THREE ESSAYS IN ACCOUNTING

by

ALI SAHIN

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ABSTRACT OF THE THESIS

This thesis consists of three essays focusing on three different issues. The first revisits the question whether analysts anticipate the persistence of accruals in future earnings. We find that if total accruals are used (covering also non-current operating and financing accruals, unlike previous research that uses mainly working capital accruals), analysts' forecast errors are uncorrelated with accruals. Our findings overall do not warrant the lack of sophistication argument. The second chapter examines whether multi segmentation affects the probability of meeting analysts' forecasts, and whether the 'diversification' discount that multi segment firms seem to suffer from is alleviated/exacerbated when multi segment firms meet/miss analysts' forecasts. We find for multi segment firms, no (less) earnings/forecast management to meet forecasts, more complex information environment, lower probability of meeting analysts' forecasts, and weaker investor reaction to meeting/missing forecasts, while significant discount if they meet forecasts by engaging in earnings/forecast management. The third chapter examines whether unconditional accounting conservatism provides a rational explanation to book to price (B/P) effect in stock returns (higher B/P yielding higher returns) coined as anomaly. We test an argument following Penman and Reggiani (2013) linking conservative accounting to future returns and subsequent earnings growth, and we find strong support to the conservative accounting explanation to B/P effect.

INTRODUCTION

The first chapter of the thesis revisits the question whether analysts anticipate the persistence of accruals in future earnings. Previous research finds that accruals are less persistent than cash flows, that investors fail to understand this property (e.g., Sloan, 1996), and also that analysts who provide information to investors do not inform investors about the predicted future reversals of accruals (e.g., Bradshaw, Richardson and Sloan, 2001). This research finds that analysts are overoptimistic with respect to working capital accruals, and this is interpreted as their failure to anticipate accruals' persistence. However, this interpretation is challenged by other research findings. For instance, analysts' forecasting abilities are praised by another research (e.g., Fried and Givoly, 1982). There is also substantial evidence that analysts can be strategic in their forecasts (e.g., Francis and Philbrick 1993), and evidence indicates that traditional accrual definition omitting noncurrent operating and financing activity accruals results in noisy measures of both accruals and cash flows (e.g., Richardson, Soliman, Sloan, and Tuna, 2005). Therefore, we argue that analysts' optimism with respect to working capital accruals might not be related to their lack of sophistication, but due to incomplete accrual information. We give consideration to 'total accruals' covering also noncurrent operating and financing activity accruals, and revisit the issue.

Our results overall do not warrant the lack of sophistication argument; we find no association between forecast errors and total accruals. Analysts seem to reflect predicted earnings reversals of total accruals in their forecasts. We also find strong evidence that analysts' optimism with working capital accruals documented by previous research is a result of analysts focusing on total accruals. Since accrual components have different persistence degrees, and total accruals' persistence is an average of its components' persistence, it is likely that individual components are associated with forecast errors if separately tested. Hence, a low persistent working capital accruals may exhibit optimistic errors, while a high persistent financing activity accruals pessimistic errors. Indeed, we find optimistic (pessimistic) forecast errors with less (high) persistent accrual components, and no association between forecast errors and middle persistent accrual components. Our results remain robust to different periods, samples and model specifications.

The second chapter investigates whether multi segmentation affects the probability of meeting analysts' forecasts, and whether the 'diversification' discount that multi segment firms appear to suffer from is mitigated/exacerbated when multi segment firms meet/miss analysts' forecasts. Analysis of this issue is important because previous research shows that meeting/missing analysts' earnings forecasts leads to premium/discount (e.g., Kasznik and McNichols 2002), and despite their obvious importance in the economy, we lack evidence about the meeting/missing forecast behaviour of multi segment firms. The subject becomes even more important given the evidence that multi segment firms suffer from higher agency conflicts (traded at discount, Berger and Ofek, 1995), and exhibit more complex information environment (e.g., Bushman et al. 2004), both of which significantly affect also meeting forecast probability (e.g., Matsumoto, 2002).

We argue that higher agency conflicts induce higher monitoring, and discourage multi segment firms' managers from earnings/forecast management activity to meet forecasts while more complex information environment leads to greater forecast bias making forecasts harder to meet, and both will lead to lower probability of meeting analysts' forecasts for multi segment firms. Our findings confirm these expectations; multi segment firms exhibit less (no) earnings (forecast) management activity to meet forecasts, more complex information environment and lower probability of meeting analysts' forecasts relative to single segment firms.

We next test whether the 'diversification' discount is alleviated/exacerbated when multi segment firms meet/miss analysts' forecasts. We argue that if the discount is a results of higher agency conflicts, then meeting analysts' forecasts does not mitigate the discount. We also argue that investors will be aware that multi segment firms show more complex information environment and use less earnings/forecast management to meet forecasts. Hence, we expect that investors react less strongly to meeting/missing forecasts by multi segment firms. Confirming this argument, we find no evidence that meeting forecasts results in a premium in multi segment setting, or that it reduces the diversification discount, while single segment firms experience significant premium (discount) when they meet (miss) forecasts.. We also find significant incremental multi segment discount if earnings/forecast management is used to meet forecasts implying that there are significant costs for multi segment firms from engaging in these activities to meet forecasts.

The third chapter tests whether unconditional accounting conservatism provides a rational explanation to book to price (B/P) effect in stock returns. Research shows that stocks with higher ratios of fundamentals to price, i.e., high B/P tend to yield higher future returns than stocks with lower ratios of fundamentals to price (e.g., (e.g., Graham and Dodd, 1934; Rosenberg, Reid, and Lanstein, 1985, Chan, Hamao, and Lakonishok, 1991; Fama and French, 1992). Various explanations have been brought forward to the phenomenon from both mispricing (e.g., DeBondt and Thaler, 1985; Lakonishok, Shleifer, Vishny, 1994) and rational pricing of risk perspective (e.g., Fama and French 1993), but challenged by subsequent evidence. We offer a risk explanation using the mechanisms of unconditional accounting conservatism following Penman and Reggiani (2013). In a pricing equation, a risk-free earnings growth adds to price, while a risky growth adds to required return rather than price making B/P ratio higher due to denominator effect. Accordingly, a higher B/P corresponds to higher return. Conservative accounting produces such risky growth (earnings are deferred under uncertainty producing earnings growth that can be deemed at risk), and can explain the phenomenon.

We test the above argument within unconditional conservatism setting, which we proxy by hidden reserves to price (HR/P) based on immediately expensed intangible investments (Penman and Zhang, 2002).

We argue and find that HR/P is positively associated with both future returns and subsequent earnings growth for any given B/P and long term earnings that we construct to capture the risky earning growth following. Our paper makes several contributions. We show unconditional accounting conservatism rationally explains B/P effect in stock returns. We also show that stock market anomalies can be traced within the accounting system, and by documenting that accounting conservatism is a response to risk, and this risk perception aligns with the investors' risk perception, we shed more light on the rationale of accounting conservatism.

CHAPTER 1

Do analysts understand accruals' persistence? Evidence revisited

Abstract

In this paper, we revisit the question whether analysts anticipate accruals' predicted reversals (or persistence) in future earnings. Prior evidence shows that analysts are over optimistic with respect to working capital accruals, and this is interpreted as their inability to understand accruals' persistence. However, using total accruals that cover also noncurrent operating and financing accruals as well as working capitals, we show that analysts' forecast errors are uncorrelated with accruals. Since accruals have different components with different persistence characteristics, and total accruals reflects an average of its components' persistence, it is likely that forecast errors are correlated with individual components if separately tested, but this does not indicate analysts' lack of sophistication as long as analysts correctly anticipate total accruals. Consistent with this conjecture, we find low persistent accruals (e.g., working capital accruals) are optimistically, but high persistent accruals (e.g., financing accrual) pessimistically associated with forecast errors, while in the middle persistent, the association approaches zero. Overall these results do not warrant the analysts' lack of sophistication argument.

Keywords: earnings/accrual persistence, analyst earnings/revenue forecast errors, efficiency

JEL Classification: M41, G10

1.1. Introduction

In this paper, we revisit the question whether sell side security analysts anticipate the persistence (or predicted reversals) of accruals in future earnings. Analysis of this issue is important, because evidence shows that accrual components of earnings are less persistent than cash flows, investors do not seem to anticipate this property (they experience negative future returns for buying high accruals, see Sloan, 1996), and that analysts who provide information to investors also fail to inform them of this accrual problem; Analysts are found to be overoptimistic with respect to high working capital accruals (e.g., Bradshaw et al., 2001), and this is mainly interpreted as their lack of necessary sophistication to fully understand accruals' persistence.

However, this interpretation does not reconcile with other research findings. For instance, analysts' forecasting abilities are highly praised in another research; they issue more accurate forecasts than earnings expectation models (e.g., Fried and Givoly, 1982). There is also substantial evidence that analysts can be strategic in their forecasts, which indicates their sophistication (e.g., Francis and Philbrick 1993). Finally, traditional accrual definition used in forecast error tests seems to omit economically important accrual categories that can be highly relevant to analysts (e.g., Richardson, Sloan, Soliman, and Tuna, 2005).

Therefore, we argue that analysts' optimism with respect to working capital accruals might not be due to lack of sophistication, but driven by incomplete accrual information, hence give consideration to 'total accruals' suggested by Richardson et al. (2005) covering also noncurrent operating and financing activity accruals.

Our empirical tests show no correlation between analysts' forecast errors and total accruals. Findings are robust to different samples, periods, specifications, decile ranked accruals, high accruals, absolute forecast errors, controlling for cash flows and high conservatism. We then decompose total accruals into components, and repeat the same test for individual accrual components [to be comparable to these tests, we also test the persistence degree of individual components as auxiliary, and find that different components exhibit different persistence degrees with working capital accruals less persistent than financing activity accruals (%67 vs %79), and that total accruals reflect an average of its components' persistence (%73)]. We argue that if analysts focus on achieving minimum forecast error[1], they should be focusing on the accuracy of total accruals (given *earnings= total accruals + cash flows),* hence, it is highly likely that forecast errors may be correlated with individual accrual components that significantly deviate from the total accruals' persistence (in individual cases associations maybe observed as previous research documents, but this does not indicate analysts' not understanding of accruals' persistence as long as total accruals are not associated with forecast errors). To be precise, forecast errors can exhibit optimism (pessimism) with accrual components that are less (higher) persistent than total accruals. Confirming, our argument, we find that forecast errors are optimistically correlated with less persistent working capital, but pessimistically correlated with higher persistent financial accruals while with noncurrent operating accruals (having almost equal persistence as total accruals with %74), the correlation is insignificant. Optimism in working capital accruals is consistent with prior research, but we additionally show forecasts errors to be pessimistically correlated with financial accruals, which also challenges to the notion that analysts' overall optimism in earnings forecasts may stem from their over optimism about current accruals.

Our paper makes several contributions to existing knowledge. Firstly, our findings do not warrant analysts' lack of sophistication argument with respect to accruals, rather reinforce the evidence praising analysts' forecasting abilities (e.g., Fried and Givoly, 1982; Elgers and Murray, 1992). Secondly, our findings do not also support the argument that analysts' optimism in earnings forecasts may stem from accruals' overestimation (analysts may intentionally collude with management and exhibit optimism by inflating accrual expectations, but we find no such overestimation in total accruals). Thirdly, although forecast errors are uncorrelated with total accruals, we find that stock returns are negatively correlated, supporting the evidence in Sloan (1996), who find that stock prices act as if investors fail to anticipate accruals' persistence. Our findings also corroborate Elgers et al. (2001; 2003) findings; who find that investors fail to efficiently impound all earnings relevant information contained in analysts' forecasts. Finally, we find that the effect of conservative

[1] We assume that analysts' ultimate objective is to achieve minimum forecast error given that the accuracy is one of key indicators of their performance. Analysts who excel in recommending and finding winning stocks, and more accurately estimating earnings are branded as 'all-star'.

accounting on accruals' persistence is well understood by analysts, which provides further support to their sophistication with respect to accruals.

The remainder of the paper is organised as follow. The next section provides literature review and develops hypotheses. Section 1.3 describes the data, Section 1.4 explains research design and presents the results. Section 1.5 reports sensitivity analyses and Section 1.6 concludes.

1.2. Literature review and hypotheses

1.2.1. Literature review

Evidence shows that earnings mean reverse (gradually decline in time), and accrual components of earnings mean reverse quicker than cash flows, i.e., accruals are less persistent[2] than cash flows, but investors do not seem to anticipate this property. Firms with high accruals are likely to experience lower earnings in future, and investors without realising this property buy high accruals, and suffer from negative stock returns (e.g., Sloan, 1996)[3]. This finding is important for analysts, because they provide information to investors, and possibly affect their investment decisions (Mendenhall, 1991). Hence, scholar also ask whether analysts inform investors about this accrual problem, and by regressing forecast errors on past accruals, they find analysts to be over optimistic with respect to working capital accruals (e.g., Bradshaw, Richardson and Sloan, 2001; Thomas and Zhang, 2002; Collins, Gong, and Hribar, 2003; Elgers, Lo, and Pfeiffer 2001, 2003; Hanlon, 2005; Mashruwala, Rajgopal, and Shevlin 2006; Drake and Myers, 2011), and this is interpreted as their failure to anticipate the subsequent earnings declines associated with high accruals consistent with the evidence in Sloan (1996).

However, this interpretation is not accommodated by other research findings. For instance, analysts' forecasting abilities are praised by another stream of literature; they seem to provide superior and more accurate forecasts than estimates generated by earnings expectation models (e.g., Brown and Rozeff, 1978; Fried and Givoly,

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[2] Persistence indicates the continuity from one period to another. Evidence shows that earnings mean reverse (gradually decline in time), and accruals mean reverse quicker than cash flows.

[3] The is coined as accrual anomaly and explained by Sloan (1996) as investors' fixation on reported earnings.

1982; Brown, Richardson, Schwager, 1987; Brown, Griffin, Hagerman, Zmijewski, 1987; Elgers and Murray, 1992). There is also growing evidence that analysts are strategic in their forecasts indicating their sophistication (one cannot add bias into a forecast without knowing the accurate one). Analysts issue optimistic forecasts to curry favour with managers in order to obtain better access to private information, to attract more investors and to boost investment banking fees, etc[4]. (e.g., Francis and Philbrick 1993, Lin and McNichols, 1998; Teoh, Welch and Wong, 1998; Hong and Kubik, 2003; Basu and Markov, 2004; Richardson, Teoh and Wysocki, 2004; Cowen, Groysberg, and Healy, 2006; Raedy, Shane, and Yang, 2006; Teoh, Groysberg, Healy, and Maber, 2011; Simon and Curtis, 2011). Evidence also suggests that analysts' optimism in earnings is rational and originates in the loss functions underpinning analysts' decisions (e.g., Gu and Wu, 2003; Basu and Markov, 2004), which offers another challenge to lack of sophistication argument.

Finally, the accrual variable used in forecast error tests seems to be subject to omitted information bias. Prior studies use working capital accruals assuming that they 'do a better job' in capturing accruals leading to earnings reversals. They argue that accruals related to a number of special items (restructuring, impairments, equity method losses, sale of plant/other investments, etc.) are nonrecurring, 'tend to mean revert very quickly' and 'investors are more likely to anticipate' their nature (e.g., Bradshaw et al., 2001). However, the evidence in Doyle, Lundholm, and Soliman (2003) indicates that such "special" accruals are far from nonrecurring and relevant to anticipate future stock returns. They show that firms with relatively large omissions of such items in their definitions of pro forma earnings suffer from lower returns. Similarly, Richardson et al. (2005) show that the accrual definition proposed by Healy (1985) based on working capital excludes important accrual categories, and results in noisy measures of both accruals and cash flows. They document that the omitted parts of accruals (noncurrent and financial) also contain measurement errors leading to significant security mispricing. For instance, great subjectivity involves in the evaluation of noncurrent accruals (changes in tangible

[4] Analysts can also exhibit self-selection bias, i.e., they follow firms if they hold favourable views about them and censure negative views due to conflict of interest (see McNichols and O'Brien 1997; Michaely and Womack, 1999), which may lead to optimism on average

intangible assets); capitalised interest expense[5], write downs, depreciation amount, etc., can restrict investors anticipating future economic benefits. There is also error margin in the evaluation of financial accruals despite their higher reliability. Long term investments and long term receivables can also be used to manipulate earnings.

1.2.2. Hypotheses

We argue that analysts' optimism with respect to working capital accruals may not be attributed to their lack of sophistication, but driven by incomplete accrual information. Therefore, we focus on 'total accruals' in our analysis suggested by Richardson et al. (2005) covering also noncurrent operating and financing accruals. We assume that this broader accrual measure provides more powerful tests on analysts' sophistication regarding accruals as it hypothetically covers all relevant accrual information available to analysts. Hence, if analysts lack the necessary sophistication to understand accruals' persistence, their forecast errors (realized earnings minus forecast earnings) will also be associated with total accruals as observed in previous research. Then we expect

> *H1:* Analysts' forecast errors are negatively correlated with current total accruals.

On the other hand, if analysts fully understand accruals' persistence, we expect[6]

> *H1A*: Analysts' forecasts errors are not correlated with current total accruals

Richardson et al (2005) disaggregate total accruals into components, and rate each accrual category according to its reliability (reliability is determined by the degree of measurement error the category involves). They find that less reliable accruals lead to lower earnings persistence, and significant security mispricing, i.e., as the persistence of an accrual component decreases it becomes harder to predict

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[5] Interest expense charged to assets (capitalised) transforms it into an operating item. There are also similar transitions between operating and financing activities, and omitting this information possibly results in some relevant information loss to explain future earnings.

[6] There is also another alternative that analysts may collude with management to be optimistic by inflating accrual expectations, but we find this alternative unsustainable since missing analysts' forecasts leads to significant discount in share prices on average (e.g., Bartov, Givoly, and Hayn 2002; Skinner and Sloan 2002), which managers do not always desire, and analysts' utility function cannot maximise being consistently optimistic (e.g., Gu and Wu, 2003; Basu and Markov, 2004)..

(forecasting difficulty increases). They also find that working capital accruals are less persistent than financial accruals (they explain this as working capital to be subject to more measurement errors due to items containing subjective estimates such as allowances for bad debts while financial items are mainly measured at fair values). A related set of studies also finds that analysts issue more optimistic forecasts for firms whose earnings are more difficult to predict (Das, Levine, and Sivaramakrishnan, 1998, Ke and Yu, 2006), and that the difficulty of forecasting earnings interacts with analysts' incentives to be optimistic which in turn, results in optimistically biased forecast (Bradshaw, Lee, and Peterson, 2016). Therefore, if the lack of sophistication argument holds, we expect

> *H2:* Analysts' forecast errors become more (less) optimistic as the persistence of an accrual component decreases (increases)

However, if the alternative holds (analysts fully understand accruals' persistence), analysts will focus on the accuracy of total accruals (since higher accuracy in total accruals hypothetically leads to minimum forecast error given *earnings=total accruals + cash flows).* Accordingly, it is highly likely that forecast errors can be correlated with individual components whose persistence significantly deviate from total accruals' persistence, and this will not indicate analysts' lack of sophistication as long as *H1A* holds (no association between forecast errors and total accruals). Therefore, given Richardson et al (2005), who find that working capital (financial) accruals exhibit the lowest (highest) persistence among accrual components, and that total accruals reflect an average of its components' persistence, we expect, as an alternative to *H2*,

> *H2A*: Analysts' forecast errors are optimistically (pessimistically) correlated with less (higher) persistent accruals, while in the middle persistence, they approach zero.

1.3. Data and sample selection

In the data selection process, we follow Bradshaw et al. (2001) and Richardson et al. (2005). We use non-financial US firms for the period between 1976 and 2013. Financial statement data is obtained from Compustat annual database. Analysts forecast data is from the IBES summary statistics file and stock returns data are from CRSP daily files. To decompose accruals into components we rely on the accrual definition from Richardson et al. (2005) [7]:

$$TACC = \Delta WC + \Delta NCO + \Delta FIN \qquad (1)$$

where *TACC* denotes total accruals, *ΔWC* is the change in noncash working capital, *ΔNCO* is the change in net noncurrent operating assets and *ΔFIN* is the change in net financial assets. *TACC* is further decomposed into its underlying components:

$$TACC = \underbrace{\Delta COA - \Delta COL}_{\Delta WC} + \underbrace{\Delta NCOA - \Delta NCOL}_{\Delta NCO} + \underbrace{\Delta STI + \Delta LTI - \Delta FINL}_{\Delta FIN} \quad (2)$$

Where *ΔCOA (ΔCOL)* denotes current operating assets (liabilities), *ΔNCOA (ΔNCOL)* noncurrent operating assets (liabilities), and *ΔSTI, ΔLTI* and *ΔLFINL* short term investment, long term investment and financial liabilities respectively. All variables are defined in Appendix A. Following Richardson et al. (2005), the missing data on short term debt, investment and advances, long term debt, preferred stock and short term investments are set to zero, while other missing observations are eliminated from the analysis. Earnings variables (accruals and cash flows) are winsorised to +1 and -1 and deflated by average assets, while all other continuous variables (e.g., earnings forecast errors) are winsorised to 1% and 99% to eliminate the extreme observations. Following Bradshaw et al. (2001), we define earnings forecast errors, *Ferror*, as the analysts' consensus earnings forecasts minus the actual earnings provided by IBES deflated by share price from CRSP. We perform our tests across 12 months starting from the initial analysts' forecasts, which are generally issued in the first month after the prior period earnings announcement date. Our final sample contains 48,142 firm-year observations per month.

1.3.1. Descriptive statistics and correlations

Table 1.1 Panel A reports descriptive statistics for earnings (*ROA*), total (*TACC*), working capital *(ΔWC*), noncurrent *(ΔNCO*) and financial *(ΔFIN*) accruals. It also

[7] Richardson et al. (2005) define accrual-based earnings through the definition of net assets: Accrual earnings = ΔAssets – ΔLiabilities + Net cash distribution. Given that Accruals = Accrual earnings – Cash earnings, and that Cash earnings = ΔCash + Net cash distribution, they define Accruals = ΔAssets –ΔLiabilities – ΔCash.

includes descriptive statistics for conservatism proxies, *Hidden_reserves* and *C_Score*. Mean *TACC* is 0.051 or roughly 5% of total assets. Means of *ΔWC* and *ΔNCO* are positive while mean *ΔFIN* is negative, which is indicative of an average firm increasing its non-current operations, and financing this increase by net debt. Panel B reports pairwise correlations, and reveals that all accrual components are positively correlated with *ROA*, with *ΔWC* having the highest correlation. The positive correlation between *ΔWC* and *ΔNCO* suggests that they grow together. Both *ΔWC* and *ΔNCO* are negatively correlated with *ΔFIN,* in line with the suggestion that growth in operating activities is largely financed by debt.

Table 1.2 reports the descriptive statistics and pairwise correlations for the extended accrual decomposition. Panel A shows that mean values of all accrual components are positive with *ΔNCOA* (change in non-current assets) having the highest mean (0.055) while *ΔLTI* (change in long term investments) the lowest (0.002) suggesting that non-current operating accruals constitute the major part of accruals. Standard deviations show that much of the variation in working capital accruals is attributed to *ΔCOA*. Similar pattern is found with respect to *ΔNCOA* implying that the asset side of operating of accruals is more likely to be subject to measurement error. In contrast, much of the variation in *ΔFIN* can be attributable to *ΔFINL* (financial liability). These observations suggest that the variation in operating accruals are driven by assets, while the variation in financial activity accruals are driven by liabilities. Panel B reports pairwise correlations and shows strong correlation among accrual components. In particular, the positive correlation between *ΔCOA* and *ΔCOL* suggests that a growing (shrinking) business generally results in an increase (decrease) in both current operating assets and liabilities. There is also a positive correlation between *ΔCOA* and *ΔFINL* suggesting that current operations are not only funded by operating liabilities, but also by financial debt. Moreover, *ΔNCOA* is positively correlated with all liability accruals[8]

Table 1.3 reports the descriptive statistics of forecast errors across 12 months, and shows negative means consistent with the prior evidence that analysts are optimistic on average. It also shows that mean errors (and standard deviations) are gradually

[8] Note that the liability component of accruals is substracted from the asset component to arrive at net accruals. Hence, a positive relation between asset and liability implies they are likely to offset each other’s effects on net accruals.

disappearing as the earnings announcement date approaches (while initial earnings forecast error is 1.6% of the share price, the last month forecast error is only 0.3% of the price). This trend is expected, since the arrival of new information (e.g., quarterly earnings announcements) prompts analysts to revise their forecasts and forecast errors decrease gradually.

Table 1.4 Panels A and B report Pearson correlations between forecast errors, accrual components and conservatism proxies, and show that forecast errors are not correlated with total accruals, but optimistically (pessimistically) correlated with operating (financial) accruals. Similar pattern is observed for the extended accrual components providing an initial support to *H1A* and *H2A:*

1.4. Empirical Analysis

1.4.1. Forecast error regressions on total accruals (TACC)

To test *H1 (H1A),* we use forecast error model by Bradshaw et al. (2001) employing total accruals (TACC), and extend the model by breaking TACC into components. We conduct regressions using ordinary least squares (OLS) and cluster standard errors by firm and year following Petersen (2009)[9]. We also use Fama and MacBeth (1973) procedure that estimates annual cross sectional regressions and reports the time series average of the resulting coefficients. The regressions are run for 12 consecutive months and also incorporate cash flows (*CF*) following Drake and Myers (2011), who argue that accruals and cash flows are the primary components of earnings and that they are highly correlated.

$$Ferror_{s,it+1} = \beta_0 + \beta_1 TACC_{it} + \beta_2 CF_{it} + \varepsilon_{it+1} \quad (3)$$

[9] The method deals with the potential time and firm effects that can be present in panel data. Firm effect means the residuals may be correlated across years for a given firm, and time effect means the residuals of a given year may be correlated across different firms. Petersen (2009) shows that in the presence of firm and time effects, clustering the standard errors by two dimensions simultaneously yields *unbiased estimates* as long as there are sufficient number of clusters, see, http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se programming.html

Where *Ferror* denotes earnings forecast errors calculated as analysts' forecasts of earnings minus actual earnings. While *H1* requires a negative coefficient on *TACC*, the alternative hypothesis *H1A* requires insignificant coefficient on *TACC*.

Table 1.5 Panels A and B (without and with cash flows) present the results for Equation (3). Both panels confirm *H1A:* analysts' forecasts errors are not correlated with current *TACC* (the inclusion of *CF* does not alter the result). The coefficients on *TACC* are statistically and economically zero across all 12 months and t-stats are far below the thresholds.[10]

1.4.2. Forecast error regressions on accrual components

To test *H2 (H2A)*, we next conduct the same analysis with the initial and extended accrual decompositions by fitting the following models:

$$Ferror_{s,it+1} = \beta_0 + \beta_1 \Delta WC_{it} + \beta_2 \Delta NCO_{it} + \beta_3 \Delta FIN_{it} + \beta_4 CF_{it} + \varepsilon_{it+1} \quad (4)$$

$$Ferror_{s,it+1} = \beta_0 + \beta_1 \Delta COL_{it} + \beta_2 \Delta COA_{it} + \beta_3 \Delta NCOL_{it} + \beta_4 \Delta NCOA_{it}$$

$$+ \beta_5 \Delta LTI_{it} + \beta_6 \Delta FINL_{it} + \beta_7 \Delta STI_{it} + \beta_8 CF_{it} + \varepsilon_{it+1} \quad (5)$$

Where *ΔWC +ΔNCO + ΔFIN=TACC.* A negative (positive) sign on coefficients indicates forecast optimism (pessimism)[11]. Before running Equations (4) and (5), to be comparable to these tests, we also run persistence tests for individual accrual components following Richardson et al (2005). Reported in Appendix A panels A, B and C, these tests show that *CF* has the highest persistent among earnings components with %80, while *ΔFIN* with %79 (0.791-0.002), *ΔNCO* with %74 (0.791-0.051), *TACC* with %73 (0.797-0.068), and *ΔWC* with %67 (0.791-0.122). This confirms accrual components exhibiting different persistence characteristics, and *TACC* reflecting an average of its components' persistence. Hence, if the lack of

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[10] Note that panel B shows pessimistic errors with CF, which has the highest persistent among earnings components, thus should be easier to predict relative to TACC. Bilinski (2014) shows that accuracy of CF estimates depends on the accuracy of accrual estimates, i.e., if analysts are accurate in estimating accruals, they should also be accurate in estimating CF. Hence, we avoid interpreting this observation as analysts' lack of sophistication given that they seem to be accurate in TACC.

