CEO Compensation in High-Tech Firms and Changes in the SFAS No 123 (R)

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Abstract
This study examines the effects of the introduction of the FASB statement 123 (R) on corporate performance and Chief Executive Officer (CEO) compensation in high-technology firms. The total CEO compensation and short- and long-term compensations were tested regarding corporate performance. Panel data SUR models were estimated that describe total compensation and cash compensation as a proportion of total pay for the period between 2000 and 2010. The findings indicate that there is a positive relation between CEO compensation and firm performance in high-tech firms after the FASB statement 123 (R) is implemented, but with less intensity than before. This econometric study provides a better understanding of the relationship between CEO compensation and performance in high-technologies firms before and after the FASB statement 123 (R).

Key words: Executive compensation, Corporate finance, FASB statement 123 (R)

*JEL classification:* M52, G30, M48
1. Introduction

Chief Executive Officer (CEO) compensation became common in the late 1970s and early 1980s and is often discussed in the literature ever since. Numerous stories have appeared recently in the financial press pointing out how many executives define contract remunerations. These news and striking reports have raised concerns on compensation. Nevertheless, no consensus view has emerged, and there is still much to learn about the determinants of CEO compensation. Appropriate incentives can be the tools in many cases, however, by basing compensation on changes in shareholder wealth. According to Graham (2012), managers often have better information than shareholders and boards in terms of identifying investment opportunities and assessing the profitability of potential projects. Furthermore, the fact that managers are expected to make higher investment decisions explains why shareholders relinquish decision rights over their assets by purchasing common stock (Graham et al. 2012).

This study explores how the Financial Accounting Standards (FAS) Statement 123 (R) affects the performance determinants of CEO pay for long-term and short-term periods and points out the influence of high-tech firms. Furthermore, this paper examines how high-tech firms behave facing the cash based compensations and total CEO pays related to various performance measurements. The performance measurements pointed in this work are the usual accounting ratios of corporate finance.

In 1990, Jensen and Murphy wrote that it is possible that CEO bonuses are strongly tied to an unexamined and/or unobservable performance measurement. When referring to the swings in CEO pay from year to year, the authors explain that the variations are consistent with the existence of an overlooked and yet important performance measurement, and that increase suggests that CEO pay is essentially unrelated to all relevant performance measurements (Jensen and Murphy 1990, 1990b; Murphy 1999). In many Standard & Poor’s (S&P) firms, employee stock option plans are an important component of employee remuneration. In 1999, 94% of companies in the S&P 500 offered stock options to their top employees (Murphy 1999; Hall and Murphy 2002). In order to better understand this argument, this study investigates the relation between the CEO pay and the performance against high-technology firms with the balance cash compensation and total compensation. The combination of salary, incentives and bonuses is often referred to as cash compensation for executives. The CEO behavior is different when we think in short-term and long-term periods. The main goal of this paper is to provide a broader perspective on the relationship between CEO pay and firm performance and how high-technology can improve that performance while analyzing the behavior with the
implementation of the SFAS 123 (R) and all its accounting rules underlying obligations. The change in the accounting treatment of stock-option compensation is exploited as well as the fair-value report under the SFAS 123 (R), which was issued by the Financial Accounting Standard Board (FASB) and entered into force in December 2005. This paper contributes to the under-studied empirical literature on the accounting treatment of equity-based compensation, influenced by the change in accounting rules and its influence on executive pay of high-tech firms.

This work is organized as follows: Section 2 contains a revision of the main theories in the literature, as well as an analysis of accounting treatment of equity-based compensation before and after the SFAS 123 (R), an analysis on executive compensation in order to address agency problems and the income strategy impact on CEO compensation. Furthermore, this section examines the appropriate measurements for corporate financial performance in high-technology firms. Section 3 explains the research hypotheses and section 4 presents the methodology, sample and data collection for the regression estimation, as well as the results of the econometric model to assess the influence that firm performance has on executive compensation before and after SFAS 123 (R). Lastly, the main conclusions are discussed, as well as some limitations and new perspectives for future research.

2. Literature review

Based on the literature, a study was conducted in order to understand CEO compensation in high-technology firms.

2.1 Accounting treatment of equity-based compensation before and after SFAS 123 (R)

In December 2004, FASB issued the FASB Statement No. 123 (revised 2004), Accounting for Stock-Based Compensation, to amend and replace the Financial Accounting Standards Statement No 123, which became mandatory for all firms toward the end of 2005 and supersedes the APB Opinion No. 25, Accounting for Stock Issued to Employees. Statement 123 as originally issued in 1995, which established that a fair-value-based method of accounting for share-based payment transactions with employees was preferable. The SFAS 123 (R) requires the use of a fair value accounting method to compute the value of option compensation. A similar approach is followed by international standards International Financial Reporting Standards (IFRS2) that states the same principle. Both standards require employee stock option
to be recognized as an expense and measured at the fair value of the employee stock option determined at the time of grant.

