenue	49,493 USD Billions	48,815 USD Billions	25%
2011	EBIT	3,559 USD Billions	3,630 USD Billions	60%
2011	Revenue	50,521 USD Billions	50,208 USD Billions	20%
2011	Strategic goals	N/A	3/3 successfully achieved	20%

Based on the results of the theoretical simulation, we can see that the material compensation of Robert Niblock after the first period should be equal to \$ 2,181 million, while in real life it was equal to \$ 2,225 million. Then, the company changed its strategy, which, apparently from performance metrics, turned out to be successful, although the model did not assume a change of strategy. In any case, the CEO's cash bonus in 2011 was \$ 1,5 million, while the model gives a result of \$ 0,525 million. Thus, the model showed that in a situation where a potentially successful strategy proved itself in the first period, the board Directors could take into account the reputational risks of the CEO and reduce his real financial reward. However, the company changed its strategy in 2011, and the reputational risks of the CEO became less, respectively.

With the application of adjustment coefficient method for this case, we can calculate weighted average coefficients for both periods given the data for performance metrics. Therefore, for the first period the weighted average coefficient is 1,01 and for the second period is 1,01, while the adjusted payouts are \$2,2 million and \$0,53 million.

Table 35. Results of modeling for Lowe's Companies

q_0	$\overline{e_1}$	$\underline{e_1}$	$\overline{e_2}$	$\underline{e_2}$	p_G	c	α	R
0,600	0,800	0,600	0,857	0,571	0,909	0,15	30	3500

Δe_1	Δe_2	p^0	p^1	$q_0^{l,l}$	$f(q_0^{l,l})$	Δf	$q_1^{l,l}$	$f(q_1^{l,l})$
0,200	0,286	0,027	0,885	0,004	0,116	29,884	0,110	3,298

$w^{h,h}$	$w^{l,h}_{S_1=S_0}$	$w^{l,h}_{S_1 \neq S_0,\ new}$	$w^h_{S_1=S_0}$	$w^{l,h}_{S_1=S_G=S_0}$	Change?
0,525	6,59	0,593	2,181	0,198	No

5.3. Analysis of the modeling results

Based on the results of our modeling, as well as historical data obtained, a comparative table was compiled, as well as the graphs presented below.

As we see, in general, for the sum of two periods, the model shows a good result by the example of five companies (Fred's, Dollar Tree, Barnes & Noble, Lowe's Corporation, Blackbaud), but has some deviations in certain periods, and, in general, better Works for the retail industry.

In addition, it should be noted that the model works best if the strategy and CEO change after the first period, which can be explained by the fact that the new

Table 36. Summary table on the results of modeling

Company	q_0	Charge of strategy		Compensation after 1st period, million $		Compensation after 2st period, million $		Sum of compensation for two periods, million $	
		Fact	Model	Fact	Model	Fact	Model	Fact	Model
Fred's, Inc.	0,75	No	No	1,345	1,300	0,000	0,000	1,345	1,300
Dollar Tree, Inc.	0,545	No	No	1,800	3,000	1,900	0,450	3,700	3,450
Kohl's Corporation	0,75	No	No	2,145	1,750	0,535	0,000	2,680	1,750
Barnes & Noble, Inc.	0,625	Yes	Yes	0,000	0,000	2,604	2,848	2,604	2,848
Lowe's Companies, Inc.	0,6	No	Yes	2,225	2,181	1,500	0,525	3,725	2,706
Yahoo, Inc.	0,67	Yes	Yes	1,500	0,000	1,120	1,490	2,620	1,490
Blackbaud, Inc.	0,72	Yes	Yes	0,437	0,000	0,870	1,370	1,307	1,370
Blucora, Inc.	0,5	No	No	0,540	0,000	0,450	0,216	0,990	0,216
Linkedin Corporation	0,875	No	No	0,507	0,000	0,636	0,450	1,143	0,450
CA Technologies, Inc.	0,8	Yes	Yes	1,500	0,000	1,764	1,790	3,264	1,790

