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Revised Non-GAAP Guidance:
Effect on the Informativeness and Disclosure Practices of GAAP and Non-GAAP earnings

Master Thesis

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Abstract

This study aims to provide insights into the effects of SEC's revised non-GAAP guidance of 2016. Using a sample of 29,162 firm-quarter observations, this study finds that firms decreased their non-GAAP earnings issuance, and the spread between GAAP and non-GAAP earnings also decreased. Moreover, investors respond less to non-GAAP earnings surprises and more to GAAP earnings surprises in the post-period. Suggesting that the quality of non-GAAP earnings decreased which led to investors focus more on GAAP earnings. The results show that firms are more likely to meet/beat analysts' forecasts in the post-period. However, the increase in probability was not associated with increasing exclusions of income-decreasing items. This indicates that management use other forms of earnings management when it becomes too costly to (mis)use non-GAAP exclusions as a way to increase non-GAAP earnings.

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1. Introduction

After the Enron scandal in 2001, regulators developed Generally Accepted Accounting Principles (GAAP) as a tool to standardize financial reporting and to improve the credibility of financial reports. Earnings that are reported under these principles are called GAAP earnings. In 2003, the Securities and Exchange Commission (SEC) adopted Regulation G as part of the Sarbanes-Oxley Act. Under Regulation G, public companies can still issue non-GAAP (adjusted or pro forma[1]) earnings only if they meet the requirements under Regulation G. However, there were concerns that Regulation G were limiting managers' ability to provide informative earnings information. Hence, regulators adopted interpretive non-GAAP guidance (C&DIs[2]) in 2010 to diminish the restrictions of existing non-GAAP regulations.

In recent years, managers have increasingly disclosed non-GAAP metrics next to their GAAP earnings in their financial reports. They claim that non-GAAP earnings give a better view of the firm's operating performance than GAAP earnings because it excludes noncash and unusual items from GAAP earnings. However, regulators have expressed their concerns on the use of non-GAAP. They argue that managers disclose non-GAAP earnings to obscure bad performance, and thereby mislead investors. SEC's chairman, Mary Jo White, is concerned that investors focus solely on non-GAAP figures and neglect the essence of GAAP earnings (Shumsky, 2016). The increasingly widening spread between GAAP and non-GAAP earnings have further raised regulators' concerns, and prompted the SEC to revise its existing guidance regarding the use of non-GAAP disclosures on May 17, 2016. The most prominent changes involve stricter guidance and interpretations on the use of adjusted earnings measures as well as limitations on placing emphasis on the most favorable earnings metric in financial reports. The latter is a response to concerns that investors are misled by emphasized earnings information.

This study investigates the effect of 2016's revised non-GAAP guidance on the perceived informativeness, and disclosure practices of GAAP and non-GAAP earnings. More specifically, it examines the effect on the (1) frequency of non-GAAP reporting, (2) spread between GAAP and non-GAAP earnings, (3) quality of non-GAAP exclusions, (4) probability of non-GAAP earnings meeting/beating analysts' forecasts, and (5) perceived GAAP and non-GAAP earnings informativeness. The aim of this research is to answer the following question: *What is the effect of the newly revised non-GAAP guidance on GAAP and non-GAAP earnings informativeness and disclosure behavior?*

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[1] Non-GAAP, adjusted and pro forma earnings will be used interchangeably throughout this study. They refer to earnings deferring from GAAP.

[2] C&DIs stand for Compliance & Disclosure Interpretations which provide insights into how each SEC regulation should be interpreted.

The motivation for this study comes from the fact that there is little known to what the actual effect of 2016's modified non-GAAP guidance is since it is introduced recently. It is useful to determine whether the regulations increase or decrease earnings quality, and how it will affect investors' and management's behavior. Past research has focused on the effect of 2003's Regulation G and 2010's Compliance and Disclosure Interpretations (C&DIs). Their findings suggest that Regulation G decreased the overall "opportunistic" behavior of management, which indicates that firms are issuing non-GAAP earnings as a way to inform investors rather than to mislead. However, the results of C&DIs are mixed. Some do find that they are decreasing "opportunistic" behavior but at a lower rate than Regulation G. This is related to the fact that C&DIs are interpretive and serve more as of a guidance, while Regulation G is restrictive. Other studies find that the earnings quality of non-GAAP earnings decreases, while others find that they are increasing. Thus, it is unclear what the effect of the newly modified non-GAAP guidance will be based on findings from past literature. The outcome of this study will provide regulators a better understanding regarding the effect of non-GAAP regulations. More specifically, it will determine whether the newly issued guidance has achieved its intended purpose which is decreasing the frequency of non-GAAP earnings issuance, decreasing the spread between GAAP and non-GAAP earnings, and decreasing "opportunistic" behavior of management.

Using a sample of 19,162 firm-quarter observations during the period 2013 to 2016, this study indeed finds that the frequency and spread of non-GAAP earnings decreased. Suggesting that increased scrutiny and modified non-GAAP guidance have made firms reconsider their use of non-GAAP earnings. However, the results also indicate that firms have increased their "opportunistic" behavior rather than decreased. This is reflected by the increase in income-decreasing exclusions (i.e. other items). Thus, firms are more likely to exclude (non-)recurring expenses in the post-period when constructing non-GAAP earnings, which ultimately leads to higher earnings than under GAAP. Furthermore, firms are also more likely to meet/beat analysts' earnings forecasts in the post-period. But, this association is not related to an increase in income-decreasing exclusions. This suggests that management use other forms of earnings management to exceed earnings expectations. Even though the modified non-GAAP guidance reduced the frequency of non-GAAP earnings and the spread, it didn't manage to reduce the "opportunistic" behavior of management. However, test results of the final hypothesis indicate that investors are being more skeptical when facing with earnings surprises based on non-GAAP earnings. They perceive GAAP earnings more informative in the post-period and non-GAAP earnings less. This suggests that investors are aware that non-GAAP earnings are of lower quality, and thereby discount them accordingly. Overall, this study suggests that the modified non-GAAP guidance limited the frequency and magnitude of non-GAAP earnings. But, also led to

some unintended effects such as lower non-GAAP earnings quality and management switching to other earnings management tools.

The findings from this study contributes in several ways. First, it extends the framework of Doyle et al. (2003), Kolev et al. (2008) and Bond et al. (2017) to newly issued non-GAAP regulations. It is important to examine what the effects of these modified non-GAAP guidance are since past literature mainly focused on the effects of Regulation G and 2010's C&DIs. Second, it combines multiple research properties into one study. Past research either focused on one or two areas regarding the effects of non-GAAP regulations, whereas this study examines multiple dimensions at once. This provides regulators a better understanding on the potential consequences of modifying existing non-GAAP regulations. Moreover, it examines whether the intended purposes are achieved. Third, it contributes to the existing debate regarding management's motivations on the use of non-GAAP earnings. It suggests that non-GAAP earnings are used to meet earnings expectations but that this relation is diminished after the issuance of the modified non-GAAP legislations.

Remainder of this study is organized as follows. Section 2 discusses past literature and background information on non-GAAP earnings, and its regulations. Further, it elaborates on the development of the hypotheses. Section 3 describes the sample selection process and variable measurements. Moreover, it discusses the empirical models used in this research. The descriptive statistics and results of the regression models are presented in section 4. Robustness tests are provided in section 5. And finally, section 6 presents the conclusion of this study.

2. Background Literature and Hypotheses Development

This section first explains the concept of non-GAAP earnings and the corresponding SEC regulations. Second, it discusses the motivations regarding the use of non-GAAP disclosures. It elaborates on the ongoing debate between managers and regulators on the use of non-GAAP earnings. Several studies have examined the motives and usefulness of non-GAAP earnings metrics. Their findings are being divided into two research streams/hypotheses, namely the information hypothesis and the opportunism hypothesis. Moreover, this section elaborates on a number of studies regarding the role of increased emphasis on pro forma earnings. Further, it discusses the proxy measures of GAAP and non-GAAP earnings used in prior studies. And finally, this section concludes with the development of the hypotheses.

2.1 Background on non-GAAP reporting and SEC regulations

Since the adoption of SOX in 2001, companies are required to report earnings under GAAP. This framework was established after the major accounting scandal at Enron. The Enron scandal raised public scrutiny and demand for stricter accounting regulations. At the same time, investors are concerned that earnings reported under GAAP are not entirely representative of a firm's true value (Henry et al., 2017) because GAAP earnings includes non-cash items and/or items that do not occur in subsequent years (hereafter, non-recurrent or transitory or irregular items). For example, when a firm incurs one-time costs due to a reorganization. It must write off these large costs which deteriorate net income. Moreover, GAAP earnings are based on the accrual accounting principle. This means that revenues (expenses) are recorded when they are earned (incurred) and not when cash is paid. Since the GAAP framework is a rule-based legislation, firms are required to meet its conditions. However, managers argue that this form of accounting does not represent their company performance correctly and induces less informative earnings. Therefore, firms continued to report non-GAAP earnings under the reasoning that non-GAAP earnings are more value relevant for investors than GAAP figures.

Pro forma earnings do not meet standard GAAP requirements, but are computed using company's own accounting methods and assumptions. These non-GAAP earnings are often derived by excluding non-recurring items from GAAP earnings (Curtis et al., 2014). The most commonly used measure for non-GAAP earnings is Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA) (Henry et al., 2017). This measure adds non-cash and non-operating expenses back to operating earnings. In other words, this form of accounting takes only recurring cash transactions into account that are related to daily business operations. However, there are cases that managers also exclude recurrent items from their non-GAAP computation because they want to "smooth" earnings (Doyle et al., 2003). Because, non-GAAP earnings are

not being audited and subject to less regulations, it is easy for firms to exclude recurring expenses by labeling them as "non-cash" or "non-operating" which automatically increases non-GAAP earnings. Correspondingly, the SEC issued regulations on the use of non-GAAP earnings metrics in 2003 (Henry et al., 2017). Under Regulation G and Item 10(e) of Regulation S-K, firms are permitted to present pro forma earnings in their financial reports under the condition that they are not misleading. When a company decides to issue non-GAAP earnings disclosures, it is required to include the directly comparable GAAP earnings measure and a reconciliation of the non-GAAP to GAAP result in their company filings (SEC, 2002). These regulations also prohibit firms from excluding "recurring items" that are likely to reoccur within two years and/or has happened in the last two years (Henry et al., 2017).

After the adoption of Regulation G, firms decreased their pro forma earnings disclosures due to increased scrutiny from authority, stricter non-GAAP accounting regulations and increased administrative burden (Heflin and Hsu, 2008). But, in 2010, the SEC has loosened its restrictions because they were worried that companies were being limited in their ability to provide useful information to market participants due to the rigorous pro forma reporting regulations (Henry et al., 2017). The SEC issued principles-based legislation, specified as new non-GAAP Compliance and Disclosure Interpretations (C&DIs), in 2010. One of the modifications in these C&DIs is that it eliminated the requirement to demonstrate the usefulness of every exclusion involving recurring items (Bond et al., 2017). Under Regulation G, managers had to prove that excluding a certain recurring item from GAAP earnings resulted in more informative non-GAAP earnings. This made it difficult for firms to make appropriate adjustments against GAAP earnings, when it is not justified under Regulation G. Hence, resulting in less informative financial information. The newly issued non-GAAP guidance (C&DIs) allowed firms to make adjustments more easily, because this guidance is based on principles. It has a less restrictive character than Regulation G which is a rule based legislation. C&DIs gave managers more flexibility to arrive at the non-GAAP financial measure that they define as appropriate and most relevant (Henry et al., 2017). However, critics are concerned that firms misuse these principles-based non-GAAP guidance to create higher earnings. Since this legislation is interpretive and non-statutory, firms experience more freedom when issuing non-GAAP earnings than before. As a result of the modified regulations, firms have increased their non-GAAP disclosure practices in recent years (Ford, 2016). This brings us to the underlying question as to why companies choose to issue pro forma earnings disclosures.

2.2 Non-GAAP reporting motivations

2.2.1 Information hypothesis

Past literature suggests two reasons as to why firms report non-GAAP earnings information. The first motivation is to provide informative and relevant financial information to investors. Managers want to avoid the possibility that investors underprice (or overprice) their shares due to incomplete or incorrect information (Johnson and Schwatz, 2001). If managers believe that earnings reported under GAAP do not capture the true value of the company, they will likely turn to non-GAAP reporting. Managers claim that non-GAAP earnings represent the state of the company better, and are helpful for investors and analysts to forecast future firm performance (Curtis et al., 2014). Because it excludes non-recurring items from the original GAAP earnings, it results in more consistent and relevant earnings than under GAAP.

Several studies related GAAP and non-GAAP earnings announcements to abnormal stock returns in an attempt to find evidence on the differences in level of informativeness and value relevance between the two earnings metrics. The study of Bradshaw and Sloan (2002) show that stock returns are less associated with GAAP earnings than with non-GAAP earnings. Their findings suggest that the public value non-GAAP earnings more relevant and informative than GAAP earnings. Choi et al. (2007) suggest that the majority of transitory exclusions made by management are appropriate adjustments from GAAP earnings, resulting in non-GAAP earnings that are more informative than under GAAP. Other studies also find evidence supporting manager's claim that companies disclose non-GAAP earnings to better inform market participants about firms' future performance (e.g. Johnson and Schwatz, 2001; Lougee and Marquardt, 2004).

2.2.2 Opportunism hypothesis

The second motivation is related to the "opportunistic" behavior of management. Critics argue that managers choose to disclose non-GAAP earnings to obscure bad performance or to portray a better than actual firm performance because non-GAAP earnings are usually higher than the corresponding GAAP earnings due to exclusion of non-recurrent expenses (e.g. Bradshaw and Sloan, 2002; Bhattacharya et al., 2003; Curtis et al., 2014). Johnson and Schwatz (2001) explain that managers face certain costs when they report performance that are below expectations such as forgone bonuses. Consistent with this reasoning, researchers find evidence that a proportion of managers behave opportunistically by disclosing non-GAAP earnings information to depict better operating earnings and to mislead investors' perception of firm's performance (Choi et al., 2007; Curtis et al., 2014). This is especially true when GAAP earnings fall below non-GAAP earnings.

Other studies suggest that managers are motivated to use non-GAAP earnings to meet or beat analysts' forecasts. When GAAP earnings fall short, managers can issue non-GAAP earnings that are modified to a certain extent that they meet analysts' expectations. However, investors seem to find pro forma earnings less informative when it meets analysts' expectations, while the corresponding GAAP figure does not (Battacharya et al., 2003). This is especially true when firms exclude non-recurring expenses, but do not exclude non-recurring gains, when computing non-GAAP earnings (Lougee and Marquardt, 2004; Doyle et al., 2013). This scenario depicts the possibility that managers deliberately treat transitory gains differently than transitory expenses, in order to gain a higher non-GAAP earnings number that meet or beat analysts' expectations. Collectively, these studies suggest that investors are partially aware of possible "opportunistic" behavior of management, and respond accordingly by discounting earnings surprise news based on non-GAAP earnings.