Prior to implementing the SFAS 123 (R), firms were required to report compensation expense due to stock options in an amount equal to the excess of the stock price at the grant date over the exercise price. This is allowed to as the intrinsic value method. Most options have an exercise price at least equal to the grant date stock price and so this method did not usually result in an expense reported on the income statement. In the originally issued SFAS 123, a company could choose to either report in its income statement the stock compensation expense calculated per the fair value method or the stock compensation expense calculated per the intrinsic value method and disclosing the impact in their footnotes. The SFAS 123 (R) covers a wide range of share-based compensation arrangements including share options, restricted share plans, performance based awards, share appreciation rights, and employee share purchase plans.

The SFAS 123 (R) leads to greater expenses as it increases the overall conservatism income. According to Heltzer (2010), different forms of conservatism have different implications on the quality of income. The author found that the SFAS 123 (R) causes an increased negative relation between economic gains and income, but it is mix on the quality of earnings in terms of conservatism (Heltzer 2010). Since the publication of the SFAS 123(R) Share-Based Payment, which eliminates the alternative of using the intrinsic value based method, the IFRS and the US GAAP have similar requirements for accounting for share-based payments. With this statement, the convergence between the IFRS in Europe and the GAAP in the US started.

2.2 Executive compensations to address agency problems and the income strategy impact

The general acceptance of the agency theory and the parallel research on executive compensation began in the early 1980s. It was the evolution of the modern corporation with ownership separation and control that undermined the agency theory. Early studies in this area focused on documenting the relation between CEO pay and firm performance. The discussion of executive compensation must proceed with the fundamental agency problem afflicting management decision-making as background. According to Jensen and Murphy (1990), there is an optimal contracting approach, which is when boards use design compensation schemes to maximize shareholder value with efficient incentives (Jensen and Murphy 1990). To connect the agency problem and the executive compensation, the authors use the managerial power approach when this connection is seen as an integral part of the agency problems. It is
important to remember that the principal-agent problems treat the difficulties that arise under conditions where information is incomplete and asymmetric whenever a principal hires an agent (Murphy, 1999, Eisenhardt (1989); Bebchuk and Fried (2003)). Furthermore, the agency theory aims at solving two problems that can occur in agency relationships. The first is the desires or goals of the principal and agent conflict and it is difficult or expensive for the principal to verify what the agent is actually doing. The problem is that the principal is unable to check if the agent has behaved correctly. Secondly, it is the problem of risk sharing facing the different attitudes toward risk, because the principal and the agent have different actions according to different risk preferences (Eisenhardt 1989).

Hall and Liebman (1998) argue that the solution to the agency problem is aligning the incentives of executives with the interests of shareholders by granting (or selling) stock and stock options to the CEOs. The CEOs have the correct incentives on every margin, including effort, perquisites and project choice, and support that the optimal contract is a one-to-one correspondence between firm value and CEO pay (Hall and Liebman 1998). In their work, Hall and Liebman (1998) conclude that the relationship between pay and performance is much larger than has previously been recognized, and that this includes both gains and losses in CEO wealth. The salary and bonus vary so little because corporate board members are often reluctant to reduce CEO pay, even in response to poor performance and that may attract unwanted media attention. Using salary and bonuses to reward and penalize CEOs may only be possible to create high-powered incentives that align CEO pay with shareholder objectives (Hall and Liebman, 1998). A large part of the executive pay literature argues that compensation and managerial interests should be aligned with shareholder interests in order to solve agency problems (see, for example, the surveys by Murphy and by Core et al. (2003a).

Equity-based compensation is widely documented in the research examining pay versus performance. Jensen and Meckling (1976), Murphy (2003) and Jensen (2004) state that the increase in stock options pay is the result of the boards’ inability to evaluate the true cost of this form of compensation. The use of equity-based compensation is encouraged by all stakeholders, such as investors, regulators and academics. The controversy over CEO compensation reflects a perception that CEOs effectively set their own pay levels. In most companies, the last decisions over executive pay are made by members outside the board of directors who are keenly aware of the conflicts of interest between managers and shareholders over the level of pay. However, the CEOs and other top managers exert at least some influence on the level and on the structure of their pay (Murphy 1999).
In recent years, the use of restricted stocks in compensation executives has increased and has been widely criticized when these executives received dividend equivalents on restricted stocks before the vesting period. Agency cost benefits of dividend equivalent rights argue that this practice helps executives focus on the business, and rewards them for managing the business to produce cash. Therefore, this is encouraged because it is a way of distributing dividends by shareholders (Akpotaire 2011).

The SFAS 123 (R) is a change in accounting policy and represents an exogenous shock to the accounting benefits, and restricts the choice of accounting principles by managers (Zmijewski and Hagerman 1981). There are economic incentives to determine and motivate the managers’ concern with a set of accounting principal utilized to generate the firms’ financial statements. Under economic factors which influence the decision, managers will attempt to archive the optimal reported net income over time and will choose a set of income policies according to theirs goals. There are many variables that induce managers to use deflating policies while other variables encourage managers to choose income inflating solutions. That infers a conservative or liberal firm income strategy. This trade-off means that any combination of Generally Accepted Accounting Practice (GAAP) variables may be optimal for each firm. However, the SAF 123(R) prevents this income strategy by the imposing and restricting some variables as accounting treatment of stock-options compensation and the fair-value report. In their study, Zmijewski and Hagerman (1981) suggest that individual accounting choice decisions are part of an overall firm strategy and applicable in larger firms and in more concentrated industries. In this sense, Matsunaga (1995) suggests that some change in the financial reporting of treatment of stock options, as proposed by the FASB, is likely to reduce the use of the employees’ stock option for some firms (Matsunaga 1995).

