



# **Non-GAAP Earnings Performance Measures in Executive Compensation Contracts**

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**Master Thesis**

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2017/7/13**

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**Master Programme: Accounting Auditing and Control**

**Programme Track: Accounting and Finance**

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## **ABSTRACT**

The primary objective of this study is to investigate how firms use non-GAAP earnings performance measures in executive compensation contract. First of all, the results suggest the following evidences: the number of firms which use non-GAAP measure increases across the period of 2005-2014; the adjusted (diluted) EPS is the most used non-GAAP earnings performance measure; compared to long-term incentive plans, firms are more likely to use non-GAAP measures in short-term incentive plans; and the majority of firms use non-GAAP earnings as the major performance measure or as a single performance measure. Furthermore, I investigate whether corporate governance factors have effect on the use of non-GAAP earnings performance measure. However, I fail to find significant associations between them. Results only show that larger and over-valued firms are more likely to use non-GAAP earnings performance measures. Lastly, in contrast to my prediction, the result indicates that the use of non-GAAP earnings performance measure could not increase firm's future performance.

**Keywords:** non-GAAP earnings; executive compensation; performance measure; corporate governance; firm performance

## 1. Introduction

The voluntary disclosure of non-GAAP numbers has been widely examined by previous literatures. Non-GAAP numbers are the numbers that are not calculated according to generally accepted accounting principle (GAAP). It is usually disclosed by firms as a supplement to audited GAAP numbers. Companies can make discretionary adjustments to non-GAAP earnings and disclose them voluntarily. The disclosure of non-GAAP earnings has significantly increased since early 1980s (Zhang and Zheng 2011; Black et al. 2012), and a most recent study indicates that 71% of S&P 500 firms choose to disclosed non-GAAP numbers in 2014 (Black et al. 2017). Researchers argue that the popularity of voluntarily disclosing non-GAAP numbers might due to advantages of non-GAAP accounting metrics. Firstly, non-GAAP numbers can rule out the influence of one-time activities and could better reflect the true operational performance of the firm. By disclosing non-GAAP metrics as supplements to non-GAAP numbers, manager believe they could better inform investors about firm's finical performance. Secondly, researchers find that compared with GAAP numbers, non-GAAP metrics are more informative, persistent and value relevant. For instance, Entwist et al. (2010) examine non-GAAP earnings disclosed by Standard and Poor's (S&P) 500 firms and find pro forma and I/B/E/S earnings are both more value relevant than GAAP earnings. Liu and Gao (2016)'s findings suggest that street earnings and managers' self-constructed non-GAAP earnings are both incrementally more comparable than GAAP earnings before extraordinary items.

In practice, non-GAAP numbers are used to not only present firm's financial situation but also evaluate managers' performance. Compensation committee believes that non-GAAP earnings are a better measure to evaluate manager's performance, because it rules out the influence of activities that are out of manager's control. Besides, non-GAAP earnings are more value relevant, thus it can better incent manger to do for the best interest of shareholders. However, to my best known, there are limited literatures directly examining how firms use non-GAAP earnings performance measure in executive compensation contract. One possible reason is the limited data availability. Before 2006, the detailed information of compensation structure and target is not available to public. In most cases, firms just disclose the final

amount of compensation they grant to executive. In December 2006, the Securities and Exchange Commission (SEC) issued new regulations on the disclosure of executive compensation, which require firms to provide additional information about what performance measures and compensation structures they employ to determine executive compensation. The regulations provide detailed data of executive compensation for studies related to performance measures and compensation structures. In this paper, I would like to examine how firms use non-GAAP earnings performance measure in executive compensation contract, such as the industry distribution, frequencies and weights of different non-GAAP measures.

According to agency theory, managers may make decisions in the best interest of themselves instead of shareholders. The performance measure in executive compensation is a solution to agency problem by aliening executive compensation and firm performance. However, there is concern about CEO's opportunistic use of non-GAAP earnings performance measure. CEO has big discretion on calculating non-GAAP earnings, so he might take advantage of non-GAAP earnings to earn more compensation. In other words, when CEO's power is stronger or board is weaker firms might be more likely to use non-GAAP earnings performance measure. Therefore, I investigate if corporate governance factors could affect the use of non-GAAP earnings performance measure in this paper.

SEC's new regulations also need firms to disclose the motivation of using certain performance measures. Regarding to non-GAAP earnings, most firms claim that they can more properly reflect firms' true operational performance, and thus can better incent managers. If these claims are true, using non-GAAP earnings performance measure would lead to better future performance of the firm. Thus, I examine the relation between the use of non-GAAP earnings performance measure and firm's future performance.

In summary there are three research questions examined in this paper, and they are sated respectively as follows.

*RQ 1: How do firms use non-GAAP earnings performance measures in executive compensation contracts?*

*RQ 2: Do corporate governance factors affect the use non-GAAP earnings performance measures?*

*RQ 3: Does the use of non-GAAP earnings performance measures have influence on*

*firm's future performance?*

Answering the first research question is very important. Firstly, to my best known, the descriptive analysis of the use of non-GAAP performance measure has seldom been performed. It is a relative new research topic in both financial accounting and cooperate governance area. Secondly, from the analysis results we could get the insight of how compensation committee views non-GAAP earnings. By answering the second research question, we can know the motives of firms using non-GAAP earnings performance measure. Like the voluntary disclosure of non-GAAP earnings, there are two conflicting motives of using non-GAAP earnings performance measure. One is manager would opportunistically use non-GAAP earnings performance measure to gain excess compensation because they have big discretional power on calculating non-GAAP earnings. On the other hand, the reason why compensation committee use non-GAAP earnings performance measure is that it can better reflect manager's performance by eliminating items that out of manager's control. Therefore, the answer to the second research question is really important to compensation committee, because by knowing the answer they can design a better compensation structure and then better incent managers. The last research question is also crucial to compensation committee. If the use of non-GAAP earnings performance measure is a solution to agency problem, firm's future performance would increase because it could reduce agency cost. Therefore, firms will choose to use non-GAAP earnings performance measure or put more weight on it.

Because there is no existing digital database which includes the detailed information about how firms use non-GAAP earnings performance measure in executive compensation contracts, I hand-collect the data from annual proxy fillings by using a key word search method. The total number of fillings is 600, which contain 186 firms. The filling year is from 2006 to 2015. For the data needed for the second and third research questions, I collect them from Wharton Research Data Services (WRDS) database. The research design of this paper is divided into two parts. The first part is to perform descriptive analysis in order to answer the first research question. The second part of this research is the regression analysis (logit and OLS regressions) which is to answer the second and third research questions.

By performing the descriptive analysis, I find several important results. First of all, the number of companies that employ non-GAAP earnings as performance measures in

compensation contracts had increased from 9 in 2005 to 49 in 2014. This is similar with the increased trend of voluntary non-GAAP earnings disclosure. Secondly, the results show that among adjusted (diluted) EPS, adjusted Net Income and adjusted Accounting returns, most firms use adjusted (diluted) EPS performance measures in their compensation contracts. It accounts for 73.05% of all observations. The following measure is adjusted Net Income. Around 34.75% of observations use it as performance measure. Thirdly, I examine the industry distribution of the use of non-GAAP earnings performance measure and find it clusters in Consumer Products (18.58%), Electronics & Machinery (20.95%) and Health Care & Insurance (17.23%) industries. However, inconsistent with my first hypothesis, Intangible-intensive and high-tech firms are not more likely to use non-GAAP earnings as performance measure in executive compensation contract. Fourthly, I find 86.82% of observations use non-GAAP earnings measures in short-term incentive plans, whereas only 34.12% of samples use them in long-term incentive plans. This indicates that firms are more likely to use non-GAAP earnings performance measures in short-term incentive plans. Lastly, majority of sample (70.87%) use non-GAAP earnings as major performance measures (weights more than 50%) and 26.13% of total sample use non-GAAP earnings as single performance measure. This finding suggests that firms prefer to put more than 50% weight on non-GAAP earnings performance measure when they use them.

Unlike what I expect, CEO tenure and board independence are not significant related to the use of non-GAAP earnings performance measure. However, the results show that firm size which measured by sales is positively associated with the use of non-GAAP performance measure. This indicates that larger firm is more likely to use non-GAAP earnings performance measure. Furthermore, consistent with my expectation, the book to market ratio is significantly negatively associated with the use of non-GAAP earnings performance measure, which shows that over-valued firm more prefer to use non-GAAP earnings to evaluate executive's performance. My result suggests there is no significant relation between the use of non-GAAP performance measure and future firm performance. This result indicates that the use of non-GAAP earnings performance measure cannot better incent executives.

This paper first contributes to the studies of non-GAAP earnings and corporate governance. It fills the blank of the study about the use of non-GAAP earnings performance

measure in executive compensation contract. Although the voluntary disclosure of non-GAAP earnings has been extensively examined, there is very little studies directly link non-GAAP earnings and compensation performance measure. Secondly, the results provided by this paper are useful to firm's compensation committee. By understanding these results, the committee could make a more effective compensation contract to better incent managers. Lastly, for regulators and investors, they do not need to worry much about the CEO's opportunistic use of non-GAAP earnings performance measure, because the CEO power and board independence are not significantly related to the use of non-GAAP earnings performance measure.

In section 2 I discuss prior literatures related to this paper. I present the development of my hypotheses in section 3. In section 4, I describe how I collect data and empirical method to perform regression analysis. The empirical results and their interpretation are illustrated in Section 5. Section 6 summarizes the key findings of this paper.



## 2. Literature Review

In this section I generally review two streams of previous literatures related to this paper, which are non-GAAP earnings and executive compensation literatures. In the first part of this section I make a comprehensive review of prior non-GAAP earnings studies from four different perspectives: general information, motives of non-GAAP earnings disclosure, and advantages and disadvantages of non-GAAP earnings reporting. Secondly, I review the researches related to executive compensation. Especially, I pay more attention on the performance measures literatures and the studies describing the relation between non-GAAP earnings and executive compensation.

### 2.1. Introduction of non-GAAP earnings

Generally speaking, although many companies report non-GAAP earnings in addition to required generally accepted accounting principles (GAAP) earnings, there has been not a uniform definition of non-GAAP earnings by now. A relative prevalent definition of non-GAAP earnings is the earnings that are not calculated according to generally accepted accounting principle. Another widely used definition of non-GAAP earnings is company's reported GAAP earnings adjusted to exclude one-time and nonrecurring items. Among all kinds of non-GAAP earnings, academic studies mostly concentrate on street earnings, I/B/E/S earnings, pro forma earnings and non-GAAP earnings reported by managers. Besides that, earnings before interest and tax (EBIIT) and earnings before interest, taxes, depreciation, and amortization (EBITDA) are also usually defined as non-GAAP earnings, but they are not often examined by scholars.

Because non-GAAP earnings commonly exclude certain items from reported bottom line GAAP earnings, it is important to know what specific items are frequently excluded. Many previous studies work on this area. For example, Bhattacharya *et al.* (2004) examine pro forma releases between 1998 and 2000 and document that depreciation and amortization (20.7%) and stock-based compensation (17.2%) are the two expense items that are most commonly excluded. Zhang and Zheng (2011) also report similar evidences, while D. E. Black *et al.* (2017) find a slightly different result, that is, during 2009-2014 the items related

to investments, amortization of intangibles, and stock-based compensation are most commonly excluded from non-GAAP earnings.