2.2.3 Special and other items exclusions

The results in previous studies suggest that companies choose to disclose pro forma earnings when GAAP earnings informativeness is low. Whereas other studies suggest that management use non-GAAP earnings for strategic considerations, such as influencing investor's perception on firm performance and meet or beat analysts' forecasts. Past research tried to identify the main motivation behind the use of non-GAAP earnings by looking at the nature of the items excluded from GAAP earnings (e.g. Doyle et al., 2003; Kolev et al., 2008; Heflin and Hsu, 2008). They classified two types of exclusions: special and other items. Special items comprise of irregular or non-recurrent items. And are expected to be excluded from GAAP earnings because they are not associated with daily business operations. On the other hand, other items are the remaining part of total exclusions that are not captured by special items. They are considered to be items that are being excluded unexpectedly from GAAP earnings. Researchers argue that unexpected exclusions (hereafter, other items) act as recurring operating expenses, but are deliberately excluded from GAAP earnings for strategic purposes (Bond et al., 2017). This is possible since the adoption of SEC's C&DIs in 2010. It became easier for management to disguise other items as being non-cash and non-recurrent with the purpose of excluding them from GAAP earnings.

Doyle et al. (2003) find that other items exclusions tend to be associated with negative future operating earnings and the cause of future abnormal stock returns. Both Kolev et al. (2008) and Bond et al. (2017) argue that high quality special and other items exclusions are those that contain mainly transitory and non-recurrent items. And since the excluded items are irregular, exclusions should not be associated with future operating earnings (i.e. less predictive power). This is not true when recurrent items are being excluded which decreases the quality of

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exclusions, and raises the predictive power of exclusions on future operating earnings. Kolev et al. (2008) studied the effects of Regulation G, and find that the quality of other items exclusions has increased. However, they also mentioned that the quality of special items exclusions decreased. Thus, suggesting that managers are disguising other items exclusions as special items exclusions as a response to SEC's intervention. Bond et al. (2017) find evidence of an increase in both the quality of special and other items exclusions by documenting an increase in transitory and non-recurrent nature of the exclusions after issuance of non-GAAP regulations. However, they also find that firms increased their use in positive exclusions to meet analysts' expectations when interpretive non-GAAP guidance (C&DIs) were introduced in 2010, but not when Regulation G became effective. This suggest that interpretive guidance rules have less impact on management' behavior than regulation rules because of the less restrictive character. Overall, evidence of past studies indicates that examining the quality of special and other items exclusions is an appropriate measure to determine the effects of SEC's non-GAAP guidance on the informativeness and management behavior regarding non-GAAP earnings disclosures.

2.3 The role of emphasis on pro forma earnings

Prior research investigated mainly the motives of managers to disclose pro-forma earnings. However, another stream of literature regarding GAAP and non-GAAP earnings focused on the level of emphasis placed on non-GAAP figures in company's earnings press releases. Several studies argued that managers use emphasis as a strategic tool to mislead investors. Bowen et al. (2005) find that managers put emphasis on the earnings metric that they perceive as the most value relevant. However, further analysis indicates that managers use emphasis as a measure to influence investor's perception on firm performance. Their results show that the emphasized earnings figure in earnings releases experienced a greater stock market reaction than the less emphasized one because the emphasized earnings metric portrayed better firm performance.

Consistent with this study, Elliot (2006) provide evidence indicating that managers can influence nonprofessional investors' reliance on non-GAAP earnings information by putting emphasis on that pro forma earnings metric. She concludes that investors perceive non-GAAP information more value-relevant as opposed to GAAP earnings disclosures because of the higher level of emphasis, and not due to higher informativeness. This finding was also reported in the study of Bradshaw and Sloan (2002), who argue that investors pay more attention to non-GAAP earnings numbers because managers place more emphasis on them in their earnings press releases and financial reports.

Collectively, these findings contribute to the ongoing debate regarding the motivations and usefulness of non-GAAP reporting. On the one hand, researchers argue that managers

disclose non-GAAP earnings because they capture the value of the company better, and thus are more informative to investors than GAAP earnings. On the other hand, critics argue that managers choose to disclose and emphasize the earnings metric that illustrate better firm performance. Especially, the differences in the level of emphasis placed is a point of criticism. For example, when managers put emphasis on the earnings metric that illustrate better performance instead of the metric that is most relevant, it could positively influence investors' perception of firm performance. This will be reflected in higher stock prices around earnings announcements. Since the majority of prior studies uses abnormal return around earnings announcements as a proxy for earnings informativeness, this could indicate that the earnings metric resulting in the highest abnormal return is possibly the same as the most emphasized earnings metric, and is not necessarily the most informative metric. Thus, it is unclear whether investors perceive non-GAAP earnings more relevant due to the increased level of emphasis placed on non-GAAP earnings. Or because GAAP earnings informativeness is lower than non-GAAP earnings, which is prompted as the primary reason by management. As a response to this criticism and the increasing use of non-GAAP disclosures, the SEC revised its existing regulations on pro forma reporting.

2.4 Newly revised non-GAAP guidance as of May 2016

The increasing use of pro forma reporting and the widening spread between GAAP and non-GAAP earnings raised scrutiny from the SEC (Shumsky and Francis, 2016). The interpretive character of 2010's non-GAAP guidance and increased flexibility of management raised the concerns that non-GAAP earnings information is lacking consistency, comparability and is possibly misleading (Henry et al., 2017). As a result, the SEC revised its existing non-GAAP interpretive guidance on May 17, 2016. They included examples that clarified which situations could potentially violate Regulation G. The modifications complement existing non-GAAP regulations in their intentions to prohibit management to emphasize the more favorable earnings metric in their earnings press releases and financial reports (PWC, 2016). This is a response to the belief of critics proposing that managers use emphasis as a strategic tool to mislead investors (Bowen et al., 2005; Elliot, 2006). Moreover, the revised guidance suggests that firms are not allowed to treat transitory expenses differently from transitory gains (PWC, 2016). This means that when a firm excludes non-recurrent expenses when computing non-GAAP earnings, it must also exclude the non-recurrent gains. Furthermore, the SEC issued stricter guidance on when to classify an item as non-recurrent since firms tend to misclassify recurrent items as irregular with the intention to increase pro forma earnings. By issuing new and stricter guidance on the use of non-GAAP disclosures, the SEC wants to mitigate the misleading factor of these pro forma disclosures. The results in previous studies suggest that

SEC's intervention into non-GAAP reporting will likely result in higher quality and more transitory exclusions, as well as less "opportunistic" behavior from management.

2.5 Literature summary

Firms are required to report earnings figures that satisfy GAAP regulation. GAAP earnings are supposed to give investors a reliable and comparable view of firm performance against others. However, GAAP earnings also include non-recurring items which are being argued not to be representative of a firm's true value. Therefore, firms are permitted to disclose non-GAAP earnings under Regulation G and Item 10(e) of Regulation S-K. Under these regulations, firms must present the most comparable GAAP earnings figure next to their non-GAAP measure, and also a reconciliation of how they computed the non-GAAP figure. These regulations were put in place to prevent fraud and misleading non-GAAP earnings. However, there were concerns that the restrictive character of Regulation G prevented companies from providing informative and relevant non-GAAP information. As a response, the SEC introduced new interpretive guidance (C&DI's) on the use of non-GAAP reporting. These principles based legislation eliminated the requirement for firms to present the usefulness of excluding any recurring item from GAAP earnings. This reduced the restrictive character of Regulation G and resulted in increasing use of non-GAAP measures, and widening spread between GAAP and non-GAAP earnings.

Managers claim that non-GAAP earnings are more informative for investors because they reflect the true value of the firm. However, critics argue that managers use non-GAAP earnings as a way to mislead investors and to meet/beat analysts' earnings forecasts. Past research investigated this debate by investigating the informativeness of GAAP and non-GAAP earnings and strategic reasons to disclose non-GAAP earnings. A commonly used method to distinguish between the "information" and "opportunism" hypothesis is by examining special and other items exclusions from GAAP earnings. Special items are considered to be excluded from GAAP earnings by management, whose intentions are to inform the public. Whereas other items exclusions are seen as strategic measures from "opportunistic" management that want to mislead investors by increasing their non-GAAP earnings. High quality exclusions are those that have less predictive power against future operating earnings. This suggests that regression coefficients of exclusions that are closer to zero are of higher quality. Other literature also examined the role of emphasis placed on non-GAAP earnings. They find that managers use emphasis as a disclosure strategy to shift investor's focus to non-GAAP earnings measures. This is especially true when GAAP earnings are below non-GAAP earnings and doesn't meet/beat analysts' forecasts. This raised the concern that managers deliberately place emphasis on the earnings metric that portray better firm performance.

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Due to the increasing use of non-GAAP reporting, the widening spread and increased emphasis placed on non-GAAP earnings measures, the SEC revised its existing non-GAAP guidance on May 17th, 2016. The newly issued non-GAAP interpretive guidance limits firms' ability to treat non-recurring gains differently than non-recurring expenses, and to place emphasis on the favorable earnings metrics. Past research find that previous non-GAAP reporting guidance and increased scrutiny result in lower non-GAAP reporting, smaller spread, higher non-GAAP earnings informativeness and lower propensity of non-GAAP earnings meeting/beating analysts' forecasts. This study extends existing literature by examining how the recently revised non-GAAP guidance influence management's decision to disclose non-GAAP earnings for strategic purposes. Moreover, it investigates whether earnings informativeness between GAAP and non-GAAP earnings is affected by changes in SEC regulations. Figure 1 presents the timeline of the non-GAAP reporting regulatory setting.

Figure 1: Timeline of non-GAAP regulations

January 23, 2003.
The SEC imposed
Regulation G.

January 11, 2010.
SEC issued "C&DIs" guidance
on non-GAAP reporting.

May 17, 2016.
The SEC issued new and
modified its existing C&DIs.
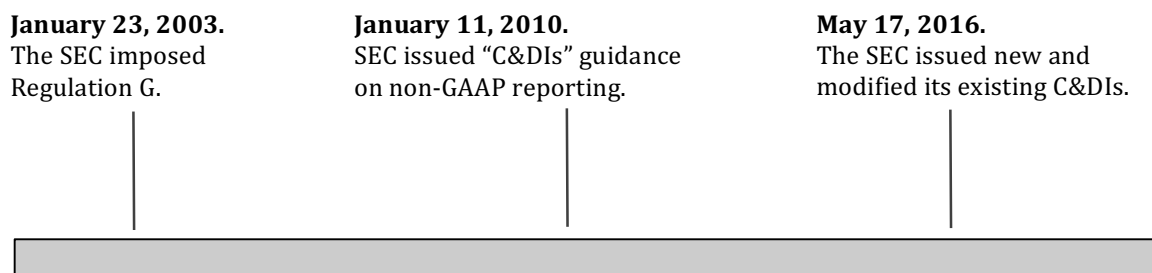
2.6 Hypotheses development

The effect of stricter regulations will likely influence management decisions on whether to disclose pro forma earnings. In recent years, firms have increased their use of pro forma reporting in earnings releases (Ford, 2016). This ongoing trend and the believe that pro forma earnings diverge from accounting reality raised scrutiny from the SEC. This is reflected in increased issuing of SEC's comment letters, which are letters addressing SEC's concerns and criticism with respect to the firm's pro forma earnings reporting method. To avoid the risk of internal investigation or prosecution by the SEC, I expect that management choose to disclose less pro forma earnings. This believe is also derived by the study of Heflin and Hsu (2008), who find that firms reduced their non-GAAP earnings disclosure following the adoption of new pro forma earnings disclosure rules in 2003.

H1: Firms disclose less pro forma earnings in their earnings releases following 2016's C&DIs.

One of SEC's concerns is the increasing spread between GAAP and pro forma earnings. Over the years, non-GAAP numbers have persistently outweighed GAAP earnings figures. In 2015, the adjusted income of 380 S&P 500 companies showed a 6.6% increase to $804 billion, while the GAAP earnings figure reported a 11% decrease to $562 billion (Ford, 2016). This trend reflects the 'opportunistic' behavior of management. Regulators are concerned that managers behave too 'opportunistically', and therefore report too high pro forma earnings numbers, which result in misleading financial information for the public.

Heflin and Hsu (2008) find that managers behave less opportunistic when there are stricter rules implemented and when there's case of heightened scrutiny. Their evidence show that after the adoption of new regulations in 2003, management excluded smaller amounts from GAAP earnings. Which suggest that the spread between GAAP and non-GAAP earnings decreased. However, in recent years, the spread has increasingly widened and attracted the attention from regulators. Considering that management reacts on regulator's scrutiny, I expect that revised regulations result in a smaller spread between GAAP and non-GAAP earnings.

H2: The spread between GAAP and non-GAAP earnings is smaller in the post-new regulation period.

Even though non-GAAP earnings are largely derived by excluding non-recurring items from GAAP earnings, there is the possibility that managers make adjustments based on recurring items. Under the original Regulation G, managers had to explain the usefulness of every adjustment made involving recurring items (Bond et al., 2017). However, this was not necessary anymore when the modified non-GAAP guidance (C&DIs) were introduced in 2010. This made it easier for firms to adjust GAAP earnings for recurring expenses by labeling them as other items. Following 2010's modified regulations, the concern regarding managers behaving opportunistically by deliberately excluding other items from GAAP earnings to increase non-GAAP earnings figures increased. This behavior result in lower quality of exclusions. As Kolev et al. (2008) mentioned, low quality exclusions are those that contain recurrent items, whereas high quality exclusions are those that are transitory and non-recurrent. An increase in the quality of excluded components from GAAP earnings suggest that management increased (decreased) the amount of non-recurrent (recurrent) items excluded from GAAP earnings. In other words, high quality exclusions are those that contain mostly special items. Whereas low quality exclusions are those that contain large proportions of other items. Both Kolev et al. (2008) and Bond et al. (2017) suggest that high quality exclusions are less associated with future operating earnings. They report an increase in the quality of items excluded from GAAP earnings by documenting a decrease in the predictive power of exclusions, after new non-GAAP regulations were imposed in 2003 and 2010. This suggest that managers are aware of the

heightened scrutiny from SEC, and take appropriate measures to avoid the risk of investigation or prosecution. This is reflected in management's decision to avoid excluding other items from GAAP earnings, which result in higher quality of exclusions.

Considering the increasing use of non-GAAP measures and the widening spread between GAAP and non-GAAP earnings, evidence suggest that management have continued their 'opportunistic' behavior and increased their other items exclusions in recent years. Based on the findings from Kolev et al. (2008) and Bond et al. (2017), the expectation is that management will decrease their other items exclusions once again due to increased scrutiny and the newly issued non-GAAP guidance in 2016. This decrease in 'opportunistic' behavior of management will be reflected in a higher quality of special and other items exclusions in the post-period.

H3: The SEC's issuance of new non-GAAP guidance increases the quality of special items and other items exclusions of non-GAAP earnings.