[11] Analysts' earnings forecasts have historically been optimistically biased leading to negative forecast errors if calculated as Forecast minus Actual. Hence, our tests are restricted to predicting a negative relation between less persistent accruals and forecast errors as in Bradshaw et al. (2001).

sophistication argument holds *H2* will prevail. Since forecasting difficulty increases in less persistence, analysts will exhibit greater bias, and optimistic forecast errors will increase as the persistence of an accrual component decreases, and vice versa (e.g., $\beta_{1\Delta WC} < \beta_{2\Delta NCO} < \beta_{3\Delta FIN} < 0$).

However, if analysts fully understand accruals' persistence, then *H2A* will hold. Forecast errors will be correlated with individual accrual components deviating from total accruals' persistence, i.e., errors can be optimistically (pessimistically) correlated with working capital (financial) accruals, while in the middle persistent, they will approach zero (e.g., $\beta_{1\Delta WC} < 0$, $\beta_{2\Delta NCO}=0$[12], $\beta_{3\Delta FIN} > 0$). We acknowledge that the confirmation of *H2A* will only support the argument of *analysts fully understand accruals' persistence* if the *H1A* also holds, i.e., if there is no correlation between forecast errors and *TACC*.

Table 1.6 reports the results for Equations (4) and (5) in Panels A and B. Confirming *H2A*, both panels show that forecast errors are optimistically correlated with low persistence accruals, but pessimistically correlated with high persistence accruals across 12 months, while the accruals of the medium persistence do not show any association with errors (e.g., $\beta_{1\Delta WC}$=-0.039, $\beta_{2\Delta NCO}$=0, $\beta_{3\Delta FIN}$ >=0.017 for month 1). Moreover, the coefficient magnitudes in Panels A and B of Table 1.6 line up closely with the relative persistence rankings reported in Appendix A Panels B and C (e.g., persistence degrees respectively are *ΔCOL*=%62.9 (0.803-0.177), *ΔCOA*=%66.8, *ΔNCOL*=%70.6, *ΔNCOA*=%72.6, *ΔLTI*=%74.4, *ΔFINL*=%75.1, and *ΔSTI*=%76.9, and their coefficients in forecast errors tests are *ΔCOL*=-0.062, *ΔCOA*=-0.037, *ΔNCOL*=-0.031, *ΔNCOA*=-0.002, *ΔLTI*=0.006, *ΔFINL*=0.024, and *ΔSTI*=0.010. *F-tests* confirm that the coefficients are different from each other).

In sum, both tests reported in Tables 1.5 and 1.6 confirm *H1A* and *H2A* and reject *H1* and *H2,* i.e., analysts' forecasts errors are not correlated with current total accruals, and analysts' forecast errors are optimistically (pessimistically) correlated with less (higher) persistent accruals, while in the middle persistence, they approach

[12] The persistence of *ΔNCO* is highly close to the persistence of *TACC* (%74 and %73), hence we expect the coefficient on *ΔNCO* is zero (or close to zero) as in the coefficient on TACC in Table 1.5.

zero, these results indicate that analysts lack of sophistication argument with respect to accruals' persistence is unwarranted.

1.4.1. Additional notes on empirical findings

When all accrual components are combined, they form total accruals (*TACC*), and we show that forecast errors are not correlated with *TACC*. We interpret this observation as analysts correctly anticipating accruals persistence, which is plausible since accruals exhibit predicted reversals (Appendix A panels A, B and C show that accrual components exhibit inherent persistence characteristics, i.e., components' persistence degrees are not random, but can be predictable). Richardson et al (2005) attribute these inherent properties to their degree of reliability, which can be explained by the measurement errors they involve.

The fact that analysts correctly anticipate accruals' persistence, does not also mean that analysts are entirely correct in all their earnings estimates. There can be still forecast errors explained by other factors such as strategic reasons and specific firm characteristics, etc. Our results eliminate only one option, accruals.

We use actual EPS provided by IBES when examining analyst forecast accuracy. Reported EPS is entered into the database on the same basis as analysts' forecasts, and by and large corresponds to earnings that represents core business activities as opposed to net income (and may be quite different from the net income). Hence, the database is considered to be the closest match with analysts' forecasts. Evidence also shows so. For instance, Bradshaw and Sloan (2002, p.41) find that 'there has been a dramatic increase in the frequency and magnitude of cases where "GAAP" and "Street" earnings differ'. They also find that 'market response to the Street earnings number has displaced GAAP earnings as a primary determinant of stock prices'. See also, Ramnath, Rock, and Shane (2008) and Brown (2007) for studies that use IBES EPS when investigating analyst forecast accuracy, analyst forecast revisions, capital market reaction to earnings surprises published after 1990. However, we have also performed forecast error tests using the Fully Reported (GPS) instead of Actual IBES EPS (please the section 'other robustness' tests).

Bradshaw et al. (2001) use decile ranked accruals focusing on high/low magnitude of accruals following Sloan (1996), who argues that accruals anomaly (negative returns to past accruals) is caused by investors buying high accruals. However, Richardson et al. (2005) findings indicate that the persistence rather than the magnitude may drive security mispricing. They show that more measurement errors lead to lower persistence, and lower persistence results in less predictability. This implies that high magnitude does not always translate into more forecast errors, on the contrary, low magnitude but low persistence (e.g., working capital accrual) can cause greater forecast bias. Supporting this argument, Kraft, Leone, and Wasley (2006) revisiting the accrual anomaly also show that it may not be the accruals' magnitude that drives stocks mispricing, and Xie (2001) shows that investors overprice the portion of abnormal accruals stemming from managerial discretion (managerial discretion that adds greater measurement errors to accruals). Since the persistence degree depends on measurement error, we consider more appropriate to use actual values in our tests (decile ranking instead aims to eliminate measurement errors). Nevertheless, our results remain robust to also decile ranked accruals, and high/low accrual portfolios (reported in Tables 1.9, 1.10, and 1.11).

1.5. Sensitivity analyses

1.5.1. Future stock returns, accruals anomaly and analysts

Our first sensitivity test focuses on the associations between future stock return and current accruals to examine whether investors and analysts exhibit the similar behaviour in using accrual information. Even though, the evidence suggests that investors follow analysts (e.g., Bartov and Mohanram, 2014), there is also strong evidence that they use public information in different manners. Elgers et al. (2001, 2003) find that average investors make more accrual related error compared to analysts, and give delayed response to more accurate analyst' forecasts.

Hence, we predict investors to naively ignore the persistence of *TACC* and be negatively surprised by the subsequent earnings declines resulting in negative future returns as opposed to analysts' zero *TACC* related error (there will be a negative relation between *TACC* and *Returns*). Moreover, the negative relation between accruals and returns will be more pronounced as the accrual component's persistence decreases, i.e., investors will experience greater negative returns with less persistent accruals, and vice versa. To test these predictions, we use the following returns models

$$Ret_{it+1} = \beta_0 + \beta_1 CF_{it} + \beta_2 TACC_{it} + \sum_{j=1}^{k} \delta_j X_{it} + \varepsilon_{it+1} \quad (6)$$

$$Ret_{it+1} = \beta_0 + \beta_1 CF_{it} + \beta_2 \Delta WC_{it} + \beta_2 \Delta NCO_{it} + \beta_2 \Delta FIN_{it} + \sum_{j=1}^{k} \delta_j X_{it} + \varepsilon_{it+1} \quad (7)$$

Where *Ret* denotes annual buy and hold stock returns for firm *i* at time *t+1* adjusted by size and market returns. The accumulation starts in the fourth month after the fiscal year end, and continues for 12 months. We control for *firm size, market Beta, B/P, E/P and past returns* following prior research (e.g., Fama and French, 1993).

Table 1.7 reports the results of Equations (6) and (7), and confirming our prediction shows negative correlation between future returns and *TACC* (as opposed to analysts, who exhibit zero forecast error in *TACC*), while the coefficient on *CF* is statistically insignificant[13].. In addition, we observe increasing investor optimism as the accrual component's persistence decreases, i.e., investors experience greater (less) negative returns with less (high) persistent accruals consistent with Sloan (1996), who documents stock prices act as if investors fail to anticipate accruals' persistence. These findings overall show that analysts do a better job in anticipating accruals' persistence implying their relatively higher degree of sophistication. This evidence also corroborates Elgers et al. (2001; 2003) who find that investors fail to efficiently use earnings relevant information contained in analysts' forecasts.

Note, even though we find that average investors seem to exhibit relatively less sophistication than analysts in using accrual information, Lev and Nissim (2006, p.193) show that the magnitude of accruals related trading is becoming small. 'By

[13] Note, in a pricing equations, CF is used to calculate firm value; if it is correctly predicted, with a correct discount factor, the true value of a firm can be achieved. However, this CF concept is different from the CF we use in this analysis. Our CF variable is of a single year while the CF in a pricing equation is an average of all future CF covering also future/past accruals too that turn into CF in the long run. Therefore, a correct anticipation of one year ahead CF (as in table 1.7) does not indicate that investors also correctly anticipate the CF to calculate firm value. On the contrary, the failure of anticipation of correct accruals that are relevant to true firm value results in negative future returns defined as accruals anomaly.

and large, institutions shy away from extreme accruals firms'. They also show that individual investors too are unable to profit from trading on accruals information because of high information and transaction costs associated with implementing a consistently profitable accruals strategy.

1.5.2. Accounting conservatism on earnings forecasts errors

Evidence shows, transitory shocks to earnings due to high conditional conservatism lead to lower persistence of earnings (Konstantinidi, Kraft, and Pope, 2016) and that analysts' forecast bias becomes greater with high conditional conservatism (Helbok and Walker 2004)[14]. Evidence also shows that intangible investments immediately expensed due to unconditional conservatism result in more volatile earnings (e.g., Kothari, Laguerre, and Leone, 2002; Amir, Guan, and Livne, 2007). These findings suggest that in the presence of high conservatism, earnings become less predictable. Therefore, we also test whether analysts anticipate accruals' persistence under high conservatism, which would provide further evidence about their sophistication. We use *Hidden_reserves* (Penman and Zhang 2002) and *C_Score* (Khan and Watts, 2009)[15] to proxy unconditional and conditional conservatism respectively (see Appendix A for definitions).

To distinguish between firms with high versus low unconditional (conditional) conservatism, we group the sample into quintiles based on the magnitude of *Hidden_reserves (C_score)* for the first three months before the quarterly earnings announcement, and use the following model.

$$Ferror_{s,it+1} = \beta_0 + \beta_1 CF_{it} + \beta_2 D + \beta_3 TACC_{it} + \beta_4 D * TACC_{it} + \varepsilon_{it+1} \quad (8)$$

[14] Under conditional conservatism book values are written down when the news is bad, but not written up when the news is favourable (Basu, 1997). Under unconditional conservatism however, accounting generates pervasive bias regardless of news (Pope and Walker, 2003; Beaver and Ryan, 2005). It is determined at the inception of accounting transaction, and gives rise to hidden reserves (unrecorded goodwill) by means of an immediate expensing of R&D and advertising expenditures.
[15] The variable is derived using Basu's (1997) measure of asymmetric timeliness of bad relative to good news, $X_{it} = \beta_1 + \beta_2 D_i + \beta_3 R_{it} + \beta_4 D_i R_{it} + e_{it}$ where the asymmetric timeliness is measured by the differential coefficient β_4.

Where *D,* conservatism dummy, differentiates between low/high *Hidden_reserve (C_score)* firm-years taking 1(0) if the earnings forecast error is in the high (low) conservatism quintile.

The coefficient on *TACC* measures the average forecast errors for low conservative firm-year, while the coefficient on interaction term measures the average incremental forecast error for high versus low conservative firm-year. We predict insignificant coefficient on *TACC (D*TACC)* if analysts fully understand accruals persistence (i.e., *H1A* holds, forecasts errors are not correlated with current *TACC*), We do not expect conservatism to play a significant role in the association between accruals and forecasts errors.

Table 1.8 reports the results for Equation (8), and confirms our expectations. The coefficients on *TACC (D*TACC)* are insignificant (marginally significant at %10 for *D*TACC* in one month). These findings overall indicate analysts' sophistication with respect to accruals. Notice that the coefficients on *D* for conditional conservatism are negative and significant consistent with Helbok and Walker (2004), who show greater forecast error under conditional conservatism.

1.5.3. Decile ranked accruals

We replace actual values of accruals with their decile ranks in the forecast error regressions (3), (4) and (5) following Bradshaw et al. (2001). Each year, we rank firms into deciles by the magnitude of accruals from low to high, and scale them to (0,9) range so that lowest (highest) accrual firm years are assigned to 0 (9). The scaling is used to alleviate nonlinearities in the data, and minimize the effects of measurement errors.

The intercept in the decile rank regressions measures the average forecast error for a low accrual firm year, while the coefficient on the accrual rank measures the average incremental forecast errors for a high versus a low accrual firm year. If analysts' understanding of accruals' persistence is affected by the magnitude, we should observe significant negative correlations between forecast errors and high accruals (supporting both *H1* and *H2),* which would be consistent with Bradshaw et al. (2001). However, we find the same pattern observed in Tables 1.5 and 1.6 that confirm the alternatives, *H1A* and *H2A*.

Table 1.9 Panels A, B and C report the results of forecast error regressions on past decile ranked accruals for Equations (3), (4), and (5), and confirm *H1A* that forecasts errors are not correlated with total accruals, and *H2A* forecast errors are optimistically (pessimistically) correlated with working capital (financing activity) accruals, while in the middle persistence, forecast errors approach zero.

1.5.4. High/low accruals

We repeat the forecast error test for only the high accrual portfolios. Specifically, each year, we rank firms into five quintiles from low to high by the magnitude of accruals, and run Equations (3), (4), and (5) only with the high accrual portfolios. We run these regressions for the first six months. Reported in Table 1.10 Panel A and B, the results further confirm the hypotheses *H1A* and *H2A*.

We also run forecast errors on high and low *TACC* portfolios. Each year we rank firms into five quintiles from low to high by the magnitude of *TACC,* then assign a dummy, *D* of 1 (0) to the high (low) *TACC* portfolios and run Equation (3) in the following form.

$$Ferror_{s,it+1} = \beta_0 + \beta_1 D + \beta_2 TACC_{it} + \beta_3 D * TACC_{it} + \beta_4 CF_{it} + \varepsilon_{it+1} \quad (9)$$

D differentiates between low/high accruals. This method excludes middle quintiles from the test and keeps only the highest/lowest quintiles. Hence, the coefficient on the *TACC* measures the average forecast error for the lowest *TACC* firm year, while the coefficient on the interaction term measures the average incremental forecast errors for a high versus a low *TACC* firm year. Table 1.11 reports the results for Equation (9) and confirms *H1A;* insignificant coefficients on both *TACC* and *D*TACC (*in some months marginally but pessimistic coefficients on *D*).

1.5.5. Absolute forecast errors and accruals

There are high correlations (some in opposite ways) among accrual components as observed in Tables 1.1 and 1.2. The question is whether they affect the zero correlation between forecast errors and *TACC,* i.e., whether in the aggregate the opposite signed errors cancel each other's effect on forecast errors. We also run Equation (3) with absolute forecast errors to test this question. This method eliminates the above possibility, but may lead to other problems such as the deviations both in the covariates' coefficients and R^2. Hence, the interpretation of the results is limited to certain circumstances.

Since we use absolute values, a negative(positive) coefficient on accruals will now indicate analysts' pessimism(optimism) contrary to signed error tests. Hence, with absolute errors, we should observe a positive coefficient on *TACC,* if analysts lack the necessary sophistication, otherwise (with other signs) *H1* will be rejected.

Table 1.12 reports the results for Equation (3) using absolute forecast errors for the first six months, and shows significant negative coefficient on *TACC.* A negative sign means analysts' pessimism, which rejects *H1*. Forecast errors should not decrease as accruals increase in magnitude, just the opposite is expected, if the lack of sophistication argument holds. Although, a significant coefficient on *TACC* does not confirm *H1A* too, it does not reject it either. Hence, we conclude saying 'analysts' lack of sophistication argument is unwarranted.

1.5.6. Other sensitivity analyses

We also performed forecast error tests using the Fully Reported (GPS) instead of Actual IBES EPS. Forecast errors are calculated as Analyst Forecast of Earnings minus the Fully Reported GPS and tests are run for the first six months. When using the GPS, forecast errors seem to be optimistically correlated with both cash flows and *TACC*, while optimism is greater with cash flows (e.g., the coefficient on *TACC* is -0.029 while the coefficient on *TACC* is -0.115 and *F-tests* shows the coefficients are different from each other). This observation is inconsistent with both previous research and with the theory. Therefore, we do not tabulate these results since using Fully Reported (GPS) is unlikely to provide better outcome, and may even cause greater noise and mislead the inferences

Our findings are also robust to Fama and MacBeth (1973) procedure, but we report standard errors clustered by time and firm using Petersen (2009) approach. Time series regressions do not provide correct standard errors for autocorrelation in the long term (stocks have weak time-series autocorrelation in daily and weekly holding periods, but higher autocorrelation over long horizons, see Fama and French, 1988). For alternative methods of correcting standard errors for time series and cross-sectional correlations, we find appropriate to use Petersen (2009).

Other unreported tests which control for regulatory changes such as the enactment of Regulation Fair Disclosure and the Global Analyst Research Settlement in 2002 reveal that the main findings remain robust. Regressions are also run by controlling industry fixed effects using Fama and French industry classifications and for different time periods such as using data post 1993 to test whether the main findings alter after the change in IBES's method of calculating earnings (Konstantinidi et al. 2016). Our results remain robust also to these tests.

1.6. Conclusion

This paper revisits the question whether analysts anticipate the persistence of accruals in future earnings. Previous research finds that accruals are less persistent than cash flows, that investors fail to understand this property, and also that analysts also fail to inform investors about this accrual problem. However, this research uses working capital accruals to arrive that conclusion and substantial evidence indicates that such accrual definition excluding noncurrent operating and financing activity accruals can be subject to omitted information bias. Therefore, we use total accruals in our analysis that covers the omitted parts of accruals, and revisit the issue.

Our results show that there is no correlation forecast errors and total accruals, and that forecast errors increase in both highest and lowest persistent accrual components while in the middle persistent, forecast errors approach zero. This confirms our conjecture that analysts focus on total accruals' accuracy (since accruals components have different persistence degrees, and total accruals reflect an average of its components' persistence, it is plausible that individual components are associated with forecast errors, but this will not indicate analysts' lack of sophistication to anticipate accruals' persistence as long as forecast errors uncorrelated with Total accruals. Our results remain robust to different periods, samples and model specifications, and therefore, our findings overall do not warrant the lack of sophistication argument.

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Appendix A

Variable definitions

Ferror	Analysts' earnings forecast errors computed as actual EPS from IBES for year t+1 minus analysts' consensus (median) forecast EPS from IBES in month *s (s=1, 2, 3, ...12)* scaled by price from CRSP in the first month year t earnings is announced. $Ferror_{s,t+1} = [Actual\ EPS_{t+1} - Forecast\ EPS_{s,t+1}] / P_{1,t}$
ROA	Earnings. Operating income after depreciation (Compustat Item OIADP, #178) deflated by average assets (Compustat Item AT, #6)
TACC	Total accruals is the change in non-cash assets - change in liabilities deflated by average assets (Compustat Item AT, #6)
CF	Cash flows (Compustat Item OANCF, #308) from operating activities deflated by average assets.
ΔOPAC	Operating accruals: change in non-cash working capital (ΔWC_t) plus change in net non-current operating assets (ΔNCO_t), deflated by average assets.
ΔWC	Working capital accruals is the change in net working capital = $WC_t - WC_{t-1}$. *WC* is current operating assets (*COA*) less operating liabilities (*COL*). *COA*=current assets (Compustat Item ACT, #4) - cash and short term investments (Compustat Item CHE, #1), and *COL*=current liabilities (Compustat Item LCT, #5) - short term debt (Compustat Item DLC, #34).
ΔNCO	Non-current operating accruals is the change in net non-current operating assets = $NCO_t - NCO_{t-1}$. *NCO* is = non-current operating assets (*NCOA*) - non-current op.liabilities (*NCOL*). *NCOA*=total assets (Compustat Item AT, #6) - current assets (Compustat Item ACT, #4) - investments and advances (Compustat Item IVAO, #32), and *NCOL*=total liability (Compustat Item LT, #181) - current liabilities (Compustat Item LCT, #5) - short term debt (Compustat Item DLC, #34) - long term debt (Compustat Item DLTT, #9)
ΔFIN	Financing accruals is the change in net financial assets = $FIN_t - FIN_{t-1}$. *FIN*=financial assets (*FINA*) - financial liabilities (*FINL*). *FINA*=short term investments (STI) (Compustat Item IVST, #193) + long term investments (LTI) (Compustat Item IVAO, #32). *FINL*= long term debt (Compustat Item DLTT, #9) + short term debt (Compustat Item DLC, #34) + preferred stock (Compustat Item UPSTKC, #130)
Returns	Size adjusted returns are calculated as the sum of 12-month buy and hold stock returns from CRSP (accumulation starts in the fourth month after the fiscal year end) minus the corresponding value-

weighted average returns for all firms in the same size-matched decile. To form size deciles, market values are ranked annually, and assigned in equal numbers to ten portfolios.

E/P	Earnings to price ratio calculated as operating income after depreciation (Compustat Item OIADP, #178) at time *t* deflated by market value at time *t-1*.
Size	Natural log of market value of equity. Market value is calculated as the share price (Compustat item PRCC_F, #199) multiplied by common shares outstanding (Compustat item CSHO, #25)
B/P	Book value of equity divided by market value of equity. Book value of equity = Common ordinary equity total (Compustat Item CEQ, #60) + Preferred treasury stock Current Assets (Compustat Item TSTKP, #227) + Preferred dividends in arrears (Compustat Item DVPA, #242)
Beta	Estimated 60 month rolling regressions using the market model $(Ret_{it} - R_f) = \alpha + \beta_i(Ret_{mt} - R_f) + \epsilon_{it}$ *Ret* is the CRSP monthly buy and hold returns for 12 month for stock *i* at time *t*, R_f is risk the free rate, $(Ret_{mt} - R_f)$ is the equity risk premium of the market portfolio. R_f is obtained from the US Federal Reserve, H15 report as the 10-year US Treasury bond rate for the relevant year. Ret_{mt} is the CRSP monthly value weighted return on a market portfolio cumulated over 12 months.
C_Score	Firm specific conditional conservatism proxy varying across years developed using the following Khan and Watts (2009) model based on Basu (1997) asymmetric timelines of earnings measure; $X_{it} = \beta_1 + \beta_2 D_i + \beta_3 R_i \left(\mu_1 + \mu_2 Size_i + \mu_3 \frac{M}{B}_i + \mu_4 lev_i D_i\right) + \beta_4 D_i R_i \left(\gamma_1 + \gamma_2 Size_i + \gamma_3 \frac{M}{B}_i + \gamma_4 lev_i\right) + \delta_1 Size_i + \delta_2 \frac{M}{B}_i + \delta_3 Lev_i + \delta_4 D_i Size_i + \delta_5 D_i \frac{M}{B}_i + \delta_6 D_i Lev_i + e_{it}$ The parameters are estimated annually, *C_Score* is calculated as $C\_Score_{it} \equiv \beta_4 = \gamma_1 + \gamma_2 Size_{it} + \gamma_3 {}^{M_{it}}/_{B_{it}} + \gamma_4 lev_{it}$ *Where X* is earnings before extraordinary items (Compustat item IB, #18) deflated by market value (MV) at time *t-1*, MV is calculated as the share price (Compustat item PRCC_F, #199) multiplied by common shares outstanding (Compustat, CSHO, #25). *R* denotes annual buy and hold return inclusive of dividends and other distributions, accumulation period starts in the fourth month after the fiscal year end *t-1* and continues for the next 12 months. *D* is set to 1 if *R<0* and zero otherwise. The coefficient β_4 measures the incremental timeliness for bad news over good news, or conservatism. *E/P* is income at time *t* deflated by market value at time *t-1*. *Size* is the natural log of market value at time *t*, *leverage* is

measured as long term debt (Compustat Item DLTT, #9) plus short term debt (Compustat Item DLC, #34)] divided by the market value at time *t*. *M/B* is calculated as market value at time *t* divided by the book value of equity at time *t*. Following Khan and Watts (2009), all firm years with missing data, negative total assets and book values are eliminated in estimation. Firms with share price less than $1 are eliminated, and all variables are winsorised to 1% and 99%.

Hid_Res Hidden reserves to proxy unconditional accounting conservatism by Penman and Zhang, (2002; 2016) deflated by average assets

$$Hidden\_Reserves_t = R\&Dres_t + ADVres_t + LIFOres_t$$

R&Dres is unamortised balance of R&D expenditures **(**Compustat Item XRD, #46) that would have appeared on balance sheet if it had been capitalised and amortised at a straightline rate of 20%, assuming a uniform distribution.

$$R\&Dres_{it} = 0.9R\&D_{it} + 0.7R\&D_{it-1} + 0.5R\&D_{it-2} + 0.3R\&D_{it-3} + 0.1R\&D_{it-4}$$

ADVres is advertisement reserve calculated using advertisement expenditures (Compustat Item XAD, #45) assuming a useful life of two years, and providing more benefits when first initiated

$$ADres_{it} = ADV_{it} + 1/3ADV_{it-1}$$

LIFOres is LIFO reserves reported in the inventory footnotes in financial reports (Compustat Item LIFR, #240).

Replicating the persistence tests in Richardson et al. (2005)

To measure the relative degree of earnings and accrual components, we replicate the tests from Richardson et al. (2005) by estimating the following model;

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t - TACC_t) + \gamma_2 TACC_t + \vartheta_{t+1}$$

ROA denotes earnings scaled by total assets, $(ROA - TACC)$ cash flows, and *TACC* total accruals. As accrual are expected to be less persistent than cash flows, the prediction is $(\gamma_2 - \gamma_1) < 0$. To measure the relative persistence of accrual components, we expand the equation

$$ROA_{t+1} = \gamma_0 + \gamma_1(ROA_t - \Delta WC_t - \Delta NCO_t - \Delta FIN_t) + \gamma_2 \Delta WC_t + \gamma_3 \Delta NCO_t + \gamma_4 \Delta FIN_t + \vartheta_{it+1}$$

The coefficient γ_1 measures the persistence of the cash flows while $(\gamma_2 - \gamma_1)$, $(\gamma_3 - \gamma_1)$, and $(\gamma_4 - \gamma_1)$ measure the persistence of ΔWC, ΔNCO, ΔFIN respectively relative to cash flows. Rewriting the equation results in

$$ROA_{t+1} = \rho_0 + \rho_1 ROA_t + \rho_2 \Delta WC_t + \rho_3 \Delta NCO_t + \rho_4 \Delta FIN_t + \vartheta_{it+1}$$

Results reported in Panels A-C below show that the mean reversion of accruals are quicker than cash flows (the coefficient on *ROA* is 0.80 while the coefficient on *TACC* is %7 lower than *ROA*). Panels B and C reporting persistence results for accrual components show that operating accruals are less persistent than financial accruals, and the magnitude of the persistence coefficients approach zero from negative as the persistence increases. In summary, the preceding analysis provides two objectives. First, the results confirm the persistence ranks of accruals from Richardson et al. (2005). Second, the findings provide us with the measure of persistence for each accrual component which we use to explain how analysts approach to accrual information.