Because there is no uniform standard for the calculation of non-GAAP earnings, managers have great discretion on the items excluded from non-GAAP earnings. It might result in inconsistency of excluded items over time and differences across firms. Bhattacharya *et al.* (2004) conclude from a descriptive study that the composition of firms' pro forma earnings had changed during the period of 1998-2000. Another evidence is that across firms around 40% of non-GAAP samples announced non-GAAP earnings with "uncommon" adjustments (Black *et al.* 2017).

In addition to the composition of non-GAAP earnings, another crucial stream of non-GAAP studies focuses on the trend of non-GAAP disclosures. A number of studies examine the trend of the use of non-GAAP earnings and find an increasing amount of companies choose to report non-GAAP earnings from early 1980s to 2003 (the year of adoption of Regulation G). For example, by analyzing a dataset during 1998-2001, Zhang and Zheng (2011) find non-GAAP disclosures increased substantially. Black *et al.* (2012) examine a broader time period (from 1998 to 2006) and document a similar general upward trend of non-GAAP reporting from 1998 to 2001, however they find during the period of the announcement and adoption of Regulation G the proportion of firms reported non-GAAP earnings had temporarily decreased. Consistent with Black *et al.* (2012), Entwistle *et al.* (2006) also find the percentage of firms who announced non-GAAP earnings declined during the implementation of Regulation G, from 77% of S&P 500 firms in 2001 to 54% in 2003. Among the studies of non-GAAP earnings, the implementation of Regulation G is a critical timing, especially when researchers examine the use of non-GAAP numbers. In order to get rid of the influence of Regulation G, Webber *et al.* (2013) examine a post-Regulation G period (2005-2010) and find the number of S&P 100 companies disclosing non-GAAP income measures increased significantly from 44% to 60% during the sample period. The most recent study of D. E. Black *et al.* (2017) shows the proportion of firms disclosing non-GAAP earnings among S&P 500 substantially increased from 52% in 2009 to 71% in 2014. In summary, previous literature shows until the announcement of Regulation G the disclosure of non-GAAP earnings had increased since early 1980s. Then it faced a temporary downturn during the

Regulation G period. However, after the impermanent decline because of the implement of Regulation G, the number of firms report non-GAAP numbers has continued to grow up to now.

Another characteristic of non-GAAP reporting is that companies in certain industries are more likely to report non-GAAP results than others. For example, Bhattacharya *et al.* (2004) document a high concentration of non-GAAP in the service industries (both “personal and business services” and “professional service”) and manufacturing industries (49.9% and 30.7% respectively). To test the distribution of pro forma earnings releases by industry, Zhang and Zheng (2011) use two catalogues (high-tech firms and intangible-intensive firms). They report 59.1% of non-GAAP earnings releases is from high-tech firms and 67.45% is from intangible-intensive firms. Recently, academic paper concludes that non-GAAP reporters cluster in Health Care (85%) and Information Technology(76%) sectors (Black *et al.*, 2017).

Researchers propose several reasons regarding to the cluster of non-GAAP numbers reporting. Firstly, they argue that firms with low informativeness of GAAP earnings are more likely to disclose non-GAAP earnings. Lougee and Marquardt (2004) examine 249 press releases and find the firms’ likelihood of pro forma earnings disclosure is high when the GAAP earnings informativeness is low. And it is confirmed that in certain industries such as high-tech industries the informativeness of GAAP earnings is lower. For instance, Kwon *et al.* (2007) investigate a sample of both high-tech and low-tech firms and detect high-tech firms show a lower level reaction and associations of security price in response to the changes in earnings than low-tech firms, which is in line with the former studies. Secondly, evidences show that firms with negative GAAP earnings more tend to announce non-GAAP earnings in their earnings releases. Bhattacharya *et al.* (2003) analyze a sample of 1,149 actual pro forma press releases and find that service and high-tech firms which usually report negative GAAP earnings are more likely to announce pro forma earnings. Similar with above literatures, Bowen *et al.* (2005) document that firms with low value-relevance of GAAP earnings are more likely to put greater emphasis on non-GAAP earnings, especially when high-tech firms have historical losses. In conclusion, the disclosure of non-GAAP numbers usually cluster in certain industries (such as Health Care and Information Technology industries). This is probably because GAAP earnings in these industries are normally less value relevant, and

some high-tech firms even often report negative earnings.

## *2.2. Motives of non-GAAP earnings reporting*

Since the late 1990s the disclosure of non-GAAP earnings has become popular. Literatures use plenty of pages to discuss the motives of non-GAAP earnings reporting for managers, however the evidence is mixed. The following passage is to review the two prevalent theories among academia, which are informative motive and opportunistic motive.

For the first motive, scholars argue that although GAAP earnings based on a set of accounting standards are more transparent and reliability, non-GAAP earnings give managers more discretion to portray the real operating performance of companies by excluding certain items (such as one-time and nonrecurring items). As we all know, GAAP is a set of standards and rules that ensure the transparency, reliability and consistency of corporation's financial statement. Thus GAAP financial information is needed when investor compares financial results across corporations and over time to make a proper investment decision. Nevertheless, just because GAAP provide uniform financial reporting results, some companies complain that GAAP earnings can not reflect their true or core operating performance. They need to rule out the influence of one-time activities to get more timely financial results. Lev and Zarowin (1999)'s study provide an evidence for this theory. They find that during the years of 1977-1997 the usefulness of reported earnings had been deteriorating steadily. Similarly, the findings of Collins *et al.* (1997) show a shift of value-relevance from 'bottom line' reported earnings to book value, and the authors contribute this phenomenon to the increasing frequency and magnitude of one-time items. On the other hand, studies confirm non-GAAP earnings display higher value relevance than GAAP earnings. Bhattacharya *et al.* (2003) suggest if the excluding items of pro forma numbers are one-time expense, pro forma earnings are more informative to investors. Albring *et al.* (2010) test the association of two types of earnings measures and estimated market valuation and returns. They find that among 518 US firms included in the Standard & Poor's 500 Index the explicitly defined non-GAAP measures were significantly more value-relevant than GAAP measure during 2002-2007. Therefore, managers hold the view that non-GAAP earnings are required to be delivered to investors as a supplement to GAAP earnings for an informative purpose.

Besides informative perspective, another theory hold by scholars is that managers report non-GAAP earnings to manage earnings and beat benchmark. According to agency theory, managers have incentives to maximize their own interest at the expense of shareholders' interest. In the non-GAAP case, managers might use the discretion on non-GAAP earnings calculation to mislead shareholders and get more compensation in a short-term period. Black *et al.* (2015) examine a hand collected dataset from 1998-2006 and find a positive association between CEOs' short-term bonus incentive and the probability of non-GAAP earnings reporting, which suggests CEOs might disclose non-GAAP numbers to gain short-term interest.

In addition to that, studies also show the reporting of non-GAAP numbers is associated with meeting or beating earnings benchmarks. A bunch of studies imply the importance of meeting or beating earnings benchmarks for managers. For instance, Graham *et al.* (2005) survey and interview more than 400 executives and find around 51% of executives rank earnings as three most important measures report to outsiders. According to the survey, this is because managers think meeting earnings benchmarks can help them build credibility with capital market, maintain or increase stock price and reduce stock price volatility. Hence, managers have incentives to meet or beat earnings benchmarks by managing earnings. However, the traditional way of earnings management that based on discretionary accruals has some problems. Firstly, it is restricted by regulators and could be detected by auditors. Secondly, because discretionary accruals earnings management makes use of accruals instead of real economic activities manipulation, it can be reversed in future periods. Therefore, some managers announce non-GAAP earnings as an alternative way to manage earnings. Bhattacharya *et al.* (2004) conclude that companies use pro forma earnings to meet earnings benchmarks and downplay negative reported earnings by using a comprehensive sample of pro forma press releases. Hsu and Kross (2011) also document that the decision of excluding certain special items from street earnings might be affected by whether these exclusions could increase street earnings, smooth the earnings series or allow managers to meet earnings benchmarks. They believe this result implies managers could opportunistically use street earnings to meet earnings benchmarks instead of increasing informativeness of financial information. Consistent with prior findings, Doyle *et al.* (2013) provide an evidence on the

opportunistic use of non-GAAP earnings by managers and further find managers use non-GAAP earnings as an additional tool to meet analyst expectations to accrual manipulation, expectations management, and real activities manipulation. They report when managers are constrained by regulars and the cost of within-GAAP earnings management is high managers are more likely to use non-GAAP exclusions to meet earnings benchmarks.

In conclusion, literatures discussed above indicate that it is likely that managers have both informative and opportunistic incentives in non-GAAP earnings disclosure. The next step of studying is to find which motive takes a leading position in non-GAAP earnings reporting. Because managers can exclude income-decreasing transitory items for both informative purpose and opportunistic purpose when they calculate non-GAAP earnings, Curtis *et al.* (2014) decide to only focus on a sample of quarterly non-GAAP earnings releases which exclude transitory gains. In this way, they could assess managers' motives for non-GAAP disclosure more precisely since managers tend to rule out temporary gain to improve the information quality of non-GAAP numbers whereas income-decreasing exclusions cannot be used to inflate non-GAAP earnings. The research results suggest that the primary reason for non-GAAP disclosure is to better inform investors.

### *2.3. Usefulness of non-GAAP earnings*

Previous studies show that compared with GAAP earnings, the disclosure of non-GAAP earnings has several advantages. They find that non-GAAP earnings are more informative, persistent and value relevant than bottom-line net income reported under GAAP.

Bhattacharya *et al.* (2003) analyze a sample of 1,149 actual pro forma press releases for the years 1998–2000 and find pro forma earnings are more informative and permanent than GAAP numbers by comparing short-window abnormal returns and revisions in analysts' one-quarter-ahead earnings forecasts of each kind of earnings. They believe this indicates investors think pro forma earnings can more reflect the real operation situation of firms. Entwist *et al.* (2010) examine pro forma earnings disclosed by Standard and Poor's (S&P) 500 firms during a special time period (2000-2004). In this period companies faced the influence of the significant Sarbanes-Oxley Act on financial reporting environment. Similar with prior papers, they find pro forma and I/B/E/S earnings are both more value relevant than GAAP

earnings, although these three earnings measures are all value relevant. Recently, Liu and Gao (2016) make an empirical analysis of incremental comparability of street earnings and self-constructed non-GAAP earnings reported by managers relative to GAAP earnings before extraordinary items by using a relative broader sample of US firms from 2003 to 2015. Their findings suggest street earnings and managers' self-constructed non-GAAP earnings are both incrementally more comparable than GAAP earnings before extraordinary items, and the improvement magnitude of street earnings is much more pronounced than managers' self-constructed non-GAAP earnings.

However, Brown and Sivakumar (2003) argue it is unfair to compare pro forma earnings with GAAP net income because GAAP net income include a lot of non-operating items, which could decrease its value relevance. Thus they decide to use operating earnings reported by Standard and Poor's to perform research. In this way, they could test the value relevance of operating earnings derived from firms' financial statement that is usually used by sophisticated investors. Furthermore, they use three procedures to compare value relevance of these two different types of earnings, which are ability to predict future earnings (predictive ability), association of earnings with stock price (valuation) and correlation of earnings surprises with abnormal stock returns (information content) respectively. By analyzing quarterly data from 1989 to 1997, the results suggest that under all three procedures pro forma earnings provided by managers and analysts have more value relevance than operating earnings provided by Standard and Poor's. Consistent with Brown and Sivakumar (2003)'s research findings, Choi *et al.* (2007) show the superior value relevance of non-GAAP EPS disclosed by managers in income statement and footnote disclosures to analysts EPS provided by Thomson DataStream by deeply examining different adjusted components of each kind of earnings. Through an analysis of non-GAAP disclosures in UK over the period of 1993-2001, their results suggest managers' exclusions which are not included in Thomson's exclusions are not value relevant, and the value relevance of items included by management but not by Thomson is increasing during the sample period. These imply that compared with Thomson's operating earnings, non-GAAP earnings provided by managers are more likely to include and exclude appropriate items.