One of the criticism against the use of non-GAAP disclosures is that firms are misusing these disclosures to meet and/or beat analyst's consensus forecasts when GAAP earnings fall short since management face large costs when they fail to meet expectations. Heflin and Hsu (2008) find that stricter regulations reduced management's incentives to misuse non-GAAP earnings disclosures for strategic purposes. Their evidence shows that the probability of non-GAAP earnings meeting/beating analysts' forecasts decreased following the implementation of stricter rules in 2003. However, the SEC has loosened its non-GAAP regulations in 2010, which again increased the misuse of non-GAAP earnings disclosures. Collectively, the expectation arises that the newly modified guidance reduces management's incentives to use non-GAAP reporting as a tool to meet analysts' expectations.

H4: The probability that non-GAAP earnings meet/beat analysts' forecasts is lower than before the 2016's regulations were implemented.

Past research (e.g. Bradshaw and Sloan, 2002) suggest that investors are reacting greater on earnings figures that appear more prominent in earnings press releases. And, that management are aware of this because they deliberately put more emphasis on the earnings metric that propose a more favorable firm performance, which is not necessarily the most relevant earnings metric. As mentioned before, the new non-GAAP guidance limits management's ability to place more emphasis on either GAAP or non-GAAP earnings. It also contains stricter guidance on the use of pro forma reporting. Since placing emphasis is being limited, I expect that investors are less misled by non-GAAP earnings and that their focus shift

towards earnings reported under GAAP. Moreover, when firms issue non-GAAP earnings, they must comply with the stricter rules. This limits the flexibility that managers can assert when computing pro forma earnings, which reduces non-GAAP earnings persistence. Heflin and Hsu (2008) find that investors price non-GAAP earnings at a discount as a result of decreased earnings persistence due to stricter regulations in 2003. However, their analysis didn't test whether investors price GAAP earnings differently than non-GAAP earnings following the modified regulations. This study differs that from Heflin and Hsu (2008) in the sense that it takes the latter into account. Collectively, the expectation is that investors value GAAP (non-GAAP) earnings more (less) value relevant compared to the period before new regulations were issued.

H5: Investors' perceived earnings informativeness regarding GAAP (non-GAAP) earnings increase (decrease) compared to pre-new regulation period.

2.7 Conclusion

Critics are divided on management's motives to issue non-GAAP earnings. Some find that firms issue non-GAAP earnings because they are more informative and relevant, while others argue that pro-forma earnings are issued because they portray better firm performance and are used to meet earnings expectations. Past literature mainly focused on the effects of Regulation G and 2010's C&DIs on earnings informativeness, disclosure practices and managements' strategic behavior. The purpose of this study is to investigate the effects of 2016's newly modified non-GAAP guidance. More specifically, it examines whether changes in SEC regulations influence investor's perceived earnings informativeness of both GAAP and non-GAAP earnings. And how stricter guidance on the use of pro forma reporting affects management' disclosure behavior. Figure 2 presents a summary of expectations of the hypotheses used in this study. It points out the expected relation between modified regulations and (1) frequency of non-GAAP reporting, (2) spread between GAAP and non-GAAP earnings, (3) the quality of non-GAAP exclusions, (4) the probability of non-GAAP earnings meeting/beating analysts' forecasts, and (5) perceived GAAP and non-GAAP earnings informativeness.

Figure 2: Hypotheses Expectation
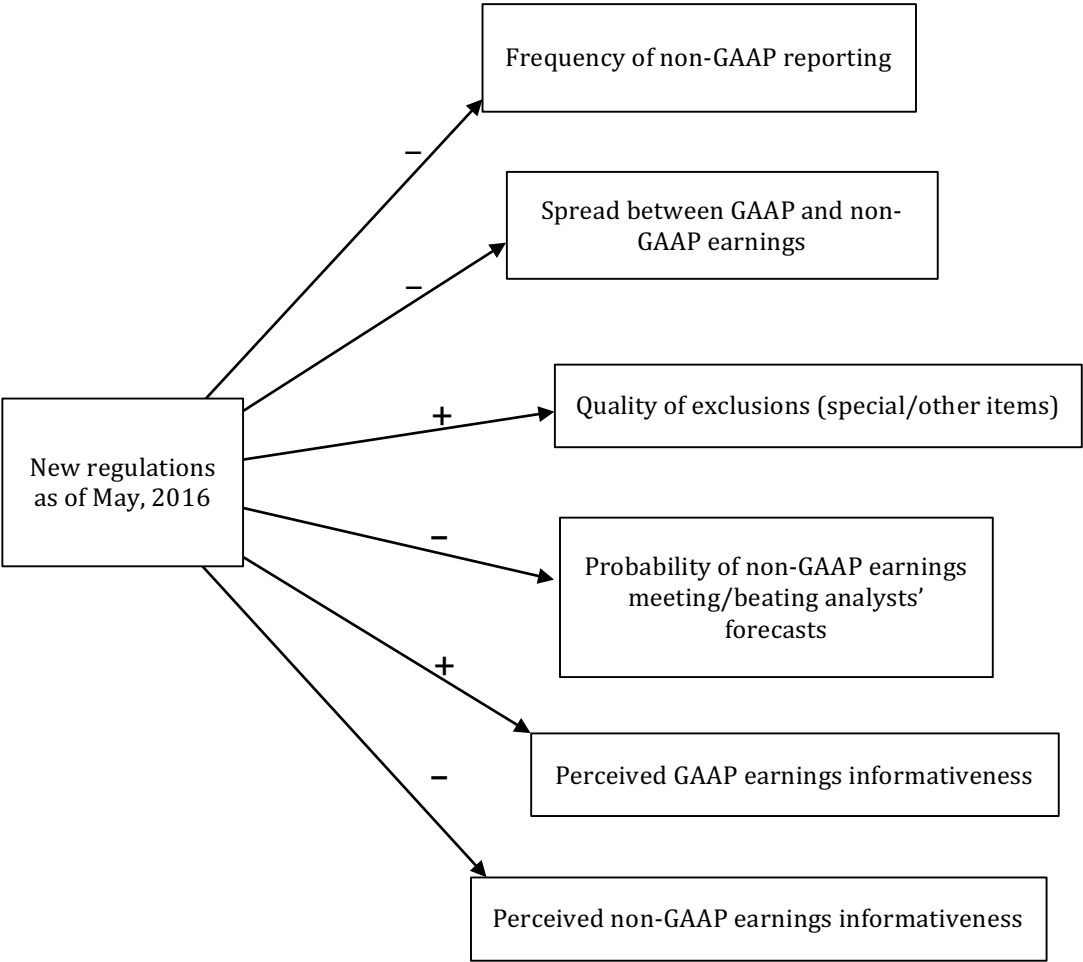
3. Research Method

This section discusses the process of sample selection, data collection and variable measurement. Moreover, it elaborates on the empirical models used to test the hypotheses.

3.1 Sample selection

The sample is collected from publicly traded companies in the United States with available data in the period between the second quarter of 2013 till the fourth quarter of 2016. This result in a sustainable sample period, namely twelve quarters before and three quarters after the event date, which is May 17, 2016. The sample is selected based on the requirement that all relevant data is available. Furthermore, the firm must contain accounting information and analyst earnings forecast data in Compustat and I/B/E/S respectively. Moreover, it must have stock return information available in database CRSP. This result in a sample of 2,309 firms and 29,162 firm-quarter observations. Table 2 summarizes the sample selection procedure.

Table 2: Sample selection procedure

	# of observations
Total firm quarter observations between Q2 2013 till Q4 2016:	81,750
Less:	
(1) missing data in I/B/E/S	44,339
(2) missing data in COMPUSTAT	7,190
(3) missing data in CRSP	55
(4) observations from firms that have less than five quarters of data available	1,004
Total final sample:	
By firm-quarters	29,162
By firms	2,309

The purpose of this study is to determine the effect of the newly modified non-GAAP regulations. Heflin and Hsu (2008) mentioned that an analysis of the effects of a regulatory change is subject to a number of remarks. First, one must take the length of the sample period into account. A long length increases the number of observations, which increases the explanatory power of the model. However, it also increases the chance of distortion due to uncontrolled factors that are changing over time. Therefore, the sample period between 2013 and 2016 is being selected. Secondly, they mentioned that the sample composition must remain the same over time to examine the effect of modified regulations. This means that firms included in the sample must contain data over the entire sample period. Heflin and Hsu (2008) argue that this method establishes a clearer relation, and excludes any distortions that might arise when

using an inconsistent sample. However, this will reduce the sample size significantly. Therefore, firms with less than five quarter observations are deleted from the sample. The cutoff point at five fiscal quarters is chosen because it yields a more consistent sample without reducing the sample size to a high extent. Moreover, in this sample it deletes firms that don't have observations available both before and after the post-new regulation period.

3.2 Variable measurements

3.2.1 GAAP and non-GAAP earnings

There are two main methods to derive GAAP and non-GAAP earnings: (1) manually collect earnings numbers in company's earnings press releases, (2) use earnings reported in databases such as Compustat and I/B/E/S[3]. Studies find that actual earnings reported in I/B/E/S are more related to stock returns than earnings reported in Compustat (e.g. Bradshaw and Sloan, 2002). However, Battacharya et al. (2003) question the use of these so called 'street' earnings figures published in these analysts tracking services to proxy for pro forma earnings. They find that earnings figures reported in these financial data providers are significantly different from the actual earnings figures published in earnings press releases. This is possibly due to the fact that analysts classify certain items as recurrent, while managers specify it as non-recurrent. This difference in classification results in different treatment of the item, namely a recurrent (non-recurrent) item will be included in (excluded from) non-GAAP earnings. Thus, this difference in treatment of certain special items results in different earnings figures reported in I/B/E/S and other financial data providers compared to actual earnings reported by management. (Brown and Shivakumar, 2003; Choi et al., 2007). Collectively, using different measures to proxy for GAAP and non-GAAP earnings can result in different conclusions.

Earnings published in earnings press releases seems to be the most appropriate measure for GAAP and non-GAAP earnings since these figures are reported by management directly. However, other studies find that I/B/E/S actual earnings number corresponds at least in 90% of the cases with non-GAAP earnings figures published in earnings press releases (e.g. Doyle et al, 2003; Doyle and Soliman, 2005; Heflin and Hsu, 2008). Thus, suggesting that I/B/E/S actual earnings are a good proxy for non-GAAP earnings. Additionally, this approach yields a larger sample compared to studies that hand-collect their data from earnings press releases (see Appendix A). Therefore, this study uses earnings reported in Compustat as a proxy for GAAP earnings and actual earnings in I/B/E/S as a proxy for non-GAAP earnings. More specifically, it uses the same approach as Bradshaw and Sloan (2002) to derive GAAP earnings per share

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[3] The Institutional Brokers' Estimate System (I/B/E/S) gathers earnings estimates from U.S. and international companies. The data are obtained by tracking analysts' forecasts.

(EPS$_{GAAP}$). Non-GAAP earnings per share are obtained by using the actual earnings figures in I/B/E/S. Since most studies characterize these numbers reported in analysts tracking services as 'street' earnings, this study also labels them as EPS$_{STREET}$. For cross-sectional analysis, both earnings measures are scaled by the closing-end stock price of the corresponding quarter (Bradshaw and Sloan, 2002). Finally, both earnings measures are winsorized at the top one and bottom one percent. This study follows the assumption, made in past literature, that a firm has issued non-GAAP earnings when EPS$_{STREET}$ is higher than EPS$_{GAAP}$.

$$EPS_{GAAP} = \frac{Compustat's\ income\ before\ extraordinary\ items_{i,q}}{Average\ common\ shares\ outstanding_{i,q}} \qquad EPS_{STREET} = I/B/E/S\ actual\ earnings$$

3.2.2 Special and other items exclusions

This study uses the same method as in prior research studies to measure special and other items exclusions. First, the total amount of exclusions is determined as the difference between EPS$_{STREET}$ and EPS$_{GAAP}$. Since this study uses Compustat and I/B/E/S to account for GAAP and non-GAAP earnings, it is not possible to observe whether the exclusions are due to special or other items. To overcome this difficulty, it uses the same method as in Heflin and Hsu (2008) and Doyle et al. (2013) to separate special and other items. Special items exclusion ($SPEC\_EXCL_{i,q}$) is measured by subtracting EPS$_{GAAP}$ from operating earnings per share. Other items exclusion ($OTH\_EXCL_{i,q}$) is determined as total exclusions per share minus special items exclusions per share. When special items exclusion is the same as the total amount of exclusions, then this suggest that there are no other items. An exclusion is labeled as positive (negative) when it increases (decreases) non-GAAP earnings relative to GAAP earnings. Thus, excluding an expense would be labeled as a positive exclusion, and gain as a negative exclusion.

3.2.3 Control variables

Following Kolev et al. (2008) and Bond et al. (2017), the following control variables are included. First, the size of the firm is controlled by taking the log of total assets at the end of each quarter. Second, there is a loss indicator which equals to one if the firm experiences a GAAP loss. And third, the factors earnings volatility and book-to-market ratio are also included. Earnings volatility is measured by taking the standard deviation of return on assets of the last four previous quarters. The book-to-market ratio controls for firm risk and is measured by dividing book value of equity with book value of debt, and adding market value of equity.

Furthermore, this study also includes control variables used in the study of Heflin and Hsu (2008), that are argued to influence the likelihood and magnitude of non-GAAP earnings. First, the level of leverage of a firm is included. This is measured by dividing total liabilities with

total equity. Second, there is a control for firms meeting last year's quarterly earnings benchmark, which equals to one if firm's quarter q earnings are higher than $q-4$ earnings. Further, there is a control for quarter observations that are at the end of the fiscal year. This control dummy variable equals to one if the observation is in the fourth fiscal quarter of the year. The number of analysts that follows the company is also included as control variable. Since firms with large analyst following have strong incentives to perform well (Heflin and Hsu, 2008). Moreover, there is a separate control variable for firms in the technology industry because these firms have high levels of intangibles which are special and/or other items (Heflin and Hsu, 2008). The technology dummy variable follows Francis and Schipper (1999), and equals to one if the Standard Industry Classification (SIC) code of the firm begins with 283, 357, 481, 360-367, 737, or 873. And there is a control variable $YEAR_q$ to control for yearly effects, which equals to one if the observation is in year 2014, two if in year 2015 and three if in year 2016. Finally, the empirical models described in the next section control for heteroscedasticity by using robust standard errors. Appendix B provides a detailed overview of the variable measures used in all regression models in this study.