Compensation for the second period

Fig. 4. Compensation comparison for the 2nd period
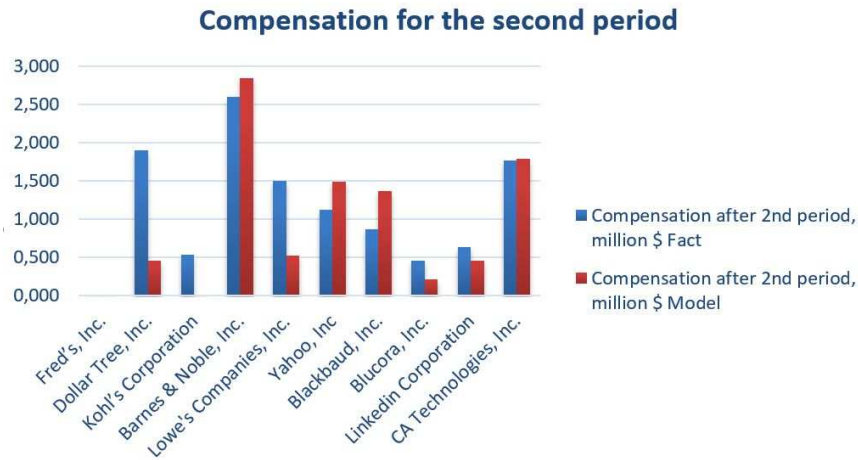
Sum of compensations for two periods
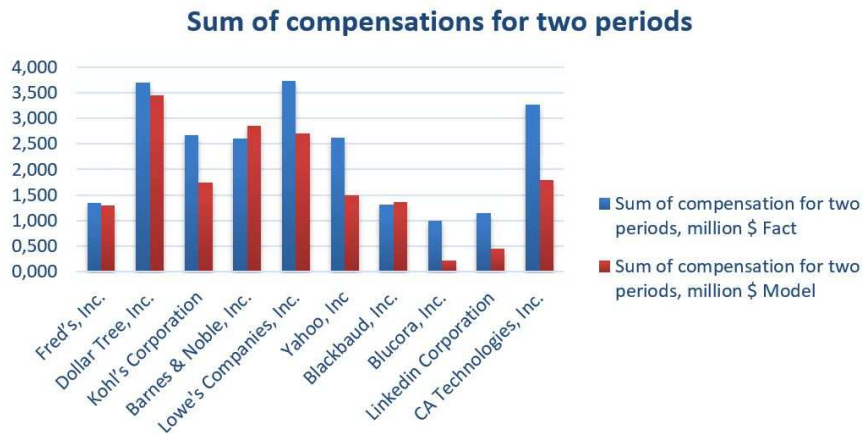
Fig. 5. Compensation comparison for the sum of two periods

model assumes no reputation risks for the new manager, and the historical effects in this case practically do not affect the formation of the amount of compensation.

The general trend among all the examples considered is that, based on the results of theoretical modeling in eight examples, companies overpaid the CEO in terms of incentive compensation, which is especially noticeable in the IT industry.

Of course, companies could save money in case of the CEO's dismissal, but, most likely, such a move would seriously damage the company's reputation in the labor market for top management. Also in real practice the company introduces more than one strategy at the same time, and business is very often diversified, so the board of directors decides to appoint a CEO award based on a wider range of factors than those considered by us.
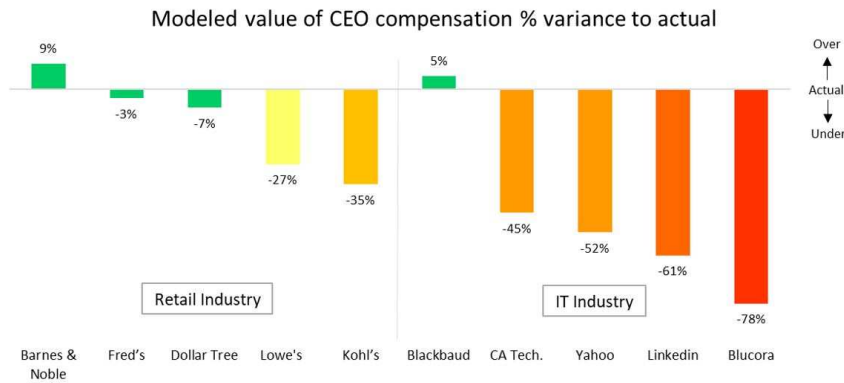
Fig. 6. Comparison between industries on % variance of modeled value to actual

In addition, the fact that the model considers the finished game for 2 periods determines the distribution of high reputational risks for these periods. In real practice, strategies are introduced over a longer period and it is worthwhile to consider several more periods in order to more accurately assess the probability of outcomes and more accurately predict the winnings for the players and distribute the reputation risks more evenly. Also, because of the limited play in two periods, the reputational stimulation of the second period is significantly less than the first, but, in fact, it is important for the CEO of a lonely person to show a high result both in the first and second period in order to receive a greater reward.