In summary, these research evidences reviewed above confirm that non-GAAP measures

are generally more informative, persistent and value relevant than GAAP earnings. Scholars next examine the reasons behind these advantages of non-GAAP measures and develop several theories. The first reason raised by academic papers is non-GAAP earnings do not have standardized definition, which could give certain flexibility to managers for calculating core operating earnings measures. Secondly, items excluded from non-GAAP earnings are often non-recurring (such as restructuring charges, gains and losses on mark-to-market securities, and impairments are not generated by firms' core and continuing operations), thus they are not value relevant to firms' future operation and have low credibility. In some cases, managers would exclude recurring items such as depreciation and amortization. Researches argue it is because these items could be distorted under conservative accounting policy. Study further demonstrate managers' adjustments to non-GAAP earnings are more precise than analyst reported earnings (Choi *et al.* 2007).

#### *2.4. Disadvantages of non-GAAP earnings*

Besides the usefulness of non-GAAP earnings discussed above, studies also show that non-GAAP earnings disclosure has its own problems.

One of the best-known critics of non-GAAP reporting is that managers may use it to mislead investors and beat earnings benchmarks. A stream of literature directly studies the association of non-GAAP number reporting and the probability of managers using non-GAAP earnings to mislead investors or meet earnings benchmarks. For instance, Christensen (2007) examines this topic and finds the evidence indicating that firms with negative GAAP earnings more probably use street earnings to meet strategic earnings benchmarks. Furthermore, those firms are more likely put more emphasize on adjusted numbers relative to their GAAP equivalent. Bowen *et al.* (2005) also find when pro forma number is more favorable than GAAP number in press release the manager usually emphasizes pro forma earnings. Another stream of studies examines the items adjusted from non-GAAP numbers. In the later study of Brown *et al.* (2008), they find when managers exclude recurring items in adjusted earnings which can potentially mislead investors, they tend not only to emphasize pro forma earnings but also issue the earnings press releases sooner than expected. By using logit analyses, Black and Christensen (2009) suggest the most frequent pro forma adjustments are greatly



significantly associated with firms' ability to meet or beat strategic earnings benchmarks when GAAP operating earnings cannot reach targets. Doyle *et al.* (2013) use univariate and multivariate analysis method and find when non-GAAP earnings are higher than GAAP earnings firms are more likely to meet analyst estimates. Moreover, through decomposing total exclusions into special items and other exclusions, they find the evidence shows that the probability of a firm meeting target grows by 20% once other exclusions are included in non-GAAP earnings.

There are other disadvantages of non-GAAP measure disclosure motioned by previous literature. Firstly, scholars also criticize about the predictability of some excluding items from adjusted numbers to further cash flow. Doyle *et al.* (2003) separate pro forma earnings adjustment into special items and other exclusions and find special items are generally not associated to future cash flows, however the predictability of other exclusion is as high as pro forma earnings itself by examining a sample of 143,462 firm-quarter observations from 1988 to 1999. Secondly, other studies argue that due to managers' discretion on calculating non-GAAP earnings, non-GAAP earnings are not consistent. For example, Bhattacharya *et al.* (2003) find adjustments of non-GAAP earnings are inconsistent across firms and over time. Furthermore, the evidence also shows managers exclude routine expenses such as depreciation and amortization and stock-based compensation. Even more seriously, these recurring exclusions tend to be the most common types of exclusions. Lastly, in terms of the relation of non-GAAP earnings disclosure and firm performance, previous empirical research uses a sample of 249 press releases during a period of 1997-1999 and finds firms with higher pro forma earnings compared with GAAP earnings have lower future returns(Lougee and Marquardt 2004).

In sum, the disclosure of non-GAAP earnings faces critics that mostly concentrate on its opportunistic use. Other disadvantages of non-GAAP earnings disclosures include improper exclusions and inconsistency. Furthermore, finding also indicates the association between the use of non-GAAP earnings and lower future returns. Due to those concerns on the disclosure of non-GAAP earnings, regulators issued several interventions on non-GAAP reporting. Among them, the implement of Regulation G have the most impact on non-GAAP disclosing, which is discussed in the following part.

## 2.5. Impact of Regulations on non-GAAP earnings disclosure

Although corporate managers often stress that the disclosure of non-GAAP earnings is to better inform the true operation information to investors by excluding certain items from GAAP earnings which are not relevant to operating. However regulators have many concerns on the opportunistic use of non-GAAP earnings to portray a better performance of firms in order to meet earnings benchmarks or mislead investors. For example, in 2001 Securities and Exchange Commission (SEC) noted that non-GAAP financial information has “no defined meaning and no uniform characteristics” and it may “mislead investors if it obscures GAAP results”. After a number of major corporate and accounting scandals including Enron and WorldCom, the United State published Sarbanes–Oxley (SOX) Act to enhance corporate governance and the quality of financial reporting. Section 401(b) of SOX guides the SEC to issue regulation on non-GAAP disclosure. Accordingly, the SEC implemented Regulation G in March 2003, which requires the firm must provide a quantitative reconciliation of non-GAAP number to its most comparable GAAP number if a firm discloses non-GAAP earnings number in any public communication and explain why managers believe non-GAAP earnings are useful to investors. Because Regulation G is the first and most important direct regulation on non-GAAP number disclosure, it is crucial to know what kind of influences it brings to non-GAAP reporting. Therefore, the following passages discuss literature related to the impact of Regulation G.

The first effect of Regulation G is the change of the likelihood of reporting non-GAAP earnings. Marques (2006) analyze the quarterly press releases from 2001 to 2003 of all S&P500 firms and document that the proportion of firms reporting non-GAAP numbers declined after the implication of Regulation G. Heflin and Hsu (2008) find similar evidence that after Regulation G there is a modest decline in non-GAAP earnings disclosures. Moreover, study also show managers put less emphasis on non-GAAP numbers in earnings releases subsequent to the SEC ‘Cautionary Advice’ in December 2001 (Bowen *et al.* 2005).

In terms of the value of non-GAAP numbers after the adoption of Regulation G, Entwistle *et al.* (2006) find the percentage of firms that report higher value of non-GAAP earning than GAAP earnings declined, and a sharp reduction of the differences between

non-GAAP earnings and their direct GAAP equivalent. Similarly, by using I/B/E/S number as a proxy for non-GAAP earnings, Heflin and Hsu (2008) document a decrease in the magnitude of GAAP and non-GAAP earnings differences.

The information quality of non-GAAP measures is also documented to increase after Regulation G. Heflin and Hsu (2008) find that non-GAAP numbers are disclosed in a less biased manner in the post-Regulation G period and report a modest decline in the probability of firms using non-GAAP earnings to meet or beat earnings benchmarks. Studies also examine the change of exclusion items from non-GAAP earnings after the adoption of Regulation G. Kolev *et al.* (2008) use a sample of 26 quarters earnings release from 1998 to 2004 and find the quality of non-GAAP exclusions increased following the SEC interventions. Chen (2010) argues the items excluded from non-GAAP earnings but not from GAAP earnings are used to meet or beat earnings benchmarks (MBF exclusions). He examines the difference in the levels of persistence between MBF and non-MBF exclusions and finds the magnitude of difference reduced after Regulation G, which implies that managers excluded fewer recurring items in MBF exclusions after Regulation G. Zhang and Zheng (2011) study the association of mispricing and non-GAAP's reconciliation to GAAP equivalent before and after Regulation G and find due to the implementation of Regulation G the enhancement of reconciliation quality leads to a more precise security pricing.

The market perceptions of non-GAAP earnings disclosure were also influenced by the announcement and implementation of Regulation G. Marques (2006) documents that after Regulation G there is a significant positive abnormal return around non-GAAP earnings announcements whereas the result is not significant before the regulation. Black *et al.* (2012) find that investors tend to pay more attention to non-GAAP earnings in the post-SOX period suggesting investors perceive pro forma earnings more credible after the Regulation G.

Lastly, in response to SEC's concern that managers may opportunistically use non-GAAP earnings to mislead investors, previous studies also find evidence that managers are less likely to use non-GAAP numbers to mislead investors. For example, by examining the use of potentially misleading language such as 'net income', Entwistle *et al.* (2006) find the percentage of firms using non-GAAP earnings to mislead investors decreased from over 10% of S&P 500 firms to less than 1% after the implementation of Regulation G. However, recent

study of Shiah-Hou and Teng (2016) show a opposite evidence. They use a dataset of non-GAAP earnings releases of S&P 1500 firms from LexisNexis database during the period of 2006-2011 (after Regulation G period) and find even though the quality of exclusions from non-GAAP earnings increased, net income-decreasing other exclusions of recurring items are negatively related with future operating income. This indicates that managers manipulate non-GAAP earnings by excluding certain recurring items from non-GAAP equivalent. This phenomenon is more prominent when CEO or CFO sells his stocks during the two weeks after the non-GAAP earnings announcement date. These findings suggest after Regulation G managers may still use non-GAAP earnings to mislead investors and even to get private benefits.

To sum up, prior literatures generally confirm the effectiveness of Regulation G and finds evidence that non-GAAP measures are more reliable after Regulation G. Nevertheless, some papers show conflicting evidence. For instance, Kolev *et al.* (2008) find the quality of special items has declined in post-Regulation G period indicating the regulation has unintended influence on shifting more recurring items into special items.

Seven years after the implantation of Regulation G, in January 2010, Compliance & Disclosure Interpretations (C&DIs) about non-GAAP financial measures was issued by the SEC Division of Corporate Finance, which is a new guidance replacing Regulation G. The objectives of C&DIs were to “(i) eliminate any actual or perceived restrictions in the FAQs on the disclosure of non-GAAP information that were not consistent with the actual rules; (ii) clarify the SEC’s interpretations; and (iii) centralize in one location the SEC’s interpretation” as motioned by Wayne Carnall, the Chief Accountant in the Corporate Finance Division. Recent research studies the impact of C&DIs and documents the proportion of firms discursing non-GAAP earnings increased by 8.2% in the post-C&DIs period (Kyung, 2014). Moreover, he finds that the quality of exclusion from non-GAAP earnings is higher and the frequency of using non-GAAP earnings to meet analysts’ forecasts is lower after the issuance of the new C&DIs. His findings suggest C&DIs have some improvement to Regulation G and make non-GAAP reporting more credible.

## *2.6 Performance measures in executive compensation contract*

Another topic related to this thesis is executive compensation, especially performance measures in compensation contract. As a solution of agency problem, executive performance measures in compensation contracts have been extensively examined by scholars since 1980s.

Generally speaking, performance measures are divided into accounting measures and market measures by pervious literatures. In early studies, researchers mostly focus on the weights of these two different types of performance measures. Lambert and Larcker (1987) suggest when the growth rates in assets and sales of firm are high and managers hold relative low portions of firm's stock, the weight of market performance is higher than accounting performance in compensation contracts. Recently, Angelis and Grinstein (2015) indicate that mature firms are more likely to use accounting based measures, whereas larger firms and firms with more growth opportunities rely more heavily on market-based measures. The other classifications of performance measures examined by early studies are financial and non-financial performance measures. Using a dataset of 317 firms during 1993-1994, Ittner *et al.* (1997) examine factors which effect the relative weights of financial and non-financial performance measures in CEO bonus plans and find firms with innovation-oriented "prospector" strategy and quality-oriented strategy place more weight on non-financial measures than financial measures. Besides, Huang *et al.* (2013) conclude that firms are more likely to place higher weights on cash flows measures when firms have higher leverage and bankruptcy risk. Regarding to the differences of performance measures in short-term and long term incentives, recently Schmidt and Reda (2017) document that accounting-based performance metrics (EPS, net income etc.) are typical of short-term incentives whereas market-related metrics (total shareholder return etc.) are more common in long-term incentives (LTIs). They find at least 90% of 200 of the top U.S. companies (based on revenue and market capitalization) use income-based measures in their short-term incentive plans and total shareholder return are most commonly used in long-term incentive plan in the year of 2015. As to the similarity of these two kinds of incentives, around 38% of sample companies use one or more same performance measures in both incentives.