3.3 Empirical models

3.3.1 Analyzing frequency of non-GAAP reporting (H1)

The following logit model is used to test for the effect of new regulations ($POST_q$) on the probability that a firm reports non-GAAP earnings ($NON\_GP_{i,q}$). The use of a logit regression model is appropriate when dealing with a binary dependent variable. Variable $POST_q$ equals to one if the observation is in the second quarter of 2016 or later, and zero otherwise. The dependent variable $NON\_GP_{i,q}$ equals to one if the observation contains both GAAP and non-GAAP earnings, and zero otherwise. The assumption is that a firm reports non-GAAP earnings, when EPS_{STREET} is higher than EPS_{GAAP}. The variable of interest is β_1, and is expected to be negative because the expectation is that firms decrease their non-GAAP reporting following the issuance of stricter regulations. Whereas a positive β_1 means the opposite.

$$PR(NON\_GP_{i,q} = 1) = \alpha + \beta_1 POST_q + \beta_2 TECH_{i,q} + \beta_3 LOSS_{i,q} + \beta_4 BENCH_{i,q} + \beta_5 4th\_QTR_{i,q} + \beta_6 SPECIALITEMS_{i,q} + \beta_7 LEV_{i,q} + +\beta_8 BTM_{i,q} + \beta_9 LN\_ASSETS_{i,q} + \beta_{10} STDROA_{i,q} + \beta_{11} \#ANALYSTS_{i,q} + \beta_{12} YEAR_q \qquad\qquad (1)$$

The model contains several control variables that were also used in the research study of Heflin and Hsu (2008). First, the variables $TECH_{i,q}$ is included because most of the non-GAAP earnings issuers are in the technology sector and has high levels of intangibles (Bradshaw and Sloan, 2002). Second, Lougee and Marquardt (2004) argue that firms who experience a GAAP

loss ($LOSS_{i,q}$) are more likely to issue non-GAAP earnings because managers face negative consequences when they fail to meet a benchmark. However, when GAAP earnings are the same or higher than in the same quarter of last year ($BENCH_{i,q}$), firms are less likely to issue non-GAAP earnings. They also document that non-GAAP issuers are more likely to be firms with high levels of debt ($LEV_{i,q}$) or firms with volatile earnings ($STDROA_{i,q}$) that want to produce smoother earnings. Bradshaw and Sloan (2002) indicate that firms with special items ($SPECIALITEMS_{i,q}$) are likely to exclude them when issuing non-GAAP earnings. Furthermore, the model takes into account that managers might want to project higher earnings to meet year-end bonuses. And thus, are more likely to report non-GAAP earnings in the last quarter ($4^{TH}\_QTR_q$) of the year. Moreover, the number of analysts that follows a company ($\#ANALYSTS$) is also included because large analyst following induces greater scrutiny from investors and analysts (Chevis et al., 2001). Thus, increases the likelihood that a firm issues non-GAAP earnings which portrays better firm performance. Past literature also argues that firms who experience high growth ($BTM_{i,q}$) are usually non-GAAP issuers (Heflin and Hsu, 2008). Finally, the size of the firm is controlled by variable $LN\_ASSETS_{i,q}$ and variable $YEAR_q$ is included to control for yearly effects.

3.3.2 Analyzing the spread between GAAP and non-GAAP earnings (H2)

When stricter regulations affect the frequency that a firm discloses non-GAAP earnings, it is possible that it also affects the dollar amount of exclusions that managers decide to exclude from GAAP earnings (Heflin and Hsu, 2008). Because, the SEC has already expressed their concerns regarding the increasing spread between GAAP and non-GAAP earnings. The expectation is that firms, who still decide to disclose non-GAAP earnings, choose to exclude lesser amounts from GAAP earnings following adoption of stricter regulations and heightened scrutiny. Thus, the coefficient estimate of new regulations ($POST_{i,q}$) is expected to be negative.

$$LN\_SPREAD_{i,q} = \alpha + \beta_1 POST_q + \beta_2 TECH_{i,q} + \beta_3 LOSS_{i,q} + \beta_4 BENCH_{i,q} + \beta_5 4th\_QTR_{i,q} + \beta_6 LEV_{i,q} + \beta_7 BTM_{i,q} + \beta_8 LN\_ASSETS_{i,q} + \beta_9 STDROA_{i,q} + \beta_{10} \#ANALYSTS_{i,q} + \beta_{11} YEAR_q \qquad (2)$$

The above model uses almost the same control variables as in regression (1). Variable $LN\_SPREAD_{i,q}$ measures the log difference between GAAP and non-GAAP earnings. If adoption of new regulations lowers the amount of exclusions, then β_1 is expected to be negative. Prior research suggest that firms in the technology sector ($TECH_{i,q}$) has a higher probability to issue non-GAAP earnings because they are more likely to exclude intangible amortization (Heflin and Hsu, 2008). The expectation is that these firms exclude larger amounts of intangible amortization than other firms. Furthermore, it is expected that firms with high levels of debt ($LEV_{i,q}$) or volatile earnings ($STDROA_{i,q}$) have larger differences between GAAP and non-GAAP earnings. The same is also expected for firm-quarter observations in the fourth quarter of the

fiscal year ($4th\_QTR_{i,q}$) because managers have reporting incentives in the fourth quarter. And thus, are more likely to exclude larger write-offs in the last quarter (Heflin and Hsu, 2008). Loss firms ($LOSS_{i,q}$) might exclude larger amounts from GAAP earnings to portray positive non-GAAP earnings. Thus, increasing the spread. Firms with large analyst following ($\#ANALYSTS_{i,q}$) experience greater scrutiny from the public, and thus have more incentives to have higher earnings. Variables $LN\_ASSETS_{i,q}$, $BTM_{i,q}$ and $YEAR_q$ is again used to control for firm size, growth and yearly effects, respectively.

3.3.3 Analyzing the quality of special and other items exclusions (H3)

This study uses the same method as Kolev et al. (2008) and Bond et al. (2017) to determine whether the quality of special and other items exclusions increased after SEC's new non-GAAP regulations in 2016. First, the sum of future operating earnings is calculated. Next, it is regressed on special and other items exclusions including some control variables.

$$SUM\_FutEarn_{i,q} = \alpha + \beta_1 POST_q + \beta_2 SPEC\_EXCL_{i,q} + \beta_3 OTH\_EXCL_{i,q} + \beta_4 SPEC\_EXCL_{i,q} * POST_q$$
$$+\beta_5 OTH\_EXCL_{i,q} * POST_q + \beta_6 EPS_{STREET} + \beta_7 TECH_{i,q} + \beta_8 LOSS_{i,q} + \beta_9 BENCH_{i,q} + \beta_{10} 4th\_QTR_{i,q}$$
$$+\beta_{11} LEV_{i,q} + \beta_{12} BTM_{i,q} + \beta_{13} LN\_ASSETS_{i,q} + \beta_{14} STDROA_{i,q} + \beta_{15} \#ANALYSTS_{i,q} + \beta_{16} YEAR_q \quad (3)$$

The variables $SPEC\_EXCL_{i,q}$ and $OTH\_EXCL_{i,q}$ as well as their interaction with variable $POST_q$ are included in the model. This is to determine whether the adoption of new non-GAAP regulations increase the quality of special items and other items exclusions. Past literature has reported that other items exclusions are related to 'opportunistic' behavior of management and that special items exclusions are related to management intensions to increase the informativeness of earnings disclosures. Kolev et al. (2008) suggest that when the predictive power of exclusions is low, the quality of exclusions is high. The average quality of exclusions is determined by looking at how well the non-GAAP exclusions fit into future operating earnings (Bond et al., 2017). And since non-GAAP exclusions are argued to be transitory and non-recurrent, the expectation is that high quality non-GAAP exclusions have low predictive power. The quality of exclusions is expected to be higher in the period when stricter non-GAAP guidance are issued because managers are less willing to report non-GAAP earnings. And even when they do report them, they behave less opportunistically by excluding less special and other items. Therefore, the absolute value of $\beta_2 + \beta_4$ and $\beta_3 + \beta_5$ (i.e. predictive power) is expected to be smaller than β_2 and β_3, respectively. This can only be achieved when the sign of β_4 is the opposite of β_2. And, the same goes for the sign of β_5 being the opposite of β_3. Following Bond et al. (2017), the variable $SUM\_FutEarn_{i,q}$ is measured by taking the sum of future operating earnings in quarters $q+1$ through $q+4$. Except for observations in the last quarter of 2016, where only future operating earnings are available till $q+3$ in Compustat. Also, the variable EPS_{STREET} is included

because it is highly correlated with special and other items exclusions. Omitting this variable will result in omitted variable bias. The same control variables of regression (2) are used in this model.

3.3.4 Analyzing the likelihood of non-GAAP earnings meeting/beating analysts' forecasts (H4)

Prior research (e.g. Bhattacharya et al., 2003; Doyle et al., 2013) suggests that firms issuing non-GAAP earnings are more likely to meet or beat analysts' forecasts. Critics are concerned that firms are misusing non-GAAP earnings to portray better firm performance. Especially, since the spread between GAAP and non-GAAP earnings is increasing. This raise the concern that managers report non-GAAP earnings when they meet/beat analysts' forecasts while GAAP earnings fail to meet these expectations. Adoption of the new non-GAAP interpretive guidance is expected to limit this "opportunistic" behavior from management. The following analysis focuses on firm-quarter observations where non-GAAP earnings are issued. $MBE_{i,q}$ equals to one if EPS_{STREET} is the same or higher than analysts' consensus forecasts, while EPS_{GAAP} is lower than expectations. Because this model concerns a logit regression model, variables for special and other items exclusions are specified differently than in previous regression model. Variable $POS\_SPECIAL_{i,q}$ ($POS\_OTHER_{i,q}$) equals to one if the firm has excluded positive special (other) items, and zero otherwise. The same control variables are used in this model.

$$PR(MBE_{i,q} = 1) = \alpha + \beta_1 POST_q + \beta_2 POS\_SPECIAL_{i,q} + \beta_3 POS\_OTHER_{i,q} + \beta_4 POS\_SPECIAL_{i,q} * POST_q + \beta_5 POS\_OTHER_{i,q} * POST_q + \beta_6 TECH_{i,q} + \beta_7 LOSS_{i,q} + \beta_8 BENCH_{i,q} + \beta_9 4th\_QTR_{i,q} + \beta_{10} LEV_{i,q} + \beta_{11} BTM_{i,q} + \beta_{12} LN\_ASSETS_{i,q} + \beta_{13} STDROA_{i,q} + \beta_{14} \#ANALYSTS_{i,q} + \beta_{15} YEAR_q \quad (4)$$

The above logit regression model is based on Doyle et al. (2013). They state that firms with positive exclusions, thus when I/B/E/S actual earnings are greater than Compustat's GAAP earnings, are more likely to meet/beat analysts' expectations ($MBE_{i,q}$). However, the expectation is that this effect decreases following new regulations ($POST_q$). The estimated coefficient (β_1) is therefore expected to be negative. Doyle et al. (2013) also included negative exclusions in their analyses, but did not find significant results. Thus, suggesting that when a firm excludes transitory items that reduces non-GAAP earnings relative to GAAP earnings, it doesn't affect the probability whether the firm meet/beat analysts' forecasts.

Following Doyle et al. (2013), positive exclusions are separated into positive special items ($POS\_SPECIAL_{i,q}$) and positive other items ($POS\_OTHER_{i,q}$) exclusions. Prior studies suggest that exclusion of special items are more associated with higher earnings persistence and other items are more related to 'opportunistic' behavior of management (e.g. Bradshaw and Sloan, 2002; Heflin and Hsu, 2008; Doyle et al, 2013). The estimated coefficients of $POS\_SPECIAL_{i,q}$ (β_2) and $POS\_OTHER_{i,q}$ (β_3) are expected to be positive because both exclusion types increases non-

GAAP earnings relative to GAAP earnings. And thus, raises the probability that it meet/beat analysts' forecasts. Consistent with this expectation, Doyle et al. (2013) find evidence that other items are used to meet/beat expectations, whereas they could not find the same significant results for special items. Following new regulations, it is expected that managers are more cautious in their use of other items exclusions for strategic purposes. The prospect is that firms want to send a signal to the public that it doesn't behave opportunistically and doesn't misuse other items to meet/beat analysts' forecasts. Thus, the estimated coefficient of variable $POS\_OTHER_{i,q} * POST_q$ (β_5) is expected to be negative. Collectively, the expectation is that the probability of non-GAAP earnings meeting/beating analysts' expectations decreased following new regulations, reflected by β_1. And, that this is partially due to a drop in "opportunistic" behavior, captured by β_5.

3.3.5 Analyzing earnings informativeness (H5)

The most prominent way to measure earnings informativeness is by calculating the earnings response coefficient (ERC). This is done by first examining the cumulative abnormal return (CAR) around the earnings announcement date. Most research studies use a short window of stock returns to determine CAR, namely one day before and one day after the earnings announcement date. However, Skinner (1997) finds that companies are likely to preannounce earnings when they fail to live up expectations. Thus, using a short window could miss these early announcements, which could bias the outcomes for firms with negative earnings surprises (Bradshaw and Sloan, 2002). This study uses the long window return to capture CAR. Following Bradshaw and Sloan (2002) and Heflin and Hsu (2008), the long interval starts at two days after the last quarterly earnings and ends one day after the current quarterly earnings announcement date, resulting in roughly 60 trading days. The regression is then estimated by regressing CAR on earnings surprises and some control variables.

Earnings surprises are measured as forecast errors by subtracting analysts' expectations from EPS$_{GAAP}$ and EPS$_{STREET}$, and scaled by share price. Using data from the last month of the quarter, this yields quarterly forecast errors: FE$_{GAAP}$ and FE$_{STREET}$. Analysts' expectations are determined by obtaining the median of analysts' forecasts in I/B/E/S. These forecast errors capture the earnings surprises for GAAP and 'street' earnings, respectively. Finally, accounting data and earnings announcement dates are obtained from Compustat quarterly data, and daily stock prices are collected from CRSP. This yields the following regression:

$$CAR_{i,q} = \alpha + \beta_1 POST_q + \beta_2\, FE_{GAAP_{i,q}} + \beta_3\, FE_{STREET_{i,q}} + \beta_4 FE_{GAAP} * POST_q + \beta_5 FE_{STREET} * POST_q$$
$$+ \beta_6 TECH_{i,q} + \beta_7 LOSS_{i,q} + \beta_8 BENCH_{i,q} + \beta_9 4th\_QTR_{i,q} + \beta_{10} LEV_{i,q} + \beta_{11} BTM_{i,q} +$$
$$\beta_{12} LN\_ASSETS_{i,q} + \beta_{13} STDROA_{i,q} + \beta_{14} \#ANALYSTS_{i,q} + \beta_{15} YEAR_q \qquad (5)$$

The change in regulations is represented by variable $POST_q$, which equals to one if the observation is in the second quarter of 2016 or later, and zero otherwise. The variables of interest are $\beta_2 + \beta_4$ and $\beta_3 + \beta_5$, which captures the change in perceived earnings informativeness of that specific earnings metric (EPS_{GAAP} or EPS_{STREET}) after adoption of new regulations. While β_2 and β_3 represents only the relation of perceived earnings informativeness before the new regulations. The expectation is that $\beta_2 + \beta_4$ is higher than β_2 for GAAP earnings. Whereas for non-GAAP earnings, the expectation is that $\beta_3 + \beta_5$ is lower than β_3. I expect that investors shift their attention more towards GAAP earnings instead of non-GAAP in the post-new regulation period since new regulations prohibit firms putting emphasis on the higher earnings figure, which is most of the time non-GAAP earnings. Moreover, firms must now comply with stricter non-GAAP guidance at the expense of pro forma earnings persistence. When earnings persistence decrease, investors perceive that earnings metric less informative and relevant. In sum, the expectation is that the earnings informativeness of GAAP (non-GAAP) earnings increase (decrease) after new regulations are introduced.