In order for the theoretical model to be more accurate in cases of a low result in the company's current operations, it was necessary to introduce and test additional parameter that determines the degree of payment of the monetary bonus depending on the degree of achievement of the targets individually for each company. As we described earlier in Chapters 3 and 4, in almost all public companies, there is a practice of partial bonus payment (less than 100%) even if the target performance indicators are not reached, although the model assumes that the manager does not receive incentive compensation at a low result in the company's current activity. To account for that fact we and to improve our modeling accuracy introduced adjustment. The results are presented below:

This methodology slightly improves overall accuracy of modeling for the suggested methodology, especially concerning IT-industry, where there were several cases when CEO got nothing in the first period according to basic model. Some extremes are also appeared with adjustment coefficients because not always in reality the board of directors is willing to pay a manager the whole proportional bonus after his achievements. As we see there three more companies in the adjusted scenario which should have paid their managers more according to modeling results.

Also, the chart below helps to emphasize that real practice adjustment in all of the cases lead to the increase of overall incentive payments as in real practice very rarely companies pay nothing to top executives.

Note that the coefficients, as well as the possible more detailed scaling of targets, are established by each company and are subject to adjustment. As a result, such a modification of the considered model as we suggested will allow to adapt the model

Table 37. Summary table on the results of modeling with adjustment coefficients

Company	q_0	Charge of strategy		Compensation after 1st period, million $		Compensation after 2st period, million $		Sum of compensation for two periods, million $	
		Fact	Model	Fact	Model	Fact	Model	Fact	Model
Fred's, Inc.	0,75	No	No	1,345	1,300	0,000	0,200	1,345	1,500
Dollar Tree, Inc.	0,545	No	No	1,800	3,210	1,900	0,450	3,700	3,660
Kohl's Corporation	0,75	No	No	2,145	1,900	0,535	0,840	2,680	2,740
Barnes & Noble, Inc.	0,625	Yes	Yes	0,000	0,100	2,604	3,330	2,604	3,430
Lowe's Companies, Inc.	0,6	No	Yes	2,225	2,200	1,500	0,530	3,725	2,730
Yahoo, Inc.	0,67	Yes	Yes	1,500	1,900	1,120	1,788	2,620	3,688
Black-baud, Inc.	0,72	Yes	Yes	0,437	0,220	0,870	1,410	1,307	1,630
Blucora, Inc.	0,5	No	No	0,540	0,337	0,450	0,325	0,990	0,662
Linkedin Corpotation	0,875	No	No	0,507	0,540	0,636	0,535	1,143	1,075
CA Technologies, Inc.	0,8	Yes	Yes	1,500	1,330	1,764	1,790	3,264	3,120
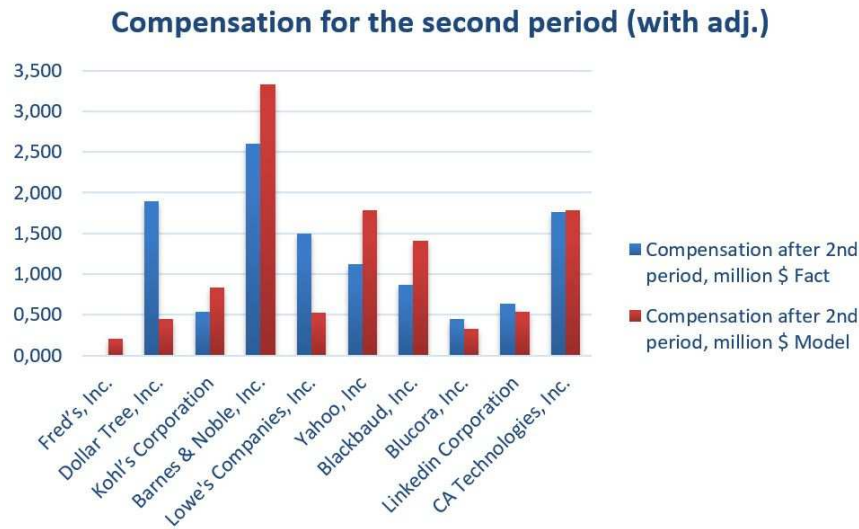
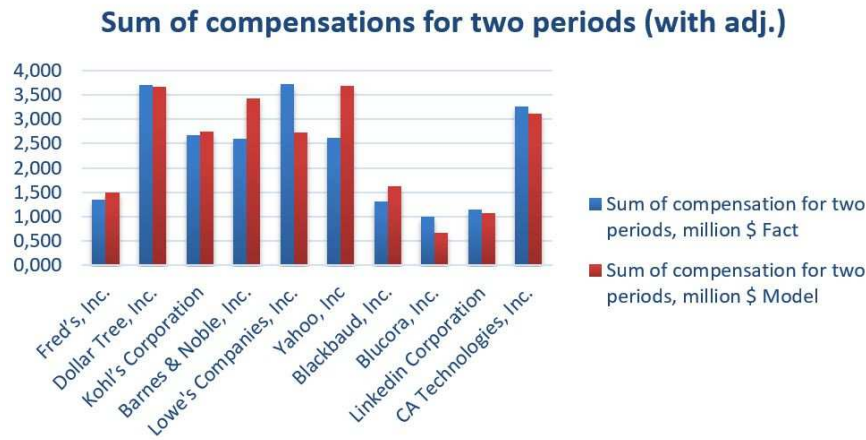**Fig. 7.** Compensation comparison for the 2nd period with adjustments