However, to my best knows, there were not much literatures directly study how the compensation committee ties executive compensation to different performance measures before the year of 2006. Some people argue it is mainly because the data of executive

compensation contracts is not available to public. In most cases, firms just disclose the final amount of compensation they grant to executives and the detailed information about how the committees measure executives' performance and determine these amounts is not fully disclosed. Recent years investors also had required more proper disclosure on executive compensation packages. In response to this requirement, the Securities and Exchange Commission (SEC) issued new regulations on disclosure of executive compensation in December 2006, which provides detailed data of executive compensation in the following years for related studies. The new regulations require firms to provide additional information about what performance measures they employ to determine executive compensation and compensation structures including the targets of performance. Angelis and Grinstein (2015) take advantage of this new availability of detailed executive compensation measures information and examine the types of executive performance measures and their relative weights by using data from the proxy statements of Standard and Poor's (S&P) 500 firms in the year of 2007. They report that 79% of the award amount is based on accounting measures, 13% is based on stock market measures and 8% is based on nonfinancial measures. In accounting performance measures, the most estimated value of performance-based awards is tied to income measures (56%), following by accounting returns measures (17%) and sales measures (12%). Huang *et al.* (2013) use a broader data period of 2006-2011 to investigate performance measures used in CEO annual bonus plan and show similar results. They find that net accruals-based measures (such as earnings, EPS and operating income) (82%) are most frequently used in short-term incentive contracts, whereas only 35% and 16% contracts use sales and cash flows as performance measures respectively. Furthermore, in terms of the weight of performance measures, net accruals-based measures still take the most important place weighting greater than 50% in around half of the contacts.

### *2.7 Non-GAAP earnings and executive compensation*

Regarding to the use of non-GAAP earnings performance measures in executive compensation contracts, there are limited literatures directly examining this topic. However, a number of papers illustrate other indirect findings of the relation between non-GAAP earning and executive compensation.

The first stream of these studies is about the treatment of special items in compensation contracts, which is related to this paper because these special items are usually excluded from non-GAAP performance measures. Early in 1990s, Dechow *et al.* (1994) examine 182 restructuring charges taken by 91 Fortune 500 firms which happened during the period of 1982-1989. They document that earnings measures in executive short-term incentive plans do not include explicit provisions for restructuring charge in order to make compensation contracts more efficient. Gaver and Gaver (1998) investigate CEO cash compensation of a large number of firms from 1970 to 1996 and find the evidence that CEOs' compensation rewards are shielded from the influence of nonrecurring losses and also at least partly of negative special items. Later research takes a deeper look at this topic and finds that CEO compensation payment is shield from the income-decreasing influences of strategic expenditure such as research and development expenditure (Duru *et al.* 2002). Because of the changes in the regulation and incidence of special items happened recent years Potepa (2014) reexamines how compensation committee treats special items in determining CEO cash compensation by using a large dataset of 3,303 firms from Execucomp database during a period of 1992-2011. The results show firms tend to exclude the effect of special items in CEO cash compensation when there is a significant macroeconomic downturn, the firms are likely to bankruptcy and special items are less persistent. Contrary to prior researches, Potepa (2014) further indicates due to the new regulations on measuring special items the shielding from negative effects of special items got less profound in the recent period. All in all, previous studies conclude that executive compensation is shielded from the influence of specific income-decreasing special items. The underneath reason is that shareholders think this treatment of special items in executive compensation plan can better incent executive.

Another stream of literatures studies the relation between non-GAAP earnings reporting and executive compensation. For example, Bansal *et al.* (2013) indicate that managers with higher stock-based compensation to vega (stock volatility sensitivity) are more likely to disclose non-GAAP earnings and the quality of non-GAAP information is higher. Later, Black *et al.* (2015) examine the association between CEO compensation incentives and voluntary disclosure of non-GAAP earnings by using a sample period (1998-2006) before SEC's new disclosure requirement of compensation contracts. They find CEO short-term bonus

incentives positive associate with the likelihood of voluntary non-GAAP earnings disclosure and the relation between long-term plan incentives and voluntary non-GAAP earnings disclosure is negative.

Similar with voluntary non-GAP earnings disclosures, there are also two conflict motives of the use of adjusted earnings measures in executive compensation contracts. On one hand critics argue that powerful managers might have incentive to opportunistic use the adjustment from non-GAAP earnings to camouflage their true performance in order to increase their compensation payout. On the other hand, supporters think that the exclusion of some items that are not related to managers' performance (e.g. restructuring charges and compensation expense) can enhance the efficiency of compensation contracts. Black *et al.* (2015) examine the opportunistic use of non-GAAP metrics in compensation contracts and find interesting evidence: when non-GAAP metrics are explicitly stated as performance measures in compensation contracts the non-GAAP earnings are less aggressive, while when the use of non-GAAP earnings is not clearly stated in compensation contracts the non-GAAP earnings are more aggressive. These results suggest that in order to prevent CEOs from defining their own non-GAAP numbers the boards might clearly define non-GAAP performance measures in compensation contracts. Nevertheless, when the definition of adjusted performance metrics is not explicit, the CEO may report non-GAAP numbers in a more opportunistic way.

The study most related to this paper is from Curtis *et al.* (2015). However, unlike my study examine the use of non-GAAP earnings in the executive level, their research only limits in the CEO compensation contracts. They study the use of adjusted earnings for performance evaluation in CEO compensation contracts and document that 70% of S&P 500 firms use adjusted earnings. Furthermore, they also find that instead of common exclusion items (e.g. special items, non-operating items, and other exclusions), the firm fixed-effects can more explain the difference between adjusted earnings used in CEO compensation contracts and GAAP earnings, which indicates CEOs use relative more firm-specific adjustments to calculate adjusted earnings.



### 3. Hypothesis Development

In this part I describe the hypotheses proposed in this paper. The number of total hypotheses is four, and those four hypotheses belong to three different topics. The first topic of hypotheses is related to the use of non-GAAP earnings performance measure in executive compensation contract. The second topic hypothesizes the determinants of using non-GAAP earnings performance measure. Lastly, I make the hypothesis about the relation between the use of non-GAAP earnings performance measure and the future firm performance.

Shareholders use executive compensation as a solution to agency problem, by aligning executive incentive to firm performance through different performance measures. The compensation committee search for measures that can best incentivize managers to act in the best interest of shareholders. There are two important features of a good performance measure. Firstly, it should reflect the true effort of managers and is able to effectively rule out the effect of firm performance other than managers' effort (such as market effect, macroeconomics effect). Secondly, the performance measure could better reflect firm's true performance.

Regarding to these two characteristics of a good performance measure, researchers argue that non-GAAP earnings might be a better performance measure for executive compensation because it better fits these two characteristics. Prior researches indicate that managers' compensation is shielded from special items such as restructuring charge, nonrecurring losses and research & development expenditure (Dechow et al. 1994, Gaver and Gaver 1998, Duru *et al.* 2002, Potepa 2014). This is because shareholders believe that the special items are not related to manager's true performance and including those items could be a noise in performance measure. Thus, to make the compensation contract more effective, special items are often excluded from performance measure. Studies show that special and nonrecurring items are also usually excluded from non-GAAP earnings (Bhattacharya *et al.* 2004, Zhang and Zheng 2011, D. E. Black *et al.* 2017). Therefore I infer that non-GAAP earnings are better measures for evaluating manager's performance and excluding items outside manager's control. Moreover, previous literatures confirm the superior value relevance of non-GAAP earnings (Bhattacharya *et al.* 2003, Albring *et al.* 2010), which means it can better reflect firms' true performance. As the result of these two features of non-GAAP earnings, it is likely

that compensation committee use non-GAAP earnings performance measure for its better ability of aligning executive incentive to firm performance.

These advantages of non-GAAP earnings performance measure are significantly more prominent in certain industries such as high-tech and intangible-intensive firms. Researchers indicate it is because in these industries the non-GAAP earnings are more value relevant (Lougee and Marquardt 2004) and the intangible asset and R&D expenditure take a relative big part in these in industries. Furthermore, for the informativeness concerns those firms are more likely disclose non-GAAP earnings. Therefore I predict that firms in high-tech and intangible industries are more likely to use non-GAAP earnings performance measure in executive compensation contract for better evaluating manager's performance. I present my first hypothesis in alternative form:

*H1: The use of non-GAAP earnings in performance evaluation is cluster in high-tech and intangible-intensive industries.*

However, there is concern about the opportunistic use of non-GAAP earnings performance measure in executive compensation contract. Managers have big discretion on the calculation of non-GAAP earnings and can choose to exclude certain items from non-GAAP earnings for their own interest. It is very likely that they opportunistically use the discretion to gain excess compensation. A bunch of studies find evidence that managers use non-GAAP earnings to meet or beat earnings benchmark and even mislead investors (Bhattacharya *et al.* 2004, Hsu and Kross 2011, Doyle *et al.* 2013). There is also evidence that powerful managers increase their payment through several methods. For example, Morse *et al.* (2011) document that powerful CEOs could shift weights of performance measures toward better-performing measures. According to agency theory, managers may have the same incentive to take advantages of the discretion on non-GAAP earnings for their own interest (earning more compensation). The board, on the other hand, tries to mitigate the manager's opportunistic use of non-GAAP earnings. Black *et al.* (2015) suggest the compensation committee clearly define non-GAAP earnings performance measures in compensation contract in order to prevent CEOs from defining their own non-GAAP metrics. But when the monitor of board is weak or less independent, the monitoring function of board is less useful and ineffective directors may give chance to managers making decisions not at the best

interest of shareholders. In sum, other than the motive of better aligning executive incentive to firm performance, the use of non-GAAP earnings performance measure could also result from powerful CEO or less independent board.

I use CEO tenure to proxy CEO power and the proportion of independence directors in the board to proxy board independence. To summarize, if the use of non-GAAP earnings performance measure is to better incentive executives, I expect the relation between the use of non-GAAP earnings performance measure in compensation contract and CEO tenure is negative, and the relation of board independence is positive. On the other hand, if non-GAAP earnings are used to gain excess compensation for executives, the use of non-GAAP earnings would be positively related to CEO tenure and negatively related to board independence. Because of the mixed theory and evidence on this topic, I preset my second and third hypotheses in null form:

*H2: The use of non-GAAP earnings in performance evaluation is not associated with CEO tenure.*

*H3: The use of non-GAAP earnings in performance evaluation is not associated with board independence.*

Finally, I test whether the use of non-GAAP earnings performance measure in compensation contract is associated with future firm performance. Based on above discuss, the effect of the use of non-GAAP earnings on firm performance is unclear. If compensation committee chose to use non-GAAP earnings to more effectively incent executives, I expect a positive association between the use of non-GAAP earnings in compensation contract and firm performance. Because agency cost could be lowered by using non-GAAP earnings performance measure in this case, firm's future performance might increase. Alternatively, if CEO uses his power to opportunistically influence the use non-GAAP earnings performance measure in compensation contract, it may reflect the unresolved agency problem and cause addition cost for company. Because the agency cost negatively affect future firm performance, I predict under the situation of powerful CEO or less independent board the use of non-GAAP earnings performance measure is associated with worse future firm performance. Therefore, I present my fourth hypothesis in null form:

*H4: Future firm performance is not associated with the use of non-GAAP earnings for*

*performance evaluation.*

## 4. Research Design

In this chapter I describe the main research design of this paper. I first describe how I manually collect the data of the use of non-GAAP earnings performance measures from firms' annual proxy filings then illustrate process of collecting data needed for regression analysis from WRDS database. I also include how I organize these data in this chapter. At last, I describe the research methodology of the regression analysis.