2.3 Financial performance in high-technology firms

This chapter provides an analysis on the different forms of measuring performance in high-tech firms and how these engage to the level of CEO pay. The behavior of high-tech firms and its contribution to CEO compensation for the short- and long-term are also analyzed. This is consistent with Shim (2009), who argues that it is possible to confirm that high-tech firms that depend more on managing assets are more successful. Some of these assets are technology innovation, continuous improvement, software development and knowledge-based management. High-tech firms must continuously innovate to survive and to sustain their growth (Shim et al., 2009). In high-technology firms it is possible to find innovation, R&D investments and some assets with an essential competitive advantage and there are, at the same
time, some risks. Different R&D spending in the firms is indicative of a large variance in the firms’ performance. High-tech investment is particularly important because the returns on high-tech investment are skewed and highly uncertain, in part because R&D projects have a low probability of succeeding financially. Another reason is the existing asymmetry in information shared between firms and potential investors. This happens because it is difficult to increase high-tech investments and often insiders will have much better information than outsiders about the prospects of the firm's investments. Moreover, as pointed out by Makri, Lane and Gomez-Mejia, to engage in innovative projects leading to innovations the incentive schemes play a pivotal role in inducing senior organizational managers. Furthermore, to secure the stream of innovations a firm needs to enhance its economic performance with a proper pay scheme to encourage executives (Makri et al. 2006). The study by Gomez-Mejia et al. (2000) was taken into consideration in this paper, especially their conclusion that high-technology industry executives may be more rewarded for innovation activity than for the firm’s financial performance. The executive incentives induce higher risk and cannot bear the associated financial risk as a consequence of those actions (Gomez-Mejia et al. 2000).

In summary, it was found that firms are subjected to the agency problem in which the CEO may not work in favor of the shareholders to maximize their wealth by improving firm performance. Furthermore, the decisions related to CEO compensation are based on the firms’ accounting and finance performance. Therefore, the change in the rules of the SFAS 123 (R) forces managers to make decisions and to overtake the limitations of their income goals.

2.4 Developing a hypothesis

The role that accounting plays on CEO compensation in high-tech firms is still little known. Some possibilities have been identified to find some relations with pay compensation and to understand how it is possible to improve firm performance and in turn the shareholder wealth. As previously discussed, existing theories provide predictions on the outlined considerations related to firm performance, allowing for two different selection hypotheses. The first research question, that the CEO compensation for the long-term is determinant and positively related to firm performance. High-technology companies support and enhance this evidence. Rejecting the null hypothesis would mean that the relative weight in terms of total compensation of each compensation component (such as salary, bonus, stock options and other compensations)are different goals for executives, as opposed to performance for the short-term. It is possible that high value firms have CEOs are interested in long-term performance and in obtaining personal benefits in terms of total compensation. It might be argued that powerful
incentive models are especially valuable for high value firms with high opportunities for
growth that need to be decisively and vigorously pursued. It might also be that high value firms
are especially likely to attract star CEOs and pay gold parachutes. Furthermore, the CEO
compensation for the short-term is determinant and positively correlated with firm
performance. With less intensity and yet more persistent than long-term compensation, bonuses
and salary are determinant and in the same effect related to accounting performance.
Hypotheses 1a and 1b are formulated accordingly.

Hypothesis 1a: CEO compensation in high-technology firms is positively related to firm
performance for the long-term.

Hypothesis 1b: CEO compensation in high-technology firms is positively related to firm
performance for the short-term.

The second question is the SFAS 123 (R) has an influence on CEO compensation in high-
technology firms. Human capital intensive industries rely heavily on stock options as
compensation relatively to other firms. The impact of fair value reporting is examined for stock
option compensation on their income statements and on CEO compensation. In line with this,
hypothesis 2 is formulated.

Hypothesis 2: CEO compensation in high-technology firms is positively related to firm
performance after the implementation of the SFAS 123 (R).

The purpose of this paper is to examine this impact on CEO compensation. The effect on
CEO compensation is analyzed for the long- and short-term using high-tech firm performance
before and after SFAS 123 (R) implementations.