PANEL A: Persistence of accruals (total accruals-TACC)

$$ROA_{it+1} = \rho_0 + \rho_1 ROA_{it} + \rho_2 TACC_{it} + \vartheta_{it+1}$$

	intercept	*ROA*	*TACC*	R^2
mean coef.	0.008	0.797 ***	-0.068 ***	0.632
t-stat		*99.11*	*-16.15*	

PANEL B: Persistence of accruals (initial decomposition)

$$ROA_{it+1} = \rho_0 + \rho_1 ROA_{it} + \rho_2 \Delta WC_{it} + \rho_3 \Delta NCO_{it} + \rho_4 \Delta FIN_{it} + \vartheta_{it+1}$$

	intercept	*ROA*	*ΔWC*	*ΔNCO*	*ΔFIN*	R^2
mean coef.	0.007	0.791 ***	-0.122 ***			0.631
pvalue			*-16.09*			
mean coef.	0.008	0.782 ***		-0.051 ***		0.625
t-stat				*-10.79*		
mean coef.	0.005	0.777 ***			0.002	0.629
t-stat					*0.26*	
mean coef.	*0.009*	*0.804* ***	*-0.137* ***	*-0.065* ***	-0.045 ***	0.634
t-stat			-19.59	-12.32	-11.78	
Persistence order		*highest*	*low*	*medium*	*high*	

PANEL B: Persistence of accruals (extended decomposition)

$$ROA_{it+1} = \rho_0 + \rho_1 ROA_{it} + \rho_2 \Delta COL_{it} + \rho_3 \Delta COA_{it} + \rho_4 \Delta NCOL_{it} + \rho_5 \Delta NCOA_{it} + \rho_6 \Delta LTI_{it} + \rho_7 \Delta FINL_{it} + \rho_8 \Delta STI_{it} + \vartheta_{it+1}$$

	intercept	*ROA*	*(-)ΔCOL*	*ΔCOA*	*(-)ΔNCOL*	*ΔNCOA*	*ΔLTI*	*(-)ΔFINL*	*ΔSTI*	R^2
Predicted reliability [a]			High	Low	Medium	Low	Medium	High	High	
mean coef.	0.005	0.776 ***	-0.035 ***							0.62
t-stat			*-4.03*							
mean coef.	0.008	0.786 ***		-0.065 ***						0.63
t-stat				*-11.3*						
mean coef.	0.005	0.777 ***			-0.044 ***					0.62
t-stat					*-4.52*					
mean coef.	0.007	0.782 ***				-0.047 ***				0.62
t-stat						*-10.17*				
mean coef.	0.006	0.78 ***					-0.037 ***			0.63
t-stat							*-4.45*			
mean coef.	0.005	0.776 ***						0.010 ***		0.62
t-stat								*2.00*		
mean coef.	0.006	0.775 ***							-0.026 ***	0.62
t-stat									*-5.53*	
mean coef.	0.008	0.803 ***	-0.177 ***	-0.132 ***	-0.097 ***	-0.077 ***	-0.059 ***	-0.052 ***	-0.034 ***	0.63
t-stat			*-18.40*	*-19.11*	*-8.38*	*-14.21*	*-6.65*	*-9.46*	*-6.77*	
Persistence Order		*8 Highest*	*1 Low*	*2*	*3*	*4*	*5*	*6*	*7 high*	

ROA $_{t+1}$ denotes earnings and *ROA* $_t$ denotes cash flows by the model construction. Other variables represent accrual components of earnings. See Appendix for models ROA (1), (2) and (3). Standard errors are clustered by firm and year using the Petersen (2009) approach. The sample consists of 142,821 firm-year observations for 1976-2013, all earnings and accrual variables are deflated by average assets and winsorised to +1 and -1. See Appendix for variable definitions. *** denotes the statistical significance at 1% level

Table 1.1

Descriptive statistics and correlations for ROA, accruals, conservatism

PANEL A: Descriptive statistics

	mean	std.dev.	25%	median	75%
ROA_{t+1}	0.045	0.214	0.007	0.08	0.14
ROA_t	0.043	0.186	0.002	0.076	0.136
$TACC_t$	0.051	0.195	-0.021	0.037	0.109
$\Delta OPAC_t$	0.063	0.195	-0.027	0.041	0.135
ΔFIN_t	-0.012	0.176	-0.071	-0.002	0.048
ΔWC_t	0.015	0.106	-0.024	0.008	0.052
ΔNCO_t	0.048	0.159	-0.015	0.021	0.084
C_Score_t	0.013	0.115	-0.052	0.012	0.081
$Hidden\_Reserves_t$	0.163	0.190	0.035	0.098	0.218

PANEL B: Correlation matrix—Pearson (above diagonal) and Spearman (below diagonal)

	ROA_{t+1}	ROA_t	$TACC_t$	$\Delta OPAC_t$	ΔFIN_t	ΔWC_t	ΔNCO_t	C_S_t	H_R_t
ROA_{t+1}	-	0.75 ***	0.13 ***	0.09 ***	0.05 ***	0.01 ***	0.04 ***	-0.24 ***	-0.16 ***
ROA_t	0.79 ***	-	0.22 ***	0.18 ***	0.05 ***	0.20 ***	0.08 ***	-0.27 ***	-0.17 ***
$TACC_t$	0.23 ***	0.38 ***	-	0.69 ***	0.45 ***	0.40 ***	0.47 ***	-0.10 ***	-0.02 ***
$\Delta OPAC_t$	0.13 ***	0.27 ***	0.60 ***	-	-0.45 ***	0.60 ***	0.84 ***	-0.08 ***	-0.06 ***
ΔFIN_t	0.09 ***	0.08 ***	0.29 ***	-0.47 ***	-	-0.22 ***	-0.41 ***	-0.02 ***	0.04 ***
ΔWC_t	0.12 ***	0.23 ***	0.41 ***	0.63 ***	-0.27 ***	-	0.07 ***	-0.01 ***	-0.02 ***
ΔNCO_t	0.11 ***	0.22 ***	0.47 ***	0.80 ***	0.41 ***	0.16 ***	-	-0.12	-0.07 ***
C_Score_t	-0.02 ***	-0.02 ***	-0.08 ***	-0.06 ***	-0.01 ***	-0.01 ***	-0.06	-	0.05
H_Rt	-0.39 ***	-0.43 ***	-0.05 ***	-0.08 ***	0.03 ***	-0.05 ***	-0.07 ***	0.00	-

Earmings/accruals sample consists of 142,821 firm-year observations, while *Hidden_Reserves* (H_R) and *C_Score* (C_S) samples consist of 98,196 and 96,324 firm-year observations respectively for 1976-2013. All earnings and accrual variables are deflated by average assets and winsorised to +1 and -1, while *C_Score* and *Hidden_Reserves* are winsorised to %1 and %99. See Appendix for variable definitions. *** denotes the statistical significance at 1% level

Table 1.2

Descriptive statistics and correlations for extended accrual decomposition

PANEL A: Descriptive statistics

	mean	std.dev.	25%	median	75%
ΔCOA_t	0.040	0.132	-0.01	0.022	0.081
ΔCOL_t	0.025	0.09	-0.009	0.015	0.051
$\Delta NCOA_t$	0.055	0.163	-0.012	0.025	0.091
$\Delta NCOL_t$	0.006	0.049	-0.001	0.001	0.011
ΔSTI_t	0.007	0.105	0	0	0
ΔLTI_t	0.002	0.047	0	0	0
$\Delta FINL_t$	0.021	0.141	-0.023	0	0.051

PANEL B: Correlation matrix—Pearson (above diagonal) and Spearman (below diagonal)

	ROA_{t+1}	ROA_t	ΔCOA_t	ΔCOL_t	$\Delta NCOA_t$	$\Delta NCOL_t$	ΔSTI_t	ΔLTI_t	$\Delta FINL_t$
ROA_{t+1}	-	0.75 ***	0.11 ***	0.04 ***	0.05 ***	0.02 ***	0.03 ***	0.02 ***	-0.03 ***
ROA_t	0.79 ***	-	0.16 ***	0.00	0.09 ***	0.01 ***	0.04 ***	0.02 ***	-0.02 ***
ΔCOA_t	0.20 ***	0.31 ***	-	0.60 ***	0.29 ***	0.08 ***	0.01	0.01 ***	0.33 ***
ΔCOL_t	0.15 ***	0.18 ***	0.57 ***	-	0.31 ***	0.07 ***	0.09 ***	0.03 ***	0.20 ***
$\Delta NCOA_t$	0.14 ***	0.25 ***	0.38 ***	0.35 ***	-	0.23 ***	-0.01	-0.01 ***	0.51 ***
$\Delta NCOL_t$	0.15 ***	0.19 ***	0.14 ***	0.11 ***	0.31 ***	-	0.01 ***	0.06 ***	0.03 ***
ΔSTI_t	0.07 ***	0.09 ***	-0.02 ***	0.08 ***	-0.02 ***	0.02 ***	-	-0.02 ***	0.03 ***
ΔLTI_t	0.02 ***	0.04 ***	0.03 ***	0.04 ***	0.02 ***	0.06 ***	0.00	-	0.08 ***
$\Delta FINL_t$	-0.04 ***	-0.04	0.32 ***	0.17 ***	0.05 ***	0.11 ***	-0.02 ***	0.05 ***	-

The sample consists of 142,821 firm-year observations for 1976-2013. Variables are deflated by average assets and winsorised to +1 and -1. See Appendix for variable definitions. *** denotes the statistical significance at 1% level

Table 1.3

Descriptive statistics for earnings forecast errors

	mean	std.dev.	25%	median	75%
M1Ferror	-0.016	0.049	-0.020	-0.002	0.003
M2Ferror	-0.015	0.048	-0.018	-0.002	0.003
M3Ferror	-0.013	0.056	-0.016	-0.001	0.003
M4Ferror	-0.012	0.055	-0.014	-0.001	0.003
M5Ferror	-0.011	0.054	-0.013	-0.001	0.003
M6Ferror	-0.009	0.038	-0.010	-0.001	0.003
M7Ferror	-0.008	0.039	-0.008	0.000	0.002
M8Ferror	-0.007	0.037	-0.007	0.000	0.002
M9Ferror	-0.005	0.038	-0.005	0.000	0.002
M10Ferror	-0.004	0.040	-0.003	0.000	0.002
M11Ferror	-0.004	0.040	-0.002	0.000	0.002
M12Ferror	-0.003	0.033	-0.002	0.000	0.002

m1, m2, ...m12 denote months, *Ferror* denotes analysts' earnings forecast error. The number of firm-year observations are 48,142 across 12 months for 1976-2013. See appendix for variable definitions.

Table 1.4

Correlations between analysts forecast errors, accruals and conservatism across 12 months

PANEL A: Pearson correlations: intial accrual decomposition and average forecast errors

	$TACC_t$	$\Delta OPAC_t$	ΔFIN_t	ΔWC_t	ΔNCO_t	C_Score_t	H_Reserv_t
$M1Ferror_{t+1}$	0.01	-0.06 ***	0.07 ***	-0.07 ***	-0.03 ***	-0.11 ***	0.00
$M2Ferror_{t+1}$	0.00	-0.06 ***	0.07 ***	0.07 ***	-0.04 ***	-0.09 ***	0.01
$M3Ferror_{t+1}$	0.00	-0.05 ***	0.05 ***	-0.05 ***	-0.03 ***	-0.09 ***	0.02
$M4Ferror_{t+1}$	0.00	-0.05 ***	0.05 ***	-0.05 ***	-0.03 ***	-0.09 ***	0.02 ***
$M5Ferror_{t+1}$	0.00	-0.05 ***	0.05 ***	-0.04 ***	-0.03 ***	-0.08 ***	0.03 ***
$M6Ferror_{t+1}$	0.00	-0.06 ***	0.06 ***	-0.06 ***	-0.03 ***	-0.08 ***	0.03 ***
$M7Ferror_{t+1}$	0.00	-0.06 ***	0.05 ***	-0.05 ***	-0.04 ***	-0.08 ***	0.03 ***
$M8Ferror_{t+1}$	0	-0.05 ***	0.05 ***	-0.05 ***	-0.03 ***	-0.06 ***	0.03 ***
$M9Ferror_{t+1}$	0.01	-0.04 ***	0.05 ***	-0.04 ***	-0.02 ***	-0.06 ***	0.03 ***
$M10Ferror_{t+1}$	0	-0.04 ***	0.04 ***	-0.03 ***	-0.03 ***	-0.05 ***	0.02 ***
$M11Ferror_{t+1}$	0	-0.04 ***	0.04 ***	-0.03 ***	-0.03 ***	-0.05 ***	0.03 ***
$M12Ferror_{t+1}$	0.00	-0.03 ***	0.03 ***	-0.03 ***	-0.02 ***	-0.05 ***	0.02 ***

PANEL B: Pearson correlations: extended accrual decomposition and average forecast errors

	ΔCOA_t	ΔCOL_t	$\Delta NCOA_t$	$\Delta NCOL_t$	ΔSTI_t	ΔLTI_t	$\Delta FINL_t$
$M1Ferror_{t+1}$	-0.04 ***	-0.03 ***	-0.03 ***	-0.02 ***	0.03 ***	0.01	0.07 ***
$M2Ferror_{t+1}$	-0.04 ***	-0.03 ***	-0.03 ***	-0.03 ***	0.03 ***	0.01	0.07 ***
$M3Ferror_{t+1}$	-0.03 ***	-0.01 ***	-0.03 ***	-0.01 ***	0.02 ***	0.01	0.05 ***
$M4Ferror_{t+1}$	-0.03 ***	-0.01 ***	-0.03 ***	-0.03 ***	-0.02 ***	0.01	0.05 ***
$M5Ferror_{t+1}$	-0.03 ***	-0.01 ***	-0.02 ***	-0.03 ***	-0.02 ***	0.00	0.05 ***
$M6Ferror_{t+1}$	-0.04 ***	-0.01 ***	-0.03 ***	-0.02 ***	-0.02 ***	0.00	0.06 ***
$M7Ferror_{t+1}$	-0.03 ***	-0.02 ***	-0.02 ***	-0.05 ***	0.02 ***	0.01	0.05 ***
$M8Ferror_{t+1}$	-0.03 ***	-0.02 ***	-0.02 ***	-0.05 ***	0.02 ***	0.00	0.05 ***
$M9Ferror_{t+1}$	-0.03 ***	-0.01	-0.02 ***	-0.02 ***	0.02 ***	0.01	0.04 ***
$M10Ferror_{t+1}$	-0.02 ***	-0.01 ***	-0.01 ***	-0.05 ***	0.02 ***	0.01	0.04 ***
$M11Ferror_{t+1}$	-0.01 ***	-0.02 ***	-0.01 ***	-0.05 ***	0.02 ***	0.00	0.03 ***
$M12Ferror_{t+1}$	-0.01 ***	-0.02 ***	-0.01	-0.04 ***	0.01 ***	0.00	0.03 ***

m1, m2, ...m12 denote months, *Ferror* denotes analysts' earnings forecast error. The number of firm-year observations are 48,142 across 12 months for 1976-2013 for which consensus analsyt earning forecasts and actual earnings are available on the IBES summary file. Accrual variables are winsorised to +1 and -1, while forecast errors are winsorised to 1% and 99%. See Appendix fr variable defnition. *** denotes the statistical significance at 1% level

Table 1.5

Regressions for forecast errors on total accruals and cash flows over 12 months

PANEL A: Forecast errors and total accruals

$$Ferror_{s,it+1} = \beta_0 + \beta_1 TACC_{it} + \varepsilon_{it+1}$$

Month	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
Intercept (coef.)	-0.017 ***	-0.015 ***	-0.013 ***	-0.012 ***	-0.01 ***	-0.009 ***	-0.008 ***	-0.007 ***	-0.005 ***	-0.004 ***	-0.003 ***	-0.003 ***
TACC (coef.)	0.002	0	0	0	0	0	0	0	0.001	0	0	0
t-stat	*0.94*	*0.39*	*-0.05*	*-0.1*	*-0.22*	*0.15*	*-0.07*	*0.08*	*0.67*	*0.15*	*0.15*	*0.2*

PANEL B: Forecast errors, total accruals and cash flows

$$Ferror_{s,it+1} = \beta_0 + \beta_1 CASHF_{it} + \beta_2 TACC_{it} + \varepsilon_{it+1}$$

Month	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
Intercept (coef.)	-0.018 ***	-0.016 ***	-0.013 ***	-0.013 ***	-0.011 ***	-0.009 ***	-0.008 ***	-0.007 ***	-0.005 ***	-0.004 ***	-0.004 ***	-0.003 ***
TACC (coef.)	0	-0.002	-0.03	0.003	-0.003	0.002	-0.002	-0.002	0	-0/001	0	0
t-stat	*0.19*	*0.72*	*-1.17*	*-0.88*	*-0.90*	*-0.71*	*-0.70*	*-0.48*	*0.67*	*-0.42*	*-0.32*	*-0.35*
CF(coef.)	0.043 ***	0.037 ***	0.032 ***	0.029	0.026 ***	0.022 ***	0.021 ***	0.017 ***	0.014 ***	0.013 ***	0.012 ***	0.11 ***
t-stat	*8.85*	*8.75*	*7.45*	*8.05*	*8.00*	*6.97*	*7.41*	*6.92*	*6.46*	*6.43*	*6.30*	*6*
%R^2	1.63	1.27	0.65	0.53	0.45	0.72	0.59	0.43	0.27	0.19	0.17	0.22

m1, m2, ...m12 denote months, *Ferror* denotes analysts' earnings forecast error. The number of firm-year observations are 48,142 from 1976 to 2013 for which consensus analsyt earning forecasts and actual earnings are available on the IBES summary statistics file. Standard errors are clustered by firm and year using the Petersen (2009) approach. See Appendix for variable definitions. *** denotes the statistical significance at 1% level

Table 1.6

Forecast errors and accrual components over 12 months

PANEL A: Forecast errors and accruals (initial accrual decomposition)

$$Ferror_{s,it+1} = \beta_0 + \beta_1 \Delta WC_{it} + \beta_2 \Delta NCO_{it} + \beta_3 \Delta FIN_{it} + \beta_4 CF_{it} + \varepsilon_{it+1}$$

		m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
Intercept (coef.)		-0.015 ***	-0.014 ***	-0.12 ***	-0.011 ***	-0.01 ***	-0.008 ***	-0.007 ***	-0.006 ***	-0.005 ***	-0.004 ***	-0.003 ***	-0.003 ***
	Persistence Order [(d)]												
ΔWC (coef.)	*1 Low*	-0.039 ***	-0.038 ***	-0.033 ***	-0.027 ***	-0.025 ***	-0.026 ***	-0.023 ***	-0.019 ***	-0.015 ***	-0.013 ***	-0.011 ***	-0.010 ***
t-stat		*-8.63*	*-8.85*	*-5.98*	*-6.19*	*-6.27*	*-9.12*	*-8.52*	*-7.11*	*-6.73*	*-5.25*	*-3.82*	*-4.46*
ΔNCO (coef.	*2*	-0.001	-0.003	-0.005	-0.007	-0.007	-0.003	-0.005	-0.004	-0.001	-0.003	-0.003	-0.003
t-stat		*-0.33*	*-1.00*	*-1.22*	*-1.06*	*-1.13*	*-0.99*	*-0.97*	*-0.78*	*-0.47*	*-0.86*	*-0.81*	*-0.74*
ΔFIN (coef.)	*3*	0.017 ***	0.015 ***	0.012 ***	0.011 ***	0.01 ***	0.01 ***	0.009 ***	0.008 ***	0.007 ***	0.005 ***	0.005 ***	0.005 ***
t-stat		*5.46*	*5.03*	*4.38*	*3.82*	*3.76*	*4.15*	*3.84*	*3.96*	*4.27*	*4.00*	*3.56*	*3.88*
CF (coef.)	*4 High*	0.042 ***	0.035 ***	0.030 ***	0.027 ***	0.025 ***	0.021 ***	0.020 ***	0.016 ***	0.013 ***	0.012 ***	0.011 ***	0.010 ***
t-stat		*8.58*	*8.57*	*7.10*	*7.70*	*7.77*	*6.85*	*7.48*	*6.99*	*6.39*	*6.63*	*6.58*	*6.29*

PANEL B: Forecast errors and accruals (extended accrual decomposition)

$$Ferror_{s,it+1} = \beta_0 + \beta_1 \Delta COL_{it} + \beta_2 \Delta COA_{it} + \beta_3 \Delta NCOL_{it} + \beta_4 \Delta NCOA_{it} + \beta_5 \Delta LTI_{it} + \beta_6 \Delta FINL_{it} + \beta_7 \Delta STI_{it} + \beta_8 CF_{it} + \varepsilon_{it+1}$$

	Persistence Order	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
Intercept (coef.)		-0.016 ***	-0.014 ***	0.012 ***	-0.011 ***	0.010 ***	-0.009 ***	-0.008 ***	-0.008 ***	-0.005 ***	-0.004 ***	-0.004 ***	-0.003 ***
(-)ΔCOL (coe	*1 Low*	-0.062 ***	-0.034 ***	-0.030 ***	-0.024 ***	-0.023 ***	-0.024 ***	-0.021 ***	-0.017 ***	-0.013 ***	-0.011 ***	-0.009 ***	-0.008 ***
t-stat		-7.26	-7.44	-5.47	-5.47	-5.56	-7.85	-7.37	-6.39	-6.04	-4.87	-3.58	-4.03
ΔCOA (coef.	*2*	-0.037 ***	-0.034 ***	-0.030 ***	-0.024 ***	-0.023 ***	-0.024 ***	-0.021 ***	-0.017 ***	-0.013 ***	-0.011 ***	-0.009 ***	-0.008 ***
t-stat		*-7.26*	*-7.44*	*-5.47*	*-5.47*	*-5.56*	*-7.85*	*-7.37*	*-6.39*	*-6.04*	*-4.87*	*-3.58*	*-4.03*
(-)ΔNCOL (c	*3*	-0.031 ***	-0.038 ***	-0.031 ***	-0.036 ***	-0.025 **	-0.027 ***	-0.006	-0.005	-0.009 ***	-0.005	-0.004	-0.004
t-stat		*-4.02*	*-3.21*	*-3.78*	*-2.27*	*-1.96*	*-3.94*	*-1.59*	*-1.57*	*-2.97*	*-1.32*	*-1.28*	*-1.19*
ΔNCOA (coef	*4*	-0.002	-0.004	-0.005	-0.006	-0.006	-0.002	-0.004	-0.003	0	-0.003	-0.003	-0.002
t-stat		*-0.71*	*-1.22*	*-1.32*	*-1.03*	*-0.99*	*-0.69*	*-0.79*	*-0.66*	*-0.11*	*-0.69*	*-0.73*	*-0.62*
ΔLTI (coef.)	*5*	0.006	0.006	0.006	0.005	0.004	0.003	0.001	0.003	0.002	0.001	0.001	0.001
t-stat		*1.33*	*1.21*	*1.13*	*1.17*	*0.92*	*0.91*	*0.88*	*0.33*	*1.01*	*0.96*	*0.56*	*0.48*
(-)ΔFINL (co	*6*	0.024 ***	0.022 ***	0.019 ***	0.017 ***	0.016 ***	0.015 ***	0.012 ***	0.012 ***	0.009 ***	0.009 ***	0.008 ***	0.007 ***
t-stat		*5.95*	*5.65*	*4.68*	*4.69*	*4.94*	*4.74*	*4,98*	*4.75*	*3.89*	*4.26*	*3.85*	*3.91*
ΔSTI (coef.)	*7*	0.010 ***	0.008 ***	0.007 ***	0.007 ***	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.006 ***	0.004 ***	0.004 ***	0.004 ***
t-stat		*4.23*	*3.59*	*3.15*	*2.32*	*2.37*	*2.75*	*2.87*	*3.51*	*4.21*	*3.47*	*2.92*	*3.45*
CF (coef.)	*8 High*	0.041 ***	0.035 ***	0.030 ***	0.029 ***	0.024 ***	0.020 ***	0.020 ***	0.016 ***	0.012 ***	0.011 ***	0.010 ***	0.010 ***
t-stat		*8.71*	*8.65*	*7.15*	*7.67*	*7.79*	*6.84*	*7.21*	*6.82*	*5.60*	*6.68*	*6.54*	*5.92*

m1, m2, ...m12 denote months, *Ferror* denotes analysts' earnings forecast error. Persistence order of earnings components is obtained from the multivariate persistence regressions provided in Appendix(Panels A-C). The number of firm-year observations are 48,142 for 1976-2013 for which consensus analsyt earning forecasts and actual earnings are available on IBES summary statistics file. Standard errors are clustered by firm and year using Petersen (2009). Untabulated *F-tests* reveal that coefficients are different from each other in the first 3-4 months. See Appendix for variable definitions. *** denotes the statistical significance at 1% level

Table 1.7

Return regressions on cash flows (CF) and accruals (1976-2013)

$$Ret_{it+1} = \beta_0 + \beta_1 CF_{it} + \beta_2 \Delta WC_{it} + \beta_2 \Delta NCO_{it} + \beta_2 \Delta FIN_{it} + \sum_{j=1}^{k} \delta_j X_{it} + \varepsilon_{it+1}$$

	CF, TACC		CF, ΔWC, ΔNCO, ΔFIN	
	Coeff	*t-stat*	Coeff	*t-stat*
Intercept	-0.067	*-1.35*	-0.059	*-1.33*
CF	-0.022	*0.55*	-0.061	*-1.32*
TACC	-0.168 ***	*-6.33*		
ΔWC			-0.293 ***	*-6.47*
ΔNCO			-0.183 ***	*-5.07*
ΔFIN			-0.053 *	*-1.74*
CONTROLS	*YES*		*YES*	
%R^2	4.43		4.63	
N	78,488		78,373	

Table reports the results of equations (8) and (7) respectively. Control variables are *size, market Beta, B/P, E/P and past returns*. See Appendix for variable definitions. Standard errors are clustered by firm and year using the Petersen (2009) approach. Un-tabulated F-tests confirm that coefficients are different from each other. *** , ** and * denote the statistical significance at 1%, 5% and %10 respectively.

Table 1.8

Forecast errors and accrual components on high/low conservatism portfolios

$$Ferror_{s,it+1} = \beta_0 + \beta_1 CF_{it} + \beta_2 D + \beta_3 TACC_{it} + \beta_4 D * TACC_{it} + \varepsilon_{it+1}$$

	High/low Unconditional conservatism			High/low Conditional conservatism		
	m1	m2	m3	m1	m2	m3
Intercept (coef.)	-0.018 ***	-0.017 ***	-0.015 ***	-0.008 ***	-0.007 ***	-0.006 ***
CF (coef.)	0.011 **	0.008 *	0.004	0.031 ***	0.026 ***	0.022 ***
D (coef.)	-0.004 *	-0.004	-0.003	-0.024 ***	-0.022 ***	0.020 ***
TACC (coef.) (a)	0.006	-0.005	-0.002	-0.004	0.004	-0.004
*D*TACC (coef.) (b)*	-0.009 *	-0.008	-0.009	-0.006	-0.008	-0.002
diff (b-a)	-0.003	-0.013	-0.011	-0.010	-0.004	-0.006
$\%R^2$	0.10	0.00	0.10	6.43	5.53	5.23
N	6,008	5,873	5,787	6,166	5,983	5,921

m1, m2, m3 denote months, *Ferror* denotes analysts' earnings forecast error. Unconditional (conditional) conservatism is measured by *Hidden_reserves (C_Score)*. *TACC* denotes total accruals and *D* is a dummy assigning 1 (0) to the highest (lowest) conservatism quintiles formed each year based on *Hidden_reserves (C_Score)* for the first three months of year t before the announcement of quarterly earnings. Standard errors are clustered by firm and year using the Petersen (2009) approach. Variable definitions are provided in Appendix. *** , ** and * denote the statistical significance at 1%, 5% and %10 respectively.