### 4.1 Data Collection

I manually collect details of the use of non-GAAP earnings performance measures for executives in compensation contracts of all US firms that have the term “adjusted earnings/net income” within the compensation section in their proxy filings for 2006 through 2015 annual proxy disclosures (SEC form DEF 14A). The number of total filings for this period is around 4000. I randomly select 600 filings out of them which contain 186 firms. In order to examine a comprehensive picture of this topic, I use a relative long sample period: a ten years length period from 2006 to 2015. Unlike most prior studies only focus on CEO short-term incentive contract (Black *et al.* 2015, Curtis *et al.* 2015; Potepa 2014), I examine the general use of non-GAAP earnings performance measures for executives in both short-term and long-term incentive plans. This allows me to get an integrated dataset to perform the research.

Because there is no existing digital database includes the information about the use of non-GAAP earnings performance measure in executive compensation contracts, I hand-collect the data from annual proxy filings by using a key word search method. Firstly, I search for the key word “adjusted” in each filing to identify if the firm use adjusted numbers in compensation contract. In this paper, the adjusted number means the number is adjusted from the number which is reported under U.S. GAAP, such adjusted sale, adjusted cash flow and adjusted net income. Then I carefully read the content related to the key word and make sure whether this adjusted number can be classed as non-GAAP earnings performance measure. I defined two types of adjusted numbers as non-GAAP earnings in this paper. The first type of non-GAAP earnings in this paper is defined as the adjusted numbers which are directly named “adjusted earnings/ net income/ (diluted) EPS”. The second type is the

adjusted numbers which are not directly named “adjusted earnings/ net income/ (diluted) EPS” but are provided clear reconciliation to GAAP bottom-line earnings or net income by compensation committee in the filings. The definition of non-GAAP earnings in this paper follows the spirit of the SEC guidance on Regulation G, which require firms to provide quantitative reconciliations of any financial measure that is not under U.S. GAAP to the most directly comparable GAAP financial measure (SEC Final Rule 33-8176a). Among these 600 firm-year filings, I find in 296 filings non-GAAP earnings are used as performance measures and in 3 filings the use of non-GAAP earnings is not clear. The total number of non-GAAP earnings performance measures used in my sample is 343 (because sometimes there are more than one measure in each filing).

To make the descriptive analysis more clearly, I categorize non-GAAP earnings performance measures into three classifications. Firstly, I categorize the adjusted earnings that can be reconciliated (defined by compensation committee) to GAAP net income to adjusted net income, which includes Clean Earnings, adjusted Net Income, adjusted pre-tax income, adjusted operating net income, adjusted Net Profit After Tax (NPAT), adjusted EBIT(DA), adjusted pre-tax pre-bonus income and adjusted Funds From Operations (“FFO”). Similar to adjusted Net Income, the adjusted (diluted) EPS include non-GAAP measures that have direct reconciliation to GAAP (diluted) earnings per share, such as Base Business Earnings per Share, core adjusted EPS, Currency-neutral EPS, adjusted (diluted) EPS, adjusted FFO per share and Adjusted Return on Common Equity. The last classification of non-GAAP earnings performance measures is adjusted accounting returns. Return on Investment capital (ROIC), Return on Equity (ROE), Return on Asset (ROA) and Operating Profit Return on Sales belong to this categorization. I include adjusted accounting returns because even these returns have different denominators they use adjusted net income/earnings as dividends.

After identifying if non-GAAP earnings performance measures are used in compensation contracts, I further collect the detailed information about the definition of non-GAAP earnings made by compensation committee, the type of compensation tied to certain non-GAAP compensation performance measure, the amount of GAAP and non-GAAP earnings reported in proxy filing and the weight, target, achieved number and payout of certain non-GAAP performance measure. Because compensation committee sometimes uses various

compensation structures for different executives, I especially record these differences. Lastly, I also include other types of non-GAAP measures used in compensation contract but not collect detailed information of them. It is because these are not my main study objectives.

For the data needed for the regression analysis I collect them from Wharton Research Data Services (WRDS) database. The CEO tenure data is collected from Compustat Executive Compensation data base for the period of 2004-2014. The other cooperate governance data (board members and Board affiliation) are from Institutional Shareholder Services (ISS). Because the director data before and after 2007 are existed in two different database (ISS – Directors and ISS - Directors Legacy), I download the data for the period of 2004-2006 and 2007-2014 from these two database separately and then append them into one data set. For company's financial metrics (net income, sales, intangibles and total assets), I get the data from Compustat-Capital IQ for the period of 2002-2014. I directly download financial ratio (return on assets, book to market ratio and debt to equity ratio) data from Financial Ratios Firm Level database (by WRDS) for the period of 2004-2014. After generating data that is not directly provided by these database (board independence, earnings volatility and the level of intangible assets), I merge those data into one dataset by using Committee on Uniform Security Identification Procedures (CUSIP) and year as match variables. After merging, I get 477 firm-year observations in total. Because 3 observations in the dataset have “unclear” value for the non-GAAP variable, I delete these 3 observations. Therefore the total number of firm-year observations for regression analysis in this study is 474 for 153 companies during the period of 2005-2014.

#### *4.2 Research Design for Regression analysis*

To test the hypotheses regards to the relation between the uses of non-GAAP earnings performance measure and corporate governance and future firm performance, I perform two regressions respectively. In this section, I introduce the methodology behind these two regression analyses.

My second and third hypotheses investigate the influence of corporate governance factors (power CEO and board independence) on the use of non-GAAP performance measure in executive compensation contract. To estimate this association I test the following equation:

$$\begin{aligned}
NonGAAP_t = & \alpha_0 + \alpha_1 LogTenure_{t-1} + \alpha_2 Independence_{t-1} + \alpha_3 Loss_{t-1} + \\
& \alpha_4 SDROA_{t-1} + \alpha_5 LogSales_{t-1} + \alpha_6 Intangibles_{t-1} + \alpha_7 BTM_{t-1} + \\
& \alpha_8 SalesGrowth_{t-1} + \alpha_9 DTE_{t-1} + \varepsilon
\end{aligned} \tag{1}$$

*NonGAAP* is a dummy variable which indicates the use of non-GAAP earnings performance measure in executive compensation contract. *NonGAAP* equals to 1 if the firm uses non-GAAP earnings as performance measure, and equals to 0 if the firm does not use non-GAAP earnings in executive compensation contract. The independent variables of interest are corporate governance variables: *LogTenure* and *Independence*. I use CEO tenure (*LogTenure*) to proxy CEO power, which is calculated as the log of current sample year minus the year the person become CEO. The newer CEO has less control over the firm's operation and the design of the performance measure, and CEO's power increase by the CEO tenure. *Independence* represents board independence, calculated as the number of outside directors divides the total number of directors. The larger *Independence* means the board is more independent from the management and vice versa.

I also include other possible determinants of the use of non-GAAP earnings performance measure to control for endogeneity issue. Bowen *et al.* (2005) indicate when firms experience negative earnings it is more likely to emphasis on non-GAAP earnings. I expect this tendency is also fit the use of non-GAAP earnings in compensation contract. I predict unprofitable company is more willing to use non-GAAP earnings to evaluate executive performance. Therefore I include a dummy variable *Loss*, which equals to one if the firm experiences a loss in the current period and zero otherwise. Consistent with Curtis *et al.* (2015), I also include the measure of earnings volatility (*SDROA*), because when the GAAP bottom line earnings are noisy the compensation committee might prefer to use non-GAAP earnings performance measure. *SDROA* is calculated as the standard deviation of prior three years return on assets. Thus I predict *Loss* is negatively related to the use of non-GAAP earnings performance measure in executive compensation contract and the association between earnings volatility and the use of non-GAAP earnings performance evaluation is positive.

Besides, I include other economic factors that may have influence on the board's decision of using non-GAAP earnings performance measure based on previous non-GAAP



earnings disclosure literature. I assume the decision of disclosing non-GAAP earnings could reflect a familiar tendency in the use of non-GAAP earnings performance measure. Studies indicate that larger firms are more complex and are likely to have more non-recurring and unusual activities. There is also academic evidence shows that the level of intangibles could affect non-GAAP earnings disclosure (Francis and Schipper 1999, Lev and Zarowin 1999). Therefore, I use the natural log of sales (*LogSales*) and the proportion of intangibles in total assets (*Intangibles*) to proxy firm size and the level of intangibles and include them in the regression equation to control for their effect. Furthermore, I control for firm value by including book to market ratio (*BTM*) in the regression, which is calculated as the total asset divides the market value of firm, because over-valued firm is more likely to disclose non-GAAP earning to help investors understand its market value. Lev and Zarowin (1999) show shareholders of growth firms think future option for expansion is more important than historical accounting numbers so GAAP earnings might be less value relevant to them. I use the sales growth (*SalesGrowth*) to control for growth opportunity of firm. I calculate sales growth as the sales change to prior year divided by the sales of prior year. In addition to that, firm's leverage level may also affect the informativeness of GAAP earnings because high leverage firm has greater probability of bankrupt (Hodgson and Stevenson-Clarke 2000) so I control for debt to equity ratio (*DTE*) as a measurement for leverage level. Debt to equity ratio is the ratio of total debt to common equity. In sum, I expect that firm size, the level of intangible assets, growth opportunity and leverage level are positively associated the use of non-GAAP earnings performance evaluation and the relation between book to market ratio and the use of non-GAAP earnings performance measure is negative.

Normally, compensation committee set the compensation structure and target in the year prior the compensation is granted. Thus in my test, all the independent variables measure the information in the end of the fiscal year before the compensation is earned. Because the dependent variable in this study is a dummy variable, I perform logit regression for hypothesis 2 and 3.