3 Empirical approach

The models introduced by the system equation presented below were used to test whether firm
performance is relevant to explain executive compensation for the long- and short-term. Firstly,
the model for the long-term,

\[
\ln (T_{COMP})_{ij} = \beta_{11} + \beta_{12}\ln(\text{ASSETS})_{ij} + \beta_{13}\Delta\text{ASSETS}_{ij} + \beta_{15}\ln(OIBD/\text{ASSETS}*100)_{ij} + \beta_{16}\ln(\text{SALES})_{ij} + \beta_{17}\ln(\text{NIBEX})_{ij} + \beta_{19}\text{SPCODE}_{ij} + \beta_{10}\text{DHTECH}_{ij} + \beta_{31}\ln(\text{COMMEQ})_{ij} + \beta\sum_{2001}^{2010} dj * Yearj + u_{ij}
\]

and for the short-term
\[
\ln (\text{CASH})_{ij} = \beta_{21} + b_{22} \cdot \log(\text{ASSETS})_{ij} + \beta_{23} \cdot \Delta \text{ASSETS}_{ij} + \beta_{25} \cdot \ln(\text{OIBD}/\text{ASSETS} \times 100)_{ij} + \\
\beta_{26} \cdot \ln(\text{SALES})_{ij} + \beta_{27} \cdot \ln(\text{NIBEX})_{ij} + \beta_{29} \cdot \text{SPCODE}_{ij} + \beta_{28} \cdot \text{DHTECH}_{ij} + \\
\beta_{32} \cdot \ln(\text{COMMEQ})_{ij} + \beta \sum_{2001}^{2010} \delta_j \cdot \text{Year}j + v_{ij}
\]

Where, \( i \) and \( j \) represent the year and the company, respectively. The coefficients \( \beta_{11} \) and \( \beta_{21} \) are constants denoting the base level from which the sum of the compensations of top executive varies according to the changes in performance variables. The table 1 below identifies the variables that were used, including their definitions, measurement units and expected signs, as reported in the theory.

**Table 1 – Executive compensation dependent and independent variables**

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_COMP</td>
<td>The sum of the compensations of top executives includes: Salary, Bonus, Non-Equity Incentive Plan Compensation, Grant-Date Fair Value of Option Awards, Grant-Date Fair Value of Stock Awards, Deferred Compensation Earnings Reported as Compensation, and Other Compensations.</td>
<td>Thousands</td>
</tr>
<tr>
<td>CASH</td>
<td>Salary + Bonus The dollar value of the base salary plus bonus earned by the named executive officer during the fiscal year.</td>
<td>Thousands</td>
</tr>
<tr>
<td>ASSETS</td>
<td>The Total Assets as reported by the company.</td>
<td>Millions</td>
</tr>
<tr>
<td>ΔASSETS</td>
<td>The year to year percentage change in Total Assets.</td>
<td>Percentage</td>
</tr>
<tr>
<td>COMMEQ</td>
<td>The sum of Common Stock, Capital Surplus, Retained Earnings, and Treasury Stock adjustments.</td>
<td>Millions</td>
</tr>
<tr>
<td>EPSEX</td>
<td>Earnings per Share (Primary) Excluding Extraordinary Items and Discontinued Operations.</td>
<td></td>
</tr>
<tr>
<td>(OIBD/ASSETS)*100</td>
<td>The Operating Income Before Depreciation/Assets as reported by the company. This quotient is then multiplied by 100.</td>
<td>Percentage</td>
</tr>
<tr>
<td>NIBEX</td>
<td>The Net Income Before Extraordinary Items and Discontinued Operations.</td>
<td>Millions</td>
</tr>
<tr>
<td>SALES</td>
<td>The Net Annual Sales as reported by the company.</td>
<td>Millions</td>
</tr>
<tr>
<td>SIC</td>
<td>Standard Industrial Classification Code.</td>
<td></td>
</tr>
<tr>
<td>SPCODE</td>
<td>Current S&amp;P Index membership</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;SP&quot; = S&amp;P 500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;MD&quot; = S&amp;P Midcap Index</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;SM&quot; = S&amp;P Small cap Index</td>
<td></td>
</tr>
</tbody>
</table>

The High-Tech Dummy (DHTECH) is equal to one if the firm operates in an industry with a four-digit SIC code of 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, or 7373, instead of four-digit Standard Industrial Classification (SIC) codes (Fama and French 1997). Other dummy variables are used, YEAR for the period between 2000 and 2010.

The proxies for financial reporting concerns expand on variables used prior to research by encompassing corporate performance and CEO compensation documented in the literature.
Earnings per share (EPS) are a popular performance metric used in executive compensation contracts (Murphy 1999, 2000). As it is commonly known, this ratio is influenced and directly punished by the increase in restricted stocks and dividend equivalents. Compensation contracts that tie managerial rewards to EPS create explicit incentives for executives to manage the EPS. Young and Jing (2011) argue that there is a net benefit to shareholders in executive compensation contracts when they use stock repurchases by EPS targets (Young and Jing 2011). Additionally, if stock options are a sub-optimal incentive contract, Sesil et al. (2006) expect that, in terms of firm performance, there will be a decrease in earnings or an increase in earnings with a reduction in the rate of return on assets (Sesil et al. 2006).