Fig. 8. Compensation comparison for the sum of two periods with adjustments

to modern incentive reward practices, considered in Chapter 5 of this work, and to increase the practical applicability and accuracy of the model.

Using the example of these 10 companies, we demonstrated the applicability of the game-theoretical model as a tool for quantifying the incentive reward to motivate a high level of CEO efforts during the implementation of the strategy in cases of: failure of strategy and CEO change, strategy success, evaluation of both short- and long-term incentive packages, One, and several targets, evaluation of the reputation of the CEO for work experience in other companies or separately in the company in question.

Modeled value of CEO compensation % variance to actual (with adj.)
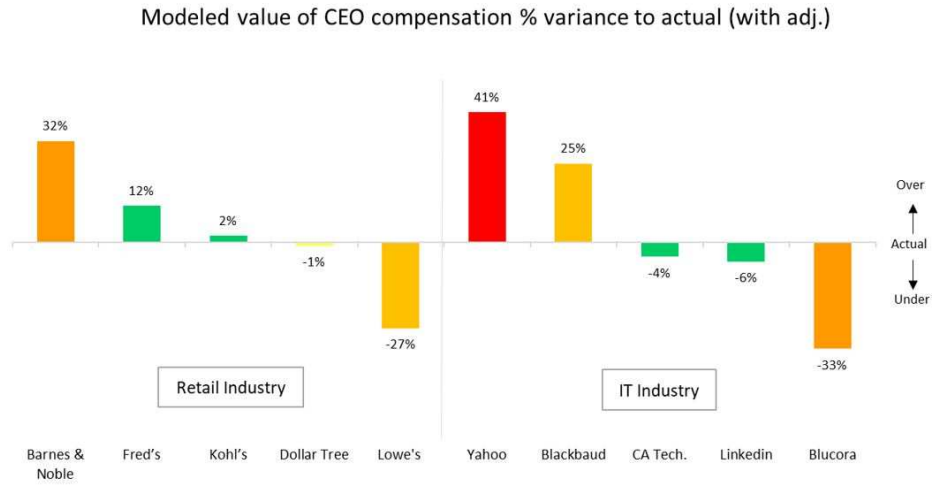
Fig. 9. Comparison between industries on % variance of modeled value to actual with adjustments

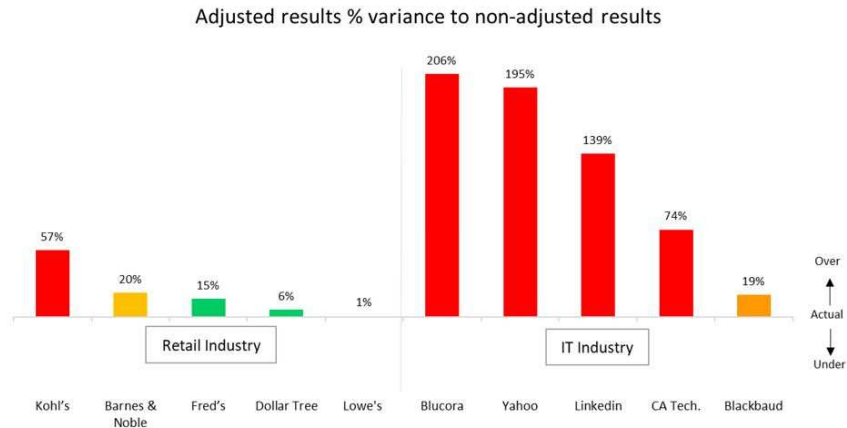Adjusted results % variance to non-adjusted results