After testing the potential determinants of the use of non-GAAP earnings performance measure, I investigate whether the use would improve or decrease firm's future performance as proposed in the last hypothesis of this paper. I use the following OLS regression to

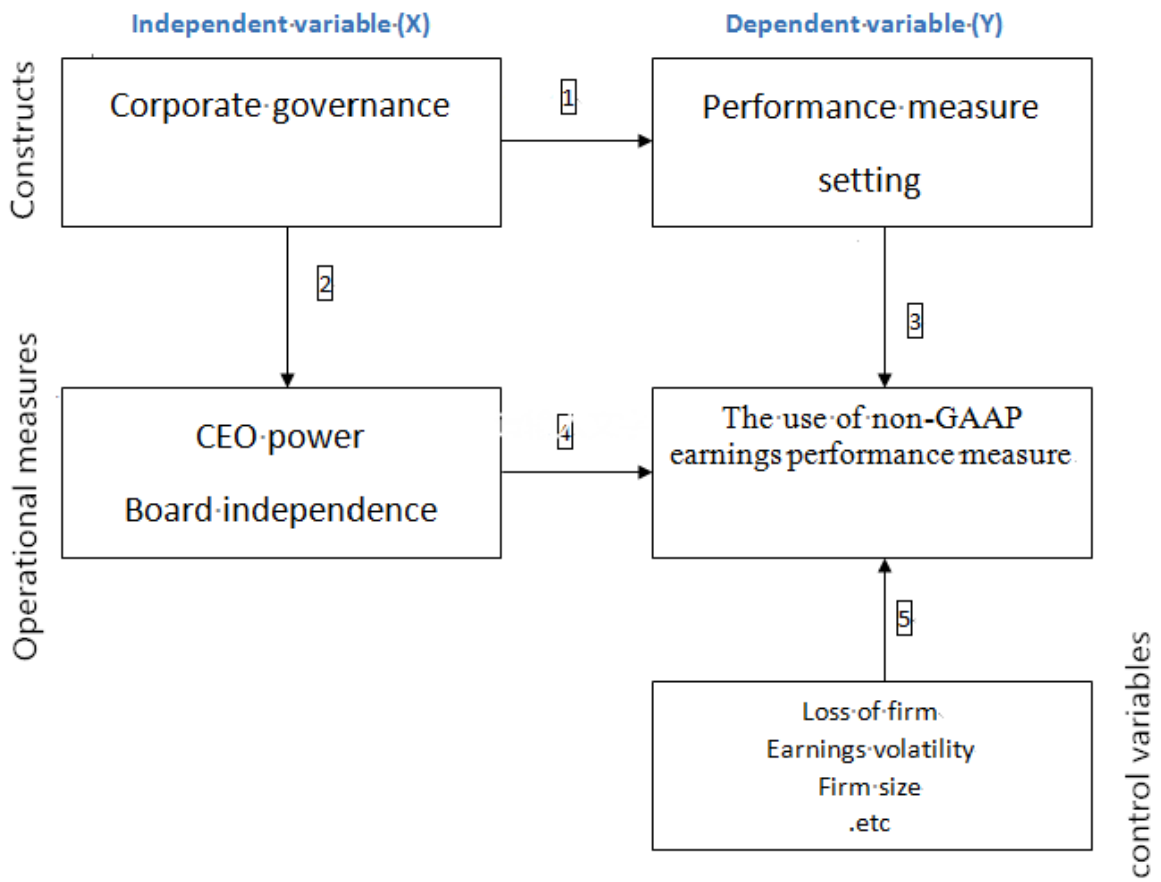
examine this relation.

$$ROA_t = \beta_0 + \beta_1 NonGAAP_t + \beta_2 ROA_{t-1} + \beta_3 SDROA_{t-1} + \beta_4 LogSales_t + \varepsilon \quad (2)$$

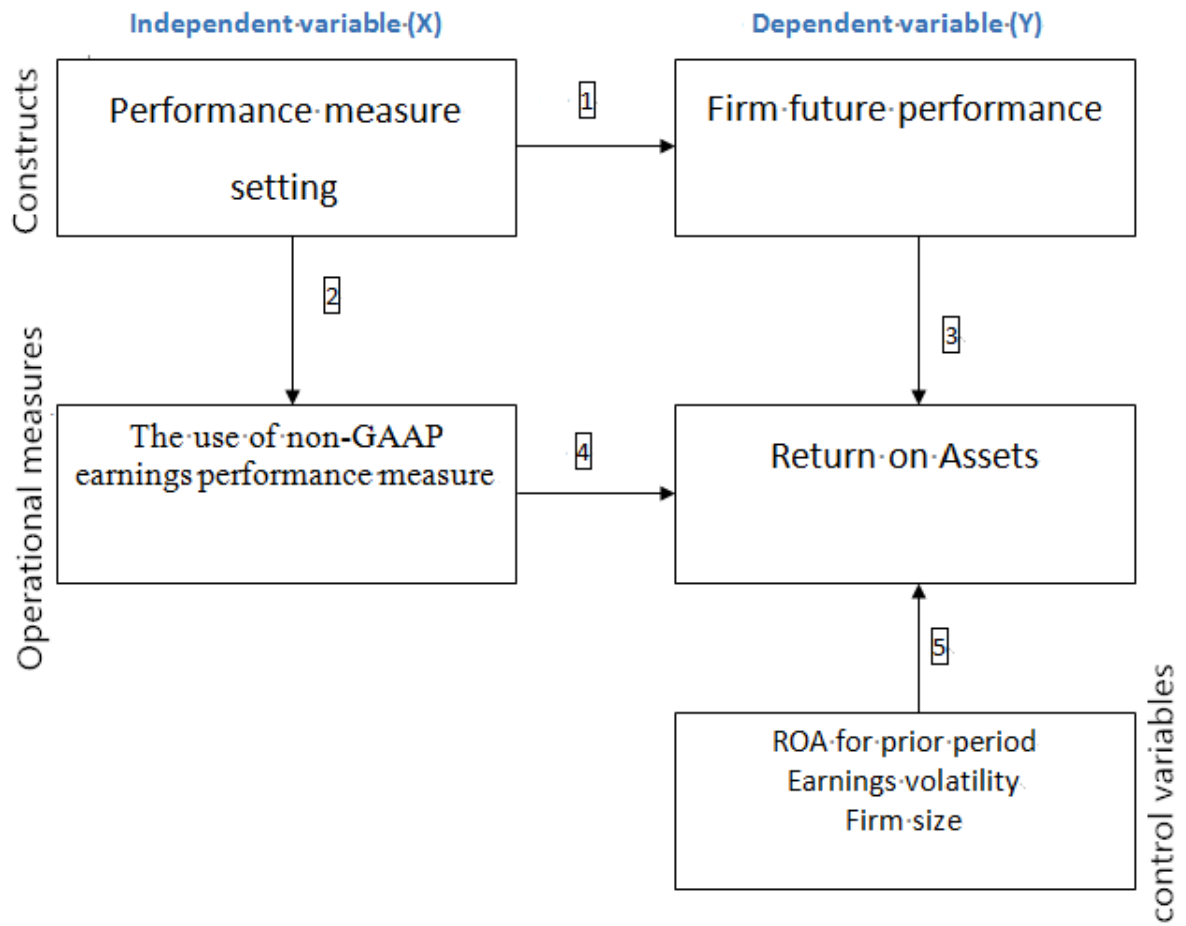
The dependent variable *ROA* (return on assets) is the measure for firm performance in year *t*. Return on asset is calculated as net income divided by total assets. The independent variable of interest is *NonGAAP* to proxy for the use of non-GAAP earnings performance measure as defined above. Because the compensation contract is set one year prior to the grant year, the influence on the firm performance takes effect in the same year with the grant 1 year. In this setting, the dependent and independent variables in this research are measured in the same period *t*. As to the control variables, I include the return of assets and the volatility of it in prior period (*ROA<sub>t-1</sub>* and *SDROA<sub>t-1</sub>*) to control for the effect of ROA in previous year(s) on the result. I also control for firm size due to the endogeneity issue by using the variable *Sales<sub>t</sub>* defined above because firm size could both affect return on assets and the use of non-GAAP earnings performance measure in compensation contract.

To better illustrate my research design, I present the following Libby boxes (predictive volatility framework) for the two research regressions discussed above.

**Figure 1: Libby box for testing hypotheses 2 and 3**



**Figure 2: Libby box for testing hypotheses 4**



## 5. Empirical Results and Analysis

The empirical study of this paper is divided into two parts. The first part (main study of this thesis) is the detailed descriptive analysis of the use of non-GAAP earnings in executive compensation contracts. The second study is the regression analysis, which is to examine cooperate governance determinates of the use of non-GAAP earnings performance measure and the relation between the use of non-GAAP earnings and firm's future performance. The results of these two kinds of analyses are discussed below.

### 5.1 Descriptive Statistics

Descriptive statistics for the variables defined above are provided in Table 1.

<b>Variable</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>
NonGAAP	0.498	0.000	0.501	0.000	1.000
LogTenure	1.519	1.609	0.837	0.000	4.111
Independence	0.821	0.867	0.105	0.462	0.947
LogSales	8.028	7.929	1.652	-0.435	11.912
Loss	0.122	0.000	0.328	0.000	1.000
Intangibles	0.243	0.192	0.215	0.000	0.790
SalesGrowth	0.109	0.040	1.134	-0.728	24.354
SDROA	0.019	0.013	0.019	0.000	0.111
BTM	0.553	0.478	0.373	0.010	3.149
DTE	3.094	1.508	9.244	-20.295	136.250
ROA	0.149	0.143	0.077	-0.034	0.369

Variable Definitions:  
NonGAAP = an indicator variable coded 1 if the firm use of non-GAAP earnings performance measure in executive compensation contract, and 0 otherwise;  
LogTenure = the log of CEO Tenure, calculated as sample year minus the year that the person became CEO;  
Independence = the independence level of firm's board, calculated as the number of independence directors divide the total number of directors in the board;

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LogSales = the log of firm's sales at the end of a fiscal year;

Loss = an indicator variable coded 1 if the net income of a firm in the end of a sample year is negative, and 0 otherwise;

Intangibles = the level of firm's intangible assets, calculated as Intangible assets divide total assets;

SalesGrowth = the growth of sales compared with prior year, calculated as the change of sales divide the sales of prior year;

SDROA = the standard deviation of prior three years return on assets;

BTM = book to market ratio, calculated as the total asset divide the market value of firm;

DTE = debt to equity ratio, calculated as total debt divide common equity; and

ROA = return on assets, calculated as net income divide total assets.

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Table 2 presents correlations among the independent and dependent variables. Unlike what I expect, there is no significant correlation between CEO tenure (*LogTenure*) and the use of non-GAAP earnings in compensation contract (*NonGAAP*). However, consistent with hypothesis 3, the correlation between board independence (*Independence*) and the use of non-GAAP earnings in compensation contract (*NonGAAP*) is positive significant. We also note that even some independent variables used in the hypotheses (i.e., *LogSales*, *Independence*, and *BTM*) are significantly correlated with each other, the values of correlation coefficient is relative low.

**Table 2**  
**Correlation Matrix**

	NonGAAP	LogTenure	Independence	LogSales	Loss	Intangibles	SalesGrowth	SDROA	BTM	DTE	ROA
NonGAAP	1.000										
LogTenure	-0.045	1.000									
Independence	0.134*	0.013	1.000								
LogSales	0.164*	-0.045	0.221*	1.000							
Loss	-0.114*	-0.034	-0.103	-0.284*	1.000						
Intangibles	0.048	-0.073	0.072	0.024	-0.095*	1.000					
SalesGrowth	-0.045	0.093	-0.086	-0.095*	0.108*	-0.051	1.000				
SDROA	-0.010	0.073	-0.082	-0.194*	0.209*	-0.174*	0.076	1.000			
BTM	-0.180*	0.030	-0.212*	-0.266*	0.221*	-0.132*	-0.135*	-0.010	1.000		
DTE	-0.032	0.018	0.022	-0.011	0.120*	-0.014	-0.101*	-0.031	-0.072	1.000	
ROA	0.175*	-0.008	0.118*	0.245*	-0.219*	0.246*	0.185*	0.125*	-0.614*	-0.045	1.000

\*, \*\*, \*\*\* Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively (all tests two-tailed).