The use of options at executive level associated with an increase in performance is not clear in the literature. Some argue that it is associated with a higher profit and output (Core et al., 2003a), while others state the opposite (Hall and Murphy 2002). The use of stock options reduces the agency cost and incentive to maximize value creation for shareholders, and encourages risk taking, and then accounting is shown by measuring corporate finance (Sesil et al. 2006). They argue that adopting stock options has an impact on firm financial performance to increase operating income (OI) and investments in assets. However, there will be a significant decrease in return on assets (ROA). Others who have previously conducted research on stock options have focused on pay-for-performance elasticity (Hall and Murphy 2003), while others have focused more on the determinants of share-based adoption (Core et al. 2003). The adoption of stock options is associated with higher growth in income, but to a significantly lower return on assets (ROA), which is evidence that options promote sub-optimal over investment.

The company’s measurements are consistent with vision, mission and strategies for long-term performance and the financial criteria to monitor CEO compensation (Epstein and Roy 2005). Usually in the USA the compensation programs combine incentives for short- and long-term periods with a set of performance measurements.

For these reasons, and because this subject is pertinent, it is interesting to examine these issues using these performance measurements and to contribute to enrich research in this area, improving the understanding on CEO compensation how and that influence before and after SFAS 123 (R) implementations.
4 Data and summary statistics

The chosen database was the ExecuComp, which was used to find the variables and to create a sample of firms between 2000 and 2010. The ExecuComp database provides yearly data on salary, bonus, stock option and restricted stock grants, as well as managerial stock and option holdings for top executives in firms within the Standard & Poor’s Index (S&P 1500). To test this hypothesis, the following specification is run on the balanced panel of high-technology firms. High-Technology firms are the firms that operate in an industry with a four-digit SIC code of 3570, 3571, 3572, 3576, 3577, 3661, 3674, 4812, 4813, 5045, 5961, 7370, 7371, 7372, or 7373, using the Fama and French classification of 48 industry groups, instead of four-digit Standard Industrial Classification (SIC) codes (Fama and French 1997).

According to Bebchuk et al. (2011), in order to test the variables and to assess the abovementioned research hypotheses there are independent variables that will possibly be used by the regression model to perform the estimation. The total compensation and cash compensation are analyzed depending on some firm performance metrics.

At an empirical level, this analysis focuses on a sample of 1500 companies in the Standard & Poor's (stock market index based on the common stock prices) index (S&P1500), for the period between 2000 and 2010, which constitutes a sample of about 19800 observations. The SFAS 123 (R) was beginning of the first annual reporting period after December 15, 2005. Thus, all firms’ observations during 2006 were excluded because this is a transition year and the quality of the statements is lower. After this restriction, the final sample comprises 1500 firm-year observations with 2000-2005 as the period before SFAS 123 (R) and 2007-2010 as the period after SFAS 123 (R).

The ExecuComp database collects information on seven independent variables – Assets and year to year percentage change of assets (ΔASSETS), sales, operation income before depreciation (OIDB), net items and discontinued operation (NIBEX), earning per share (EPSEX), The sum of Common Stock Capital Surplus (COMMEQ), net annual sales (SALES) – and dependent total compensation (T_COMP) and cash compensation (CASH) variables are listed by each year and company. Several measurements were used in this study, such as control variables. These include assets, increase in sales, the net Income and the earning per share, as a proxy of firm size, firm performance and shareholder wealth, the common predictors of executive pay. The two primary measurements of CEO pay were used. The short-term compensation consisted of annual salary and bonus, which represents the total cash compensation received during a specific year. Annual salary and bonus for 2000 and 2010 (in
Some thousands of dollars were taken from the ExecuComp data set. The long-term compensation represents the equity-based compensation of a CEO, as reported by Frydman (2009). As she reported in the case study of General Electric, salary and bonus are defined as the level of salaries and current bonuses, both awarded and paid out throughout the year. Long-term bonus measures the amount paid out during the year according to long-term bonuses awarded in prior years. Total compensation is the sum of salary, bonus, long-term bonus and the Black–Scholes value of stock options granted (Frydman 2009).

The main variables of the analysis in the system equation are T_COMP (defined by the sum of salary, bonus, non-equity incentive plan compensation and other compensations) and CASH (Salary plus bonus) of all top executives in each company. Table 2 presents the descriptive statistics and correlations for variables used in the CEO compensation analysis. Some interesting outcomes were found as a result of this study.

Table 2 - Descriptive statistics and correlations for the sample of 1500 S&P over the period 2000-2010