Following Heflin and Hsu (2008) the market capitalization ($LN\_ASSETS_{i,q}$) and the book-to-market ratio ($BTM_{i,q}$) are used as proxies for firm i's risk and growth, both as of end of the quarter q. When firm's risk is high, investors will demand a higher return which is translated in higher earnings. And when a company is experiencing growth, it is likely that is has higher risk. Other factors that influence the earnings-return relation are leverage ($LEV_{i,q}$) and when a company reports a GAAP loss ($LOSS_{i,q}$). Investors react less to earnings surprises announced by firms that has high level of leverage or who've experienced a GAAP loss (Hayn, 1995). Another factor to take into account is that firms in the technology sector ($TECH_{i,q}$) have high levels of intangibles and has larger amounts of special items than other firms. Heflin and Hsu (2008) argue that firms with large special items report higher non-GAAP earnings. Moreover, investors tend to react more positively on earnings news when the company meets a benchmark (Heflin and Hsu, 2008). These benchmarks include meeting or beating last year's quarterly earnings. Therefore, the variable $BENCH_{i,q}$ is included to control for this factor. Firms with large analyst coverage ($\#ANALYSTS_{i,q}$) have more incentives to meet benchmarks and analysts' expectations. Furthermore, they are more 'visible' for the public, which result in bigger punishment when they don't meet expectations.

3.4 Conclusion

This chapter discussed the sample selection process, variable measurements and the empirical models. The sample used in this study constitutes of 29,162 firm-quarter observations during the second quarter of 2013 till the end of 2016. This study uses Compustat's quarterly earnings per share (EPS_GAAP) and I/B/E/S actual earnings per share (EPS_STREET) as proxies for

GAAP and non-GAAP earnings respectively. A firm-quarter observation is defined as a GAAP observation when EPS_{STREET} is equal to or lower than EPS_{GAAP}, and defined as a non-GAAP observation when it is higher. As discussed in section 2, special items exclusion is associated with informative earnings and other items exclusion is associated with "opportunistic" behavior of management. The empirical models described in this section will be used to answer the hypotheses discussed previously. The following control variables are used in the empirical models: firm size, loss, leverage, earnings volatility, number of analyst following, fourth quarter, technology industry and yearly effects.

4. Descriptive Statistics and Regression Results

This section presents the descriptive statistics of the sample and correlations between the variables used in the models. Furthermore, the results of the regression models are presented and discussed.

4.1 Descriptive statistics

Panel A of table 3 presents the descriptive statistics of all variables used. The total sample consists of 29,162 firm-quarter observations from the second quarter of 2013 till the end of 2016. The full sample is divided into observations that only report GAAP earnings and observations that reported both GAAP and non-GAAP earnings (hereafter, non-GAAP sample). A mean test is included to measure the significance of the mean difference between the GAAP and non-GAAP sample. A positive (negative) t-value means that the variable mean of the GAAP sample is higher (lower) than the non-GAAP sample. The variables are defined in Appendix B. All continuous variables are winsorized at the top and bottom 1%. Panel B of table 3 presents the Pearson correlations coefficients among the regression variables.

Table 3 Panel A: Descriptive statistics

	Total sample (n = 29,162)		GAAP only (n = 16,534)		Non-GAAP (n = 12,628)		Mean test
	Mean	Median	Mean	Median	Mean	Median	T-test
#ANALYSTS	8.150	6	7.215	5	9.373	7	(26.58)***
BENCH	0.430	0	0.483	0	0.361	0	20.97***
BTM	3.433	2.086	3.296	1.953	3.613	2.249	(4.55)***
CAR	0.002	0.005	0.006	0.005	(0.002)	0.004	3.30***
EPSgaap	0.304	0.24	0.393	0.29	0.188	0.16	24.45***
EPSstreet	0.393	0.29	0.327	0.26	0.478	0.34	(20.74)***
FEgaap	(0.006)	(0.000)	0.003	0.001	(0.017)	(0.004)	30.88***
FEgaap*POST	(0.001)	0	0.001	0	(0.003)	0	13.66***
FEstreet	0.001	0.001	0.000	0.000	0.002	0.001	(4.85)***
FEstreet*POST	0.000	0	0.000	0	0.000	0	(0.60)
LEV	2.457	1.286	2.573	1.289	2.305	1.284	5.75***
LN_ASSETS	21.295	21.321	21.111	21.182	21.535	21.505	(18.49)***
LN_SPREAD	0.405	0.372	0.313	0.372	0.525	0.452	(89.53)
LOSS	0.267	0	0.230	0	0.315	0	(16.31)***
MBE	0.583	1	0.547	1	0.630	1	(14.35)***
NON_GP	0.433	0	0	0	1	1	-
OTH_EXCL	0.069	0	0.008	0	0.149	0.03	(49.71)***
OTH_EXCL*POST	0.008	0	0.000	0	0.027	0	(22.94)***
POS_OTHER	0.094	0	0.006	0	0.210	0.03	(29.26)***
POS_OTHER*POST	0.019	0	0.001	0	0.042	0	(9.07)***
POS_SPECIAL	0.007	0	0.000	0	0.018	0	(16.50)***
POS_SPECIAL*POST	0.067	0	0.018	0	0.130	0.01	(23.72)***
POST	0.149	0	0.148	0	0.150	0	(0.54)
4th_QTR	0.272	0	0.276	0	0.266	0	1.93*
SPEC_EXCL	0.057	0	0.017	0	0.110	0.01	(38.35)***

SPEC_EXCL*POST	0.012	0	0.003	0	0.024	0	(9.07)***
SPECIALITEMS	0.593	1	0.485	0	0.734	1	(44.34)***
STDROA	0.016	0.006	0.016	0.005	0.015	0.007	1.65*
SUM_FutEarn	1.387	1.07	1.352	1.11	1.432	1.02	(2.64)***
TECH	0.233	0	0.205	0	0.270	0	(13.10)***
YEAR	1.715	2	1.682	2	1.758	2	(6.09)***

Numbers put in brackets () are negative. *Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

The results of the mean test from panel A of table 3 indicates that firms report non-GAAP earnings when they have large analyst coverage, growth, firm size, special and other items. The results also show that the non-GAAP sample has lower GAAP earnings than the GAAP sample, and a higher mean to meet/beat analysts' forecasts. Furthermore, the mean of special and other items exclusions decreased in the post-period. This is also supported by the correlation coefficients from panel B of table 3. From column 18 and row 19 to 22, the relation between other items and issuance of non-GAAP earnings decrease when the observation is in the post-period. The same is true for special items. The results suggest two things. First, firms who issue non-GAAP earnings decreased their 'opportunistic' behavior by decreasing their other items exclusions (0.169>0.064). Second, non-GAAP issuers are more cautious when excluding special items, which is reflected by a decrease in special items exclusions (0.219>0.096). This suggests that the informativeness of non-GAAP earnings decreased, which supports the findings from Heflin and Hsu (2008). They find that earnings persistence decreased after stricter non-GAAP regulations were introduced. The results from panel B also suggest that investors perceive non-GAAP earnings more (less) relevant than GAAP earnings before (after) adoption of modified non-GAAP regulations in 2016. This is reflected by the correlation coefficients in column 4 and row 7 to 10 (0.100>0.086; 0.25<0.31). Collectively, these results are in line with the expectations from section 3.

Ordinary Least Squares (OLS) is a widely used method to determine the parameters of a linear regression model. It is based on a few assumptions. One of the assumptions is that there must be no relation between the independent variables and the error term. Thus, the expected value of the mean of the error term must equal to zero. This is also known as homoscedasticity. A violation of its assumptions will give incorrect predictions. White's test is used to test for homoscedasticity. In untabulated results, the White test shows that the homoscedasticity assumption is violated. Thus, the OLS method is not appropriate to use in this study. An alternative approach is to use the Generalized Least Squares (GLS) method which transforms the regression model in a new model with uncorrelated error terms and constant variances. Therefore, the GLS method will be used in the regression models with a continuous dependent variable. Whereas the logit regression model will be used for binary dependent variables.

Table 3 Panel B: Pearson correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	#ANALYSTS	1.000														
2	BENCH	-0.037	1.000													
3	BTM	0.078	0.026	1.000												
4	CAR	-0.025	0.062	0.044	1.000											
5	EPSgaap	0.199	0.211	0.017	0.065	1.000										
6	EPSstreet	0.298	0.133	0.025	0.039	0.799	1.000									
7	FEgaap	-0.016	0.129	0.028	0.086	0.349	0.090	1.000								
8	FEgaap*POST	-0.011	0.051	0.012	0.031	0.119	0.022	0.426	1.000							
9	FEstreet	**-0.002**	0.097	**-0.003**	0.100	0.104	0.162	0.393	0.113	1.000						
10	FEstreet*POST	-0.011	0.053	**-0.003**	0.025	0.023	0.056	0.103	0.236	0.478	1.000					
11	LEV	0.019	0.035	0.360	**0.006**	0.112	0.126	**-0.002**	**-0.009**	-0.025	-0.013	1.000				
12	LN_ASSETS	0.517	0.019	-0.111	-0.019	0.385	0.488	**0.008**	**-0.004**	0.004	-0.015	0.297	1.000			
13	LN_SPREAD	0.085	-0.151	0.021	-0.039	-0.463	0.087	-0.381	-0.158	0.056	0.025	**0.000**	0.032	1.000		
14	LOSS	-0.111	-0.192	0.046	-0.071	-0.608	-0.512	-0.231	-0.089	-0.087	-0.020	-0.147	-0.390	0.243	1.000	
15	MBE	0.086	0.209	0.024	0.176	0.196	0.244	0.116	0.044	0.256	0.098	**0.002**	0.084	0.027	-0.157	1.000
16	NON_GP	0.154	-0.122	0.027	-0.019	-0.142	0.121	-0.178	-0.080	0.028	**0.004**	-0.034	0.108	0.464	0.095	0.084
17	OTH_EXCL	0.066	-0.066	**-0.005**	-0.023	-0.164	0.143	-0.232	**0.006**	0.068	**-0.004**	-0.013	0.063	0.364	0.096	0.031
18	OTH_EXCL*POST	0.012	0.010	**-0.003**	**-0.005**	-0.028	0.087	-0.100	-0.244	0.046	0.098	-0.011	0.021	0.144	0.020	0.017
19	POS_OTHER	0.102	-0.109	**0.002**	-0.031	-0.258	0.151	-0.286	0.010	0.090	**-0.006**	**-0.009**	0.094	0.480	0.172	0.044
20	POS_OTHER*POST	0.046	-0.017	**0.005**	**-0.009**	-0.128	0.058	-0.124	-0.303	0.093	0.197	-0.019	0.012	0.259	0.076	0.026
21	POS_SPECIAL	0.063	-0.019	-0.014	-0.050	-0.195	0.051	-0.209	**0.006**	0.002	**-0.004**	**0.003**	0.072	0.285	0.121	**0.006**
22	POS_SPECIAL*POST	0.030	-0.019	**-0.004**	-0.012	-0.051	0.029	-0.094	-0.230	-0.015	-0.031	-0.005	0.034	0.118	0.039	**-0.007**
23	POST	-0.014	0.125	**-0.007**	**0.001**	-0.008	**-0.000**	**-0.001**	-0.087	0.019	0.054	0.011	**0.001**	0.016	0.024	0.029
24	4th_QTR	**-0.001**	0.028	**-0.005**	-0.045	0.029	0.025	**0.009**	-0.013	**0.006**	**0.011**	**0.002**	**0.000**	-0.011	-0.019	**0.008**
25	SPEC_EXCL	0.094	-0.131	-0.010	-0.051	-0.273	0.068	-0.273	0.001	-0.020	**-0.006**	0.019	0.110	0.412	0.175	**-0.000**
26	SPEC_EXCL*POST	0.040	-0.042	**0.003**	-0.016	-0.127	0.022	-0.162	-0.392	-0.023	-0.046	0.014	0.031	0.215	0.072	-0.012
27	SPECIALITEMS	0.194	**0.006**	-0.017	0.006	0.214	0.293	-0.022	-0.009	0.015	0.002	0.059	0.274	0.044	-0.178	0.085
28	STDROA	-0.091	-0.052	0.092	-0.036	-0.285	-0.260	-0.146	-0.028	0.001	0.036	-0.167	-0.365	0.060	0.394	-0.056
29	SUM_FutEarn	0.239	0.108	0.0274	0.070	0.7424	0.787	0.115	0.038	0.026	-0.006	0.142	0.448	-0.088	-0.484	0.161
30	TECH	-0.057	-0.020	0.158	0.021	-0.211	-0.212	0.016	0.006	0.031	0.022	-0.181	-0.361	0.060	0.327	0.033
31	YEAR	-0.033	0.330	-0.001	-0.018	-0.088	-0.039	-0.057	-0.044	0.009	0.028	0.006	-0.015	0.090	0.096	0.020

Panel B continued

		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
16	**NON_GP**	1.000															
17	**OTH_EXCL**	0.169	1.000														
18	**OTH_EXCL*POST**	0.064	-0.009	1.000													
19	**POS_OTHER**	0.280	0.732	-0.017	1.000												
20	**POS_OTHER*POST**	0.133	-0.010	0.577	-0.018	1.000											
21	**POS_SPECIAL**	0.219	0.148	-0.016	0.204	-0.018	1.000										
22	**POS_SPECIAL*POST**	0.096	-0.012	0.086	-0.021	0.114	0.178	1.000									
23	**POST**	0.003	-0.066	0.142	-0.116	0.159	-0.114	-0.033	1.000								
24	**4th_QTR**	-0.011	-0.022	0.024	-0.036	0.020	0.178	0.034	-0.020	1.000							
25	**SPECIAL**	0.138	0.128	-0.010	0.155	-0.011	-0.069	-0.013	0.698	-0.012	1.000						
26	**SPECIAL*POST**	0.053	**-0.010**	0.174	-0.017	0.123	0.145	0.032	-0.017	0.464	-0.010	1.000					
27	**SPECIALITEMS**	0.251	0.017	**0.009**	0.051	**-0.001**	-0.003	**-0.006**	0.210	0.055	0.137	0.050	1.000				
28	**STDROA**	-0.010	0.101	0.012	0.103	0.035	0.014	**0.003**	0.096	0.016	0.117	0.029	-0.103	1.000			
29	**SUM_FutEarn**	0.016	-0.065	**0.001**	-0.103	-0.045	-0.013	**-0.006**	0.025	0.013	0.023	**0.005**	0.262	-0.311	1.000		
30	**TECH**	0.077	0.038	0.035	0.046	0.051	0.015	**0.001**	-0.037	**0.005**	-0.026	**0.003**	-0.084	0.254	-0.238	1.000	
31	**YEAR**	0.036	0.018	0.072	0.010	0.080	0.505	-0.060	**0.007**	0.090	0.015	0.073	**-0.002**	0.061	-0.071	0.036	1.000

Table 4 presents the frequency of GAAP and non-GAAP earnings by one-digit SIC code. The total sample is divided into observations that only reported GAAP earnings and observations that also included non-GAAP earnings (hereafter, non-GAAP sample). As expected, the non-GAAP sample comprises of firms in the Manufacturing and Services industry, which includes a lot of technology firms. The sample also includes a large portion of firms in the Finance, Insurance and Real Estate industry because these companies possess large intangible assets and special items.