**Variable Definitions:**

NonGAAP = an indicator variable coded 1 if the firm use of non-GAAP earnings performance measure in executive compensation contract, and 0 otherwise;

LogTenure = the log of CEO Tenure, calculated as sample year minus the year that the person became CEO;

Independence = the independence level of firm's board, calculated as the number of independence directors divide the total number of directors on the board;

LogSales = the log of firm's sales at the end of a fiscal year;

Loss = an indicator variable coded 1 if the net income of a firm in the end of a sample year is negative, and 0 otherwise;

Intangibles = the level of firm's intangible assets, calculated as Intangible assets divide total assets;

SalesGrowth = the growth of sales compared with prior year, calculated as the change of sales divide the sales of prior year;

SDROA = the standard deviation of prior three years return on assets;

BTM = book to market ratio, calculated as the total asset divide the market value of firm;

DTE = debt to equity ratio, calculated as total debt divide common equity; and

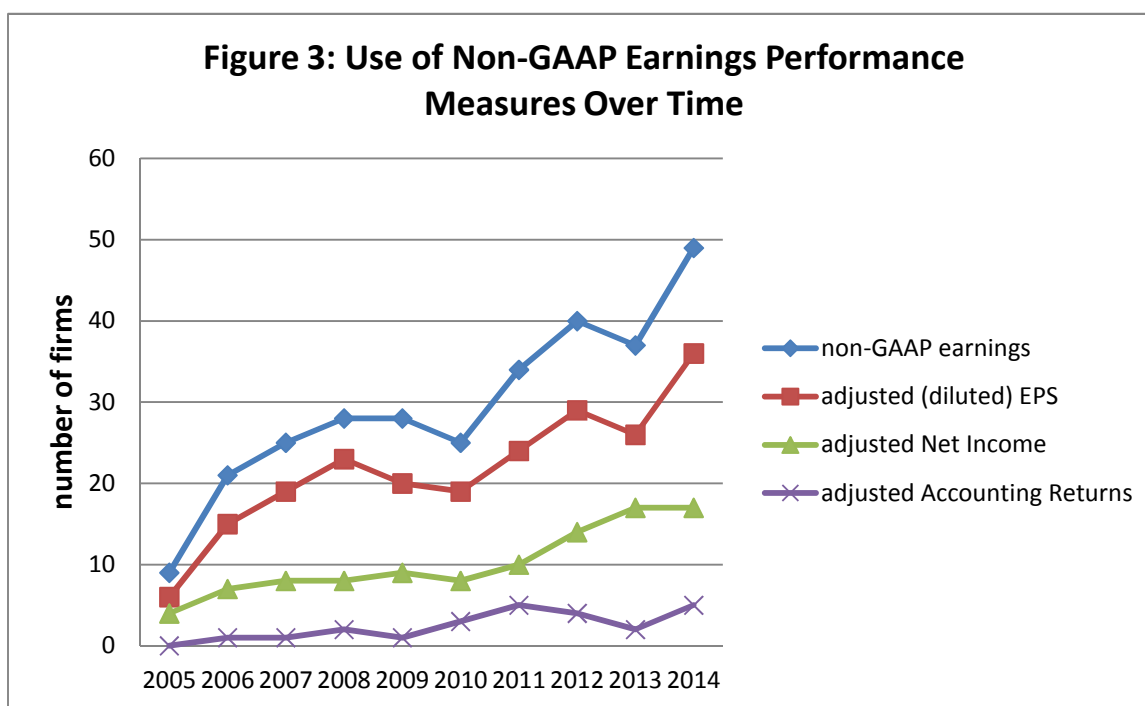
ROA = return on assets, calculated as net income divide total assets.

## *5.2 Descriptive analysis of the use of non-GAAP earnings in compensation contracts*

In this part, I make a general descriptive analysis of the use of non-GAAP earnings performance measures in compensation contract by using my hand-collected data sample. I especially examine the trend of the use across time, the distribution of the use by industries, the distribution of the use in short-term and long-term incentive plans and the weights of different non-GAAP earnings performance measures. The results are illustrated in flowing passages.

Figure 3, as showed below, illustrates the trend of using non-GAAP earnings performance measures over the period of 2005-2014. Because the fillings represent last years' compensation contract, the fillings during the year 2006-2015 actually reflect the use of non-GAAP earnings in the period of 2005-2014. This is why the sample period used in the Figure 3 is 2005-2014. Generally speaking, the number of companies that employ non-GAAP earnings as performance measures in compensation contracts had increased from 9 in 2005 to 49 in 2014 although the number slightly dropped in 2010 and 2013 respectively. There are also upward trends for the use of adjusted (diluted) EPS, adjusted Net Income and adjusted Accounting Returns during this ten-year period. Starting from 6 and 4 in 2005, the number of firms uses adjusted (diluted) EPS and adjusted Net Income grow to 36 and 17 respectively at the end of sample period.





Note: the number of observations is 296.

The following Table 3 shows the proportion of firms use adjusted (diluted) EPS, adjusted Net Income and adjusted Accounting Returns in each sample year. According to Table 3, I find that among these three categorizations of non-GAAP earnings, firms mainly use adjusted (diluted) EPS performance measures in their compensation contracts, which accounts for 73.05% of observations on average. The following measure is adjusted Net Income with around average 34.75% of observations using it as incentive measure. While companies are less likely to use adjusted Accounting Returns as executive performance measure. On average only 7.18% of sample observations use it from 2005 to 2014.

**Table 3 Year Distributions of Non-GAAP Performance Measures**

This table shows the percentage of firms using specific non-GAAP earnings performance measures in compensation contracts during the sample period.

Year	adjusted (diluted) EPS	adjusted Net Income	adjusted Accounting Returns
2005	66.67%	44.44%	0.00%
2006	71.43%	33.33%	4.76%
2007	76.00%	32.00%	4.00%
2008	82.14%	28.57%	7.14%
2009	71.43%	32.14%	3.57%
2010	76.00%	32.00%	12.00%
2011	70.59%	29.41%	14.71%

2012	72.50%	35.00%	10.00%
2013	70.27%	45.95%	5.41%
2014	73.47%	34.69%	10.20%
Average	73.05%	34.75%	7.18%
Observations		296	

I further exam the distribution of the use on non-GAAP earnings performance measures in different industries. I use Standard Industrial Classification (SIC) code to separate firms into different industries. Table 4 illustrates the number and percentage of firm-years of each industry that use non-GAAP earnings performance measures. As we can see from the Table 4, a relative larger portion of non-GAAP earnings performance measures is concentrated in Consumer Products (18.58%), Electronics & Machinery (20.95%) and Health Care & Insurance (17.23%) industries. Manufacturing & Construction and Natural Resources industries occupy smaller percentages with 13.51% and 14.19% of observations using non-GAAP earnings performance measures. The other six industries, however, only account for 15.54% of observations in total. This indicates that the use of non-GAAP earnings performance measures clusters in several industries. Previous studies document that some industries are more likely disclose non-GAAP earnings as a supplement to GAAP numbers, such as high-tech firms and intangible-intensive firms (Zhang and Zheng 2011, Black *et al.* 2017). In this paper, I also test if this character exists in the use of non-GAAP earnings performance measures for executives in compensation contracts. In contrast with the voluntary disclosure of non-GAAP earnings, I don't find massive use of non-GAAP earnings performance measures in high-tech firms and intangible-intensive firms, which is not consistent with hypothesis 1. There are only 12.16% and 1.69% of observations in Intangible-intensive and high-tech firms use non-GAAP earnings in their compensation contracts respectively. This result indicates that unlike the voluntary disclosure of non-GAAP earnings, high-tech and intangible-intensive firms do prefer to use of non-GAAP earnings performance measure in executive compensation contract.

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**Table 4 Industry Distribution of Use of Non-GAAP Earnings Performance Measures**

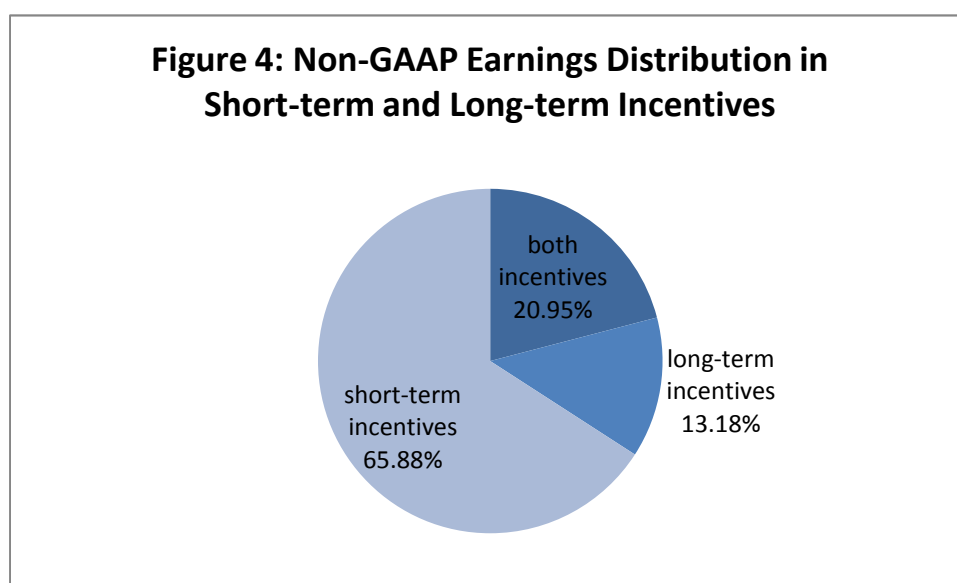
This table shows the distribution of the use of non-GAAP earnings performance measures by industry. Following prior non-GAAP disclosure literature I especially examine intangible-intensive industry and

high-tech industry.

Industry	No. of firm-years	% Of sample
Computers & Office Equipment	1	0.34%
Consumer Products	55	18.58%
Electronics & Machinery	62	20.95%
Financial Services	8	2.70%
Health Care & Insurance	51	17.23%
Manufacturing & Construction	40	13.51%
Natural Resources	42	14.19%
Real Estate & Business Services	3	1.01%
Small Business	10	3.38%
Telecommunications	2	0.68%
Transportation & Leisure	22	7.43%
<b>Observations</b>	<b>296</b>	<b>100.00%</b>
Intangible-intensive firm	36	12.16%
High-technology (high-tech) firm	5	1.69%

Notes: The sample consists of 296 firm-year data from 2005 to 2014. Individual industries are defined by SEC. High-tech firms are as defined in Francis and Schipper (1999). Intangible-intensive firms are as defined in Collins *et al.* (1997).

Consistent with Schmidt and Reda (2017), I also find firms are more likely to use non-GAAP earnings performance measures in short-term incentive. Figure 4 indicates that in 86.82% of observations, non-GAAP metrics are used in short-term incentive plans, whereas only 34.12% of observations use non-GAAP earnings performance measures in long-term incentive plans. Around 13.18% of firm-years employ non-GAAP earnings to evaluate executives' performance in both short-term incentive plans.



Note: the number of observations is 296.

The last important descriptive finding of non-GAAP earnings metrics is the weights of different measures in executive compensation plans. Table 5 reports that majority of observations (70.87%) use non-GAAP earnings as major performance measures (weight more than 50%). 26.13% of total observations use non-GAAP earnings as single performance measures in executive incentive plans. Namely, the weights of these non-GAAP performance measures are equal to 100%. The most striking finding is that among these three measures, firms tend to put more weights on EPS performance measure, with about a half (48.95%) of observations using it as major measure.

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**Table 5 Frequencies and Weights of Non-GAAP Earnings Performance Measures**

This table reports the frequencies and weights of all non-GAAP performance measures used in the executive compensation contracts for sample of firm-measure-weights for fiscal years 2005-2014. The number of total observations is 333.