Table 1.9

Forecast error regressions on decile ranked accruals

PANEL A: Forecast errors and decile ranked total accruals

Month	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
decTACC (coef.)	0	0	-0.005	-0.005	-0.005	-0.002	-0.002	-0.001	-0.002	-0.001	0	-0.001
t-stat	*-0.28*	*-0.91*	*-1.68*	*-1.59*	*-1.63*	*-0.87*	*-1.28*	*-0.69*	*-0.90*	*-0.90*	*-0.51*	*-0.90*

PANEL B: Forecast errors and decile ranled working capital, non-current operating, and financial accruals

$$Ferror_{s,it+1} = \beta_0 + \beta_1 dec\Delta WC_{it} + \beta_2 dec\Delta NCO_{it} + \beta_3 dec\Delta FIN_{it} + \varepsilon_{it+1}$$

	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
Intercept (coef.)	-0.019 ***	-0.018 ***	-0.016 ***	-0.015 ***	-0.013 ***	-0.011 ***	-0.01 ***	-0.009 ***	-0.008 ***	-0.006 ***	-0.005 ***	-0.005 ***
dec ΔWC (coef.)	-0.006 ***	-0.006 ***	-0.004 ***	-0.003 ***	-0.003 ***	-0.003 ***	-0.003 ***	-0.002 ***	-0.001 ***	-0.001	-0.001	-0.001
t-stat	*-6.12*	*-6.52*	*-3.44*	*-2.90*	*-3.13*	*-5.02*	*-4.83*	*-3.7*	*-2.54*	*-1.89*	*-1.44*	*-1.77*
decΔNCO (coef.)	0.003 ***	0.002 ***	0.001	0.001	0	0.002	0.001	0.001	0.001	0	0	0
t-stat	*3.06*	*2.50*	*0.97*	*0.72*	*0.56*	*1.62*	*1.1*	*1.18*	*1.81*	*0.95*	*1.17*	*1.15*
decΔFIN (coef.)	0.010 ***	0.009 ***	0.009 ***	0.008 ***	0.008 ***	0.006 ***	0.006 ***	0.005 ***	0.004 ***	0.004 ***	0.004 ***	0.003 ***
t-stat	*7.53*	*7.54*	*6.79*	*7.51*	*7.10*	*6.35*	*6.61*	*7.06*	*6.11*	*6.13*	*5.92*	*5.18*

PANEL C: Forecast errors and decile ranked accruals (extended decomposition)

$$Ferror_{s,it+1} = \beta_0 + \beta_1 dec\Delta COL_{it} + \beta_2 dec\Delta COA_{it} + \beta_3 dec\Delta NCOL_{it} + \beta_4 dec\Delta NCOA_{it} + \beta_5 dec\Delta LTI_{it} + \beta_6 dec\Delta FINL_{it} + \beta_7 dec\Delta STI_{it} + \varepsilon_{it+1}$$

	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12
Intercept (coef.)	-0.009 ***	-0.008 ***	-0.008 ***	-0.009 ***	-0.008 ***	-0.006 ***	-0.007 ***	-0.006 ***	-0.005 ***	-0.004 ***	-0.004 ***	-0.003 ***
(-)decΔCOL (coef.)	-0.012 ***	-0.012 ***	-0.008 ***	-0.006 ***	-0.006 ***	-0.006 ***	-0.005 ***	-0.004 ***	-0.003 ***	-0.002 ***	-0.002 ***	-0.002 ***
t-stat	*-9.69*	*-9.45*	*-4.04*	*-3.04*	*-2.93*	*-5.48*	*-5.35*	*-5.03*	*-3.41*	*-3.93*	*-3.91*	*-3.75*
decΔCOA (coef.)	-0.006 ***	-0.006 ***	-0.004 ***	-0.003	-0.003	-0.004 ***	-0.003 ***	0.0018 **	-0.002 ***	-0	-0	-0
t-stat	*-5.48*	*-5.76*	*-1.97*	*-1.2*	*-1.15*	*-4.76*	*-2.87*	*-2.58*	*-2.2*	*-0.55*	*-0.46*	*-0.19*
(-)decΔNCOL (coef.)	-0.009 ***	-0.008 ***	-0.008 ***	-0.007 ***	-0.007 ***	-0.005 ***	-0.005 ***	-0.004 ***	-0.003 ***	-0.003 ***	-0.003 ***	-0.003 ***
t-stat	*-6.72*	*-6.38*	*-5.74*	*-5.01*	*-4.98*	*-5.42*	*-4.41*	*-4.6*	*-4.41*	*-3.83*	*-3.75*	*-3.38*
decΔNCOA (coef.)	-0	-0	-0.002	-0.001	-0.001	-0	0	0	0	0	0	0
t-stat	*-0.32*	*-0.6*	*-0.83*	*-0.48*	*-0.52*	*0.52*	*0.52*	*0.61*	*1.09*	*0.45*	*0.23*	*0.56*
decΔLTI (coef.)	0.001	0.002 **	0.002 **	0.002	0.002	0	0	0	0	0	0	0
t-stat	*1.59*	*1.98*	*1.90*	*1.92*	*1.77*	*0.92*	*0.98*	*0.92*	*-0.02*	*0.55*	*0.26*	*0.15*
(-)decΔFINL (coef.)	0.009 ***	0.008 ***	0.007 ***	0.007 ***	0.007 ***	0.006 ***	0.006 ***	0.005 ***	0.004 ***	0.004 ***	0.003 ***	0.003 ***
t-stat	*3.87*	*3.65*	*3.63*	*4.74*	*4.17*	*3.73*	*4.29*	*4.53*	*3.37*	*3.38*	*2.92*	*2.72*
decΔSTI (coef.)	0.005 ***	0.004 ***	0.004 ***	0.004 ***	0.004 ***	0.003 ***	0.003 ***	0.003 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***
t-stat	*5.11*	*5.07*	*5.62*	*5.64*	*5.24*	*3.73*	*5.14*	*6.3*	*5.14*	*4.64*	*4.5*	*4.13*

m1, m2, ...m12 denote months, *Ferror* denotes analysts' earnings forecast error and *dec* decile ranks. Decile ranked portfolios are formed based on the magnirude of a particular accrual component in year *t* and scaled to (0,9) range. The number of firm-year observations are 48,142 for 1976 to 2013 for which consensus analsyt earning forecasts and actual earnings are available on the IBES summary statistics file. Standard errors are clustered by firm and year using Petersen (2009). See Appendix for variable definitions. *** denotes the statistical significance at 1% level.

Table 1.10

Forecast error regressions on high accrual quintiles over the first 6 months

PANEL A: Forecast errors and high total accrual (TACC) quintiles

Month	m1		m2		m3		m4		m5		m6	
Intercept (coef.)	-0.021	***	-0.019	***	-0.017	***	-0.016	***	-0.014	***	-0.012	***
QhTACC (coef.)	0.005		0.004		0.004		0.004		0.003		0.003	
t-stat	1.73		0.81		0.20		0.12		0.13		0.04	

PANEL B: Forecast errors and high accrual quintiles of ΔWCA, ΔNCO and ΔFIN

	m1		m2		m3		m4		m5		m6	
Intercept (coef.)	-0.022	***	-0.020	***	-0.016	***	-0.015	***	-0.015	***	-0.013	***
QhΔWC (coef.)	-0.005	***	-0.005	***	-0.005	***	-0.005	***	-0.005	***	-0.004	***
t-stat	-2.86		-2.83		-3.45		-3.21		-3.05		-3.28	
QhΔNCO (coef.)	0.000		-0.001		-0.002		-0.002		-0.001		-0.001	
t-stat	-0.07		-0.49		-0.86		-1.02		-0.69		-0.71	
QhΔFIN (coef.)	0.007	***	0.007	***	0.006	***	0.005	***	0.006	***	0.005	***
t-stat	3.43		3.15		2.96		2.75		3.58		3.24	

m denotes months, *Ferror* analysts' earnings forecast error, and *Q* the quitile of related accrual component. Each year, we rank firms into five quintiles from low to high by the magnitude of accruals, and run the equations 3, 4 and 5 only with the highest accrual portfolios. The number of firm-year observations are 9,605 for which consensus analsyt earning forecasts and actual earnings are available on IBES summary statistics file. Standard errors are clustered by firm and year using Petersen (2009). See Appendix for variable definitions. ***, **, * denote the statistical significance at 1%, %5 and %10 level

Table 1.11

Forecast error regressions on high/low total accrual (TACC) quintiles over the first 6 months

$$Ferror_{s,it+1} = \beta_0 + \beta_1 D + \beta_2 TACC_{it} + \beta_3 D * TACC_{it} + \beta_4 CF_{it} + \varepsilon_{it+1}$$

	m1	m2	m3	m4	m5	m6
Intercept (coef.)	-0.024 ***	-0.022 ***	-0.019 ***	-0.019 ***	-0.017 ***	-0.014 ***
CF (coef.)	0.042 ***	0.034 ***	0.030 ***	0.029 ***	0.025 ***	0.022 ***
t-stat	*6.57*	*7.09*	*6.30*	*6.34*	*6.44*	*5.80*
D (coef.)	0.004	0.005	0.003	0.004	0.004	0.003
t-stat	*2.08* **	*2.17* **	*1.18*	*1.79*	*1.53*	*1.94* *
(a) TACC (coef.)	-0.007	-0.009	-0.008	-0.012	-0.009	-0.008
t-stat	*0.71*	*-0.91*	*-0.78*	*-1.22*	*-1.21*	*-0.88*
(b) D*TACC (coef.)	0.009	0.008	0.010	0.010	0.012	0.009
t-stat	*0.75*	*0.74*	*0.79*	*0.91*	*0.80*	*0.94*
Diff (b-a)	0.000	0.002	0.002	0.002	-0.002	0.003
t-stat	*0.12*	*0.06*	*0.13*	*0.12*	*0.20*	*0.09*

m denotes months, *Ferror* analysts' earnings forecast error. Each year we rank firms into five quintiles from low to high by the magnitude of *TACC*, and then assign a dummy, *D* of 1 (0) to the high (low) *TACC* portfolios and run the equations 3. The number of firm-year observations are 16.408 for which consensus analsyt earning forecasts and actual earnings are available on IBES summary statistics file. Standard errors are clustered by firm and year using Petersen (2009). See Appendix for variable definitions. ***, **, * denote the statistical significance at 1%, %5 and %10 level

Table 1.12

Absolute forecast errors on Total Accrual (TACC) over the first 6 months

$AbsFerror_{s,it+1} = \beta_0 + \beta_1 TACC_{it} + \beta_2 CF_{it} + \varepsilon_{it+1}$

	m1	m2	m3	m4	m5	m6
Intercept (coef.)	0.034 ***	-0.022 ***	0.031 ***	0.028 ***	0.026 ***	0.023 ***
TACC (coef.)	-0.020 ***	-0.019 ***	-0.019 ***	-0.017 ***	-0.016 ***	-0.015 ***
t-stat	*-5.08*	*-4.86*	*-4.77*	*-5.75*	*-5.52*	*-5.11*
CF (coef.)	-0.074 ***	-0.071 ***	-0.065 ***	-0.060 ***	-0.056 ***	-0.049 ***
t-stat	*-16.85*	*-16.86*	*-17.95*	*-15.59*	*-14.45*	*-15.41*

m denotes months, *AbsFerror* analysts' earnings forecast absolute error (unsigned errors). The number of firm-year observations are 41,225 for which consensus analsyt earning forecasts and actual earnings are available on IBES summary statistics file. Standard errors are clustered by firm and year using Petersen (2009). See Appendix for variable definitions. ***, **, * denote the statistical significance at 1%, %5 and %10 level

Important note; since the dependent variable is now all positive, a negative coefficient on accruals will indicate analysts' pessimism, but a positive coefficient will indicate analysts' optimism contrary to signed error tests (where the mean signed error was negative).

CHAPTER 2

How multi segmentation affects the probability of meeting analysts' earnings forecasts and economic consequences associated with it?

Abstract

This paper examines whether multi segmentation affects the probability of meeting analysts' forecasts, and whether the 'diversification' discount that multi segment firms seem to suffer from is mitigated/exacerbated when multi segment firms meet/miss analysts' forecasts. We find that multi segment firms exhibit lower probability of meeting analysts' forecasts relative to single segment firms, which we argue to be caused by less (no) engagement in earnings (forecast) management activities and more complex information environment. However, we find no evidence that meeting/missing forecasts mitigates/exacerbates the diversification discount, while single segment firms experience significant premium (discount) when they meet (miss) forecasts. We interpret this finding as indicative of weaker investor reaction to meeting forecasts by multi-relative to single segment firms. On the other hand, we find significant incremental multi segment discount if earnings and/or forecast management activities are used as instruments to meet analysts' forecasts, which implies that there are significant costs for multi segment firms from engaging in such activities to meet forecasts.

Key Words: Multi/single segment firm, meeting/missing forecast, earnings /forecast management, diversification discount

JEL Classification: M41, G10

2.1.Introduction

In this paper, we investigate whether multi segmentation[16] affects the probability of meeting analysts' forecasts, and whether the 'diversification' discount that multi segment firms seem to suffer from is alleviated/exacerbated when multi segment firms meet/miss analysts' forecasts. Analysis of this issue is important for several reasons. Firstly, research shows that meeting/missing analysts' earnings forecasts at the earnings announcements dates has significant value consequences; meeting leads to premium, missing leads to discount in share price (e.g., Kasznik and McNichols 2002), i.e., meeting/missing analysts' forecasts is an economically important phenomenon. Secondly, evidence also shows that multi segment firms suffer from severe agency conflicts (e.g., Berger and Ofek, 1995), and exhibit more complex information environment (e.g., Bushman Chen, Engel, and Smith 2004), while these two significantly affect meeting forecast probability (e.g., Matsumoto, 2002; Brown, Hillegeist, and Lo, 2009), and thirdly, despite their obvious importance in the economy[17], we lack evidence about the meeting/missing forecast behaviour of multi segment firms, and economic consequences associated with it.

We argue that higher agency conflicts induce higher monitoring, and discourage multi segment firms' managers from opportunistic earnings/forecast management activity to meet forecasts, while more complex information environment results in greater forecast error making forecasts harder to meet, and both lead to lower probability of meeting analysts' forecasts for multi segment firms. Our findings confirm this argument; multi segment firms exhibit less (no) earnings (forecast) management activity to meet forecasts, more complex information environment (they receive more comment letters from the SEC, exhibit higher bid-ask spreads, higher discretionary accruals, higher trading volume, greater standard deviation in working capital accruals and higher forecast errors), and lower probability of meeting analysts' forecasts relative to single segment firms.

We then focus on the value consequences of meeting/missing forecast phenomenon for multi segment firms. In particular, we test whether the 'diversification' discount

[16] Multi segment refers to firms that operate in more than one industry.
[17] (e.g., multi segment firms make up approximately %60 of Compustat population)

that multi segment firms appear to suffer from is alleviated/exacerbated by multi segment firms meeting/missing analysts' forecasts. We argue that if the discount is caused by higher agency conflicts, simply meeting analysts' forecasts does not mitigate the problem. We also argue that investors will be aware that multi segment firms exhibit more complex information environment and engage less in earnings/forecast management to meet forecasts. Hence, we expect investors to react less strongly to meeting/missing forecasts by multi segment firms. Confirming our prediction, we find no evidence that meeting forecasts results in a premium for multi segment firms, or that it reduces the diversification discount (while single segment firms experience significant premium/discount when they meet/miss forecasts). Multi segment firms rather experience significant incremental discount if they use earnings/forecast management as instruments to meet forecasts, which implies that there are significant costs for multi segment firms from engaging in these activities.

Our paper makes several contributions to existing knowledge; Firstly, we show that multi segment firms exhibit lower meeting forecast probability and this stems from multi segment firms less (no) engaging in earnings(forecast) management activity. We attribute this to higher monitoring induced by higher agency conflicts (additional analysis shows larger institutional ownership for multi segment firms suggesting closer monitoring, under which earnings/forecast management is likely to be costlier). Secondly, we show that lower meeting probability is also caused by more complex information environment pertinent for multi segment firms consistent with Brown et al (2009), who find that higher information asymmetry corresponds to more missing incidences. Thirdly, we show that multi segmentation is negatively associated with firm value implying diversification discount, consistent with Berger and Ofek (1995), who show that multi segment firms are traded at a discount. Finally, we show that the 'diversification' discount that multi segment firms suffer from is not alleviated when multi segment firms meet analysts' forecasts, which is indicative of weaker investor reaction to meeting forecasts by multi-relative to single segment firms. We rather find exacerbating discount if multi segment firm engage in earnings/forecast management to meet forecasts. These findings imply that multi segment firms have also weaker incentives to guide analysts' forecasts downwards and manage earnings upwards to meet forecasts since the costs of these activities are significantly higher, consistent with

Matsumoto (2002), who shows that firms with certain characteristics place greater (less) importance on meeting forecasts due to perceived benefits (costs).

The remainder of the paper is organised as follow. The next section provides literature review and develops hypotheses. Section 2.3 describes the data, Section 2.4 explains research design and presents the results. Section 2.5 reports sensitivity analyses and Section 2.6 concludes the study.

2.2. Literature review and hypotheses

2.2.1. Literature review

Previous research shows that firms that meet/miss analysts' earnings forecasts experience significant premium/discount in their share price in general (e.g., Matsunaga and Park 2001; Bartov, Givoly, and Hayn 2002; Kinney, Burgstahler and Martin 2002; Kasznik and McNichols 2002; Lopez and Rees 2002). This research also shows that the premium/discount is unlikely caused by investors' overreaction to positive/negative earnings surprises (forecast minus realised earnings), rather earnings surprises seem to possess information content with respect to future performance (e.g., Bartov, Givoly, and Hayn 2002), which makes meeting/missing forecasts an economically important phenomenon.

Research further shows that the probability of meeting analysts forecasts is highly associated with earnings/forecast management activities and firms' information environment. Managers engage in earnings and/or forecast management to meet forecasts by manipulating accruals upward or guiding analysts' forecasts downward if they perceive benefits from doing so (e.g., Matsumoto 2002; Burgstahler and Eames 2006; Athanasakou, Strong, and Walker 2009)[18] while a more complex information environment leads to greater forecast bias making the forecasts harder to meet (e.g., Brown et al., 2009). In the event that managers avoid engaging in earning/forecast management to meet forecasts (since they face greater costs than

[18] Note that firm may manage earnings by engaging in other mechanisms such as real earnings management. For instance, a firm may reduce the R&D expenditures of a specific year just to meet the forecasts (see, Schipper, 1989; Black and Christensen 2009; Black, Joo, and Schmardebeck, 2014,), but such activities are not so easily detected, therefore, we focus on earnings management via accrual manipulation that is widely used measure in the earnings management literature.

benefits such as under high monitoring induced by higher agency conflicts), and with more complex information environment, the probability of meeting forecasts will be lower. Aware of these properties for such firms, investors' reaction to meeting/missing forecasts will also be weaker, reducing mutually the incentives of managers to engage in earnings/forecast management to meet forecasts (evidence supports the notion that investors' reaction to meeting/missing forecasts can be different under certain circumstances. For instance, Degeorge, Patel, Zeckhauser (1999) show that that meeting/missing forecasts has lower impact on share price for firms that incur losses -losses may be less informative to investors, see Hayn (1995), while Skinner and Sloan (2002) find that markets react stronger to negative surprises of high growth firms).

We investigate meeting/missing forecast phenomenon within the context of multi segmentation since research shows that multi segment firms exhibit more complex information environment and suffer from higher agency conflicts, and both also significantly influence meeting forecast probability. For instance, research find that multi segment firms are traded at a discount, and this is considered due to severe agency conflicts that they seem to suffer from (e.g., Lang and Stulz 1994; Berger and Ofek, 1995; Comment and Jarrel 1995; Servaes 1996; Stein, 1997; Hyland 1999; Lins and Servaes 1999; Rajan, Servaes, and Zingales 2000)[19.]. Potential agency conflicts for multi segment firms include the existence of higher discretionary resources under managers' use (managers have incentives to grow their firms beyond the optimal size, see, Jensen, 1986), cross subsidisation that allows poor segments to drain resources from better performing segments, misalignment of incentives between central and divisional managers, competition of projects for limited sources (managers will try to invest within their expertise at the expense of higher NPV projects).

Evidence also shows that multi segment firms have more complex information environment relative to single segment firms stemming mainly from their relatively complex business structure. They operate in different industries with complicated transfer pricing schemes, different countries with different cultural/legal diversities

[19] See also the argument/evidence that diversification may not destroy value (Khanna and Tice 2001; Campa & Kedia, 2002; Villalonga, 2004A, 2004B; Hann, Ogneva and Ozbas, 2013; Custodio, 2014)

under different rules (e.g., Harris, Kriebel, Raviv 1982; Habib, Johnsen, Naik, 1997; Bushman, Chen, Engel, Smith 2004), and exhibit greater internal control problems (e.g., Ashbaugh-Skaife, Collins, Kinney, 2007; Doyle, Ge, MacVay, 2007). Guidry, Leone, and Rock (1999) further show that individual segment managers conceal their units' underperformance to maximise their bonuses (it appears that they have both the motives and opportunity to do so). Multi segment firms' managers can also conceal some segment information from public due to proprietary cost concerns (they may hide segment profitability from the rivals) or agency costs concerns (they may hide low segment profitability from the public due to agency costs concerns) (see, Lambert and Larcker, 1987; Hayes and Lundholm, 1996; Givoly, Hayn and D'Souza 1999; Botosan and Stanford, 2005; Berger and Hann 2007; Bens, Berger, and Monahan 2011; Bens, Monahan, and Steele, 2015).

2.2.2. Hypotheses

Given previous evidence that higher agency conflicts induce closer monitoring from capital markets, in particular, if firms frequently require funding for various projects (e.g., Rozeff, 1982, Easterbrook, 1984), and given that multi segmentation is closely associated with higher agency conflicts, we consider multi segment firm to be under closer monitoring (multi segment firms typically grow by acquiring other firms, and need larger external funding to finance such projects relative to single segment firms, which possibly triggers higher monitoring), therefore, any opportunistic managerial activity such as upwards earnings management via accrual manipulation or downwards forecast management to meet forecasts will be detected and may be severely punished. Accordingly, we expect that multi segment firms' managers will engage less in (or entirely avoid) earnings/ forecast management activities as instruments to meet forecasts,

H1: Multi segment firms exhibit less earnings and forecast management activities to meet analysts' earnings forecasts relative to single segment firms,

Evidence suggests that more complex information environment leads to greater analysts' forecast errors (e.g., Lehavy, Lee and Merkley, 2011; Feldman, Gilson, and Villalonga, 2014), and that analysts issue more optimistic forecasts for firms whose earnings are more difficult to predict (e.g., Das, Levine, Sivaramakrishnan, 1998, Ke and Yu, 2006; Bradshaw, Lee, and Peterson, 2016). Evidence also shows that higher information asymmetry leads to more missing incidences (Brown et al. 2009), and greater international diversification leads to less accurate and more optimistic forecasts (Duru and Reeb, 2002). Therefore, we hypothesise more complex information environment for multi segment firms that negatively affects their meeting probability (less predictability makes forecasts harder to meet)

H2: Multi segment firms exhibit more complex information environment than single segment firms, and this reduces their meeting forecast probability

Since both less earnings/forecast management activity *(H1)* and more complex information environment *(H2)* possibly result in lower propensity of meeting analysts' forecasts, we also hypothesise that

H3: Multi segment firms exhibit lower probability of meeting analysts' forecasts than single segment firms

Relying on our expectations set out in hypotheses 1 and 2, in hypothesis 3, we predict that multi segment firms show lower meeting probability relative to single segment firms. Given that multi segment firms are traded at a discount relative to single segment firms (e.g., Berger and Ofek, 1995), and that missing analysts' forecasts has negative value consequences, a potential question arises whether the diversification discount is explained or associated with meeting/missing forecast phenomenon, i.e., whether the documented discount by prior research is alleviated/ exacerbated when multi segment firms meet/miss analysts' forecasts. We argue that if the discount that multi segment firms seem to suffer from is associated with higher agency conflicts, then meeting analysts' forecast per se does not address the problem, therefore, meeting forecasts should not mitigate the diversification discount. It is also highly likely that investors will not be willing to trade on forecasts with greater bias (due to more complex information environment), nor they prefer multi segment firms acting opportunistically and use earnings/forecast management just to meet forecasts, hence, they should also react less strongly to meeting/missing forecasts by multi segment firms. Overall, these arguments lead to the following hypothesis, *H4*: The ‘diversification’ discount that multi segment firms suffer from is not alleviated when multi segment firms meet analysts’ earnings forecasts

Finally, we argue that under higher monitoring, opportunistic earnings/forecast management activities used as instruments to meet forecasts can be easily detected and result in a discount since such activities mainly serve the interests of managers while harming the interest of shareholders (see, Healy 1985; Dechow, Sloan and Sweeney 1995; Dechow and Skinner 2000; Fields, Lys, and Vincent, 2001; Graham, Harvey, and Rajgopal, 2005; Barton, Kirk, Reppenhagen, and Thayer, 2014). The punishment or a discount in share price will be reasonable in such cases, because where there is insignificant investor reaction to meeting/missing forecasts, the only motivation for a manager to meet a forecast using such activities will most likely be based on self-interest. Therefore, we also hypothesise that

H5: Multi segment firms experience further discount if they meet analysts’ forecasts by engaging in earnings and/or forecast management activities.

2.3. Data and sample selection

We use non-financial US data for 1999-2014, which SFAS 131 has been in use, which requires a firm to report separate information for a segment if its Sales, Assets, or Profit/Loss are 10% or more of the combined Sales, Assets, and Profit/ Loss of the firm. SFAS 131 (operation segment reporting) replaces SAFS 14 (regional segment reporting) in 1998. Compustat replaced the segment reporting criteria in 1999 according to segments as reported by the firms. Berger and Hann (2003, p.163) find that SFAS 131 ‘increased the number of reported segments and provided more disaggregated information. By increasing information disaggregation, the new standard induced firms to reveal previously “hidden” information about their diversification strategies. The newly revealed information affected market valuations and lead to changes in firm behavior consistent with improved monitoring following adoption of SFAS 131’. Therefore, we consider the SFAS 131 segment classification is the most appropriate for our analysis.

We obtain segment data from Compustat historical segment files, analyst forecast data from IBES summary statistics files[20], market data from CRSP, financial data from Compustat, and institutional ownership data from FactSet Lion Shares and Stock Ownership Summary files provided by Ferreira and Maros (2008). In data selection process, we follow Berger and Ofek (1995) and Matsumoto (2002). Standard & Poors assign each segment a primary (SICS1) and secondary (SICS2) code. We classify segment by SICS1, which is the prevalent description of segment (SICS2 represents sub operations). We eliminate segment information whose names ('snmns') do not appear on the main industry list (SIC)[21], adjust double entries, and remove segments ceasing operation during the year. The final sample covers 30,349 firm-year observations (19,057 single, 11,292 multi segment firms).

2.3.1. Excess Value (*EV*) construct

Since one of our research questions is whether the 'diversification' discount that multi segment firms suffer from is alleviated/exacerbated when multi segment firms meet/miss analysts' forecasts, we use the Excess Value (*EV*) concept introduced by Berger and Ofek (1995) to test the hypotheses *H4* and *H5.* Berger and Ofek (1995) use this construct in order to determine whether multi segment firms are traded at discount or premium comparing to single segment firms. It helps compare a multi segment firm's actual value (market plus debt) to the total value of its segments if

[20] We use actual IBES EPS and IBES analyst forecast EPS to measure whether a firm meets/misses analysts' forecasts. See also, Ramnath, Rock, Shane (2008) and Brown (2007) for studies that use IBES EPS when investigating analyst forecast accuracy, analyst forecast revisions, capital market reaction to earnings surprises published after 1990. According to IBES, reported EPS is entered into the database on the same basis as analyst forecasts, which by and large corresponds to core earnings but may be quite different from reported income. Hence, the IBES EPS is considered to be the closest match with analysts' forecast EPS. Note, it is possible that firms' meet/beat analysts' forecasts on a proforma basis; some managers may preannounce proforma earnings. They either report these adjusted numbers to better reflect core earnings, or may use these earnings adjustments to meet strategic earnings targets on a pro forma basis when they fall short based on GAAP reporting standards (see, Battacharya, Black, Christensen, and Mergenthaler, 2007; Black and Christensen, 2009). However, evidence suggests that 'investors appear to understand these trade-offs as they discount pro forma disclosures in the presence of higher levels of prior earnings management' (Black, Joo, and Schmardebeck, 2014). Similarly, Bradshaw and Sloan (2002, p.41) find that 'over the past 20 years there has been a dramatic increase in the frequency and magnitude of cases where "GAAP" and "Street" earnings differ, and that 'market response to Street earnings has displaced GAAP earnings as a primary determinant of stock prices'.