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
<th>Stdev</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>T_COMP</td>
<td>13,727.19</td>
<td>8,089.79</td>
<td>0.00</td>
<td>641,446.20</td>
<td>20,478.12</td>
<td>19678</td>
</tr>
<tr>
<td>CASH</td>
<td>4,156.38</td>
<td>2,937.51</td>
<td>0.00</td>
<td>199,115.90</td>
<td>5,100.74</td>
<td>19889</td>
</tr>
<tr>
<td>ASSETS</td>
<td>15,205.21</td>
<td>1,746.97</td>
<td>0.00</td>
<td>3,221,972.00</td>
<td>88,055.59</td>
<td>19872</td>
</tr>
<tr>
<td>∆ ASSETS</td>
<td>39.96</td>
<td>6.03</td>
<td>-99.43</td>
<td>522,050.00</td>
<td>3,705.64</td>
<td>19855</td>
</tr>
<tr>
<td>ROA</td>
<td>10.79</td>
<td>11.54</td>
<td>-1,000.00</td>
<td>138.87</td>
<td>76.41</td>
<td>19563</td>
</tr>
<tr>
<td>OIBD</td>
<td>1,000.63</td>
<td>176.32</td>
<td>-76,735.00</td>
<td>124,840.00</td>
<td>3,833.16</td>
<td>19606</td>
</tr>
<tr>
<td>SALES</td>
<td>5,488.19</td>
<td>1,239.66</td>
<td>-4,234.47</td>
<td>425,071.00</td>
<td>16,956.91</td>
<td>19870</td>
</tr>
<tr>
<td>NIBEX</td>
<td>2,889.75</td>
<td>58.41</td>
<td>-99,289.00</td>
<td>42,220.00</td>
<td>2,018.44</td>
<td>19870</td>
</tr>
<tr>
<td>EPSEX</td>
<td>3.47</td>
<td>1.20</td>
<td>-231.67</td>
<td>8,548.00</td>
<td>113.87</td>
<td>19842</td>
</tr>
<tr>
<td>COMMEQ</td>
<td>2,714.77</td>
<td>637.08</td>
<td>-111,403.00</td>
<td>211,686.00</td>
<td>9,044.26</td>
<td>19842</td>
</tr>
<tr>
<td>DHTech</td>
<td>0.144</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18889</td>
</tr>
</tbody>
</table>

Panel B : Descriptive statistics pre and post SFAS 123 (R)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Stdev</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Stdev</th>
<th>N</th>
<th>Difference</th>
<th>Adj Med</th>
<th>Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre SFAS 123 (R)</td>
<td>Post SFAS 123 (R)</td>
<td>T-Test</td>
<td>(0.001)</td>
<td>(100,22)***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T_COMP</td>
<td>13,635.58</td>
<td>7,440.77</td>
<td>23,140.38</td>
<td>10687</td>
<td>13,762.41</td>
<td>8,973.70</td>
<td>16,254.54</td>
<td>7156</td>
<td>(-0.402)</td>
<td>(100,20)***</td>
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<td>CASH</td>
<td>4,751.23</td>
<td>3,352.65</td>
<td>5,594.83</td>
<td>10854</td>
<td>3,357.93</td>
<td>2,630.00</td>
<td>3,877.08</td>
<td>7159</td>
<td>(18,362)***</td>
<td>(502,02)***</td>
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<td>ASSETS</td>
<td>13,008.18</td>
<td>1,491.48</td>
<td>64,758.39</td>
<td>10837</td>
<td>18,230.98</td>
<td>2,104.52</td>
<td>114,006.40</td>
<td>7159</td>
<td>(-3,909)***</td>
<td>(101,94)***</td>
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<td>∆ ASSETS</td>
<td>65.00</td>
<td>7.04</td>
<td>5,019.63</td>
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<td>8.56</td>
<td>4.18</td>
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<td>(-0.951)</td>
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<td>ROA</td>
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<td>11.68</td>
<td>98.73</td>
<td>10571</td>
<td>10.61</td>
<td>11.26</td>
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<td>(-0.040)</td>
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<td>165.58</td>
<td>3,197.82</td>
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<td>11,101.00</td>
<td>190.00</td>
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<td>7159</td>
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<td>(15,35)***</td>
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<td>14,207.38</td>
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<td>6,367.19</td>
<td>1,430.13</td>
<td>20,034.76</td>
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<td>(56,15)***</td>
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<td>256.65</td>
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<td>287.62</td>
<td>63.70</td>
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<td>(-1,002)</td>
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<td>EPSEX</td>
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<td>1.17</td>
<td>94.12</td>
<td>10807</td>
<td>3.41</td>
<td>1.17</td>
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<td>559.15</td>
<td>7,136.89</td>
<td>10837</td>
<td>3,182.20</td>
<td>753.00</td>
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<td>7159</td>
<td>(-6,102)***</td>
<td>(100,43)***</td>
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<tr>
<td>DHTech</td>
<td>0.148</td>
<td>-</td>
<td>-</td>
<td>10854</td>
<td>0.141</td>
<td>-</td>
<td>-</td>
<td>7159</td>
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</tr>
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</table>
The descriptive statistics of the variables for total compensation and cash compensation for high-tech firms are presented in Table 2. Panel A of Table 2 provides descriptive statistics for the full sample. The firms in the sample are large with a mean of 15,201.20 million USD and median assets of 1,746.97 million USD.