Table 4: Frequency of GAAP and non-GAAP earnings by one-digit SIC code

SIC Code	Industry	Total sample #obs.	%	GAAP sample #obs.	%	Non-GAAP sample #obs.	%
0000-0999	Agriculture, Forestry and Fishing	15	0.05	9	0.03	6	0.02
1000-1999	Mining and Construction	1,989	6.82	1,039	3.56	950	3.26
2000-2999	Merchandising	4,859	16.66	3,070	10.53	1,789	6.13
3000-3999	Manufacturing	5,299	18.17	2,425	8.32	2,874	9.85
4000-4999	Transportation, Communications, Electric, Gas and Sanitary service	3,112	10.67	2,019	6.92	1,093	3.75
5000-5999	Wholesale and Retail Trade	1,614	5.53	872	2.99	742	2.54
6000-6999	Finance, Insurance, Real Estate	7,763	26.62	5,373	18.42	2,390	8.20
7000-8999	Services	4,462	15.30	1,706	5.85	2,756	9.45
9000-9999	Public Administration	49	0.17	21	0.07	28	0.10
Total		29,162	100.00	16,534	56.70	12,628	43.30

Panel A of table 5 divides the sample into observations per year. The sample period is chosen to start at the second quarter of 2013 because that is exactly 3 years before the event date. Since the sample period starts at the second quarter of 2013 rather than at the first quarter, the number of observations in 2013 is considerably lower than in other years. However, this should not affect the results. Panel B divides the sample into observations before and after new non-GAAP regulations were introduced in the second quarter of 2016. The results show that the proportion of observations are unevenly distributed between pre-new and post-new regulation period. This should be considered when interpreting the regression results.

Table 5 Panel A: Observations per year

Year	Total sample #obs.	%	GAAP sample #obs.	%	Non-GAAP sample #obs.	%
2013	4,862	16.67	2,878	9.87	1,984	6.80
2014	7,255	24.88	4,243	14.55	3,012	10.33
2015	8,386	28.76	4,679	16.04	3,707	12.72
2016	8,659	29.69	4,734	16.23	3,925	13.46
Total	29,162	100.00	16,534	56.70	12,628	43.30

Panel B: Observations before and as of second quarter of 2016

Period	Total sample #obs.	%	GAAP sample #obs.	%	Non-GAAP sample #obs.	%
Before Q2 2016	24,828	85.14	14,093	48,33	10,735	36.81
As of Q2 2016	4,334	14.86	2,441	8.37	1,893	6.49
Total	29,162	100.00	16,534	56.70	12,628	43.30

4.2 Regression results

<u>Hypothesis 1</u>

Table 6 presents the regression results of hypothesis 1, and shows the relation between the determinants of a firm issuing non-GAAP earnings and the new regulations of May 2016. The sample contains 29,162 firm-quarter observations. A logit regression model is used because the dependent variable is binary (i.e. variable only takes on the value 0 or 1). *NON_GP* equals to one if the observation contains non-GAAP earnings, and zero otherwise. Following past literature, this study assumes that a firm issues non-GAAP earnings when EPS_{STREET} is higher than EPS_{GAAP}. The period after new regulations is measured by variable POST, and equals to one if the observation is in or after the second quarter of 2016. The coefficient of variable POST is predicted to be negative because the expectation is that firms are less likely to issue non-GAAP earnings due to increased scrutiny and stricter regulations.

From the table, the coefficient of POST equals −0.156 and is significant at the 1% level. Next, the marginal effect is determined using STATA's 'mfx' command function. Marginal effects estimate the predicted change in the dependent variable when an explanatory variable changes with one-unit while holding other variables constant. The table shows a marginal effect of −3.77 for the variable *POST*. This is interpreted as follows: the probability that a firm issues non-GAAP earnings following new regulations decreases by 3.77%. Other factor, that decreases the probability that a firm issues non-GAAP earnings, is when a firm meets or beats quarterly earnings of the previous year. This is represented by the marginal effect of variable *BENCH*, and equals to −13.27%. Further, the sign of the coefficient of all control variables are the same as predicted, except for variable *LEV* and *STDROA*. In contrary to what was predicted, the table shows that the higher the leverage level and earnings volatility, the less likely the firm issues non-GAAP earnings. Finally, all variables are significant at the 1% level, except for the variable *4th_QTR*.

In sum, the regression results in table 6 show that firms issue less non-GAAP earnings following new regulations. This finding is the same as from Heflin and Hsu (2008), who find that firms decrease their non-GAAP earnings disclosure following the adoption of Regulation G. The reasoning behind this finding is that managers react on increased SEC's scrutiny and stricter non-GAAP regulations. The results also confirm previous studies that suggest that firms issue non-GAAP earnings when the firm is in the technology industry, has special items and/or large analysts following, and experience losses and/or growth.

Table 6:
Logit model for the probability of issuing non-GAAP earnings following new regulations (H1)

Variable	Prediction	Coefficient	Marginal effect (%)
Dependent variable: NON_GP			
Intercept		−3.808***	−
		(−18.87)	
POST	−	**−0.156***	**−3.77**
		(−3.66)	
TECH	+	0.423***	10.44
		(12.56)	
LOSS	+	0.685***	16.88
		(19.89)	
BENCH	−	−0.550***	−13.27
		(−19.55)	
SPECIALITEMS	+	1.116***	26.16
		(39.85)	
4th_QTR	+	0.034	0.84
		(1.16)	
LEV	+	−0.038***	−0.94
		(−9.39)	
BTM	+	0.019***	0.47
		(7.61)	
LN_ASSETS	+	0.113***	2.77
		(11.67)	
STDROA	+	−0.033***	−0.80
		(−6.20)	
#ANALYSTS	+	0.020***	0.51
		(9.18)	
YEAR	?	0.170***	4.17
		(11.34)	
Adjusted R-squared		0.0940	
N		29,162	

Logit regression: Dependent variable *POST* equals to one if the observation is in or after the second quarter of 2016, and zero otherwise. The marginal effects are computed using STATA's 'mfx' function and presented as percentages. The interpretation of the marginal effects differs between binary and continuous variables. Effects for binary variables should be interpreted as change in percentages. Whereas for continuous variables, it should be interpreted as change in percentage points. Chi-squared statistics are reported below the coefficients. *Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

Hypothesis 2

Table 7 presents the regression results of hypothesis 2, and examines the change in earnings spread following new regulations. The regression results are divided between total and non-GAAP sample, and result in 29,162 and 12,628 firm-quarter observations respectively. The dependent variable is *LN_SPREAD,* and is measured by taking the natural log of the difference between EPS_{STREET} and EPS_{GAAP}. The variable of interest is variable *POST*, and is predicted to be negative. The sign of the coefficient of variable *POST* is negative in both samples (−0.030 and −0.029) and significant at the 1% level. When the firm-quarter observation is in the post-new regulation period, the spread decreases with 3.0% for the total sample and 2.9% for the non-GAAP sample. Both results suggest that the spread between GAAP and non-GAAP earnings decreased following new regulations.

The adjusted R-squared increases from 0.1011 to 0.2522 by switching from the total sample to the non-GAAP sample. This increase in model quality is due to the fact that the non-GAAP sample excludes firm-quarter observations where the spread equals to zero, whereas the total sample includes them. Since we are interested in the change in earnings spread, the focus lies on the regression results of the non-GAAP sample. In the column of the non-GAAP sample, we can see that almost all variables are at least significant at the 10% level, except for the variables *LEV*, *BTM* and *#ANALYSTS*. Moreover, the sign of *LEV* and *#ANALYSTS* is not the same as predicted. However, these differences are not significant.

Table 7: Natural log of the spread between EPS_{STREET} and EPS_{GAAP} on new regulations (H2)			
Variable	Prediction	Total sample	Non-GAAP sample
Dependent variable: LN_SPREAD			
Intercept		−0.054	−0.370***
		(−0.60)	(−3.84)
POST	−	**−0.030*****	**−0.029*****
		(−5.91)	(−5.39)
TECH	+	0.012	0.031***
		(1.04)	(2.83)
LOSS	+	0.138***	0.130***
		(7.35)	(8.08)
BENCH	−	−0.066***	−0.058***
		(−8.85)	(−14.47)
4th_QTR	+	0.009***	0.009***
		(3.33)	(2.80)
LEV	+	0.001	−0.000
		(1.31)	(−0.02)
BTM	+	0.000	0.000
		(0.89)	(0.76)
LN_ASSETS	+	0.018***	0.037***
		(4.30)	(7.59)
STDROA	+	0.000	0.012***
		(0.06)	(5.54)
#ANALYSTS	+	0.000	−0.000
		(0.96)	(−0.25)
YEAR	?	0.030***	0.28***
		(7.74)	(10.78)
Adjusted R-squared		0.1011	0.2522
N		29,162	12,628

GLS regressions: Dependent variable *LN_SPREAD* is measured by taking the natural log of the difference between EPS_{STREET} and EPS_{GAAP}. Chi-squared statistics are reported below the coefficients. *Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

The findings from table 6 and 7 suggest that firms behave less opportunistically due to increased scrutiny and regulations. This is reflected by the negative coefficients of variable *POST.* In the previous section, we could see that there is a drop in the issuance of non-GAAP earnings disclosures following stricter regulations. Here, the evidence suggests that managers issue non-GAAP earnings less aggressively. In other words, the difference between GAAP and non-GAAP

earnings is lower after 2016's regulations were introduced. These findings correspond with the evidence from Heflin and Hsu (2008).

<u>Hypothesis 3</u>

Table 8 presents the relation between the sum of future operating earnings, and special and other items exclusions. It follows the research methods from Kolev et al. (2008) and Bond et al. (2017) to examine the effect of regulations on the quality of exclusions. The dependent variable *SUM_FutEarn* is measured as the sum of future operating earnings of quarters *q+1* through *q+4*. Except for observations in the last quarter of 2016, where only future operating earnings till *q+3* were available. Special and other items exclusions are constructed as described in section 3.2.2. Kolev et al. (2008) and Bond et al. (2017) argue that high quality exclusions are those that are less associated with future operating earnings. The expectation is that both special and other items exclusions have lower predictive power (and hence, are of higher quality) after new non-GAAP regulations are imposed because the assumption is that managers become more reluctant to exclude recurrent items that are associated with daily business operations. Thus, they become more cautious when determining non-GAAP earnings, and only exclude items that are irregular. And since irregular items are not related to daily business operations, it should not be associated with future operating earnings. Bond et al. (2017) find that the predictive power of special and other items exclusions decreased after Regulation G and 2010's C&DIs were introduced. Suggesting that managers decreased their opportunistic behavior by excluding less recurrent items following stricter regulations. However, Kolev et al. (2008) find that the quality of special items exclusions decreased while quality of other items exclusions increased after Regulation G was adopted. They suggest that stricter regulations result in unintended effects, such as managers complying with the new disclosure setting by transferring recurrent items from other items to special items exclusions.

In table 8, both the coefficient of *SPEC_EXCL* and its interaction term *SPEC_EXCL*POST* in the column 'total sample' is positive (0.061 and 0.062). However, both terms are not significant which could mean that the quality of special items exclusions remained unchanged. The same goes for the non-GAAP sample where the coefficients (−0.001 and −0.099) are also not significant. This suggest that special items exclusions are not affected by the introduction of new non-GAAP regulations. The opposite is true for other items exclusions. The coefficients of *OTH_EXCL* and *OTH_EXCL*POST* are both negative and significant for either the total and non-GAAP sample. This strongly suggest that 2016's modified non-GAAP guidance have a negative impact on how management construct non-GAAP earnings. It indicates that management's opportunistic behavior has increased. They've continued labeling recurrent items as other items exclusions which resulted in lower quality exclusions. In sum, the results in table 8 do not match

findings of Kolev et al. (2008) and Bond et al. (2017). This difference in conclusion could be because this study has a relatively smaller sample than past literature. Moreover, the post-new regulation period in this study only constitutes of three quarters, whereas previous studies had a much longer post-new regulation period to examine from.

Table 8:
Future operating earnings on special and other items exclusions (H3)

Variable	Prediction	Total sample	Non-GAAP sample
Dependent variable: SUM_FutEarn			
Intercept		−1.570***	−1.165**
		(−3.77)	(−2.26)
POST	?	−0.019	0.053
		(−0.25)	(1.00)
SPEC_EXCL	?	**0.061**	**−0.001**
		(0.72)	(−0.01)
OTH_EXCL	−	**−2.152***	**−2.212***
		(−12.96)	(−12.52)
SPEC_EXCL*POST	?	**0.062**	**−0.099**
		(0.39)	(−0.45)
OTH_EXCL*POST	+	**−1.696***	**−2.099***
		(3.52)	(−3.26)
EPS_{STREET}	+	3.083***	3.287***
		(32.29)	(35.90)
TECH	−	−0.206***	−0.226***
		(−3.18)	(−3.43)
LOSS	+	0.141***	0.136**
		(3.34)	(2.41)
BENCH	−	−0.079***	−0.050
		(−3.29)	(−1.30)
4th_QTR	−	−0.172***	−0.188***
		(−4.95)	(−6.37)
LEV	+	−0.011	−0.005
		(−1.55)	(−0.54)
BTM	+	0.012**	0.009
		(2.51)	(1.55)
LN_ASSETS	+	0.102***	0.073***
		(5.02)	(3.06)
STDROA	−	−0.041**	−0.045**
		(−2.35)	(−2.30)
#ANALYSTS	+	0.004	0.003
		(1.07)	(0.94)
YEAR	?	−0.056**	−0.022
		(2.48)	(−1.00)
Adjusted R-squared		0.6852	0.7105
N		29,145	12,620

GLS regression: Dependent variable *SUM_FutEarn* is measured as the sum of future operating earnings of quarters *q+1* through *q+4*. Except for observations in the last quarter of 2016, where only future operating earnings till *q+3* were available. Chi-squared statistics are reported below the coefficients. *Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

Hypothesis 4

Hypothesis 4 concerns whether firms are more likely to meet or beat analysts' earnings forecasts following new regulations. Moreover, it looks at whether having positive special

and/or other items exclusions are related to the probability that a firm performs better than analysts' expectations. The dependent variable *MBE* equals to one if EPS$_{STREET}$ is equal to or higher than the median analysts' forecast reported in database I/B/E/S. Note that EPS$_{STREET}$ equals to EPS$_{GAAP}$ when the firm is specified as a GAAP firm. Since the dependent variable is binary, special and other items exclusions are constructed slightly different than in hypothesis 3. They equal to one if the magnitude of special or other items exclusions are positive, and zero otherwise. This approach was also used in the studies of Doyle et al. (2013) and Bond et al. (2017). They argue that positive exclusions are those that increase non-GAAP earnings relative to GAAP earnings, whereas negative exclusions are those that decrease non-GAAP earnings.