[21] We exclude segments whose names include words 'adjustment, elimination, correction, currency translation, miscellaneous, disposed, divested, sold, for sale, discontinued, liquidated, distributed, other, non/not/un allocated, non/not/un assigned, non/not/un classified, non/not/un distributed, non/not/un reported, non/not/un restructured, group, corporate, head office, administrative, central, consolidation, holding, management, parent, subsidiary, treasury, intercompany, (non)segment'.

those segments have been single independent firms. The construct is calculated as the natural logarithm (*ln*) of Actual Value (*V*) to the sum of Imputed Values (*IV*) for its segments as stand-alone entities;

$$EV = \ln\left(\frac{V}{IV}\right)$$

Where *EV* denotes the excess value, and *V* total capital (or Actual Value), which is equal to market value of equity (Compustat item PRCC_F, #199*Compustat item CSHO, #25) plus book value of debt (Compustat item DLTT, #9 + Compustat item DLC, #34 + Compustat item UPSTKC, #130). Imputed value (*IV*) is calculated as

$$IV = \sum_{i=1}^{n} AI * (Ind_i \frac{V}{AI})_{mf}$$

Where *n* denotes the number of segments, and *AI* the amount of accounting item (Sales, Assets, or EBIT) for each segment. The multiple $(Ind_i \frac{V}{AI})_{mf}$ is calculated for each segment using the corresponding median single segment firm (*mf)* in the same industry. Specifically, the median firm's total value is divided by the amount of its accounting item (*AI*). For more intuition, consider a multi segment firm with a segment operating in food industry with 100 CU sales. Consider also that in the same industry, there are five single segment firms operating independently, whose median firm with actual value of 150 CU has 90 CU sales. Then, the multiple will be *ln (150/90)* for sales, and multiplied by 100 CU. Repeating the same process for all segments *(n)*, and summing them up provides the *IV*. We calculate the multiple initially by using the narrowest SIC code (four-digit) requiring at least five single segment firms in the same industry. Otherwise we move to three-digit SIC code, and repeat the process until two digit SIC code if necessary.

The idea behind this method is that if the evaluation is similar for all projects, there should not be any difference between the value of a single segment firm operating stand alone and the value of a segment operating in a multi segment structure. If *EV≠0*, i.e., positive (negative) however, this will suggest that multi segment firm is traded at a premium (discount). Widely documented evidence indicates that multi segment firms are traded at a discount as we discuss earlier in the Literature Review.

We exclude segments operating in financial services (SICS1 codes 6000-6999), and keep only the firms having total sales at least $20 million. Since the sales are almost completely allocated among the reported segments (unlike assets and earnings), we keep only firms with sum of segment's sales within %1 of total sales of the firm. Further, if the sum of segments' Assets (EBIT) of a firm deviate from Total Assets (EBIT) by more than %25, we exclude the observation from all analyses requiring Asset (EBIT) multiples. If the deviation is within %25, we adjust the firm's imputed value. Specifically, the imputed value is grossed up or down by the percentage deviation between the sum of its segments' Assets (EBIT) and Total Assets (EBIT). Since a firm's actual value should not be negative, we replace negative EBIT multiplier imputed value with either EBITDA multiplier imputed value if it is positive, or with the asset multiplier imputed values. Finally, we exclude the 'extreme' excess values from the tests. 'Extreme' is defined as the *EV* above 1.386 or below -1.386, i.e., actual firm value is either more than four times imputed value or less than one-fourth imputed value. In the final step, all continuous variables are winsorised to 1% to 99%.

We have several reasons to use *EV* in our analysis. Firstly, *EV* captures the diversification discount (that multi segment firms may suffer from), and thus helps us robustly test for instance whether the diversification discount is alleviated when multi segment firms meet analysts' forecasts. Secondly, the variable also captures the implications of meeting forecasts on firm value over longer period (Kaznik and McNichols, 2002 show that investors condition the premium on firms meeting forecasts consistently over time. If there is a reward to meeting forecasts, it becomes greater as long as the firm continues meeting forecasts. Therefore, if meeting forecasts has any effect on diversification discount, it will be reflected on firm value over time. Fourthly, models testing a causality or correlation in shorter periods (e.g., event studies) are highly subject to omitted variables bias that can otherwise explain the phenomenon. Hence, traditional meeting/missing forecast literature mainly uses returns cumulated for at least three months, one, two and three years (e.g., Bartov, Givoly and Hayn, 2002; Kaznik and McNichols, 2002; Skinner and Sloan, 2002; Koh, Matsumoto, and Rajgopal, 2008). Finally, using a variable that captures longer term average helps us avoid from the temporary over/under valuation trap.

2.3.2. Descriptive statistics and correlations

Table 2.1 Panels A, B and C report the descriptive statistics for multi versus single segment firms for variables used in the tests (see variable definitions in Appendix).

Table 2.1 Panel A presents the descriptive statistics for meeting probability (*MEET*=1 if firm meets/exceeds analyst forecast, and zero otherwise), earnings management proxy (*POSAA*=1 if abnormal accruals are positive and zero otherwise), and forecast management proxy (*DOWN*=1 if unexpected analyst forecast is negative and zero otherwise). Results show no difference between two firm types regarding earnings/ forecast management activity if the sample is not conditioned on *MEET*, but if we condition the sample to *MEET=1*, observe less engagement in both activities by multi segment firms[22]. Differences are significant at %1. This observation lends initial support to *H1* multi segment firms exhibit less earnings/forecast management to meet analysts' forecasts. Panel B also shows that firms in general tend to engage more in earnings rather than forecasts management.

Table 2.1 Panel B reports the descriptive statistics for segment number (*NofSeg*), institutional ownership (*INS*), optimistic and pessimistic forecast errors ($|FE/P|^{op}$ and $|FE/P|^{pes}$ respectively. Panel B shows that mean segment number is 2.86 for years 1999-2014 and mean *MEET* %60 for single segment (%56 for multi segment) firms. The difference is significant at %1 level supporting *H3* (multi segment firms exhibit lower meeting probability than single segment firms). Untabulated analysis further reveals that having the segment number 4 or more is essentially the same regarding meeting incidences (%54.7). Our analysis also implies that when a firm becomes multi segment (operating in more than one industry), this is enough to make a business more complex (mean meeting probability is %60 for single segment firms, while it is %56 for firms with 2 segments). We also observe higher institutional ownership[23] for multi versus single segment firms suggesting greater monitoring. Panel B further reveals that multi segment firms exhibit higher optimistic but lower pessimistic forecast errors. Given the evidence that analysts

[22] We interpret this observation as multi segment firms engaging in earnings/forecast management for purposes other than meeting analysts' forecasts, see for the objectives of earnings management Burgstahler and Dichev (1997) and Healy and Wahlen (1999).

[23] Gompers and Metrick (1998) find that institutional ownership doubled between 1980 and 1996 presenting more than half the value of the U.S. market.

issue more optimistic forecasts in forecasting difficulty (Das et al 1998, Ke and Yu, 2006; Bradshaw et al 2014), this observation shows support to *H2* (multi segment firms exhibit more complex information environment)[24].

Table 2.1. Panel C reports the descriptive statistics for the Excess Value (*EV*) constructs based on three accounting items Sales, Assets, and EBIT, and shows that mean/median *EV* for multi segment firms are negative and significantly lower than single segment firms. Mean *EV* based on *Sales* (Assets and EBIT) is -8.6% (-9.8% and -9.8% respectively) for multi segment firms while it is -0.7% (-1.6% and -0.7%) for single segment firms. These observations suggest that multi segment firms are subject to 'diversification' discount consistent with Berger and Ofek (1995).

Table 2.2 sets out the correlation matrix with Pearson (Spearman) below (above) the diagonal, and shows that *MEET* is negatively correlated with segment indicator (*Segin* taking value of 1 if a firm has more than one segments, and zero otherwise). Table shows that *Segin* is positively correlated with absolute forecast error |*FE*| (consistent with *H2),* negatively correlated with *MEET* (consistent with *H3),* and positively correlated with institutional ownership (*INS),* while no correlation with *POSAA(DOWN)* suggesting no difference between the two firm types if not conditioned on *MEET*. Table 2.2 also shows that *Segin* is negatively correlated with *EV* constructs providing further evidence of diversification discount.

2.4. Empirical analysis

2.4.1. Testing the earnings/forecast management hypothesis

To test *H1* (multi segment firms exhibit less earnings/forecast management activity to meet analysts' forecasts relative to single segment firms), we run the logistic models[25] of *POSAA(DOWN)* from Matsumoto (2002) by incorporating the segment indicator and MEET variable onto the models in the following forms,

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[24] In the remaining tests, we do not separate forecast errors as optimistic and pessimistic. One reason is to be more conservative with respect to robustness of our results, and the second reason is to employ a relatively larger number of observations in the tests.

[25] **Logistic regression**: If an output variable (*Y*) is discrete or binary, then the estimated output is like a probability between 0 and 1. Hence, we use logit regression to model the conditional probabilities as a function of covariates (i.e., conditional distributions of output given the input

$$Prob(POSAA = 1) = F(\beta_0 + \beta_1 Segin_i + \beta_2 MEET_i + \beta_3 Segin * MEET_i + \delta_i X_i + \varepsilon_i \quad (1A)$$

$$Prob(DOWN = 1) = F(\beta_0 + \beta_1 Segin_i + \beta_2 MEET_i + \beta_3 Segin * MEET_i + \delta_i X_i + \varepsilon_i \quad (1B)$$

Where $F(\beta' X) = e^{\beta' X} / 1 + e^{\beta' X}$

Where *POSAA=1* (earnings management proxy) if abnormal accruals are positive, and *DOWN=1* (forecast management or forecast guidance proxy) if unexpected earnings forecast is negative, *MEET=1* if actual earnings meet or exceed consensus analysts' earnings forecasts, and *Segin*[26]*=1* if the firms is multi segment, and zero otherwise. Vector *X* denotes controls, which are institutional ownership (*INS)*, reliance of implicit claims with stakeholders (*ICLAIM*), prior period losses (LOSS) to measure the value relevance of earnings for the firm, value relevance of earnings for industry (*EARNRET*), growth opportunity (*LogB/P*), litigation risk of the industry (*LIT*), positive changes in seasonal earnings to control for shocks to earnings (*POSUE*), firm size (*LogMV*), four-quarter average US growth rate (*GDP)* to control for macroeconomic shocks, and absolute forecast errors |*FE*| to control for uncertainty in forecast environment (see Appendix B for variable definitions).

The coefficient on *MEET* measures the average probability of *POSAA(DOWN)* activity for single segment firms when they meet analysts' earnings forecasts, while the coefficient on the interaction term *(Segin*MEET)* measures the average incremental probability of *POSAA(DOWN)* activity for multi -relative to single segment firms when they meet analysts' forecasts. We predict positive significant coefficients on *MEET* and negative significant coefficients on the interaction terms and the differences should be significant for *H1* to hold.

Table 2.3 reports the results for Equations (1A and 1B), confirming our predictions, shows significant negative coefficient on *Segin*MEET* and positive coefficient on

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variables). Logit model estimates the probabilities by maximum likelihood (*MLE*). Note that the estimated conditional probability is the sum of the left-hand side of the model, not the sum of coefficients, therefore we also report marginal effects.

[26] In the robustness tests, we also use number of segments, *NofSeg* (1, 2, 3, .., N) as an alternative segment indicator in all the tests that use *Segin*.

MEET indicating that multi segment firms exhibit less *POSAA(DOWN)* to meet analysts' forecasts confirming *H1*. Marginal effects [27] that are analogous to the slope coefficient in OLS regressions confirm the results (the probability of engaging in earnings/forecast management activity to meet forecasts is lower by %13.5 and %14.2 respectively for multi segment firms).

To complement findings in Table 2.3, we next run the meeting model using *POSAA (DOWN)* as independent and *MEET* dependent variables, reversing Equation (1). We use seemingly unrelated estimation (SUEST) by fitting the following logistic model from Matsumoto (2002), run the model for multi (*Segin=1)* and single segment firms (*Segin=0),* and observe the difference in corresponding coefficients,

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 POSAA_i + \beta_2 DOWN_i + \delta_i X_i + \varepsilon_i) \qquad (2)$$

$$\text{Where } F(\beta' X) = e^{\beta' X}/1 + e^{\beta' X}$$

The coefficients on *POSAA* and *DOWN* measure the average effects of earnings /forecast management activity on meeting probability. Hypothesis 1 (*H1)* requires that the coefficients on *POSAA(DOWN)* are smaller in magnitude for multi segment firms than the corresponding coefficients for single segment firms

Table 2.4 presents the results for Equation (2), and confirming *H1*, shows that the coefficients on *POSAA(DOWN)* are both smaller for multi- than for the single-segment firms (0.014<0.099 and 0.428<0.567). Moreover, the coefficient on *POSAA* is statistically zero for multi segment firms while it is positive for single segment firms indicating that multi segment firms do not engage in earnings management to meet forecasts as opposed to single segment firms. Marginal effects confirm the findings (*DOWN* has 13% effect on MEET for single- but 10% effect for multi segment firms, while *POSAA* has 3.3% effect on MEET for single-, but zero effect for multi-segment firms). This test is particularly important because it shows that multi segment firms do not engage in earnings management as opposed to single segment firms, which we cannot obtain using Equations (1A and 1B).

[27] In logistic model, **marginal effects at the means** are analogous to the slope coefficient in OLS regressions. With binary independent variables (e.g. *POSAA*) marginal effect measures the discrete change, i.e. how *MEET (*predicted probability) changes as the *POSAA* changes from 0 to 1, while marginal effect for continuous variable (e.g. *INS)* measures the instantaneous rate of change.

Table 2.4 also shows that the coefficients on *POSAA* are smaller than *DOWN* for both firm types indicating that firms in general engage less in earnings than forecast management consistent with Matsumoto (2002) and Athanasakou et al (2009).

In sum, the results in Tables 2.3 and 2.4 reveal statistically significant differences between single- and multi-segment firms with respect to how variable *POSAA (DOWN)* affects the meeting probability, and confirm *H1*.

2.4.2. Testing the information environment hypothesis

To test *H2* (multi segment firms exhibit more complex information environment than single segment firms, and this reduces their meeting forecast probability), we employ two complementing approaches; (i) we regress the segment indicator on information asymmetry proxies to detect whether multi segment firms exhibit more complex information environment than single segment firms, (ii) we generate a factor score using principal component analysis (PCA) by reducing the information asymmetry proxies into a single variable, and run the meeting probability model on this factor score, segment indicator and their interactions to detect whether multi segment firms' information environment reduces their meeting forecast probability. Firstly, to test whether multi segment firms exhibit more complex information environment, we regress the segment indicator on widely used six information asymmetry proxies[28] as follows,

$$Segin_i = \beta_0 + \beta_1 CL_i + \beta_2 LogVol_i + \beta_3 Spread_i + \beta_4 AbDisaac_i$$
$$+\beta_5 StWacc_i + \beta_3 FE_i + \varepsilon_i \qquad (3)$$

Where *CL* denotes the receipt of comment letter from the SEC[29], *LogVol* log of trading volume, *Spread* bid-ask spread, *AbDisaac* absolute sum of three-year

[28] Studies use various measures for information asymmetry (see McNichols, 2002; Francis, LaFond, Olsson, and Schipper 2005; Brown, Hillegeist, and Lo, 2009; Khan and Watts, 2009; Gietzmann and Isidro, 2013) most of them endogenously correlated providing similar outcome. Hence, for practical reasons and for the purpose of our analysis, we limit the numbers to six.
[29] The Sarbanes-Oxley Act of 2002 requires the Securities and Exchange Commission (SEC) to review firms' filings (10Q, 10K, etc.) submitted to them at least once every three year. The stated objective of the review is to identify potential or actual accounting, auditing, financial reporting and disclosure deficiencies (main goal is to improve the quality of corporate information environment). If a review identifies deficiency in a firm's financial report, the SEC sends a comment letter to the reviewed firm seeking clarification or if necessary revision of the filing. The SEC started publishing these correspondences on its website since 2005 (we obtain data from Audit Analytics Edgar Files).

abnormal accruals (for years -1, 0, +1), *StWacc* standard deviation of working capital residuals obtained from the typical accrual model[30], and *FE* initial analyst forecast errors. If multi segment firm have more complex information environment, then segment indicator should not be orthogonal to these variables. Specifically, we expect information asymmetry to be positively correlated with segment indicator.

Table 2.5 reports the results for Equation (3), and shows that information asymmetry proxies are positively correlated with *Segin* in both univariate and multivariate setting (coefficients are significant at %1 level). Multi segment firms receive more comment letters from the SEC, exhibit higher bid-ask spreads in share prices, higher discretionary accruals, higher trading volume[31], greater standard deviation in working capital accruals and higher initial forecast errors.

Secondly, we test whether multi segment firms' information environment reduces their meeting forecast probability by generating a factor score using principal component analysis (PCA), which we reduce six information asymmetry proxies into a single variable retaining factors with eigenvalues greater than one[32]. We then run the meeting probability model on this factor score, segment indicator and their interactions by fitting the following model,

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 Segin_i + \beta_2 InfPCA_i + \beta_1 Segin * InfPCA_i$$
$$+\delta_i X_t + \varepsilon_i) \quad (4)$$

Where *InfPCA* denotes the factor score for six information asymmetry proxies, and *X* the vector of control variables as defined in Equation (1) (see Appendix B for variable definitions). The coefficient on *InfPCA* measures the average effect of information asymmetry on meeting probability for single segment firms, while the

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30 Standard deviation of working capital accrual residuals are obtained from the typical accrual model (see McNichols, 2002; Francis, LaFond, Olsson, and Schipper 2005)

$$\Delta WC_t = \propto_0 + \alpha_1 CF_{t-1} + \alpha_2 CF_{t1} + \alpha_3 CF_{t+1} + \alpha_4 \Delta REV_t + \alpha_5 PPE_t + \varepsilon_t$$

where ΔWC is change in working capital (the change in current assets - the change in current liabilities - the change in cash + the change in short-term debt), CF cash flows from operations, ΔREV change in revenues, and PPE property plant and equipment.

31 Investor Recognition Hypothesis (Merton, 1987) assumes that additional attention from the press, markets etc. leads to increased trading volume by uninformed investors. If information asymmetry is higher, then trading volume is also likely to be higher.

32 We also perform communality tests examining the correlation between the common factor and the individual variables, and collinearity diagnostics replacing the factor score with individual variables in the final model to ensure the factor score represents all six.

coefficient on $Segin * InfPCA$ measures the average incremental effect of information asymmetry for multi segment firms. We predict significant negative coefficient on $Segin * InfPCA$

Table 2.6 reports the results for Equation (4), and confirming our prediction, shows significantly negative coefficient on $Segin *$ Table 2.8 reports results$InfPCA$ and the difference between the coefficients on *InfPCA* and $Segin * InfPCA$ is significant at %1 indicating that information environment of multi segment firms reduces their probability of meeting analysts' forecasts relative to single segment firms.

Overall, the results from Tables 2.5 and 2.6 confirm *H2* that multi segment firms exhibit more complex information environment than single segment firms, and this reduces their meeting forecast probability.

2.4.3. Multi segmentation and meeting probability

To test *H3* (multi segment firms exhibit lower probability of meeting analysts' forecasts than single segment firms), we run Equation (3) with only the segment indicator and control variables in the following form.

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 Segin_i + \delta_i X_i + \varepsilon_i) \quad (5)$$

Where $F(\beta' X) = e^{\beta' X}/1 + e^{\beta' X}$

Control variables are as defined in Equation (1) (see Appendix B for variable definitions). To mitigate the concerns that the model in Equation (5) might suffer from multicollinearity bias[33] between the *Segin* and controls, we also employ a two stage least square (2SLS) approach. In the first stage, we estimate a new segment indicator *Seginhat* by using natural log of number of shares as an instrument, and in the second stage, we re-estimate Equation (5) by replacing *Segin* with *Seginhat*.

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[33] In a multiple regression, if two or more predictors are highly correlated, **multicollinearity** (or collinearity) arises, meaning that one predictor is also linearly predicted by others with a high degree of accuracy, while in a perfect y=a+bX, we assume independent variables are not perfect linear functions of each other [Cov (x1, x2)=0]. Multicollinearity does not violate Gauss-Markow main assumptions (zero expected error, exogenous independent variables, correct specification), but results in larger standard errors, smaller *t-stats*, and unstable coefficient estimates, which can change erratically in response to small changes in the data or the model. Our untabulated tests show that most of the covariates are highly correlated with *Segin*.

We consider the *number of shares* to be a suitable instrument since it is unlikely related to meeting probability (affects neither forecast accuracy nor meeting ability), while it should theoretically be higher for multi segment firms (multi segmentation results from investing in new industries or acquiring other firms that would require new share issuances at some point, hence the outstanding number of shares of multi- is likely to be higher than for the single- segment firms on average). We assume that *Segin* captures the hypothesised negative effects of earnings/ forecast management and more complex information environment on meeting probability. Therefore, the we predict the coefficient on *Segin* (*Seginhat*) is negative and significant *(H3)*.

Table 2.7 presents the results for Equation (5) performed with both *Segin* and *Seginhat*. Tests with both variables confirm our prediction that multi segmentation is negatively associated with meeting probability. The coefficient on *Segin* is -0.8% significant at the1% with the marginal effect of -1.8% on *MEET*. The test using *Seginhat* shows larger negative coefficient and greater marginal effect (-12%). This is relatively higher marginal effect given the effects of other variables. For instance, the marginal effect on *MEET* of moving from the first to the third quartile of INS is 3.3% [(0.871 – 0.465)*0.078], see Table 2.1 for the quartile values].

Overall, the results in Table 2.7 confirm hypothesis *H3:* multi segment firms exhibit lower probability of meeting analysts' forecasts than single segment firms.

2.4.4. Diversification discount and meeting/missing analysts' forecasts

To test *H4* (the 'diversification' discount that multi segment firms suffer from is not alleviated when multi segment firms meet/miss analysts' forecasts), we use the 'Excess Value (*EV*)' model by Berger and Ofek (1995) in the following forms. We repeat the tests for three different *EV* constructs that are based on Sales, Assets and EBIT. *EV* represents the log of actual value to imputed value (detailed in section 2.3.1). The approach is widely used by prior research testing the effects of multi segmentation on firm value.

$$Ev_{ji} = \beta_0 + \beta_1 Segin_{ji} + \beta_2 Meet_i + \beta_3 Meet * Segin_i + \varphi_i X_i + \varepsilon_i \quad (6A)$$

$$Discount_{ji} = \beta_0 + \beta_1 Segin_{ji} + \beta_2 Meet_i + \beta_3 Meet * Segin_i + \varphi_i X_t + \varepsilon_i \quad (6B)$$

Where *Discount* denotes the negative excess values, i.e., *EV<0*, *X* is the vector of controls that Berger and Ofek (1995) employ, which are firm size (*Logof assets)*, profitability (*Ebit to sale)*, and growth opportunity (*Capex to sale)* (see Appendix B for variable definitions). The coefficient on *Segin* measures the average *EV(Discount)* for multi segment firms that we expect to be significantly negative for both Equations implying the existence of diversification discount (e.g., discount that is negative will get larger in multi segmentation). The coefficient on *MEET* measures the average *EV (Discount)* when single segment firms meet analysts' forecasts that we expect to be significantly positive implying premium. Finally, the coefficient on interaction term measures the average incremental *EV(Discount)* for multi segment firms that meet analysts' forecasts, which we expect to be insignificant or negative implying that meeting forecast does not lead to premium or reduce diversification discount.

Table 2.8 reports results for Equations (6A) and (6B), and confirming *H4,* shows either insignificant or negative coefficients on $Meet * Segin$ for all three *EV or (Discount)* constructs based on different accounting items (Sales, Assets, EBIT). These observations indicate that meeting analysts' earnings forecasts does not reduce the diversification discount associated with multi segmentation, nor does it lead to a premium. In other words, multi segment firms do not benefit from meeting/ exceeding analysts' forecasts. Table 2.8 also shows that the coefficients on *MEET* is positive (significant at the 1% level in 5 out of 6 models) implying premium for single segment firms meeting analysts' forecasts, while the coefficients on *Segin* are negative (significant at the 1% level in 5 out of 6 models) implying diversification discount, consistent with Berger and Ofek (1995), who show that multi segment firms are traded at a discount.

In sum, the results in Table 2.8 confirm hypothesis *H4:* The diversification discount that multi segment firms seem to suffer from is not alleviated when multi segment firms meet analysts' earnings forecasts.

2.4.5. The effect of earnings/forecast management on excess value *(EV)*

To test *H5* (multi segment firms experience further discount if they meet analysts' forecasts by engaging in earnings and/or forecast management activities), we run

Equation (6A) separately for cases in which *POSAA(DOWN)* equals 1/0[34] with two excess value constructs based on Sales and Assets. We predict negative and significant coefficients on $Meet * Segin$ for *POSAA(DOWN)*=1 cases (earnings/ forecast management is engaged) if *H5* is to hold.

Table 2.9 reports the results for Equation (6A) for *POSAA(DOWN)*=1/0 cases, and confirming *H5*, shows that the coefficients on the interaction term for *POSAA (DOWN)*=1 cases are negative (significant at the 1% level), indicating that investors *incrementally* discount multi segment firms if they engage in earning/forecast management activity in order to meet analysts' forecasts. Table 2.9 also show that the coefficients on interaction term are insignificant for *POSAA(DOWN)*=0 cases (earnings/forecast management is not engaged), further confirming *H4* that diversification discount is not alleviated when multi segment firms meet/miss analysts' earnings forecasts. However, the coefficients on *MEET* are positive (and significant at the 1% level) in all specifications implying that meeting forecasts leads to significant premium for single segment firms regardless of whether these firms engage in earnings/forecasts management activities or not. These findings are also indicative of weaker investors' reaction to meeting forecasts by multi- relative to single segment firms.

In sum, the results in Table 2.9 confirm hypothesis *H5:* Multi segment firms experience further discount if they meet analysts' forecasts by engaging in earnings and/or forecast management activities

2.5. Sensitivity analyses

2.5.1. Testing H4 and H5 by stock returns instead of excess value *(EV)*

Our first sensitivity test focuses on using stock returns instead of *EV* to examine whether *H4* and *H5* hold by an alternative variable measuring the investor response to meeting/missing forecast phenomenon. We use cumulative one year market adjusted future stock returns following Kaznik and McNichols (2002), which

[34] e.g. $Ev_{ji} = \beta_0 + \beta_1 Segin_{ji} + \beta_2 Meet_i + \beta_3 Meet * Segin_i + \varphi_i X_i + \varepsilon_i$ if *POSAA*=1
$Ev_{ji} = \beta_0 + \beta_1 Segin_{ji} + \beta_2 Meet_i + \beta_3 Meet * Segin_i + \varphi_i X_i + \varepsilon_i$ if *POSAA*=0

captures the cumulative changes in firm value within a year, hence best corresponds to our annual EV construct.

$$Ret_{ji+1} = \beta_0 + \beta_1 Segin_{ji} + \beta_2 Meet_i + \beta_3 Meet * Segin_i + \varphi_i X_i + \varepsilon_i \quad (7)$$

Where *Ret* denotes market-adjusted returns calculated as buy and hold stock return cumulated over the 12 months prior to year t's earnings announcement minus the return on the *CRSP* value-weighted (including dividends) index cumulated over the same period. *X* is the vector of control variables used in Equations (6A) and (6B). We additionally employ absolute forecast errors following Kaznik and McNichols (2002) to measure the information in current year earnings. The coefficient on *MEET* measures the average annual *Return* when single segment firms meet analyst forecast that we expect to be significantly positive, and the coefficient on interaction term measures the average incremental *Return* for multi segment firms that meet analysts' forecasts, which we expect to be insignificant or negative, i.e., meeting forecast does not lead to premium or mitigate the diversification discount.

Table 2.10 reports results for Equation (7), and confirms both *H4* and *H5*. The results are very similar to the results reported in Tables 1.8 and 1.9. We observe negative coefficients on $Meet * Segin$ for *POSAA(DOWN)*=1 cases (markets incrementally discount multi segment firms if they meet forecasts using earning/ forecast management), while the coefficients on $Meet * Segin$ are insignificant for *POSAA (DOWN)*=0 cases (meeting forecasts results in significant premium for single segment firms).