In the S&P1500, before and after SFAS (R), for the period between 2000 and 2010, there are about 14.415% high-technology firms, and it is possible to observe that the group of top executives in each company has an average total compensation around 13,727 million USD and earn in cash around 4,156 million USD. Other interesting finding is that, in this period and in this group of companies, and consistent with the overall economic growth, there is an increase in assets and returns on assets around 39.96% and 10.79 %, respectively. Panel B of Table 2 reports the same descriptive statistic partitioned by time period. Consistent with the overall economic growth, it is possible to observe that almost all firm performance measurements increase in the period after SFAS 123 (R). Total compensations maintain an average around 13,727 million USD (value for full period) for the periods before and after SFAS 123 (R). The same cannot be said about the compensation for the short-term as variable cash presents a significant decrease in value after SFAS 123 (R). Panel C of table 2 presents correlations between variables. The performance variables, such as assets, return on assets, operating income, sales and the common stocks, are positively correlated with total compensation and for the short-term they are positively correlated with operating income and sales with cash.

5 Results

Using the sample presented above suggests that accounting played a significant role in the high-tech firms’ choice of equity compensation. The panel data model is used because it is the
most suitable way of studying a large set of repeated observations and due to the fact that it assesses evolution over time. With panel data it is possible to simultaneously explore several variations over time and between different individuals. The use of such models has increased immensely and, in fact, combining time and cross-sectional data brings many advantages: it is possible to use a larger number of observations and the degree of freedom in estimates increases, thus making statistical inferences more credible. At the same time, the risk of multicollinearity is reduced since the data in companies present different structures. Moreover, this model provides access to further information and the efficiency and stability of the estimators increase, while enabling the introduction of dynamic adjustments (Gujarati 2004; William 2003).

The results are presented in table 3 and in Panel A the regression with full sample is analyzed in order to test the first hypothesis; the second hypothesis is tested in Panels B and C.

As expected, there is a significant and positive correlation between performance variables and total compensation (T_COMP) and between them and the short-term compensation presented by cash. Therefore, it is possible to state that firm performance measured by assets, return on assets, sales and net income have a positive influence on the executive compensation for long- and short-term periods.

Table 3 - Results of the total compensation and cash compensation estimations using the SUR method (regressions with SIC code dummy (DHTECH) for high-technology companies – econometrics models)
A system equation was used for the dependent variables natural logarithm of total compensation (Ln_T_COMP) and natural logarithm of cash compensation (Ln_CASH), which are explained by performance measurement for long- and short-term periods. The system equation presented was estimated using the Seemingly Unrelated Regression (SUR) method. The SUR is a generalization of a linear regression model that consists of several regression equations, each having its own dependent variable and potentially different sets of exogenous explanatory variables. The main motivations for using the SUR are: improving estimation efficiency by combining information on different equations; and imposing and testing restrictions that involve parameters in different equations. The model can be estimated for each equation considering the interdependence of distribution. The SUR model can be further generalized into the multiple regressions, where the variables on the right-hand side can also function as endogenous variables. The multiple-equation model is a system of equations where the assumptions made for the single-equation model apply to each equation. The regression coefficient, year, does not vary over time because the estimation was conducted using dummy
variables for year, and assuming that the company’s heterogeneity is captured in the constant part (William 2003).

The results in table 3 reflect the estimation of equations (1) and (2). Panel A is consistent with hypothesis 1, the estimated coefficient for total compensation for long–term periods and cash compensation for short-term periods. As it is possible to observe the regressions are globally significant, with a 5% significance level. The following table presents the results of the estimation for the studied data.

The sample includes 15109 observations for full time, the period before SFAS 123 (R) represented by 8103 observations and period after SFAS 123 (R) represented by 5433 observations. The result of the SUR model is depicted for total compensation and cash compensation in the period between 2000 and 2010. Adjusted R² is 0.565, which means that the dependent variables total compensation is explained by this set of regressors present in the model. For the period after SFAS 123 (R), the adjusted R² is 0.611, meaning that the model can be explained by the group of variables and is higher than that the adjustment or the model is better for this sample. These indicate that the variables addressed here play a significant role in explaining executive compensation for short- and long-term periods, as stated by Chi-Square test (Probability=0).

It is possible to note that in full period in high-tech firms CEO compensation is higher than in other firms of the S&P 1500 at about 31.4%, but in the period before SFAS 123(R) it was about 44.9% higher and dropped to 15.2% in the period after SFAS 123(R). CEO compensation in high-technology firms is higher than in the other firms but with a smaller difference than previously. It is important to highlight that the implementation of the SFAS 123 (R) has an influence on awards in the long-term, but not for short-term periods. Stock options represent awards for the long–term, and the negative influence on CEO compensation in high-tech firms after the SFAS 123 (R) is confirmed. However, for long-term S&P 500, for the biggest S&P firms, CEO compensations are higher than in S&P small firms. When the annual effects are analyzed, it is possible to find a decrease in CEO compensation for the long-term in 2002 and 2003 over 2000 and an increase in the period between 2007 and 2010.