Table 9:
Likelihood of meeting/beating analysts' forecasts on special and other items exclusions in post-period (H4)

Variable	Prediction	Total sample Coefficient	Marginal effect (%)	Non-GAAP sample Coefficient	Marginal effect (%)
Dependent variable: MBE					
Intercept		−0.665***	–	−0.994***	–
		(−3.39)		(−3.31)	
POST	−	**0.311***	**7.35**	**0.422****	**9.24**
		(5.22)		(2.45)	
POS_SPECIAL	+	**0.229***	**2.58**	**0.259***	**5.99**
		(8.29)		(5.27)	
POS_OTHER	+	**0.496***	**11.71**	**0.373***	**8.68**
		(16.86)		(7.09)	
POS_SPECIAL*POST	?	**0.108***	**5.52**	**0.127**	**2.89**
		(1.66)		(1.08)	
POS_OTHER*POST	?	**0.457***	**10.50**	**0.110**	**2.50**
		(6.61)		(0.87)	
TECH	+	0.415***	9.78	0.367***	8.21
		(11.93)		(7.51)	
LOSS	−	−0.648***	−15.87	−0.564***	−13.26
		(−19.34)		(−12.25)	
BENCH	+	0.934***	21.95	0.869***	19.07
		(33.10)		(19.21)	
4th_QTR	−	−0.056*	−1.36	−0.074*	−1.71
		(−1.92)		(−1.67)	
LEV	−	−0.012***	−0.29	−0.016***	−0.38
		(−3.31)		(−2.91)	
BTM	+	0.006**	0.14	0.013***	0.30
		(2.50)		(3.43)	
LN_ASSETS	+	0.022**	0.55	0.037***	0.87
		(2.40)		(2.68)	
STDROA	−	0.000	−0.01	0.003	0.08
		(0.09)		(0.45)	
#ANALYSTS	+	0.016***	0.39	0.015***	0.35
		(7.19)		(4.76)	
YEAR	?	−0.126***	−3.05	−0.051**	−1.18
		(−8.61)		(−2.35)	
Adjusted R-squared		0.0660		0.0596	
N		29,162		12,628	

Logit regression: Dependent variable *MBE* equals to one if EPS$_{STREET}$ is equal to or higher than the median analyst' forecast. The marginal effects are computed using STATA's 'mfx' function and presented as percentages. The interpretation of the marginal effects differs between binary and continuous variables. Effects for binary variables should be interpreted as change in percentages. Whereas for continuous variables, it should be interpreted as change in percentage points. Chi-squared statistics are reported below the coefficients. *Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

First, focusing on the column 'total sample' in table 9. There, we can see that the probability of meeting/beating analysts' forecast increased with 7.35% after new regulations were introduced. This is in contrast with the original prediction where the expectation was that increased scrutiny would lead to a decrease in the probability. Further, it shows that the higher probability is due to both positive special and other items exclusions. When a firm has excluded positive special items then the probability that the firm meets/beats expectations increases with 2.58+5.52=8.10%. Whereas for positive other items exclusions, it increases with 11.71+10.50= 21.71%. The results in the column 'total sample' indicates that firms who issue non-GAAP earnings are more likely to meet/beat analysts' forecasts than those who don't. And this relation even exists when there are stricter regulations involved.

However, this is not the case when we look at the non-GAAP sample. Even though the coefficient of *POST* is positive and significant, the coefficients of *POS_SPECIAL*POST* and *POS_OTHER*POST* are not significant. Thus, the increase in probability of meeting/beating analysts' forecasts can't be explained by increase in positive special and other items exclusions. This could potentially mean that managers switched from using positive special and other items exclusions to other methods to meet/beat analysts' forecast after stricter regulations were introduced. Consistent with this reasoning, Doyle et al. (2013) argue that managers substitute the use of positive (i.e. income-increasing) exclusions with other earnings management tools such as accrual management and real earnings management. They find that when it becomes too costly for managers to use positive exclusions to meet expectations, they will switch to these other earnings management methods. The results in table 9 suggest that increased SEC's scrutiny and stricter non-GAAP regulations increased the cost of using positive exclusions to meet analysts' expectations in the post-period which led to a decrease in their use. However, an unintended consequence that might arise is that managers simply switch to other earnings management tools.

Hypothesis 5

Hypothesis 5 examines the relation between earnings surprises and the cumulative abnormal return (CAR) with respect to the new regulation environment. Dependent variable *CAR* represents the 60-day window cumulative abnormal return following a quarterly earnings announcement. Past literature argue that investors are focusing more on non-GAAP earnings than GAAP earnings during earnings announcements because investors are under the assumption that non-GAAP earnings are of higher quality and more informative than GAAP earnings. Moreover, critics also claim that investors are misled by the amount of emphasis put on non-GAAP earnings. However, this relation decreases when there are stricter non-GAAP regulations and higher scrutiny involved. In this analysis, the expectation is that the new

regulation environment and higher scrutiny raises the awareness that non-GAAP earnings should be interpreted with cautious. This should influence how investors react to earnings announcements based on non-GAAP earnings. Thus, the expectation is that investors discount earnings surprises based on non-GAAP earnings, and shift their focus towards GAAP earnings in the post-new regulation period. The results in table 10 are consistent with this expectation.

Table 10:
60-day CAR on GAAP and non-GAAP forecast errors/earnings surprises (H5)

Variable	Prediction	Total sample	Non-GAAP sample
Dependent variable: CAR			
Intercept		0.073***	0.095***
		(2.96)	(3.04)
POST	?	0.016***	0.018**
		(2.54)	(2.34)
FE_{GAAP}	+	**0.074**	**0.111***
		(1.01)	(1.78)
FE_{STREET}	+	**0.799***	**1.129***
		(5.05)	(5.76)
FE_{GAAP}*POST	+	**0.085**	**0.225***
		(0.53)	(1.67)
FE_{STREET}*POST	−	**−0.535***	**−0.728***
		(−3.28)	(−3.23)
TECH	+	0.012***	0.007*
		(3.17)	(1.70)
LOSS	−	−0.021***	−0.013***
		(−5.53)	(−3.45)
BENCH	+	0.018***	0.025***
		(6.95)	(6.29)
4th_QTR	−	−0.024***	−0.028***
		(−3.88)	(−4.45)
LEV	−	−0.001	−0.000
		(−0.81)	(−0.64)
BTM	+	0.001***	0.001**
		(3.60)	(2.23)
LN_ASSETS	+	−0.002**	−0.003**
		(−1.99)	(−2.39)
STDROA	−	−0.001	−0.003**
		(−0.80)	(−2.15)
#ANALYSTS	+	−0.001**	−0.000
		(−2.30)	(−1.27)
YEAR	?	−0.008**	−0.008***
		(−2.26)	(−2.66)
Adjusted R-squared		0.0255	0.0361
N		29,162	12,628

GLS regression: Dependent variable *CAR* represents the 60-day window cumulative abnormal return following a quarterly earnings announcement. Chi-squared statistics are reported below the coefficients. *Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

First, the coefficients of FE_{STREET} are positive in the pre-period but negative in the post-period which is reflected by the interaction term FE_{STREET}*POST. This suggest that investors react less positive on positive non-GAAP earnings surprises following new regulations. For the non-GAAP sample, the results indicate that a one percentage point increase in non-GAAP earnings

surprise in the post-period decreases the overall market reaction with 0.728 percentage point to 1.129–0.728=0.401 percentage point. Second, the coefficients of FE_{GAAP} and $FE_{GAAP}*POST$ are both positive, but only significant in the non-GAAP sample. This indicates that investors are responding more positive on positive GAAP earnings surprise news in the post-period. For the non-GAAP sample, the results indicate that a one percentage point increase in GAAP earnings surprise in the post-period increases the overall market reaction with 0.225 percentage point to 0.111+0.225=0.336 percentage point. In sum, table 10 provides evidence suggesting that investors perceive non-GAAP earnings less informative, and GAAP earnings more informative compared to the pre-period due to increased scrutiny and stricter non-GAAP guidance. There is also the possibility that investors focus less on non-GAAP earnings, because the modified non-GAAP guidance limits the level of emphasis that managers can put on non-GAAP earnings. However, this is just an assumption and can't be entirely identified based on the analyses in this study, since the proxy of non-GAAP earnings used in this study is I/B/E/S actual earnings and not the actual reported earnings in earnings announcements.

4.3 Conclusion

This study investigates whether modified non-GAAP guidance influenced earnings informativeness and disclosure behavior. Evidence from the regression results indicates that firms issue less non-GAAP earnings following the modification, and also the gap between GAAP and non-GAAP earnings diminished. This does suggest that "opportunistic" behavior of management has decreased. Thus, even though the revised non-GAAP guidance are not restrictive, firms are still responding to them. However, further analysis shows that non-GAAP earnings quality decreased which is reflected by hypothesis 4. Firms, who are still issuing non-GAAP earnings, are still excluding other items when constructing non-GAAP earnings. Furthermore, firms' non-GAAP earnings continue to meet or beat analysts' forecasts following revised non-GAAP guidance but this relation is not related to increased use of other items exclusions. This suggests that managers switch to other earnings management tools when it becomes too costly to use non-GAAP earnings exclusions to increase earnings due to higher scrutiny and increased risk of prosecution (Doyle et al., 2013). The final regression results indicate that investors are aware of the lower quality non-GAAP earnings, and respond accordingly by discounting earnings surprise information based on non-GAAP earnings.

5. Robustness Tests

Additional analyses were performed to provide confidence in the results. There is the concern that the results are driven by a small portion of the sample. It is useful to test whether exclusion of some type of firms changes the results drastically. For example, larger and more well-known firms have higher incentives to adapt to stricter regulations because they experience higher scrutiny. Therefore, the existing sample is being modified into two different samples: (1) including only S&P 500 firms, and (2) excluding S&P 500 firms. The latter sample is labeled as other firms. Next, the regression models are run over these new samples. Table 1A and 1B in Appendix C provides these robustness test results.

The tables present the regression results of all five models used in this study and their expected sign of the coefficients. The results are comparable to those found in the previous section. Both the probability of issuing non-GAAP earnings and the difference in earnings spread decreases in the post-period. Moreover, the results are consistent with the finding that the quality of other items exclusions decreased, and that managers are substituting exclusions with other forms of earnings management methods to meet analysts' expectations. Further, the results also indicate that investors are reacting more (less) on earnings surprise news based on GAAP (non-GAAP) earnings based on the sign of the coefficients. However, the coefficients of variables FE_{GAAP}, $FE_{GAAP}*POST$ and FE_{STREET} are not significant. Next, the focus lies on observations were only non-GAAP earnings are issued. Thus, only observations were I/B/E/S actual earnings are different than Compustat earnings are being included in the sample. This will be done separately for the S&P 500 firms and the other firms sample. The results (not tabulated) are also consistent to those found previously. Thus, these robustness checks indicate that the results are not driven by including a specific portion of firms in the sample.

6. Conclusion

This study investigates several consequences of SEC's recent modifications on its existing interpretive non-GAAP guidance. More specifically, it examines whether the new disclosure environment affects the probability that a firm issue adjusted earnings, the spread between GAAP and non-GAAP earnings, the quality of exclusions, the probability that a firm uses non-GAAP earnings to meet/beat analysts' forecasts, and the perceived informativeness of both earnings measures. In this study, GAAP earnings are defined as Compustat's quarterly earnings per share, and non-GAAP earnings as I/B/E/S actual earnings. Using a sample of 29,162 firm-quarter observations during the second quarter of 2013 till the end of 2016, this study finds that firms issued less non-GAAP earnings following new non-GAAP guidance. Moreover, the gap between GAAP and non-GAAP earnings also decreased. This suggests that the modified non-GAAP guidance and increased SEC's scrutiny raised management's awareness that they must reconsider their use regarding non-GAAP earnings. However, the results on the quality of exclusions portrays a different scenario. It seems that the quality of other items exclusions decreased which suggests that management continued, and perhaps increased their recurrent items exclusions. As discussed before, increased exclusion of recurrent items from GAAP earnings is associated with increased "opportunistic" behavior of management. The results also indicate that non-GAAP earnings continue to meet or exceed analysts' expectations, whereas the expectation was that it would decrease following revised non-GAAP guidance. Note, it appears that this increased probability is not related to positive non-GAAP exclusions because the coefficients are not significant for the non-GAAP sample. In other words, the increased probability that a firm's non-GAAP earnings meet/beat analysts' forecasts is not due to increased exclusions of income-decreasing items (i.e. expenses) but due to other factors. As Doyle et al. (2013) explained, when the cost of using exclusions to manage earnings becomes too high, firms will substitute it with other forms of earnings management (e.g. accrual management; real earnings management). And lastly, the results provide evidence that investors perceive GAAP earnings more and non-GAAP earning less informative in the post-period. Suggesting that investors are being more cautious when interpreting non-GAAP earnings, and focus more on GAAP earnings in financial reports. Additional robustness tests provide the same results. Overall, the conclusion of this paper is that SEC's intervention on non-GAAP reporting decreased the number of non-GAAP earnings issuance and the earnings spread but also decreased the quality of non-GAAP earnings. As a response, investors are discounting earnings surprises based on non-GAAP earnings, and shift their focus towards GAAP earnings. An unintended consequence that might arise is that management switch to other earnings management tools when non-GAAP earnings management becomes too costly.

This study contributes in several ways. First, it addressed the consequences of SEC's updated non-GAAP guidance on the informativeness, and disclosure behavior of GAAP and non-GAAP earnings. It contributes to a better understanding regarding the effects of non-GAAP regulations. More specifically, it provides insights into whether the objective of stricter non-GAAP guidance is achieved since the goal of regulators is to minimize the issuance and magnitude of non-GAAP earnings, and the "opportunistic" behavior of management. Moreover, it suggests that regulators should take into account that there might be unintended consequences when issuing stricter non-GAAP regulations. Furthermore, this study extends existing research (Heflin and Hsu, 2008; Kolev et al., 2008; Doyle et al., 2013; Bond et al., 2017) by stretching their framework to a different non-GAAP regulation environment. This study contributes to the existing debate regarding the motivations of management' non-GAAP earnings disclosure practices. The evidence suggests that management uses non-GAAP earnings to meet or beat analysts' forecasts but that this effect is diminished following SEC's intervention in 2016.