2.5.2. The effect of institutional ownership on *POSAA(DOWN)*

Tables 2.1 and 2.2 report higher institutional ownership for multi -relative to single segment firms, and we interpret this as a sign of closer monitoring. Theory assigns an important role to institutional investors for market efficiency; They are assumed to be better information gatherers/processors, have more economical resources, price stocks more efficiently, and perform more effective monitoring (e.g., Merton 1987; Diamond and Verrecchia 1991; Easley, Hvidkjaer and O'Hara, 2002).

Given that higher agency concerns trigger closer monitoring (e.g., Jensen and Meckling, 1976; Brennan and Thakor, 1990; Carleton, Nelson, and Weisbach, 1998; Gillan and Starks, 2000; Hunton, Mauldin, Wheeler, 2008), we argue that higher institutional ownership will imply higher monitoring and less earnings/ forecast management to meet forecast. Therefore, we also test whether earnings/ forecast management activities are at a relatively lower extent when firms meet analysts' earnings forecasts under higher institutional ownership. We employ the following logistic models,

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 INS\%_i + \beta_2 POSAA_i + \beta_3 INS\% * POSAA_i + \delta_i X_i + \varepsilon_i \quad (8A)$$

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 INS\%_i + \beta_2 DOWN_i + \beta_3 INS\% * DOWN_i + \delta_i X_i + \varepsilon_i \quad (8B)$$

INS% denotes the percentage of institutional ownership, and *X* the control variables as defined in Equation (1) (see Appendix B for variable definitions). The coefficient on *POSAA(DOWN)* measures the average effect of earnings/forecast management on meeting probability regardless of institutional ownership, while the coefficient on interaction terms measure the average incremental effect of *POSAA (DOWN)* on meeting probability as the institutional ownership percentage changes. We predict negative coefficients on the interaction terms.

Table 2.11 reports results for Equation (8A) and (8B), and confirming our prediction, shows significant negative coefficients on the interaction terms, which indicates that as institutional ownership increases, the probability of meeting forecasts via earnings/forecast management decreases. In other words, firm with higher (lower) institutional ownership engage less (more) *POSAA* and *DOWN* to meet analysts' forecasts, consistent with Chung et al (2002), who show that the existence of institutional investors discourages managers from opportunistic earnings management activities.

2.5.3. Using POSAA(DOWN) as dependent variables in testing the *H1*

To provide further robustness to the findings reported in Tables 2.3 and 2.4 that confirm *H1:* multi segment firms exhibit less earnings/forecast management to meet analyst forecast relative to single segment firms, we also run meeting models for *POSAA* and *DOWN* separately (in case using *POSAA* and *DOWN* together in

Equation 2 affects the coefficients of each other). Note that a firm may engage in only forecast (earnings) management if it finds easier to meet the forecast, which mechanically indicates less use of earnings (forecast) management, but it may not be associated with segmentation. The following models attempt to distinguish the segmentation effect with POSAA and DOWN separately.

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 Segin_i + \beta_2 POSAA_i + \beta_3 Segin * POSAA_i + \delta_i X_i + \varepsilon_i \quad (9A)$$

$$Prob(MEET = 1) = F(\beta_0 + \beta_1 Segin_i + \beta_2 DOWN_i + \beta_3 Segin * DOWN_i + \delta_i X_i + \varepsilon_i \quad (9B)$$

The coefficients on *POSAA(DOWN)* measure the average effects of earnings/ forecast management activity on meeting probability for single segment firms, while the coefficient on *Segin* measures the average effect of multi segmentation on meeting probability (excluding the incremental effect), and the coefficients on interaction variables measure the average incremental effect on meeting probability for multi segment firms engaging in earnings/forecast management. We predict negative coefficients on the interaction terms but positive coefficient on *POSAA (DOWN)* to be consistent with Tables 2.3 and 2.4, which will indicate that meeting probability is lower (or does not increase) for multi -relative to single segment firms with earnings/forecast management.

Table 2.12 reports the results for Equations (9A) and (9B), and in line with our prediction shows negative coefficients on *Segin*POSAA (Segin*DOWN)* while the coefficients on *POSAA(DOWN)* are positive, that shows greater probability of meeting forecasts for single segment firms carrying out earnings/forecast management. Marginal effects are 3.3% for *POSAA* and 9.9% for *DOWN* in single segment setting, but -3.1% for *POSAA* and -2.4% for *DOWN* in multi segment setting. These results (together with the results in Tables 2.3 and 2.4) confirm *H1* that multi segment firms exhibit no (less) less earnings (forecast) management to meet analysts' forecasts relative to single segment firms. Note, these results show that multi segment firms engage in such activities, but mainly for other purposes rather than meeting forecasts.

2.5.4. Using the segment number (*NofSeg*) instead of *Segin*

We also perform tests with the number of segment (*NofSeg*) that use segment indicator, *Segin*, and obtain categorically the same results. Table 1.13 reports the results of one of these tests, namely, for Equation (5). Table 1.13 shows significant negative coefficient on segment indicator *NofSeg* as in Table 1.7 on *Segin*.

2.6. Conclusion

In this paper, we investigate whether multi segmentation affects the probability of meeting analysts' forecasts, and whether the 'diversification' discount that is alleviated/exacerbated when multi segment firms meet/miss analysts' forecasts.

We argue and find that higher agency concerns inducing higher monitoring in multi segment firms discourage earnings/forecast management activities to meet forecasts, and also more complex information environment leads to greater forecast bias making forecasts harder to meet, both leading to lower probability of meeting analysts' forecasts for multi segment firms.

We also argue and find that the diversification discount that multi segment firms appear to suffer from is not mitigated by meeting analysts' forecasts (missing also does not cause extra discount). However, single segment firms experience significant premium/discount when they meet/miss forecasts. We also find that multi segment firms in fact experience incremental discount if they use earnings/forecast management to meet forecasts. This implies that there are significant costs for multi segment firms from engaging in such activities. These results overall show that investors give weaker reaction to meeting/missing forecast in multi segment firm setting. This further implies that multi segment firms have also mutually weaker incentives to engage in upwards earnings management (by manipulating accruals) and/or guiding analysts' forecasts downwards to meet forecasts since the costs of such activities seem to be significantly higher.

Appendix B

<u>Variable Definitions</u>

MEET	A binary variable taking the value of 1 if actual earnings meet or exceed the outstanding/last consensus analyst forecast at the earnings announcement date, and zero otherwise.
Segin	A binary variable segment taking the value 1 if the firm is multi segment, and 0 otherwise.
NofSeg	denotes the number of segments (1, 2, 3, ….., N). Maximum segment number is 14 in our analysis between 1999 and 2014.
%INS	Quarterly percentage of institutional ownership obtained from FactSet Lion Shares and Stock Ownership Summary files provided by Ferreira and Maros (2008)
ICLAIM	Reliance on implicit claims with stakeholders, ICLAIM is a factor score from principal component analysis (PCA) reducing three variables (DUR, R&D and LABOUR) into a single variable retaining factors with eigenvalues greater than 1. DUR is a dichotomous variable taking 1 if the firm is in a member of a durable goods industry (SICs 1500-1799, 2450-2599, 2830-3010, 3240-999) and zero otherwise. R&D is research and development expenditures deflated by total assets (quarterly Compustat items XRDQ, #4 / ATQ, #44, and annually Compustat item XRD, #46), and LABOUR denotes labour intensity, [1-gross property plant, equipment / (accumulated depreciation, amortisation + gross assets)], i.e., [1-Compustat item PPEGTQ, #118 / (Compustat item ACTQ, #41+Compustat item ATQ, #44). We assume as in Matsumoto (2002) that a single construct proxy to three factors. We also perform commonality estimates/correlation tests and collinearity diagnostics on the final model (i.e., replacing ICLAIM with DUR, RD, and LABOR) to ensure that the single variable represents all three.
LOSS	A measure of value relevance of earnings for firms , which takes 1, if a firm reports losses before extraordinary items (Compustat item IBQ, #8) in each of the last four quarters (q-1 to q-5).
EARNRET	A measure of value relevance of earnings for industry (to capture the industry-specific differences in the value-relevance of earnings), which is the annual decile rank of industry-year R^2 of the value relevance regression, $$Ret_q = \gamma_o + \gamma_1 \Delta EPS_q + \varepsilon_q,$$ where *Ret* denotes size adjusted excess returns accumulated for the coming 12 months from the month end in which quarter q-4 earnings are announced, ΔEPS seasonal change (q versus q-4) in earnings (Compustat item IBQ, #8) scaled by the price per share at q-4 end.

	Regressions are run by industry-year using the narrowest (four digit) SIC code with at least 10 firm-quarter in the same industry each year. Due to potential measurement errors, we use yearly decile ranks of the industry's R^2
LogB/P	Represents growth opportunity, calculated as book value over market value of equity at time *t* where market value is calculated as the share price (Compustat item PRCC_F, #199) multiplied by the common shares outstanding (Compustat item CSHO, #25) and book value is the Common ordinary equity total (Compustat Item CEQ, #60). B/P is widely used to proxy growth prospects (e.g., Koh, Matsumoto, and Rajgopal, 2008)
LIT	A binary variable taking the value of 1 if the firm is in a member of high litigation risk industries (SIC 2833-2836, 3570-3577, 7370-7374, 3600-3674, 5200-5961) and zero otherwise.
POSUE	Positive change in seasonal earning (q-q4). It controls for contemporaneous unexpected firm level changes in earnings, and takes the value 1 if the change is positive, and zero otherwise (Compustat item IBQ #8)
GDP	Four-quarter average annual US growth rate. It controls for the contemporaneous macroeconomic shocks on earnings. Matsumoto (2002) uses industrial level production growth, but, since multi segment firms operate in various industries, we use overall GDP.
LOGMV	Natural log of market value (Compustat items PRCC_F, #199 multiplied by common shares outstanding (CSHO, #25).
|FE|	Controls for the uncertainty in firm level forecasting environment, which is the absolute value of first consensus EPS forecast (after announcement of year t-1 EPS) minus year *t* actual EPS deflated by price at the end of year *t-1*).
LogAssets	Natural log of total assets (Compustat item AT, #6),
EBIT/Sale	Annual earnings before interest and taxes to total sales (Compustat EBIT / SALE, #12)
Capex/Sale	Annual capital expenditures to total sales (Compustat items CAPX, #128 / SALE, #12) respectively.

Earnings management proxy (positive abnormal accruals-POSAA):

To estimate upwards earnings management proxy (POSAA), we use the modified Jones (1991) model described in Dechow, Sloan, and Sweeney (1995) adapted for quarterly data.

$$TA_{ijtq}/A_{ijtq-1} = \alpha_{jt}\left[1/A_{ijtq-1}\right] + \beta_{1jt}\left[\Delta REV_{ijtq}/A_{ijtq-1}\right]$$
$$+\beta_{2jt}\left[PPE_{ijtq}/A_{ijtq-1}\right] + \beta_{3jt}QTR4_{ijtq} + \varepsilon_{ijtq}$$

Where TA is total accruals, defined as Δcurrent assets - Δcurrent liabilities - Δcash + Δshort-term debt– depreciation [i.e., Compustat items ΔACTQ, #40 - ΔLCTQ, #49 - ΔCHEQ, #36 + ΔDLCQ, #45 –DPQ, #77], A is total assets (Compustat item ATQ, #44), ΔREV is change in revenues (Compustat item REVTQ, #42), PPE is gross property plant and equipment (Compustat item PPEGTQ, #118) for firm i in two-digit SIC code j in quarter q of year t, and QTR4 is 1 if quarter is the fourth fiscal quarter, and 0 otherwise (since accruals in the fourth quarter might differ from accruals of previous quarters). We estimate the model each year for the same two-digit SIC code for all firms after winsorising data to %0.5 to %99.5 and requiring at least 10 observations for a firm in a year for each industry. We then apply the estimated parameters to actual values by each firm-quarter to obtain the firm specific abnormal accruals adjusting for the change in receivables through the following model.

$$AbACCR = TA_{ijtq}/A_{ijtq-1} - (\hat{\alpha}_{jt} + \hat{\beta}_{1ijt}\left[\Delta REV_{ijtq} - \Delta REC_{ijtq}/A_{ijtq-1}\right] + \hat{\beta}_{2ijt}\left[PPE_{ijtq}/A_{ijtq-1}\right] + \hat{\beta}_{3ijt}QTR4_{ijtq})$$

Where ΔREC is the change in account receivables (Compustat item RECTQ, #37) for firm i in two-digit SIC code j in quarter q of year *t*. The difference between the total actual accruals and the estimated accruals represents abnormal accruals. We take this as the discretionary part of total accruals, and classify it POSAA=1 if the difference is positive to proxy upward earnings management, and zero otherwise.

Forecast management proxy (DOWN or Negative abnormal forecast)

To estimate forecast management proxy, we use Matsumoto (2002) model which follows similar steps in the earnings management methodology. She first estimates the expected portion of analysts' forecasts by modelling the seasonal change in EPS as a function of the prior quarter's seasonal change in EPS and returns cumulated over the current year:

$$\Delta EPS_{ijtq}/P_{ijtq-4} = \alpha_{jt} + \beta_{1jt}\left[\Delta EPS_{ijtq-1}/P_{ijtq-5}\right] + \beta_{2jt}CRET_{ijtq} + \varepsilon_{ijtq}$$

Where ΔEPS is seasonal change (q – q-4) in actual earnings per share in IBES files for firm i in four-digit SIC code j in quarter q of year t, P is price per share, and CRET is the excess monthly returns accumulated for the coming 12 months from the month end in which the quarter q-4 earnings are announced. Matsumoto includes CRET to capture the additional value-relevant information that an analyst can use to forecast earnings. The model parameters are estimated each year for the same four-digit SIC code for all firms after winsorising data to %0.5 to %99.5, requiring at least 10 quarter observations for a firm in a year for each industry. The model has average %33 adjusted R^2 for over 174,000 firm-quarter observations. We then apply the estimated parameters with one lag to actual values (so that analysts could have obtained when forecasting EPS) by each firm-quarter in order to determine the expected change in actual EPS as the following.

$$E[\Delta EPS_{ijtq}] = [\hat{\alpha}_{jt-1} + \hat{\beta}_{1jt-1}(\Delta EPS_{ijtq-1}/P_{ijtq-5}) + \hat{\beta}_{2jt-1}CRET_{ijtq}] * P_{ijtq-4}$$

After adding the expected change in EPS to q-4 actual EPS (to obtain the expected EPS of quarter q), and subtracting this from the analyst' consensus earnings forecast, we obtain the unexpected portion of analyst forecast.

$$UEF_{ijtq} = F_{ijtq} - E[F_{ijtq}](= EPS_{ijtq-4} + E[\Delta EPS_{ijtq}])$$

If *UEF* is negative (i.e., if forecast EPS is below the expected EPS), it is considered as the evidence of downwards forecast management, and defined as DOWN=1, and 0 otherwise.

This guidance proxy has been widely used by previous research (e.g.; Matsumoto, 2002; Burgstahler and Eames, 2006; Koh, Matsumoto, and Rajgopal, 2008; Athanasakou, Strong and Walker, 2009). The model allows for the possibility that managers provide long-term guidance that affects the quarter's initial forecast. An alternative to forecast guidance is the forecast revision by Bartov, Givoly and Hayn (2002). However, using forecast revisions to identify firms that manage analysts' forecasts downward assumes that the initial forecast is unbiased. 'If managers give downward biased guidance two or three quarters out, then in subsequent quarters, the initial forecast would not need to be managed downward (because it is already biased downward)'. The Matsumoto 2002 proxy does not assume that the first forecast is unbiased. The cost of using this model however is that the more onerous data requirements result in a smaller sample size (See, Koh, Matsumoto, and Rajgopal, 2008).

We assume that bad news is more frequently preannounced than good news (see, Sloan 1994, 1997; Soffer, Thiarajagan, and Walther, 2000; Skinner and Sloan 2002), i.e., analysts are guided downwards more frequently when the news is negative, thus we assume that analysts unexpected pessimism is mainly due to managerial guidance. Given that firms preannouncing negative news becomes more frequent after the Regulation FD (2002) according to the anecdotal evidence, we consider the *DOWN* variable appropriately captures the managerial guidance of analysts' forecasts after controlling for the possible shocks on analysts' forecasts such as the macroeconomic shocks, seasonal changes in quarterly earnings, etc. following Matsumoto (2002).

Table 2.1

Descriptive statistics (Single vs Multi Segment firms) during 1999-2014

PANEL A: Descriptive statistics for POSAA(DOWN) by MEET=0/1

	Single Segment Firms					Multi Segment Firms					Mean
	mean	Medn.	Std.Dv.	25%	75%	mean	Medn.	Std.Dv.	25%	75%	Difference
POSAA (%)	0.614	1.000	0.487	0.000	1.000	0.612	1.000	0.480	0.000	1.000	-0.002
DOWN (%)	0.536	1.000	0.499	0.000	1.000	0.527	1.000	0.482	0.000	1.000	-0.009
Meet=1											
POSAA (%)	0.636	1.000	0.481	0.000	1.000	0.605	1.000	0.489	0.000	1.000	-0.031 ***
DOWN (%)	0.581	1.000	0.468	0.000	1.000	0.561	1.000	0.475	0.000	1.000	-0.020 ***

PANEL B: Descriptive statistics for MEET, INS and FE, MV

	Single Segment Firms					Multi Segment Firms					Mean
Variable	mean	Medn.	Std.Dv.	25%	75%	mean	Medn.	Std.Dv.	25%	75%	Difference
NofSeg	1.00	1.00	0.00	1.00	1.00	2.86	2.00	1.16	2.00	3.00	-1.86 ***
MEET (%)	0.602	1.000	0.489	0.000	1.000	0.568	1.000	0.492	0.000	1.000	-0.034 ***
INS(%)	0.623	0.668	0.294	0.389	0.785	0.651	0.706	0.268	0.465	0.871	0.028 ***
$\|FE/P\|^{op}$	0.029	0.012	0.037	0.003	0.036	0.034	0.014	0.061	0.004	0.041	0.005 ***
$\|FE/P\|^{pes}$	0.025	0.009	0.043	0.003	0.026	0.019	0.007	0.034	0.002	0.019	-0.006 ***
MV ($m)	2,525	515	7,823	178	1,589	4,852	1,055	11,826	326	3,521	2,327 ***

PANEL C: Descriptive statistics for Excess Values (EV)

	Single Segment Firms					Multi Segment Firms					Mean
Variable	mean	Medn.	Std.Dv.	25%	75%	mean	Medn.	Std.Dv.	25%	75%	Difference
EvSales	-0.007	0.040	0.568	-0.280	0.461	-0.086	-0.034	0.109	-0.413	0.343	0.079 ***
EvAssets	-0.016	0.014	0.498	-0.243	0.368	-0.098	-0.051	0.449	-0.312	0.238	-0.082 ***
EvEbit	-0.007	0.011	0.473	-0.293	0.236	-0.098	-0.116	0.431	-0.360	0.138	-0.091 ***

The sample consists of 30.349 firm-year observations (19.057 single segment, 11.292 multi segment), *Meet=1* if analysts' consensus forecast is met/exceeded by the firm, *NofSeg* is number of segments (1,2,3....N), *INS* institutional ownership, |FE| absolute analysts' forecast error in optimistic (op) and pessimistic (pes) cases, *MV* market value, POSAA=1 (earnings management proxy) if abnormal accruals are positive, and DOWN=1 (forecast management proxy) if unexpected earning forecast is negative. EV is the natural log of 'Actual Value over Imputed Value' based on Sales (EvSales), Assets (EvAsset), and EBIT (EvEbit). See Appendix for variable definitions. *** denotes the statistical significance at %1 level

Table 2.2.

Correlations-Pearson (above diagonal) and Spearman (below diagonal)

	MEET	*Segin*	*%INST*	*|FE|*	*POSAA*	*DOWN*	*EvSales*	*EvAssets*	*EvEbit*
MEET		-0.01 ***	0.11 ***	-0.17 ***	0.05 ***	0.10 ***	0.07 ***	0.09 ***	-0.04 ***
Segin	-0.01 ***		0.06 ***	0.05 ***	0.00	0.00	-0.10 ***	0.11 ***	-0.11 ***
%INST	0.12 ***	0.07 ***		-0.22 ***	0.02 ***	0.06 ***	0.13 ***	0.09 ***	0.00
|FE|	-0.16 ***	0.05 ***	-0.24 ***		0.00	-0.05 ***	0.00	0.00	0.11 ***
POSAA	0.50 ***	0.00	0.02 ***	0.00		0.00	0.07 ***	0.04 ***	0.00
DOWN	0.10 ***	0.00	0.06 ***	0.05 ***	0.01 ***		0.06 ***	0.06 ***	0.01 ***
EvSales	0.07 ***	-0.10 ***	0.13 ***	0.00	0.07 ***	0.05 ***		0.66 ***	0.32 ***
EvAssets	0.10 ***	-0.11 ***	0.09 ***	0.00	0.04 ***	0.06 ***	0.66 ***		0.22 ***
EvEbit	-0.04 ***	-0.11 ***	0.00	0.01 ***	0.00	0.01 ***	0.32 ***	0.22 ***	

Meet=1 if analysts' consensus forecast is met/exceeded by the firm, NofSeg is number of segments (1,2,3….N), INS institutional ownership, |FE| absolute analysts' forecast error in optimistic (op) and pessimistic (pes) cases, MV market value, POSAA=1 (earnings management proxy) if abnormal accruals are positive, and DOWN=1 (forecast management proxy) if unexpected earnings forecast is negative. Excess value is the natural log of the ratio of a firm's actual value to its imputed value based on sales (EvSales), assets (EvAsset), and EBIT (EvEbit). See Appendix for variable definitions. *** denotes the statistical significance at %1 level

Table 2.3

Logit analysis of POSAA(DOWN) on MEET and Segin, 1999-2014

	Earnings management (POSAA)			Forecast management (DOWN)		
Variable	Coeff		Marginal Effect	Coeff		Marginal Effect
Intercept	0.117	***		-0.409	***	
%INST	0.013		0.003	0.165	***	0.041
ICLAIM	-0.051	***	-0.012	0.073	***	0.018
LOSS	-0.127	***	-0.029	-0.437	***	-0.108
EARNRET	0.249	***	0.058	0.027		0.006
LogB/P	0.011		0.002	-0.082	***	-0.020
LIT	0.028		-0.006	0.078	***	0.019
POSUE	0.167	***	0.039	-0.592	***	-0.146
GDP	0.953	***	0.224	-0.189		-0.047
LogMV	0.019	**	0.004	0.038	***	0.009
|FE|	-1.905	***	-0.447	1.137	***	-0.282
Segin	*0.034*		*0.008*	*0.007*		*0.002*
MEET (b)	*0.112*	***	*0.026*	*0.523*	***	*0.130*
*Segin*MEET (a)*	*-0.135*	***	*-0.031*	*-0.142*	***	*-0.030*
Difference (a-b)	-0.247	***		-0.665	***	
Log likelihood	-18630			-15672		
Chi-Square	275			917		
Pseudo % R^2	0.5			2.8		
Obs. (firm-year)	28,284			23,368		

Table reports the results for Equations (1A) and (1B). Marginal effects are computed as eβ'x / (l + eβ'X)2 where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. MEET=1 if firm meets or exceeds last consensus analysts earnings forecast, POSAA=1 (earnings management proxy) if abnormal accruals are positive, and DOWN=*1* (forecast management proxy) if unexpected earnings forecast is negative, Segin is segment indicator taking the value 1 if a firm is multi segment, and zero otherwise. Continuous variables are winsorised to %1 to %99. See Appendix for variable definitions. ***, **, * denote the statistical significance at 1%, %5 and %10 levels respectively.

Table 2.4

Logit analysis of meeting probability (MEET) on POSAA(DOWN), 1999-2014

Seemingly Unrelated Estimation (SUEST) for multi (Segin=1) and single (Segin=0) segment firms

	Single segment firms			Multi segment firms			Difference	
Variable	**Coeff**		**Marginal Effect**	**Coeff**		**Marginal Effect**	***Coeff***	
Intercept	-1.021	***		-0.685	***		-0.336	**
POSUE	0.937	***	0.216	0.849	***	0.199	0.088	
GDP	1.664	***	0.384	1.357	**	0.319	0.307	
LogMV	0.114	***	0.025	0.074	***	0.017	0.040	**
|FE|	-3.498	***	-0.807	-4.812	***	-1.130	1.314	*
POSAA (a)	*0.099*	***	*0.033*	*-0.014*		*-0.003*	*-0.113*	**
DOWN (b)	*0.567*	***	*0.131*	*0.431*	***	*0.101*	*-0.136*	**
difference (a-b)	*-0.468*	***		*-0.445*	***			
Log likelihood	-9.101			-5421				
Chi-Square	1.345			609				
Pseudo % R^2	6.9			5.3				
Obs. (firm-year)	14,814			8,603			23,417	

Table reports the results for Equation (2). Marginal effects are computed as eβ'x / (l + eβ'X)2 where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. MEET=1 if firm meets/exceeds last consensus analysts earnings forecast, POSAA=1 (earnings management proxy) if unexpected accruals are positive, and DOWN=1 (forecast management proxy) if unexpected earnings forecast is negative, Continuous variables are winsorised to %1 to %99. See Appendix for variable definitions. ***, **, * denote the statistical significance at 1%, %5 and %10 levels respectively.

Table 2.5

Segment indicator regressions on information asymmetry proxies, 1999-2014

Variable	Predicted Sign	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
Intercept		0.371 ***	0.071 ***	0.374 ***	0.383 ***	0.358 ***	0.387 ***	0.237 ***
CL	*(+)*	0.111 ***						0.091 ***
LogVol	*(+)*		0.025 ***					0.013 ***
Spread	*(+)*			0.013 ***				0.020 ***
AbDisacc	*(+)*				0.175 ***			0.438 ***
StWcacc	*(+)*					0.001 ***		0.001 ***
FE	*(+)*						0.225 ***	0.306 ***
% R^2		0.3	0.7	1.0	0.1	1.8	0.1	4.4
N (firm-year)		16,189	16,139	37,198	35,154	16,189	35,172	14,988

Table reports the results for Equation (3). CL=1 if a firm receives a comment letter form the SEC and zero otherwise, L*ogVol* is natural log of trading volume, *Spread* is bid-ask spread of share price computed as [high-low)/((high+low)/2] using monthly/quarterly share price, *AbDisaac* is the absolute sum of three-year discretionary accruals (for years -1, 0 and +1), *StWacc* is standard deviation of residuals of the typical accruals model, and FE is the initial analysts' forecast error. *** denotes statistical significance at 1% level.

Table 2.6

Logit analysis of meeting probability on information asymmetry, 1999-2014

Variable	Coeff		Marginal Effect
Intercept	-1.318	***	
%INST	0.330	***	0.076
ICLAIM	0.140	***	0.033
LOSS	-0.173		-0.040
EARNRET	0.179	**	0.042
LogB/P	-0.041		-0.009
LIT	0.248	***	0.058
POSUE	0.945	***	0.219
GDP	0.942	***	0.217
LogMV	0.143	***	0.033
|FE|	-2.049	***	-0.476
Segin	-0.079	**	-0.018
InfPCA (a)	0.034		-0.007
*Segin*InfPCA (b)*	-0.089	***	-0.021
Difference (b-a)	-0.123	**	
Log likelihood	-8840		
Chi-Square	612		
Pseudo % R^2	3.3		
N (firm-year)	13,793		

Table reports the results for Equation (4). Marginal effects are computed as $e^{\beta' x} / (l + e^{\beta' X})^2$ where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. *InfPCA* is the information asymmetry proxy, which is a factor score from the principal component analysis (PCA) reducing six information asymmetry proxies into a single variable. MEET=1 if firm meets or exceeds the last consensus analyst earnings forecast. See Appendix for variable definitions. ***, ** denote the statistical significance at %1 and %5 levels, respectively .