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	<i>Any Use (N=333)</i>	Frequency (%)	
		Use as Single Measure (N=87)	Use as Major Measure (>50%, N=236)
adjusted (diluted) EPS	65.77	15.92	48.95
adjusted Net Income	28.23	9.61	18.92
adjusted Accounting Returns	6.01	0.60	3.00
Non-GAAP earnings	100	26.13	70.87
Observations		333	

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I further examine if firms put different weights of non-GAAP earnings performance measures for different executives. Table 6 illustrates that in 11.49% of observations, CEOs have specific weight on non-GAAP earnings performance measures. Approximately 16.89% of observations do not set same weight for all NEOs. Majority observations (82.43%) give all NEOs same weight of non-GAAP earnings performance measures.

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**Table 6 Distribution of Use of non-GAAP Earnings by Executives**

This table illustrates the number and percentage of samples set different weights of non-GAAP earnings

performance measures to different kinds of executives. CEO represents the firm that sets special weight for CEO. Not all NEOs represents firm that do not set same weight of non-GAAP metrics for all NEOs, whereas ALL NEOs represents all NEOs have same weight of specific performance measure.

	No. of firm-years	% Of sample
CEO	34	11.49%
Not all NEOs	50	16.89%
All NEOs	244	82.43%
Observations	296	100.00%

Firms also use other non-GAAP metrics to measure executive performance, such as adjusted Cash Flow from Operations, adjusted book value, adjusted sales growth and adjusted (Operating) Revenue. They mostly belong to cash flow and sales/revenue accounting metrics. Since in this study I only focus on earnings metrics, I don't deeply examine the detail use of these non-GAAP cash flow and sales (revenue) performance measures in executive compensation contracts.

### 5.3 Regression analysis

I first examine whether corporate governance factors (CEO tenure and board independence) would have influence on the use non-GAAP performance measure in executive compensation contract (hypothesis 2 and hypothesis 3). I use logit regression to test this question and the regression results are displayed in Table 7. Unlike my prediction, even though CEO tenure (*LogTenure*) is negatively related to the use of non-GAAP earnings performance measure and board independence (*Independence*) is positively related to the use of non-GAAP earnings, these results are not statistically significant. This indicates that the influence of CEO tenure and board independent on the use of non-GAAP earnings performance measure is not statically significant. One possible explanation for the contrary results is that in practice corporate governance characteristics (CEO tenure and board independence) are not decisive factors for compensation committee making the decision of using non-GAAP earnings performance measure in executive compensation contract.

Among the control variables, some of them show significant results. Firm's sales (*LogSales*), which is the measurement for firm size, is positively associated with the use of non-GAAP performance measure. The coefficient is significant at 10% significance level.

This result suggests that when firm size increases 1% the probability of firm using non-GAAP earnings performance measure in executive compensation contract also increases 0.204%, which is consistent with the prediction that the likelihood of firm using non-GAAP earnings performance measure increases with firm size. Besides, as I expect, the book to market ratio (*BTM*) is significantly negatively associated with the use of non-GAAP earnings performance measure (at 5% significance level). When the book to market ratio decreases 1% the probability of firm using non-GAAP earnings performance measure increases 0.968%. This is probably because the over-valued firms may think the GAAP earnings cannot reflect its real firm performance. They tend to use the non-GAAP earnings, which are considered to reflect their true performance, as the executive performance measure in compensation contract. In sum, the compensation committee of over-valued firm might think that non-GAAP earnings are less noisy measures. For the other control variables, the coefficients are not statistically significant.

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**Table 7**

**Regression of the use of non-GAAP earnings performance measure on CEO tenure and board independence**

	Direction of predicted association	Coefficient (z-statistics)
<b>LogTenure<sub>t-1</sub></b>	?	-0.113 (-0.73)
<b>Independence<sub>t-1</sub></b>	?	1.719 (1.37)
LogSales <sub>t-1</sub>	+	0.204* (1.94)
Loss <sub>t-1</sub>	-	-0.192 (-0.34)
Intangibles <sub>t-1</sub>	+	0.746 (1.22)
SalesGrowth <sub>t-1</sub>	+	0.395

		(0.39)
SDROA <sub>t-1</sub>	+	12.47
		(1.62)
BTM <sub>t-1</sub>	-	-0.968**
		(-2.23)
DTE <sub>t-1</sub>	-	-0.0653
		(-1.59)
Constant		-2.686
		(-1.88)
Observations		291
Pseudo R-squared		0.069

\*, \*\*, \*\*\* Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively (all tests two- tailed).

This table reports the estimates from the logit regression based on the following model:

$$NonGAAP_t = \alpha_0 + \alpha_1 LogTenure_{t-1} + \alpha_2 Independence_{t-1} + \alpha_3 Loss_{t-1} + \alpha_4 SDROA_{t-1} + \alpha_5 LogSales_{t-1} + \alpha_6 Intangibles_{t-1} + \alpha_7 BTM_{t-1} + \alpha_8 SalesGrowth_{t-1} + \alpha_9 DTE_{t-1} + \varepsilon$$

Coefficients and z-statistics (in parentheses) are provided for each variable.

Variable Definitions:

NonGAAP = an indicator variable coded 1 if the firm use of non-GAAP earnings performance measure in executive compensation contract, and 0 otherwise;

LogTenure = the log of CEO Tenure, calculated as sample year minus the year that the person became CEO;

Independence = the independence level of firm's board, calculated as the number of independence directors divide the total number of directors in the board;

LogSales = the log of firm's sales at the end of a fiscal year;

Loss = an indicator variable coded 1 if the net income of a firm in the end of a sample year is negative, and 0 otherwise;

Intangibles = the level of firm's intangible assets, calculated as Intangible assets divide total assets;

SalesGrowth = the growth of sales compared with prior year, calculated as the change of sales divide the sales of prior year;

SDROA = the standard deviation of prior three years return on assets;

BTM = book to market ratio, calculated as the total asset divide the market value of firm; and

DTE = debt to equity ratio, calculated as total debt divide common equity.

Secondly, I test if the committee's decision of using non-GAAP earnings performance measure can better incent managers and thus increases future firm performance. I use OLS

regression to examine this question, and the results are showed in Table 8. Unlike my prediction in hypothesis 4, there is no significant relation between the use of non-GAAP performance measure and future firm performance. This result indicates that the use of non-GAAP earnings performance measure cannot better incent executives and does not lead to a significant increase in future firm performance. One possible explanation is that the use of non-GAAP earnings performance measure in compensation contract fails to mitigate the agency problem and lower agency cost.

**Table 8**

**Tests of the association between future performance and the use of non-GAAP earnings performance measure**

	Coefficient (t-statistics)
<b>NonGAAP</b>	0.00339 (0.89)
$ROA_{t-1}$	0.881*** (34.31)
$SDROA_{t-1}$	0.286*** (2.87)
LogSales	-0.00125 (-0.85)
Constant	0.0211 (1.70)
Observations	364
Adjusted R-squared	0.787

\*, \*\*, \*\*\* Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively (all tests two- tailed).

This table reports the estimates from the OLS regression based on the following model:

$$ROA_t = \beta_0 + \beta_1 NonGAAP_t + \beta_2 ROA_{t-1} + \beta_3 SDROA_{t-1} + \beta_4 LogSales_t + \varepsilon \quad (2)$$

Coefficients and t-statistics (in parentheses) are provided for each variable.

Variable Definitions:

ROA = return on assets, calculated as net income divide total assets;



NonGAAP = an indicator variable coded 1 if the firm use of non-GAAP earnings performance measure in executive compensation contract, and 0 otherwise;

SDROA = the standard deviation of prior three years return on assets; and

LogSales = the log of firm's sales at the end of a fiscal year;

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## 6. Conclusions

In this paper, I mainly examine how non-GAAP earnings are used in executive compensation contract. Furthermore, I test the corporate governance determinants (CEO tenure and board independence) of the use of non-GAAP earnings performance measure and whether the use of non-GAAP earnings performance measure would lead to a better firm future performance.

To answer the first research question, I perform the descriptive analysis and find several important results. First of all, the number of companies that employ non-GAAP earnings as performance measures in compensation contracts had increased from 9 in 2005 to 49 in 2014. Secondly, the results show that most firms (73.05%) use adjusted (diluted) EPS performance measures in their compensation contracts. The following measures are adjusted Net Income (34.75%) and adjusted Accounting Returns (7.18%). Thirdly, I find that the use of non-GAAP earnings performance measure clusters in Consumer Products (18.58%), Electronics & Machinery (20.95%) and Health Care & Insurance (17.23%) industries. However, inconsistent with my first hypothesis, Intangible-intensive and high-tech firms are not more likely to use non-GAAP earnings as performance measure in executive compensation contract. Fourthly, evidence shows that firms are more likely to use non-GAAP earnings performance measures in short-term incentive (86.82%) plans, whereas only 34.12% of observations use non-GAAP earnings performance measures in long-term incentive plans. Lastly, I find a large proportion of observations (70.87%) use non-GAAP earnings as major performance measures (weight more than 50%) and 26.13% of total sample use non-GAAP earnings as single performance measure (weight equals to 100%). This suggests that once firm use non-GAAP earnings performance measure, the non-GAAP measure is highly likely to be used as the major measure or single measure.

From the results of regression analysis, I find CEO tenure and board independence are not significant related to the use of non-GAAP earnings performance measure. Firm size which measured by sales is positively associated with the use of non-GAAP performance measure, which is consistent with my prediction. This indicates that larger firm is more likely to use non-GAAP earnings performance measure. Furthermore, consistent with my

expectation, the book to market ratio is significantly negatively associated with the use of non-GAAP earnings performance measure. This result shows that over-valued firm more prefer to use non-GAAP earnings to evaluate executive's performance. Unlike my prediction in hypothesis 4, there is no significant relation between the use of non-GAAP performance measure and future firm performance. This result indicates that the use of non-GAAP earnings performance measure cannot better incent executives.

This study contributes to 3 different areas. First of all, this paper fills the blank of the study about the use of non-GAAP earnings performance measure in executive compensation. It is a relative new research topic among studies of non-GAAP earnings and corporate governance. This paper not only provides descriptive evidence of the use of non-GAAP earnings performance measure but also examine the relation between corporate governance and performance measure. Secondly, the results provided by this paper are useful to firm's compensation committee. The committee could make a more effective compensation contract by understanding the results of this paper. Lastly, for regulators and investors, they do not need to control for CEO's opportunistic use of non-GAAP earnings performance measure, because the CEO power and board independence are not significantly related to the use of non-GAAP earnings performance measure.

The main limitation of this study is the sample size, which is relatively small. When I exam the distribution of non-GAAP earnings performance measure across years and industries, the sample size seems not enough even I have 600 fillings in total. This is because Only 296 observations use non-GAAP earnings as performance measure. When they are divided into different years or industries, the numbers of observations are all less than 50 and some are even less than 10. Secondly, the fillings have already been selected before I perform this study, because the fillings I get all have the term "adjusted earnings/net income" within the compensation section. This could bias my empirical results. Also, I could not examine the relative proportion of the firms using non-GAAP earnings performance measure in a certain year or industry because of this bias sample. Lastly, there could be some errors in my dataset. Although I try my best to control the accuracy of the data, the hand-collected data of the use of non-GAAP earnings performance measure may still has errors.

For the Future research, I have several suggestions. Firstly, future studies could examine

the target setting for non-GAAP earnings performance measure. They can further compare the target setting for GAAP and non-GAAP earnings performance measure. Researchers could investigate whether the non-GAAP earnings target is easier or more difficult to be achieved. Besides, whether the payout under non-GAAP earnings performance measure is different with the payout under GAAP earnings performance measure is also an interesting topic for future examination. Lastly, because this paper fails to find the corporate governance determinants of the use of non-GAAP earnings performance measure, further studies could also work on finding the determinants of using non-GAAP evaluation measure.

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