In table 3, the coefficient signs are similar in both specifications. However, the magnitudes of the coefficients are sensitive to the specification. As expected, earnings per share are negative and significantly related to total compensation for the long-term. This indicates that there are no explicit contractual arrangements linking compensations and earnings per share. The performance ratio of firms measured by return has a negative influence on CEO Compensation (Core et al. 2003a; Young and Jing 2011). According to Aboody et al. (2004),
there is a significant negative relation between share price and the SFAS 123 expense when it is relevant to investors and well measured (Aboody et al. 2004). A positive and statistically significant relationship was found between sales, asset growth and return on assets, and for adding the same level of total CEO compensation and cash compensation Gabaix and Landier (2008) also empirically test the relation between the level of pay and firm size. Ln (assets), a variable proxy for firm size is positively related to pay with a coefficient total compensation and cash compensation in the regression. When the adjustment is performed for the long-term compensation, it is possible to understand that when firm sizes are compared using the current S&P index membership, S&P500 firms have an increase around 5.7% and for the S&P Small caps 600 there is a decrease around 16.7%, comparatively to the S&P mid firms. In terms of cash compensation, the S&P 500 firms are 4.7% below mid cap, and the S&P small firms are 1.6% below, comparatively to the same group of S&P mid firms.

Another finding is that the influence on CEO pay for the short-term between the year 2006 and 2008 does not have the same meaning in long-term compensations. As expected, there is an increase around 5% for each year between 2007 and 2010 as a result of the introduction of the SFAS 123(R).

There is a positive relation between CEO compensation and firm performance in high-tech firms after the implementation of the SFAS 123 (R), but with less intensity than before. For the S&P 500 firms, the implementation of the SFAS 123 (R) is profitable to CEOs because it increases their compensations, while for high-tech CEOs it increases the value, although not as strongly, and it is possible to verify the normalization for all S&P 500 firms. Some authors, such as Hall and Murphy (2002), advocate that this adjustment of stock options is necessary to restrict options and to consequently increase CEO compensation. That suggests that firms find it difficult to downsize the executive pay packages and shift toward restricted options to provide more incentives for long-term CEO compensation (Carter et al. 2007). Restricted stock awards are profitable for executives because the income tax consequences can be more favorable to employees than stock options. The special case of the USA and the consequences of a restricted stock mean that in some cases the award can be structured to allow for the deferral of all tax until the time of stock sale, and for all appreciation to be taxed at capital gain rates even if the stock is appreciated prior to vesting. In contrast, stock options can result in ordinary income to the recipient the stock has appreciated prior to vesting, with only the post-exercise appreciation being deferred to the time of sale at capital gain rates. Furthermore, the preferred stock usually carries no voting rights but may carry a dividend and may have priority over common stock in the payment of dividends and upon liquidation. The preferred share
investor is entitled to a preset rate of dividend that must be paid out of earnings before any dividends are distributed to common shareholders.

6 Conclusion and future research

This paper will contribute to a better understanding of the relationship between compensation and performance in high-technology firms, and of the behavior caused by the new role of expensing stock options with the SFAS 123 (R). The main purpose of this study was to examine whether the total compensation paid to CEOs in high-technology firms in the S&P 1500 is related in corporate finance and how it is influenced by the introduction of the SFAS 123 (R).

The results presented are consistent with those achieved by Carter et al. (2007), who stated that the favorable accounting treatment for stock options possibly lead to overall higher CEO compensations. There is no evidence of a decrease in total compensation combined with the positive association between financial reporting. They find that after controlling standard economic determinants of compensation, expensing options in firms decrease compensation from options and increase compensation from restricted stock. These results suggest that accounting plays an important role in executives plan design (Carter et al. 2007).

There was an increase in CEO compensation after the introduction of the SFAS 123 (R). Although the change in the plan design was not analyzed, a new accommodation of CEO compensation was found as a result of the new rules of the SFAS 123 (R). The influence of firm performance on the CEO compensation is positive and consistent in this group of high-technology firms in the period between 2000 and 2010.

As concluded by Graham et al. (2012), there are differences in corporate culture and in the managers’ latent traits, which are difficult to observe or measure. These latent traits could be an innate ability, personality, risk aversion or, in this case, propensity to innovation, managing uncertain times in order to boost (enhance) returns to the firm and reaction to stakeholders. The CEOs of high-tech firms had to maximize returns, facing a big competition with new technological solutions, thereby warranting a higher compensation than others.

However, this work is not without limitations. This study focuses only on high-technology firms in the S&P 1500 in the period between 2000 and 2010, and the results of this study may not be generalized to include other sectors due the specificity of high-tech firms. Another limitation is the definition of high-technology used in this study that can be extended, as performed by Shim et al. (2009), to include other important item measurements, such as value.
of R&D expenditures, number of patents by firm and citation of patents (Gomez-Mejia et al. 2000; Shim et al. 2009). The level of R&D expenditures and new product introductions are viewed as proxies for innovation, risk-taking and long-term decision-making, which are crucial to characterize high-technology firms. Furthermore, innovation constitutes an indispensable component of corporate strategies.

In the future, it will be important to analyze other developments, such as the effect of managerial attributes for the short- and long-term in executive compensation (Graham et al. 2012). Furthermore, it will also be important to broaden the period of analysis in order to investigate the effect of the financial crisis in the USA, which started in 2007.

7 References


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