Table 2.7

Logit analyses of meeting probability (MEET) on Segin, 1999-2014

		With *Segin*			Two-stage least squares (2SLS) With *Seginhat*		
Variable	**Predicte Sign**	**Coeff**		**Marginal Effect**	**Coeff**		**Marginal Effect**
Intercept		-1.102			-0.848		
Segin	(-)	-0.082	***	-0.018	-0.852	***	-0.120
%INST		0.354	***	0.083	0.331	***	0.078
ICLAIM		0.134	***	0.032	0.122	***	0.029
LOSS		-0.178	***	-0.042	-0.249	***	-0.059
EARNRET		0.128	**	0.031	0.113	**	0.027
LogB/P		0.015		0.003	0.054	**	-0.013
LIT		0.344	***	0.081	0.165	**	0.038
POSUE		0.902	***	0.212	0.901	***	0.212
GDP		1.828	***	0.432	1.494	***	0.353
LogMV		0.116	***	0.027	0.142	***	0.034
|FE|		-3.855	***	-0.912	-3.921	***	-1.141
Log likelihood		-18.869			-18.245		
Chi-Square		2.918			2.827		
Pseudo % R^2		7.2			7.3		
N (firm-year)		30,349			30,349		

Table reports the results for Equation (5) with *Segin* and *Seginhat*. Marginal effects are computed as $e^{\beta'x} / (l + e^{\beta'X})^2$ where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. MEET=1 if the firm meets/exceeds the last consensus analysts earnings forecast, and Segin (the segment indicator) takes the value 1 if a firm is multi segment, and zero otherwise. Two stage least squares (2SLS) regression is performed by employing 'Seginhat' replacing Segin (Seginhat is estimated using the instrumental variable method). Continuous variables are winsorised to %1 to %99, See Appendix for variable definitions. ***, ** denote the statistical significance at %1 and %5 levels.

Table 2.8

Regressing EV and Discount (EV<0) on MEET and Segin, 1999-2014

	Using Sales Multiples		Using Asset Multiples		Using EBIT Multiples	
	EvSale	DiscountSale	EvAsset	DiscountAsset	EvEBIT	DiscountEBIT
Variable	**Coeff**	**Coeff**	**Coeff**	**Coeff**	**Coeff**	**Coeff**
Intercept	-0.098 ***	-0.637 ***	-0.077 ***	-0.505 ***	0.097 ***	-0.448 ***
LogAsset	0.022 ***	-0.026 ***	-0.015 ***	0.014 ***	-0.008 ***	0.019 ***
EBIT/Sales ^{n}	0.190 ***	-0.216 ***	0.335 ***	-0.168 ***		
Capex/Sales	0.146 ***	-0.166 ***	-0.029	-0.098 ***	0.081 ***	-0.072 ***
Segin	-0.115 ***	-0.034 ***	-0.089 ***	-0.010	-0.115 ***	-0.022 ***
MEET	0.095 ***	0.020 ***	0.110 ***	0.029 ***	0.038 ***	0.007
*MEET*Segin*	-0.048 ***	-0.004	-0.047 ***	-0.007	0.006	0.019
% R^2	3.0	4.9	4.4	3.9	1.7	1.3
N (fim-year)	28,326	12,590	30,317	14,430	22,003	11,437

^{n} not included in the excess value regressions that use EBIT multiples

Table reports the results for Equation (6A) and (6B). Excess value (EV) is the natural log of the ratio of total actual value. *Discount* denotes the negative excess values, thus the coefficients should be interpreted carefully. For instance, a negative coefficient on segin indicates that multi segmentation increases discount, while positive coefficient on Meet indicates, meeting reduces discount. MEET=1 if firm meets or exceeds last consensus analysts earnings forecast, Segin is segment indicator taking the value 1 if a firm is multi segment, and zero otherwise. Continuous variables are winsorised to %1 to %99. See Appendix for variables definitions. *** denotes the statistical significance at %1 level.

Table 2.9

Regressing Excess Values (EV) on MEET and Segin by POSAA(DOWN), 1999-2014

	Excess value based on Sales Multiples				Excess value based on Asset Multiples			
	POSAA=1	POSAA=0	DOWN=1	DOWN=0	POSAA=1	POSAA=0	DOWN=1	DOWN=0
Variable	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff	Coeff
Intercept	-0.097 ***	-0.216 ***	-0.002	-0.206 ***	0.12 ***	0.037 ***	-0.161 ***	-0.006
LogAsset	0.022 ***	0.026 ***	0.008 **	0.031 ***	-0.018 ***	-0.012 ***	-0.023 **	0.004 **
EBIT/Sales	0.191 ***	0.092 ***	0.211 ***	0.171 ***	0.380 ***	0.240 ***	0.499 ***	0.325 ***
Capex/Sales	0.146 ***	0.303 ***	0.112 ***	-0.151 ***	-0.073 ***	-0.134 ***	0.077 **	-0.020 **
Segin	-0.125 ***	-0.114 ***	-0.106 ***	-0.109 ***	-0.093 ***	-0.093 ***	-0.076 ***	-0.090 ***
MEET	0.082 ***	0.096 ***	0.092 ***	0.076 ***	0.106 ***	0.104 ***	0.115 ***	0.089 ***
*MEET*Segin*	-0.048 ***	-0.035	-0.069 ***	-0.031	-0.053 ***	-0.032	-0.078 ***	-0.010
% R^2	3.0	3.0	2.6	3.1	5.1	3.3	5.4	3.7
N (firm-year)	16,012	10,177	10,209	9,028	17,042	10,949	10,905	9,530

Table reports the results for Equation (6A) for POSAA(DOWN)=1/0 cases separately for two Excess value constructs based Sales and Assets. EV is the natural log of the ratio of total actual value to total imputed value. Actual value is calculated as the market value plus the book value of debt while total imputed value is the sum of imputed values of segments. MEET=1 if firm meets or exceeds last consensus analysts earnings forecast, POSAA=1 (earnings management proxy) if unexpected accruals are positive, and DOWN=1 (forecast management proxy) if unexpected earnings forecast is negative, Segin is segment indicator taking the value 1 if a firm is multi segment, and zero otherwise. Continuous variables are winsorised to %1 to %99. See Appendix for variables definitions. ***, ** denote the statistical significance at %1 and %5 level respectively.

Table 2.10

Returns regressions on MEET and Segin by POSAA(DOWN), 1999-2014

		POSAA=1	POSAA=0	DOWN=1	DOWN=0
Variable	Coeff	Coeff	Coeff	Coeff	Coeff
Intercept	0.111 ***	0.050 ***	0.160	0.224 ***	-0.079 ***
LogAsset	-0.021 ***	-0.014 ***	-0.026 **	-0.029 ***	-0.003
EBIT/Sales	0.283 ***	0.287 ***	0.261 ***	0.213 ***	0.194 ***
Capex/Sales	-0.025	0.052	0.048 *	0.029	0.003
|Ferror|	0.576 ***	0.206 ***	1.001 ***	0.762 ***	0.825 ***
Segin	0.030 ***	0.036 **	0.019	0.035 **	0.026 *
MEET	0.156 ***	0.154 ***	0.139 ***	0.133 ***	0.141 ***
*MEET*Segin*	-0.040 ***	-0.042 **	-0.025	-0.043 **	-0.032
% R^2	3.1	2.9	2.6	3.0	2.7
N (firm-year)	31,205	17,640	11,207	12,106	10,543

Table reports the results for Equation (7). Ret denotes is market-adjusted return calculated as buy and hold stock return compounded over the twelve months prior to year t's earnings announcement minus the return on the CRSP value-weighted (including dividends) index compounded over the same period. MEET=1 if firm meets or exceeds last consensus analysts earnings forecast, POSAA=1 (earnings management proxy) if unexpected accruals are positive, and DOWN=1 (forecast management proxy) if unexpected earnings forecast is negative, Segin is segment indicator taking the value 1 if a firm is multi segment, and zero otherwise. Continuous variables are winsorised to %1 to %99. See Appendix for variables definitions. ***, **, * denote the statistical significance at %1, %5 and %1 level respectively.

Table 2.11

Logit analysis of meeting probability (MEET) on POSAA(DOWN) separately The effects of Institutional Ownership (INS), 1999-2014

	Earnings management (POSAA)			Forecast management (DOWN)		
Variable	Coeff		Marginal Effect	Coeff		Marginal Effect
Intercept	-1.111	***		-1.163	***	
POSUE	0.907	***	0.216	0.934	***	0.217
GDP	1.425	***	0.229	1.766	***	0.411
LogMV	0.095	***	0.023	0.086	***	0.020
|FE|	-2.348	***	-0.559	-2.659	***	-0.618
INS%	*0.214*	***	0.051	*0.713*	***	*0.165*
POSAA	*0.629*	***	*0.149*			
*INS%*POSAA*	*-0.180*	**	*0.043*			
DOWN				*0.540*	***	*0.125*
*INS%*DOWN*				*-0.350*	***	*-0.081*
Log likelihood	-21045			-16350		
Chi-Square	2951			2281		
Pseudo % R^2	6.6			6.5		
Obs. (firm-year)	33,507			26,414		

Table reports the results for Equations (8A) and (8B). Marginal effects are computed as eβ'x / (l + eβ'X)2 where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. MEET=1 if firm meets or exceeds last consensus analysts earnings forecast, INS denotes tha percentage of institutional ownership, POSAA=1 (earnings management proxy) if abnormal accruals are positive, and DOWN=1 (forecast management proxy) if unexpected earnings forecast is negative. Continuous variables are winsorised to %1 to %99. See Appendix for variable definitions. ***, ** denote the statistical significance at 1% and %5 levels respectively.

Table 2.12

Logit analysis of meeting probability on POSAA(DOWN) separately, 1999-2014

	Segin is a covariate interacting with POSAA and DOWN.					
	Earnings management (POSAA)			Forecast management (DOWN)		
Variable	Coeff		Marginal Effect	Coeff		Marginal Effect
Intercept	-0.304	***		-0.409	***	
POSUE	0.306	***	0.072	0.294	***	0.069
GDP	1.612	***	0.377	1.845	***	0.431
LogMV	0.100	***	0.023	0.096	***	0.023
|FE|	-4.264	***	-0.997	-4.194	***	-0.980
Segin	*-0.080*	*	*-0.019*	*-0.107*	***	*-0.025*
POSAA	*0.143*	***	*0.033*			
*Segin*POSAA*	*-0.134*	**	*-0.031*			
DOWN				*0.423*	***	*0.099*
*Segin*DOWN*				*-0.100*	*	*-0.023*
Log likelihood	-15090			-15000		
Chi-Square	774			953		
Pseudo % R^2	2.5			3.1		
Obs. (firm-year)	23,415			23,415		

Table reports the results for Equations (9A) and (9B). Marginal effects are computed as eβ'x / (l + eβ'X)2 where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. MEET=1 if firm meets or exceeds last consensus analysts earnings forecast, POSAA=1 (earnings management proxy) if abnormal accruals are positive, and DOWN=*1* (forecast management proxy) if unexpected earnings forecast is negative, Segin is segment indicator taking the value 1 if a firm is multi segment, and zero otherwise. Continuous variables are winsorised to %1 to %99. See Appendix for variable definitions. ***, **, * denote the statistical significance at 1%, %5 and %10 levels respectively.

Table 2.13

Logit analyses of meeting probability (MEET) on NofSeg, 1999-2014

Variable	Predicted Sign	Coeff		Marginal Effect
Intercept		-1.033		
NofSeg	(-)	-0.170	***	-0.040
Log likelihood		-22.838		
Chi-Square		2795		
Pseudo % R^2		5.8		
N (firm-year)		30,349		

Table reports the results for Equation (5) with the segment number (NofSeg). Marginal effects are computed as $e^{\beta'x} / (l + e^{\beta'X})^2$ where β'X is computed at the mean values of the covariates. It measures how P(Y) changes when holding all other variables at their means. Standard errors are calculated by delta method. MEET=1 if the firm meets/exceeds the last consensus analysts earnings forecast. Continuous variables are winsorised to %1 to %99, See Appendix for variable definitions. *** denotes the statistical significance at %1 level.

CHAPTER 3

Does unconditional accounting conservatism through hidden reserves provide a rational explanation to B/P effect (value effect) in stock returns?

Abstract

We examine whether unconditional accounting conservatism provides a rational explanation to book to price (B/P) effect in stock returns. Evidence shows that stocks with higher B/P tend to yield higher future returns than stocks with lower B/P. This regularity is against the central paradigm (e.g., stock returns follow random walk and cannot be predicted), and explanations from both mispricing and risk (rationality) perspective are mainly challenged by subsequent evidence. We offer a rational explanation using the mechanisms of unconditional conservatism following Penman and Reggiani (2013). In a pricing equation, while a riskless earnings growth adds to price, a risky growth adds to required return making B/P ratio higher due to denominator effect. Hence a higher B/P corresponds to higher return as in the B/P effect phenomenon. Conservatism produces such risky growth (earnings are deferred under uncertainty producing future growth that can be deemed as risk), and can explain the phenomenon. Using hidden reserves to proxy unconditional conservatism we find strong support to this explanation.

Key Words: B/P effect, value effect, conditional and unconditional accounting conservatism

JEL Classification: M41, G10

3.1. Introduction

This paper examines whether unconditional accounting conservatism provides a rational explanation to book to price (B/P) effect in stock returns. The phenomenon that stocks with higher B/P tend to yield higher returns than stocks with lower B/P (e.g., Rosenberg, Reid, and Lanstein 1985; Chan, Hamao, and Lakonishok, 1991) has been widely investigated, and explanations from both mispricing (Lakonishok, Shleifer, and Vishny, 1994) or rationality perspective (Fama and French 1993) have been mainly challenged by the subsequent evidence. We offer a rational explanation using the mechanism of unconditional accounting conservatism following Penman and Reggiani (2013) (henceforth, P&R).

In a pricing equation, a riskless earnings growth adds to price, while a risky growth adds to required return making B/P higher due to denominator effect, thus a higher B/P corresponds to higher returns (a typical observation of B/P effect). Such risky growth is produced by conservative accounting, which generates an asymptotic bias between price and book value, B<P (see, Feltham and Ohlson, 1995; Ohlson, 1995). Specifically, earnings are deferred to future under uncertainty until they become low beta asset (e.g. booked sale). This produces future growth, but since the deferral is due to uncertainty, the growth becomes risky and should be compensated with a proper return. If this uncertainty perception aligns with the market's risk perception, conservative accounting rationally explains B/P effect. P&R find support to this argument using B/P; when accounting is conservative, returns to buying stocks based on B/P seem to be rewards for buying the risk in the expected growth, which can be attributable to the (risky) growth produced by earnings deferral.

We build on P&R, and test the above argument by using hidden reserves (HR/P) proxying unconditional conservatism. We argue that HR/P better captures than B/P the returns associated with risky growth generated by accounting conservatism, thus provides a more adequate platform to test conservatism argument. Indeed, HR/P is more associated with risky growth, while B/P covers both risky and riskless growth (bias between P and B is accumulated over time covering different projects with varying risk degrees). Evidence confirms the riskiness of HR/P; Future earnings to hidden reserves are more volatile (Amir, Guan, Livne, 2007), investors ask higher compensation for buying such projects (Chambers, Jennings, Thompson, 2002), they are directly expensed despite potential benefits (Lev and Sougiannis, 1996). On the other hand, a higher B/P cannot always predict higher returns/growth. A firm can be less conditionally conservative (losses are delayed while investors immediately sell them). This also leads to higher B/P, but can predict no returns (adverse effect is already sold) whilst predicting only future losses. Similarly, firms can grow by acquisitions that are recorded at fair values. B/P becomes again higher, but there is no return/growth to predict related to these projects since expectations are already booked, i.e., conservatism effect has disappeared.

We hypothesise and find first of all that HR/P is positively associated with both B/P and future returns initially supporting the notion that it can explain B/P effect. We next find that HR/P is also positively and monotonically associated with both future returns and earnings growth for any given LTE/P and B/P. We construct LTE/P following P&R by disaggregating the price into short term (STE) and long term (LTE) earnings. STE is obtained applying risk free rate, so that LTE represents hypothetically the risky part of price covering risky growth. We consider HR/P to better capture returns associated with risky growth generated by accounting system within LTE, and our results indicate so; as HR/P increases (as earnings deferral to future increases), growth in LTE increases. Since the deferral is due to uncertainty, higher returns to higher HR/P for any given LTE/P seem to be rewards of buying this risky growth. We further find that when B/P (HR/P) and future returns are at their lowest, earnings growth is at its lowest, and when B/P (HR/P) and future returns are at their highest, earnings growth is at its highest.

In sum, our paper makes the following contributions to existing knowledge. Firstly, we show that unconditional accounting conservatism rationally explains B/P effect in stock returns. Secondly, we show that stock market anomalies can be traced and explained within the accounting system. Financial reports as publicly available fundamental bridges between investors and firms can inform and enhance our understanding of the underlying sources of market anomalies. Thirdly, by documenting that conservatism is a response to risk surrounding earnings that aligns with the risk perception of investors, we also shed more light on the rationale of accounting conservatism.

The remainder of the paper is organised as follow. The next section provides literature review and develops hypotheses. Section 3.3 describes the data, Section 3.4 explains research design and presents the results. Section 3.5 reports sensitivity analyses and Section 3.6 concludes the study.

3.2. Literature review and hypotheses

3.2.1. Literature review

Research shows that stocks with higher ratios of fundamentals to price (e.g., high B/P, E/P) called value stocks tend to yield higher returns than stocks with lower ratios of fundamentals to price called growth stocks (e.g., Basu, 1977, 1983; Ball, 1978; Schiller, 1981; Rosenberg et al., 1985; Chan et al., 1991; Fama and French, 1992, 1993; 1995; 2008; Lakonishok et al., 1994; Kothari, Shanken, and Sloan, 1995; Chan, Jegadeesh, and Lakonishok, 1995). B/P effect is one of the prominent such observations. First enumerated in Graham and Dodd (1934) as value stocks outperforming growth stocks, the regularity is against the modern finance paradigm that embraces the notion that higher expected risks should be compensated with higher expected returns (Fama, 1980; Merton, 1980). However, for firms with higher B/P, expected growth is thought to be lower requiring lower return, hence higher returns to higher B/P do not seem to fit into this notion. Moreover, the capital asset pricing model (CAPM) shaping the concepts of return and risk predicts that expected returns of stocks are a positive function of their market βs, and B/P also positively correlated with stock returns can be seen as anomalous[35].

While some scholars argue that the phenomenon is caused by mispricing of stocks (e.g., DeBondt and Thaler, 1985; Lakonishok et al. 1994; Zhang, 2013), others offer explanations from the rationality point of view (e.g., Fama and French 1992,

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[35] Investors are exposed to two types of risk; unsystematic (firm specific) and systematic (market specific), and the only relevant risk to investor is the systematic risk requiring compensation since the former can be diversified away. Theory assumes unsystematic risk simply a random noise of a stock's return that does not co vary with the market as a whole. Since the random noise has zero expected return, it can be diversified away by adding more stocks to the portfolio (see Sharp, 1964; Lintner, 1965). CAPM portrays the relationship between expected returns and systematic risk of a stock as the following stating that a stock is expected to earn risk-free rate plus a reward for bearing risk measured by β. Deviations from this structure are defined as anomalies.

$$E(R_i) = R_f + \beta_i[E(R_m) - R_f]$$

Where *E(R)* is expected rate of return of stock *i*, R_f risk free rate, *[E(R_m)-R_f)]* the equity risk premium of the market portfolio beyond the R_f, and β the measure of systematic risk capturing the tendency of sock return to co vary with the return of the market portfolio, R_m..

Bernard, Thomas and Wahlen, 1997; Dechow and Sloan 1997). Lakonishok, et al. (1994) argue that some investors tend to overbuy value stocks performing well in the past, while oversell growth stocks performing badly, and contrarian investors bet against such naive investors leading to the observed pattern[36]. Zhang (2013) further argues that the value/growth puzzle can be partially explained by investors' preference for positive skewness in returns consistent with the *S*-shaped utility function observed in the consumer behaviour in lottery purchase and gambling.

On the other hand, Fama & French (1992) consider B/P as a risk factor not captured by market β. For instance, Fama & French (1993) argue that B/P proxy distress risk. Higher B/P reflects higher distress risk, and higher returns are compensation to this risk. Similarly, Berk (1995) and Fama and French (2007) argue that investors require higher returns from low profitability firms, which are assumed to be riskier, and pricing of this risk results in higher B/P (high B/P stocks are less profitable and grow less rapidly, while low B/P stocks tend to more profitable and fast growing. High expected growth and profitability combine with lower expected returns to produce low B/P, while low profitability, slow growth, and higher expected returns produce high B/P)[37]. However, subsequent evidence mainly challenges to these explanations (e.g., Gold and Stambugh 1997; Novy-Marx 2013).

3.2.2. Conservative accounting argument

We provide a rational explanation to the phenomenon using the mechanisms of unconditional accounting conservatism following P&R, who test two alternative growth scenarios in a pricing equation. To express how conservatism can explain B/P effect in stock returns consider a pricing equation such as the residual income model (RIM) with growth (Edwards and Bell, 1961; Ohlson, 1995)

[36] Contrarian investors by selling growth stocks and buying value stocks employ an effective method of exploiting miss valuation in the cross section. Contrarian strategies 'invest disproportionately in stocks that are underpriced and underinvest in stocks that are overpriced', which outperforms the market (Lakonishok, et al, 1994, p.1542).

[37] Other explanations include Berk, Green, and Naik (1999, 2004) growth options: investment projects such as R&D and advertisement involve systematic risk, which has potential to unravel the underlying of the value anomaly. Carlson, Fisher, Giammarino (2004); systematic risk associated with firm level investment is the determinant of the value premium. Cochrane (1991, 1996), Q-theory: if market is complete, a firm's investment returns and stock returns are equal in equilibrium, and excess returns are correlated with the changes in investment growth, which implies that value effect disappears after controlling for investment (growth).

$$P_t = B_t + \frac{E_{t+1} - rB_t}{r-g} \quad (1)$$

Where *P* denotes price, *B* book value of equity, *r* required return, *g* earnings growth with $r>g$, and $E_{t+1}-rB_t$ residual earnings (*RE*). In Equation (1), if the growth is riskless, it is expected to add to price (*P* increases), while a risky growth adds to required return (*r* increases). In the second case, B/P is higher due to denominator effect and corresponds to higher return. A risky growth is produced by accounting system; Conservatism requires earnings to be deferred to future under uncertainty producing future earnings growth. Since the deferral stems from uncertainty, this growth is also risky and should be compensated with a required return. If this uncertainty perception of accounting coincides with market's risk perception, then conservative accounting rationally explains B/P effect. Using B/P ratio to proxy conservatism, P&R find support to this argument; When accounting is conservative (B/P), higher returns to higher B/P appear to compensate buying the risk in the expected earnings growth. The Authors attribute this (risky) growth to the growth stemming from earnings deferral produced by conservative accounting.

We build on P&R and test conservatism argument by a variable more associated with risky growth than B/P. The argument distinguishes how riskless/risky growth manifests in a pricing equation; one adds to price, another to required return, but in practice, both can be in play, and B/P covers both (the difference between the price and book value is a cumulation of past projects that involve various degrees of risk, some may even involve zero risk such as the advanced payments for future sales not yet booked in B but recoded as liability, whilst share price incorporates them). We attempt to distinguish two growth types by using hidden reserves (HR/P) (Penman and Zhang, 2002), a proxy to unconditional conservatism[38]. HR/P is based on R&D and advertising expenditures associated with high risk[39,] and highly likely

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[38] Literature considers two forms of conservatism. In the conditional form, accounting recognises events asymmetrically conditional on news. Bad news is recognized quicker as losses than good news as gains, thus book value is written down with adverse circumstances, but not written up when the news is favourable (Basu, 1997). In the unconditional form, however, accounting generates bias independent of news (Beaver and Ryan, 2000, 2005). Common examples are immediate expensing of R&D and advertising expenditures, historical cost accounting, accelerated depreciation, and LIFO valuation (if inventory prices are increasing). It is determined at the inception of assets and liabilities, and results in the creation of hidden reserves or unrecorded goodwill (Pope and Walker, 2003).

[39] The riskiness explanation of tangible investments has reasonable grounds. Outcomes of CAPEX are more comparable and predictable examining past performance of similar investments, industry

to produce risky earnings growth. Indeed, research confirms the riskiness of HR/P; Intangible investments as the basis of HR/P exhibit more volatile future earnings than CAPEX (e.g., Kothari et al., 2002, Amir et al., 2007), investors demand higher compensation for buying these projects (e.g., Chambers et al. 2002), and accounting recognises them as expenses despite possible benefits, while CAPEX is capitalised (e.g., Lev and Sougiannis 1996).

In addition, a higher B/P cannot always inform higher returns and higher growth. A firm can be less conditionally conservative; Manager can delay restructuring costs, charge less impairment, and defer losses to future rather than profits, while market immediately sells them. This leads to a higher B/P, but this B/P cannot predict returns since the related risk is already sold, whilst it can predict only future losses. Moreover, firms may acquire other firms/projects in order to grow, and these transactions are recorded at their market values in the balance sheet. Conservatism bias disappears and results in a higher B/P. But again, it cannot predict higher returns or growth since expectations related to these transactions are already booked Theoretically, if B=M, there is no future growth (*g*=0) stemming from existing projects, and thus B/P cannot predict returns. Formally, the required return, *r,* can be expressed using the residual income model in the following form,

$$r = \frac{E_{t+1}}{P_t} + \left(1 - \frac{B_t}{P_t}\right) g \qquad (2)$$

If $\quad g = 0$ and/or B=$P \quad r = \frac{E_{t+1}}{P_t}$

The equation simply indicates that when g=0 and/or P/B=1, required return is the earnings yield, i.e., B/P can add to the explanation of return only if there is earnings growth and accounting is conservative (Penman and Reggiani, P&R, 2013, p.1026).

3.2.4. Hypotheses

In a pricing equation, a risky earnings growth adds to required return rather than to price making B/P higher, and since we assume that risky growth is produced by conservative accounting, we expect a positive association between HR/P and B/P,

indicators, etc., but intangible investments are particular to firms, not easy to trade, take more time to turn into cash, and result in less predictable outcomes (Amir et al., 2007).

H1: HR/P is positively correlated with B/P

Immediately expensing of R&D, advertisement expenditures and LIFO valuation result in relatively lower forward earnings, hence we expect a negative association between HR/P and E/P,

H2: HR/P is negatively correlated with E/P

Given that intangible investments are subject to higher uncertainty/risk regarding their future benefits (Chambers et al., 2002; Kothari et al., 2002; Amir et al., 2007), we argue that by deferring earnings recognition to future, conservatism responds to risk. If this risk perception aligns with market's risk perception, HR/P can explain future returns (assuming, future returns are rewards for buying risk), hence we expect a positive association between HR/P and future stock returns. However, a positive association between future returns and R&D and advertising expenditures (the basis of hidden reserves) is already established by prior research (e.g., Lev and Sougiannis, 1996; Chan, Lakonishok, Sougiannis, 2001; Penman and Zhang, 2002; Al Horani, Pope, and Stark, 2003; Eberhart, Maxwell and Siddque, 2004), and it is still unclear whether this is due to mispricing or rewards of buying risk. Hence, to distinguish our findings from alternative mispricing explanations, we disaggregate the price into short term earnings (STE) and long term earnings (LTE) following P&R using the residual income valuation model,

$$\text{where } P_t - B_t = \underbrace{RE_{t+1}\left(\frac{1}{r}\right)}_{(1)} + \underbrace{RE_{t+1}\left(\frac{1}{r-g} - \frac{1}{r}\right)}_{(2)} \qquad (3)$$

Applying risk-free rate to (1) we obtain $STE = \frac{E_{t+1} - r_f B_t}{r_f}$, and hence (2) represents hypothetically the risky portion of price (LTE) covering also risky growth. Dividing the sides by P, we obtain $\frac{LTE}{P} = 1 - \frac{E_{t+1} - r_f B_t}{r_f P_t} - \frac{B_t}{P_t}$. By construction, LTE/P and STE/P are negatively correlated, while STE/P (LTE/P) is positively (negatively) correlated with E/P.