There are some limitations to this study. First, the sample and the number of observations in the post-period is significantly smaller than in past research studies (e.g. Kolev et al., 2008; Bond et al., 2017). Second, this study uses I/B/E/S actual earnings as a proxy for non-GAAP earnings. This provides less reliable results since there is a difference between the earnings figures reported in company's press releases and those reported in I/B/E/S (Bhattacharya et al., 2003). Therefore, future research should tackle these limitations by using a larger sample and a longer sample period. Moreover, it should use non-GAAP earnings presented in firm's earnings press releases instead of I/B/E/S actual earnings. Another suggestion for future research would be that researchers examines whether managers indeed substitute non-GAAP exclusions management with other types of earnings management just like in the research paper of Doyle et al. (2013). Researchers could also examine whether firms reduced their level of emphasis placed on non-GAAP earnings in financial reports since the modified non-GAAP guidance suggests that both earnings measures should have the same level of emphasis.

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Appendix A – Literature Overview

Overview of studies related to GAAP and non-GAAP earnings

No.	Authors	Data Description	Earnings Proxy	Research focus
1	Johnson and Schwatz (2001)	Earnings press releases of 433 firms from June through August 2000.	**GAAP and non-GAAP:** Earnings press releases **'Street' earnings:** Zacks Investment Research	Frequency and magnitude of pro forma reporting; Mispricing of pro forma firms
2	Bradshaw and Sloan (2002)	108,864 firm-quarter observations in the period 1985-1997.	**GAAP:** Compustat **'Street' earnings:** I/B/E/S	Informativeness; Spread; Emphasis
3	Bhattacharya et al. (2003)	Hand-collected 1,149 quarterly pro forma earnings announcements during 1998-2000.	**GAAP and non-GAAP:** Earnings press releases **'Street' earnings:** I/B/E/S	Informativeness and persistence of pro-forma earnings; Spread
4	Brown and Shivakumar (2003)	Total of 11,306 firm-quarter observations.	**GAAP:** Compustat **'Street' earnings:** I/B/E/S	Earnings informativeness; value relevance
5	Lougee and Marquardt (2004)	Matched-sample design for 249 quarterly press releases from 1997-1999.	**GAAP and non-GAAP:** Earnings press releases	Informativeness; Future firm profitability
6	Bowen et al. (2005)	Hand-collected 1,518 quarterly pro forma earnings announcements during 2001-2002.	**GAAP and non-GAAP:** Earnings press releases	Emphasis; market reaction to earnings announcement
7	Elliot (2006)	Experimental design with 89 MBA's and 55 sell-side analysts	**GAAP and non-GAAP:** Earnings press releases	Informativeness; Emphasis
8	Choi et al. (2007)	Hand-collected non-GAAP EPS disclosures of 1301 firms in 1994, 1996 and 2001.	**GAAP and non-GAAP:** Earnings press releases **'Street' earnings:** Thomson Datastream, I/B/E/S	Persistence of earnings components
9	Heflin and Hsu (2008)	42,760 firm-quarter observations in the period 2000-2004.	**GAAP:** Compustat **Non-GAAP:** I/B/E/S	Frequency of non-GAAP reporting; 'Opportunistic' behavior; Emphasis
10	Kolev et al. (2008)	104,954 firm-quarter observations from 1998 to 2004.	**GAAP:** Compustat **'Street' earnings:** I/B/E/S	Earnings quality after new regulations; 'Opportunistic' behavior; Informativeness

11	Doyle et al. (2013)	237,617 firm-quarter observations from 1988 to 2009.	**GAAP:** Compustat **'Street' earnings:** I/B/E/S	'Opportunistic' behavior of managers
12	Curtis et al. (2014)	1,920 firm-quarter observations from 2004 to 2009.	**GAAP and non-GAAP:** Earnings press releases **'Street' earnings:** I/B/E/S	Informativeness; 'Opportunistic' behavior of management
13	Bond et al. (2017)	69,800 firm-quarter observations from 1998-2008; 67,874 firm-quarter observations from 2005-2015.	**GAAP:** Compustat **Non-GAAP:** I/B/E/S	Earnings quality after new regulations; 'Opportunistic' behavior; Informativeness

Appendix B – Variable Definitions

Variable	Definition	Study
#ANALYSTS	The number of analysts that follows the company.	Heflin and Hsu, 2008
BENCH	Indicator = 1 if GAAP earnings is the same or higher than earnings in the same quarter of previous year, and 0 otherwise.	Heflin and Hsu, 2008
BTM	Book-to-market ratio measured as book value of equity divided by market value of equity.	Heflin and Hsu, 2008; Curtis et al., 2014; Bond et al., 2017
CAR	Cumulative Abnormal Return measured as two days after last quarterly earnings announcement till one day after current announcement.	Bradshaw and Sloan, 2002
LEV	Firm's leverage measured as total liabilities divided by total equity.	Lougee and Marquardt, 2004; Heflin and Hsu, 2008
LN_ASSETS	Measures firm size as the log of firm's total assets.	Heflin and Hsu, 2008; Bond et al., 2017
LN_SPREAD	The spread between EPS_{STREET} and EPS_{GAAP}, measured as the log difference between I/B/E/S actual earnings and Compustat's GAAP earnings.	Heflin and Hsu, 2008
LOSS	Indicator =1 if GAAP earnings is negative, and 0 otherwise.	Hayn, 1995; Heflin and Hsu, 2008
MBE	Indicator = 1 if EPS_{STREET} meet/beat median analyst' forecast, and 0 otherwise.	Doyle et al., 2013; Bond et al., 2017
NON_GP	Indicator = 1 if EPS_{STREET} is higher than EPS_{GAAP}, and 0 otherwise.	Heflin and Hsu, 2008
OTH_EXCL	Measuring the dollar amount of EPS_{STREET} minus EPS_{GAAP} and minus special items, when the observation is before second quarter of 2016.	Bond et al., 2017
OTH_EXCL *POST	Measuring the dollar amount of EPS_{STREET} minus EPS_{GAAP} and minus special items, when the observation is in second quarter of 2016 or later.	Bond et al., 2017
POS_OTHER	Indicator = 1 if observation is before second quarter of 2016, and EPS_{STREET} minus EPS_{GAAP} and minus special items is positive, and 0 otherwise.	Doyle et al., 2013; Bond et al., 2017
POS_OTHER *POST	Indicator = 1 if observation is in second quarter of 2016 or later, and EPS_{STREET} minus EPS_{GAAP} and minus special items is positive, and 0 otherwise.	Doyle et al., 2013; Bond et al., 2017
POS_SPECIAL	Indicator = 1 if observation is before second quarter of 2016 and operating income per share less EPS_{GAAP} is positive, and 0 otherwise.	Doyle et al., 2013; Bond et al., 2017

POS_SPECIAL *POST	Indicator = 1 if observation is in second quarter of 2016 or later and operating income per share less EPS_{GAAP} is positive, and 0 otherwise.	Doyle et al., 2013; Bond et al., 2017
POST	Indicator = 1 if firm i quarter observation q falls in the period after the first quarter of 2016, and 0 otherwise.	Heflin and Hsu, 2008
4th_QTR	Indicator = 1 if observation is in the last quarter of the fiscal year, and 0 otherwise.	Heflin and Hsu, 2008
SPEC_EXCL	Measuring the dollar amount of operating income per share less EPS_{GAAP}, when the observation is before second quarter of 2016.	Bond et al., 2017
SPEC_EXCL *POST	Measuring the dollar amount of operating income per share less EPS_{GAAP}, when the observation is in second quarter of 2016 or later.	Bond et al., 2017
SPECIALITEMS	Indicator = 1 if operating income per share less EPS_{GAAP} is nonzero, and 0 otherwise.	Doyle et al., 2013
STDROA	Standard deviation of firm i's quarterly return on assets over the sample period.	Heflin and Hsu, 2008; Bond et al., 2017
SUM_FutEarn	The sum of future operating earnings of quarters $q+1$ through $q+4$. Except for observations in the last quarter of 2016, where only future operating earnings till $q+3$ are available.	Kolev et al. (2008); Bond et al., 2017
TECH	Indicator = 1 if the firm belongs to industry's SIC codes starting with: 283, 357, 481, 360-367, 737, or 873.	Francis and Schipper, 1999; Heflin and Hsu, 2008
YEAR	Equals to 0, 1, 2 or 3 when the year observation is in 2013, 2014, 2015 or 2016, respectively.	Bradshaw and Sloan, 2002

All variables are measured using data of the last month of quarter q, unless specified otherwise.

Appendix C – Robustness Test Results

Table 1A: Robustness test using S&P 500 firms (total sample)

Variable	Exp. Sign	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent variable:		NON_GP	LN_SPREAD	Sum_FutEarn	MBE	CAR
Intercept		−4.536***	−0.075	−1.204***	−0.809***	0.080***
		(31.80)	(−0.70)	(−2.51)	(−3.23)	(3.64)
POST	−	**−0.185***	**−0.034***	−0.077	0.265***	0.006
		(−3.18)	(−5.13)	(−0.85)	(3.21)	(1.19)
SPEC_EXCL	?			**−0.043**		
				(−0.41)		
OTH_EXCL	−			**−2.174***		
				(−10.33)		
SPEC_EXCL*POST	?			**0.065**		
				(0.41)		
OTH_EXCL*POST	+			**−1.659***		
				(−3.05)		
EPS_{STREET}				3.148***		
				(31.60)		
POS_SPECIAL	+				**0.248***	
					(6.90)	
POS_OTHER	+				**0.476***	
					(5.08)	
POS_SPECIAL*POST	−				**0.151***	
					(1.71)	
POS_OTHER*POST	−				**0.487***	
					(5.08)	
FE_{GAAP}	+					**0.058**
						(0.67)
FE_{STREET}	+					**0.763***
						(3.11)
FE_{GAAP}**POST**	+					**0.248**
						(1.57)
FE_{STREET}**POST**	−					**−0.313**
						(−1.06)
TECH		0.424***	0.009	−0.175**	0.284***	0.010**
		(9.12)	(0.64)	(−2.01)	(6.06)	(2.28)
LOSS		0.860***	0.175***	0.210***	−0.699***	−0.20***
		(17.70)	(8.87)	(3.32)	(−15.08)	(−3.85)
BENCH		−0.625***	−0.072***	−0.110***	0.925***	0.014***
		(−16.82)	(−8.14)	(−3.50)	(24.78)	(4.89)
4th_QTR		0.042	0.010***	−0.213***	−0.077**	−0.012**
		(1.09)	(3.02)	(−4.67)	(−2.03)	(−2.24)
LEV		−0.059***	0.002*	−0.018**	−0.017***	0.000
		(−10.32)	(1.82)	(−2.23)	(−3.68)	(0.67)
BTM		0.023***	−0.000	0.024***	0.008**	0.001*
		(6.11)	(−0.06)	(5.53)	(2.38)	(1.88)
LN_ASSETS		0.145***	0.019***	0.083***	0.034***	−0.003***
		(11.58)	(3.76)	(3.66)	(2.85)	(−3.04)
STDROA		−0.018**	−0.002	−0.064***	0.003	−0.001
		(−2.28)	(−1.05)	(−3.95)	(0.50)	(−0.51)
#ANALYSTS		0.009***	0.000	0.007	0.014***	−0.001*
		(3.19)	(1.17)	1.62	(5.36)	(−1.66)
YEAR		0.196***	0.034***	−0.033	−0.148***	−0.004*
		(10.00)	(7.15)	(−1.20)	(−7.79)	(−1.66)
Adjusted R-squared		0.1088	0.1212	0.7031	0.0623	0.0361
N		17,141	17,141	17,134	17,141	12,628

*Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.

Table 1B: Robustness test using other firms (total sample)

Variable	Exp. Sign	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent variable:		NON_GP	LN_SPREAD	Sum_FutEarn	MBE	CAR
Intercept		−3.162***	0.064	−1.702***	−0.416	0.089
		(−9.29)	(0.58)	(−2.85)	(−1.25)	(1.58)
POST	−	**−0.128***	**−0.023***	0.061	0.367**	0.029***
		(−2.01)	(−3.17)	(0.95)	(4.21)	(2.76)
SPEC_EXCL	?			**0.331***		
				(1.79)		
OTH_EXCL	−			**−2.036***		
				(−8.46)		
SPEC_EXCL*POST	?			−0.053		
				(−0.18)		
OTH_EXCL*POST	+			**−1.682***		
				(−3.56)		
EPS$_{STREET}$				2.895***		
				(21.53)		
POS_SPECIAL	+				**0.185***	
					(4.23)	
POS_OTHER	+				**0.560***	
					(12.21)	
POS_SPECIAL*POST	−				**0.088**	
					(0.90)	
POS_OTHER*POST	−				**0.459***	
					(4.50)	
FE$_{GAAP}$	+					**0.060**
						(0.63)
FE$_{STREET}$	+					**0.881***
						(3.30)
FE$_{GAAP}$*POST	+					**0.061**
						(0.25)
FE$_{STREET}$*POST	−					**−0.856***
						(−2.71)
TECH		0.424***	0.012	−0.268***	0.490***	0.010
		(8.47)	(0.56)	(−3.23)	(9.42)	(1.46)
LOSS		0.447***	0.108***	0.061	−0.604***	−0.018***
		(8.79)	(4.80)	(1.03)	(−12.09)	(−3.02)
BENCH		−0.451***	−0.061***	−0.015	0.951***	0.024***
		(−10.32)	(−6.80)	(−0.45)	(21.83)	(5.38)
4th_QTR		0.026	0.010**	−0.113***	−0.055	−0.040***
		(0.58)	(2.12)	(−3.83)	(−1.21)	(−4.41)
LEV		−0.009	−0.001	0.006	−0.012**	−0.002*
		(−1.62)	(0.97)	(0.65)	(−2.18)	(−1.68)
BTM		0.012***	0.001**	−0.000	0.003	0.002***
		(3.60)	(2.20)	(−0.13)	(1.05)	(3.34)
LN_ASSETS		0.085***	0.013***	0.107***	0.004	−0.002
		(5.17)	(2.48)	(3.42)	(0.26)	(−0.90)
STDROA		−0.046***	0.000	−0.031	−0.006	−0.001
		(−6.15)	(0.32)	(−1.14)	(−0.88)	(−0.67)
#ANALYSTS		0.048***	−0.000	−0.000	0.018***	−0.001
		(11.37)	(−0.51)	(−0.06)	(4.36)	(−1.60)
YEAR		0.124***	0.026***	−0.090***	−0.090***	−0.013**
		(5.13)	(6.04)	(−4.00)	(−3.84)	(−2.23)
Adjusted R-squared		0.0828	0.0720	0.6206	0.0720	0.0313
N		11,848	11,848	11,839	11,848	11,848

*Significant at the 0.10 level, **significant at the 0.05 level, ***significant at the 0.01 level.