Fig. 10. Adjusted results % variance to non-adjusted results

As a result, we can conclude that the game-theoretical model considered, with some amendments, can be used as an auxiliary and recommendatory tool for public companies headquartered in the United States in terms of material incentives for general directors. In addition to companies, researchers like me may be interested in such a technique. And, finally, companies engaged in business consulting services can expand their tools by using the method of forming the variable part of remuneration for CEOs of public companies headquartered in the United States. If the decision making process, regulation, transparency of executive compensation in any country can be compared to the US, the model could be applied to international public

companies from this country with some adjustments. In terms of our research, it was only possible to show the applicability of the modeled on the US headquartered companies due to access to all of the data for model specification.

6. Conclusions

In this research the following tasks were accomplished:

- Based on the analysis of scientific literature on the topic of the CEO compensation, the requirements to the mechanism of forming the variable part were justified;
- The practice of decision making and regulation on forming the size of the variable part of compensation of CEOs on examples of international public companies from the retail and IT industries was analyzed;
- The model of forming the variable part of CEO compensation was selected and improved in accordance with the requirements;
- The chosen model introduced reputation as an important factor of influence on manager's efforts application;
- A comparative analysis of the results of theoretical modeling and real practice of forming the variable part of CEO compensation on examples of international public companies was made and applicability of the mechanism was proven;
- The suggested mechanism can be used as a tool by board of directors in public companies or researchers with possibilities for individual adjustments.

As a result, the goal of the paper was completely achieved, namely, based on the analysis of existing theoretical models and approaches to determining the size of the variable part of material compensation for CEOs, the methodology for determining the amount of such remuneration was improved and the possibility of its practical application on examples of public companies in the U.S.

We would like point out that the game-theoretical model presented in the work uses reputation as one of the parameters that influence what level of effort the manager can use in the future. So, the CEO takes into account not only monetary compensation, but also reputational risks in case of low performance of the company's current activity. This approach is very relevant in the light of modern research in the field of accounting and measurement of talent manager. Due to the fact that reputation is the determining factor for successful execution of the strategy, the manager will try to maintain his reputation with all his will.

In addition, the game-theoretical model explains the process of managerial entrenchment when he remains in the company even after achieving a low result in the company's current activity in the first period, because changing the strategy and hiring a new CEO is a costlier option for the owners.

The developed methodology was used in the analysis of 5 cases on examples of companies from the retail industry and 5 cases on examples of companies from the IT industry.

In 10 cases, we demonstrated the applicability of the model as a tool for assessing the variable part of the CEO's remuneration in order to stimulate high efforts in implementing the strategy in several cases:

- Strategic disruption and change of the CEO;
- Short-term non-equity incentive plan evaluation;

- A performance indicator consisting of a single indicator;
- A performance indicator, consisting of several indicators;
- The CEO working in several companies before the current tenure;
- The CEO working in the current company in different positions

The resulting estimates, as a rule, correspond to the actual values of compensation in the companies. The developed mechanism can be applied to other state-owned US companies in the retail and information technology industries and, with special changes and inspections, in other environments.

The system of corporate governance in Russia differs significantly and partially lags behind in the development of institutions from the corporate governance system in U.S. public companies. However, with the development of relevant institutions, especially the institute of independent directors, it is possible to develop a similar methodology for the formation of variable part of the remuneration of CEOs of Russian public companies.

Limitations and further research. The research was conducted on the example of U.S public companies in retail and IT industries. However, there are more countries with publicly traded companies and more industries where such companies are represented. But given the number of industries in U.S. alone, it is hardly possible to cover them all in one paper. Moreover, as we explained earlier only data for U.S. headquartered companies was enough for us to test the applicability of the mechanism. Second, we could not test the chosen mechanism on every company from the sample. Third, part of the companies has multiple strategies implemented with different time frames which makes it a more complicated task to evaluate them all. Additionally, only non-equity incentive plans were modeled using the mechanism, thus the results of incentive plans improvement are limited to only one of the part from a compensation structure.

There is a room for improvement for this research by expanding the analysis into more industries in U.S. and possibly other countries with the similar systems of corporate governance. With more results it would be possible to conclude to exact applicability of the mechanism for certain environments. Also, this research can be also extended to improving the mechanism for other compensation components.

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