Since intangible investments that cause the accumulation of hidden reserves reduce short term earnings, but increase long term earnings in recognition of risk, the expected correlation between returns and HR/P should also hold for any given LTE.

H3: HR/P is positively correlated with future returns for any given LTE/P

Unconditional conservatism by deferring earnings is expected to produce future earnings growth, hence we further expect a positive association between HR/P and future growth for any given LTE/P. This, together with *H1*, will indicate that hidden reserves produce risky earnings growth in the long term, and investors who buy this growth are compensated with higher returns,

H4: HR/P is positively correlated with future growth for any given LTE/P

If unconditional conservatism explains B/P effect in stock returns, the observations we test in *H3* and *H4* will also hold for any given B/P. This will indicate that higher returns are rewards for buying risky growth that adds to required returns and makes B/P higher. Accordingly, the B/P effect in stock returns is rationally explained.

H5: HR/P is positively correlated with future returns for any given B/P

H6: HR/P is positively correlated with future growth for any given B/P

Conservatism argument is based on the riskiness of growth in future earnings proxied by LTE/P that results in higher B/P. If the growth is riskless, however, it should add to price, and corresponds to lower B/P and lower returns. Accordingly, growth can be correlated with both lower and higher B/P, but correlated with higher returns only if B/P (HR/P) is also higher if it represents risk. This requires that if B/P (HR/P) and future returns are at their highest, future earnings growth should also be at its highest, which will indicate that buying expected risky growth based on B/P (HR/P) will yield higher returns

H7: When B/P (HR/P) and future returns are at their lowest, future growth is at its lowest, and when B/P (HR/P) and future returns are at their highest, future growth is at its highest

3.3. Data and sample selection

The sample covers US listed firms excluding financial sector (SIC codes 6000 to 6999) for the period 1963 and 2014. We obtain financial data from COMPUSTAT, analysts' earnings forecast data from IBES (summary history statistics), market data from CRSP, and 10-year US Treasury bond rates from the US Federal Reserve, H15 Reports. In data selection process, we follow P&R excluding firms with missing book values, earnings before extraordinary items, shares outstanding, stock prices and stock returns. We use realised *t+1* earnings for 1963-2014 period to calculate E/P, but in the robustness tests, we also use analysts' earnings forecasts but only for 1977-2014 period (see Appendix C for variable definitions). We also exclude firms with stock price less than 20 cents, and winsorise data to 1% to 99% to eliminate extreme values. Our final sample consists of 103,645 firm-years observations.

3.3.1. Constructing hidden reserves (HR/P)

Hidden reserves have been widely used to proxy unconditional conservatism (e.g., Penman and Zhang, 2002; 2016; Pae and Thornton, 2010; Kim, Nekrasov, Schrof, and Simon, 2015, Biddle, Ma, Song, 2016), which we compute as the following.

$$Hidden\_Reserves_t = R\&Dres_t + ADVres_t + LIFOres_t$$

We compute HR/P as *Hidden_Reserves* deflated by market value of equity three months after the fiscal year end [MV=price (Compustat PRCC_F, #199) X common shares outstanding (Compustat CSHO, #25)].

R&Dres denotes the unamortised balance of R&D (Compustat, XRD, #46) asset that would have appeared on balance sheet had it been capitalised and subsequently amortised at a straight-line rate of 20% assuming a uniform distribution

$$R\&Dres_t = 0.9R\&D_t + 0.7R\&D_{t-1} + 0.5R\&D_{t-2} + 0.3R\&D_{t-3} + 0.1R\&D_{t-4}$$

ADVres is the unamortised balance of advertisement (Compustat, XAD, #45) asset that would have appeared on balance sheet had it been capitalised and subsequently amortised using a sum-of-the-year's digit method over two years (assuming XAD to have a useful life of one or two years and provides more benefits first initiated).

$$ADres_t = ADV_t + \frac{1}{3ADV}_{t-1}$$

LIFOres denotes LIFO (Compustat LIFR, #240) reserves reported in the inventory footnotes in financial reports. It is relevant to hidden reserves because, if a firm increases its investment in inventory under LIFO its current earnings is depressed.

We acknowledge that hidden reserves as we employ in our analysis disregards other forms of 'hidden reserves' related to other assets/liabilities such as bad-debt allowances, depreciation allowances resulting from accelerated depreciation, other asset valuation allowances, deferred revenue, overestimated pension liabilities and other estimated liabilities. However, these items involve discretion and are not reliably measurable due to estimates or accounting manipulation. Besides, some of these items might not be recurring and not relevant to investors (Penman and Zhang, 2002). Therefore, we focus on only items that are more detectable and less subject to managerial discretion (permanent accounting policies/regulation and mandates require that internally generated intangibles such as R&D and advertising expenditures are directly expensed, LIFO reserve disclosed, etc.). According to Lev and Sougiannis (1996), the average understatement of reported earnings due to R&D expensing is %21 for 1976-1991 in the US, which implies that our selected items to form hidden reserves represent an economically significant part of all hidden reserves, and provide a sufficient measure to test conservatism argument.

Note, McNichols, Rajan, and Reichelstein (2014) also introduce an accounting conservatism measure (conservatism correction factor to B/P and Tobin's Q), however, consider HR/P to better capture the returns associated with risky growth generated by accounting conservatism, therefore, we focus on HR/P rather than other forms of accounting conservatism. We construct hidden reserves by hypothetically capitalising R&D (Advertising) expenditures and amortise them over five (two) years. Accordingly, if a firm reports R&D, it means we are able to keep this firm in the sample for five years. Similarly, LIFO reserves become almost a permanent item in the deep notes once reported unless the firm changes the valuation method or inflation is negative. It is also enough for a firm to be included in our sample, even one of three items is reported. These approaches altogether reduce the missing data problem to a minimum level.

3.3.2. Descriptive statistics and correlations

Table 3.1 reports descriptive statistics for variables used in the analysis. Median (mean) HR/P is 8.9 (15.5) of the price, while median(Mean) B/P is 0.54 (0.76), which indicates that around %45 of the value in price is reflected in the expected future earnings consistent with P&R. The distributions of STE/P and LTE/P show how total expected residual earnings implicit in the price are broken down into short term and long term earnings. At the median, we observe that STE/P accounts for %28 of price if forward or t+1 residual earnings are calculated and perpetually discounted by the risk-free rate without growth. Since our sample covers also loss making firms, the mean STE/P will be dominated by the losses (mean STE/P will emerge as negative). Indeed, we observe mean STE to be %-0.34, very similar to %-0.42 in P&R (see P&R, 2013, p.1033 Table 1). For more intuition, consider two firms, one reporting CU100 profit and the other reporting CU100 loss. Both report CU900 book value of equity. Assuming, R_f=%10, for the profit making firm *RE*=10 ($RE_{t+1}=E_{t+1}-R_fB_t$), and the price is 10/0.10=100 (RE_{t+1}/R_f,), while for loss making firm *RE*=-190, and the price is -190/0.10=1900. Notice that for valuation purposes, *RE* must be greater than zero (positive cash flow), but in our analysis, for loss making firm-years, *RE* will be less than zero, and will dominate the mean values, therefore, we urge our reader to focus on median value on his assessment.

Table 3.2 reports the Spearman (upper diagonal) and Pearson (lower diagonal) correlation coefficients over the period 1963-2014 (Pearson correlation coefficients benchmark *linear* relationships among variables while Spearman correlation is highly sensible to *monotonic* relationship). Scattering the plots (not tabulated) indicates mostly monotonic relations among the tested variables, hence Spearman correlations may be considered more representative of the data. Table 3.2 shows the expected signed associations among variables: HR/P is positively correlated with B/P (consistent with *H1)*, negatively correlated with E/P *(*consistent with *H2)*, positively correlated with future returns (consistent with *H3* and *H5*) and future earnings growth (consistent with *H4* and *H6).* It also shows a positive association between earnings growth and stock returns (consistent with *H7).* HR/P is negatively (positively) correlated with STE/P (LTE/P), while STE/P (LTE/P) is positively (negatively) correlated with E/P as expected.

3.4. Empirical analysis and portfolio sorts

We employ portfolio sorting method following P&R. One main advantage of this method is that it provides a clear picture of how stock returns vary across a spectrum of portfolios for a chosen variable. Specifically, portfolio sorting shows whether the correlations among the tested variables are monotonic. We use both individual and joint portfolios. In the individual portfolios, we test the associations between the two variables across decile portfolios, and in the joint portfolios, we test the joint associations between three variables across 25 joint quintile portfolios.

To form individual portfolios in Table 3.3 each year between 1963-2014 we rank firms in equal numbers into ten deciles according to their HR/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. We then observe B/P, E/P, LTE/P, STE/P, future earnings growth and future returns (buy and hold stock returns are accumulated over twelve months following the portfolio formation date each year. We report the average of these annual returns). Other figures reported are the means over years of portfolio means for each year. The *t-statistics* are calculated as the mean differences over years between the highest and lowest portfolios (as are the other t-statistics in the following tables).

To form joint portfolios in the lower part of the tables, we use the following method, for instance for the results reported in Table 3.4 (returns to joint portfolios of HR/P and LTE/P), between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their LTE/P from low to high three months after fiscal year end. Within each LTE/P quintile, we then regroup firms each year in equal numbers into five quintiles this time on their HR/P from low to high three months after fiscal year end. This process results in 25 joint portfolios. Finally, for each joint portfolio, we observe future returns as defined above. Other joint portfolios are formed in the same way replacing the relevant variables. To form portfolios in the upper part of the tables, for instance for the results reported in Table 3.4 (returns to LTE portfolios), between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their LTE/P from low to high three months after fiscal year end. For each LTE portfolio, we calculate future returns as defined above.

3.4.1 Individual portfolio sorts

To test *H1* and *H2* (respectively, HR/P is positively correlated with B/P and negatively correlated with E/P), we employ individual portfolio sorts, which test associations between the two variables across decile portfolios. For individual portfolio formation refer to section 3.4

Table 3.3 reports the characteristics of HR/P decile portfolios by B/P, E/P, LTE/P, STE/P, future earnings growth and future average stock returns, and shows that HR/P is positively correlated with B/P (confirming *H1)* and negatively correlated with E/P (confirming *H2*). Associations are monotonic and the differences between the highest and lowest portfolios are significant at %1. Table also shows that HR/P is positively correlated with future returns (consistent with *H3* and *H5*), earnings growth and residual earnings growth (consistent with *H4* and *H6).* Again, the associations are monotonic, and the differences between the lowest and highest deciles are significant at the %1 level. We further observe a negative (positive) correlation between HR/P and STE/P (LTE/P). In sum, Tables 3.2 and 3.3 confirm hypotheses *H1* and *H2*, and lend strong support to other hypotheses.

3.4.2 Returns and earnings growth to joint LTE/P and HR/P portfolios

To test *H3* (HR/P is positively correlated with future returns for any given LTE/P), we employ joint portfolio sorts, which test joint association between two variables for a third variable (returns to HR/P for a given LTE/P) across 25 joint quintile portfolios vertically and horizontally. See section 3.4, for joint portfolio formation.

Table 3.4 reports future returns to LTE/P alone (upper part of the Table) and HR/P-LTE/P joint portfolios with LTE/P along columns and HR/P rows. Portfolio returns to LTE/P alone (upper part of the Table) indicate a negative monotonic association between LTE/P and future returns (35.9% annual returns to lowest LTE/P vs 1.5% annual returns to highest LTE/P). The difference between the highest and lowest quintiles is significant at the 1% level. Since the LTE/P ranking is an inverse ranking on E/P, this result confirms previous evidence that E/P and returns are positively correlated (e.g., Basu, 1977). Confirming *H3*, in the joint portfolios (lower part of Table), we observe that HR/P is positively and monotonically associated with future returns for any given LTE/P. As HR/P increases, future returns increase in any LTE/P portfolio (For instance, average annual returns to joint portfolio of lowest LTE/P-highest HR/P are 40.5%, while returns to joint portfolio of highest LTE/P-lowest HR/P are -4.1%). Monotonic relations are also confirmed across vertical and horizontal portfolios, and hedge portfolio returns are significant at the 1% level, which strongly suggests that high returns to high HR/P are rewards for buying risk in the expected earnings growth in long term earnings.

To test *H4* (HR/P is positively correlated with future earnings growth for any given LTE/P), we employ joint portfolio sorts, which shows future earnings growth to HR/P for a given LTE/P across 25 joint portfolios vertically and horizontally. See section 3.4, for joint portfolio formation.

Table 3.5 reports future earnings growth to LTE/P alone (upper part of the Table) and HR/P-LTE/P joint portfolios with LTE/P along columns and HR/P rows. *H4* requires that if the deferral of earnings recognition leads to future earnings growth, we should observe increasing subsequent earnings growth in both LTE/P and HR/P-LTE/P joint portfolios. Results confirm these expectations. On the upper part of the Table, we observe that earnings growth is monotonically increasing in LTE/P, and in the joint portfolios, for any given LTE/P, HR/P is positively and monotonically correlated with earnings growth (associations are monotonic across vertical and horizontal portfolios, and growth differences between the highest and lowest LTE/P portfolios are significant at the 1% level).

Overall, Tables 3.4 and 3.5 confirm *H3* and *H4*; HR/P is positively correlated with both future returns and future earnings growth for any given LTE/P. These results indicate that as HR/P increases (as earnings deferral to future increases), growth in LTE increases, and since the deferral is due to uncertainty, higher returns to higher HR/P for any given LTE are rewards for buying this risky growth.

3.4.3 Returns and earnings growth to joint B/P and HR/P portfolios

To test *H5* (HR/P is positively correlated with future returns for any given B/P), we employ joint portfolio sorts, which shows future returns to HR/P for a given B/P across 25 joint quintile portfolios vertically and horizontally. See section 3.4, for joint portfolio formation.

Table 3.6 reports future returns to B/P alone (upper part of the Table) and HR/P-B/P joint portfolios with B/P along columns and HR/P rows. Portfolio returns to B/P alone (upper part of the Table) indicate a positive monotonic association between B/P and future returns (9.6% annual returns to lowest B/P vs 22.9% annual returns to highest B/P). The difference between the highest and lowest quintiles is significant at the 1% level. This is a typical observation of B/P effect in stock returns documented by prior research and defined as anomaly. Confirming *H5*, in the joint portfolios, we observe that HR/P is positively and monotonically associated with future returns for any given B/P. As HR/P increases, future returns increase in any given B/P portfolio (For instance, average annual returns to joint portfolio of highest B//P-highest HR/P are 29%, while returns to joint portfolio of lowest B/P-lowest HR/P are 6%).

Monotonic relations are confirmed across vertical and horizontal portfolios, and hedge portfolio returns are all significant at the 1% level. As HR/P increases, future returns increase, and corresponds to higher B/P. When both B/P and HR/P are at their lowest (highest), the future returns are 6% (29.9%).

To test *H6* (HR/P is positively correlated with future earnings growth for any given B/P), we employ joint portfolio sorts, which shows future earnings growth to HR/P for a given B/P across 25 joint portfolios vertically and horizontally. See section 3.4, for joint portfolio formation.

Table 3.7 reports future earnings growth to BP alone (upper part of the Table) and HR/P-B/P joint portfolios with B/P along columns and HR/P rows. On the upper part of the Table, we observe a positive association between B/P and earnings growth (the growth difference between the lowest and highest B/P portfolios is significant at the 1% level), while in the joint portfolios, we observe that for any given B/P, earnings growth is positively and monotonically associated with HR/P, confirming *H6* (growth differences between the highest and lowest LTE/P portfolios are again significant at the 1% level). As HR/P increases earnings growth increases, and corresponds to a higher B/P; when both B/P and HR/P are at their lowest (highest), earning growth is 10.7% (35.5%).

These observations overall confirm *H5* and *H6*, and indicate that HR/P captures risky growth that is priced as risky by investors. Risky growth associated with HR/P yields higher returns and results in higher B/P (since the risky growth is offset by returns rather than adding to price). Hence, unconditional conservatism appears to provide a rational explanation to B/P effect in stock returns.

3.4.4 Earnings growth to joint portfolios of returns and B/P (HR/P)

To test *H7* (When B/P (HR/P) and future returns are at their lowest, future growth is at its lowest, and when B/P (HR/P) and future returns are at their highest, future growth is at its highest), we sort future earnings growth (after t+1) to future returns (at t+1) for a given B/P (HR/P) across 25 joint portfolios vertically and horizontally. See section 3.4, for joint portfolio formation.

The conservatism argument relies on the riskiness of future growth in LTE assumed to be produced by conservative accounting, and our findings has indicated so far that higher returns to higher B/P (HR/P) are rewards for buying this risk. If the growth is riskless, however, it should add to price, and result in lower B/P. Accordingly, to confirm our main findings, we should also observe a lower future growth to correspond to a lower B/P (HR/P) and also to lower future returns (since future growth will involve less risk when HR/P is lower). This requires *H7*.to hold (notice that *H7* automatically requires also future returns to be positively correlated with future earnings growth).

Table 3.8 reports future earnings growth to B/P alone (upper part of the Table) and Returns-B/P joint portfolios with B/P along columns and Returns rows. Confirming our expectation, Table 3.8 shows that (i) future returns are positively associated with future growth, and that (ii) when B/P and future returns are at their lowest (highest), future growth is at its lowest (highest) [-18.1% versus +24.7%]. This pattern repeats across both horizontal and vertical joint portfolios and growth differences between the highest and lowest portfolios are significant at the 1% level.

Table 3.9 reports future earnings growth to HR/P alone (upper part of the Table) and Returns-HR/P joint portfolios with HR/P along columns and Returns rows. Confirming our expectation, Table 3.9 shows when HR/P and future returns are at their lowest (highest), future growth is at its lowest (highest) [-21.7% versus +26.3%]. Associations are confirmed across horizontal and vertical joint portfolios, and growth differences in highest/lowest joint portfolios are significant at 1%.

These observations overall confirm our hypotheses, and indicate that unconditional conservative accounting rationally explains B/P effect in stock returns.

3.5. Sensitivity analyses

3.5.1. LTE calculated by Analysts' consensus forecasts of forward earnings

We also check the robustness of our main tests using analysts' earnings forecasts from IBES. We employ the initial analysts' consensus (median) forecasts of forward earnings (for year t+1) released between 0 and 60 days after the year *t* actual earnings are announced. We denote long term earnings computed via analysts' forecast as ALTE (corresponding to LTE in the main tests). The data selection process yields 52,255 firm year observations for the period 1977-2014 as opposed to 103,645 firm year observations using LTE for the period 1963-2014 (analysts' earnings forecasts are available since 1976). We repeat the tests with ALTE that involve LTE. These tests mainly indicate that the results obtained through LTE are robust to ALTE.

Table 3.10 reports one of these tests as an example for the variables used in Table 3.4 that tests *H3* (HR/P is positively correlated with future returns for any given LTE/P), which shows joint association between HR/P for a given ALTE/P across 25 joint quintile portfolios vertically and horizontally. See section 3.4 for joint portfolio formation. Table 3.10 reports future returns to ALTE/P alone (upper part of the Table) and HR/P-ALTE/P joint portfolios with ALTE/P along columns and HR/P rows. Portfolio returns to ALTE/P alone (upper part of the Table) indicate a negative association between ALTE/P and future returns. The hedge portfolio rerun is significant at the 1% level. Confirming *H3*, in the joint portfolios (lower part of Table), we observe that HR/P is positively associated with future returns for any given ALTE/P (For instance, average annual returns to joint portfolio of lowest ALTE/P-highest HR/P are 33.7%, while returns to joint portfolio of highest ALTE/P-lowest HR/P are 9.7%), and hedge portfolio returns are significant at 1%.

3.5.2. Using net operating assets (NOA) to deflate hidden reserves

We also perform our tests using average net operating assets as denominator for hidden reserves instead of market value of equity and replace HR/NOA with HR/P in the tests using HR/P (see Appendix for NOA definition). These tests show that our results are not driven by the deflator of hidden reserves, and confirm that the results obtained through HR/P are robust to HR/NOA.

Table 3.11 reports one of these tests as an example for the variables used in Table 3.4 that tests *H3* (HR/P is positively correlated with future returns for any given LTE/P) [see section 3.4, for joint portfolio formation]. Table 3.11 reports future returns to LTE/P alone (upper part of the Table) and HR/NOA-LTE/P joint portfolios with LTE/P along columns and HR/NOA rows. Again, confirming *H3*, in the joint portfolios (lower part of Table), we observe that HR/NOA is positively associated with future returns for any given LTE/P (For instance, average annual returns to joint portfolio of lowest LTE/P-highest HR/NOA are 44.4%, while returns to joint portfolio of highest LTE/P-lowest HR/NOA are -3.3%), and hedge portfolio returns are all significant at the 1% level.

3.5.3. Cross section Return regressions on HR/P and B/P

We also perform cross section regressions in order to overcome some potential pitfalls of portfolio sorting method. For instance, portfolio sorts may not provide clearer picture about the marginal effects of a variable on returns beyond another variable. Portfolio sorts do not also allow controlling the factors that may affect future returns. In particular, we test whether HR/P explains future returns beyond B/P and better than B/P. We run the following return regression with control.

$$Ret_{it+1} = \beta_0 + \beta_1 HR/P_{it} + \beta_2 B/P_{it} + \delta_j X_{it} + \varepsilon_{it+1} \qquad (4)$$

Where *Ret* denotes annual buy and hold returns for firm *i* at time *t+1* accumulated over 12 months starting from after three month of fiscal year end (we also employ size and market adjusted returns, and the results are similar). *X* denotes control; *firm size (logMv), market Beta, E/P and past returns* following the literature (e.g., Fama and French, 1993). Beta is estimated by 60 month rolling regression using the market model $\left(Ret_{it} - R_f\right) = \alpha + \beta_i\left(Ret_{mt} - R_f\right) + \epsilon_{it}$ R_f is the risk free rate (the 10-year US Treasury bond rate) from the US Federal Reserve, H15 report for the relevant year, $(Ret_{mt} - R_f)$ the equity risk premium of the market portfolio, Ret_{mt} the CRSP monthly value weighted return on a market portfolio cumulated over 12 months. The model is run for both B/P and HR/P and separately for B/P (HR/P). We expect the coefficient on HR/P to be greater than the coefficient on B/P to be consistent with the notion that HR/P is more associated with risk than B/P.

Table 3.12 reports the results of Equations (4), and shows that both HR/P and B/P are positively correlated with future returns after controlling for the factors that may affect returns (coefficients are significant at the 1% level). Moreover, confirming our expectation, Table also shows that the coefficient on HR/P is greater than the coefficient on B/P (the difference between two coefficients is significant at 1%).

We also run cross section regressions for other variables corresponding to other tables. These regressions (not tabulated) indicate that our main findings are also robust to cross section regression setting.

3.5.4. Other sensitivity tests

We repeat the tests within firm size dimension. Size effect in stock returns has already been documented by previous research (e.g., Banz, 1981, Fama and French 1993 and 1995). We test whether our results differ when we control for firm size. Small cap effect may play a role in our tests by exhibiting higher dispersion in the tested variables, in particular, for the lowest/highest portfolios (see, Fama and French, 2008). Although the microcap firms are 3% of the total market capitalisation on average, they account for about 55% of the total number of firms in our sample. Therefore, following Fama and French (2008), we rank firms each year by their market values by coding them as small, medium and large (less than 20%, between 20% and 50%, and over 50% of the mean sample size, respectively). Our tests (not tabulated) on these size portfolios show that there are some deviations in the small cap sample, but the results for medium and big firms are similar.

We perform growth tests with both two year ahead analysts' growth expectations and residual earnings growth. Since analysts do not provide two year ahead earnings forecasts for every firm, these tests are run by relatively very small sample sizes in joint portfolios. Our tests (not tabulated) show that analysts' growth expectations provide a somewhat similar picture to the one indicated by our main tests although the relations between the variables are not as strong as in the main tests (probably analysts' forecasts for two year ahead earnings may be subject to larger bias). The growth rates for residual earnings provide very similar results (not tabulated).

3.6. Conclusion

In this paper, we examine whether unconditional accounting conservatism provides a rational explanation to book to price (B/P) effect in stock returns (stocks with higher B/P yielding higher returns than stocks with lower B/P (e.g., Rosenberg, Reid, and Lanstein 1985). Various explanation from both mispricing (Lakonishok, Shleifer, and Vishny, 1994) and rationality point of view (Fama and French 1993) have been mainly challenged by subsequent evidence. We provide a rational explanation to the phenomenon using the mechanism of unconditional accounting conservatism following P&R.

We test an argument that in a pricing equation, a riskless earnings growth adds to price, while a risky growth adds to required return. The process makes B/P higher due to denominator effect and it corresponds to higher returns. Risky growth is produced by conservatism principle because it requires accounting to defer earnings to future if there is uncertainty. Such deferral produces future earnings growth. We test whether this growth assumed to be risky helps explain B/P effect in stock returns. Our main variable to proxy unconditional accounting is HR/P which are based on R&D, advertisement expenditures and LIFO reserve that we consider to be more associated with risky growth.

We find HR/P is positively associated with both B/P and future returns, and that HR/P is also positively and monotonically associated with both future returns and earnings growth for any given LTE/P and B/P, and in the final set of tests, we further find that when B/P (HR/P) and future returns are at their lowest, earnings growth is at its lowest, and when B/P (HR/P) and future returns are at their highest, earnings growth is at its highest. By these results, our paper makes following contributions to existing knowledge. It shows that unconditional accounting conservatism rationally explains B/P effect in stock returns. It also shows that stock market anomalies can be traced and explained within the accounting system. Finally, it shows that conservatism is a response to risk that aligns with the risk perception of investors, thus provides further insights about the rationale of accounting conservatism.

Appendix C

Variable definitions

$Returns_{(t+1)}$ 12 month buy and hold stock returns. Monthly return accumulation started after three months of the fiscal year end (accounting data for a fiscal year are presumed to have been published until this point).

B/P Book value of equity divided by market value of equity
B=Common ordinary equity total (Compustat CEQ, #60) + Preferred treasury stock (Compustat TSTKP, #227) - Preferred dividends in arrears (Compustat DVPA, #242)

$g_{(t+2)}$ Earnings Growth. Following P&R growth rates are calculated as

$$g_{t+2} = \frac{Earnings_{t+2} - Earnings_{t+1}}{|Earnings_{t+2}| - |Earnings_{t+1}|}$$

Ex post growth calculation limits the growth rates between ± 2 in the extreme only for firms that survived two years ahead. Hence, the results will be generalisable only to firms that remained listed at least two years (according to P&R, the survivorship rates differ between %76 for low B/P group and %70 for high B/P group between 1963 and 2006). An alternative method allowing larger deviations in growth is also used in the robustness tests as the following:
if t+1 earnings is positive $g_{t+2} = \frac{Earnings_{t+2} - Earnings_{t+1}}{Earnings_{t+1}}$
if t+1 earnings is negative $g_{t+2} = -[\frac{Earnings_{t+2} - Earnings_{t+1}}{Earnings_{t+1}}]$

E/P Earnings to price ratio is forward earnings (t+1) deflated by market value of equity at time *t*. We use estimates of forward earnings to compute STE following P&R, which are based on reported earnings for year *t* before extraordinary and special items with a tax adjustment to special items at prevailing statutory tax rates for the year [(compustat IB, #18) - (Compustat item SPI, #17)]

ALTEP Long term earnings calculated using analysts' earnings forecasts from IBES for year *t+1*. We use the first consensus (median) forecast released between 0 and 60 days after the year *t* actual earnings is announced.

NOA Net operating assets used to calculate HR/NOA as an alternative to HR/P. NOA=Plant Property Equipment (Compustat PPENT, #8)+Current Assets (Compustat ACT, #4) - Cash & short term investment (Compustat CHE, # 1) - Operating liabilities (Current liabilities, Compustat LCT, #5) – current debt Compustat DLC, #34)

Rf Risk free rate, 10-year US Treasury bond rate for the relevant year between 1963-2014 obtained from the WRDS database US Federal Reserve, H15 reports

Table 3.1

Descriptive statistics for variables used in the analysis

	N	Mean	Std.Dev	25%	Median	75%
HR/P $_t$	103,645	0.155	0.181	0.033	0.089	0.206
B/P $_t$	103,645	0.760	0.871	0.292	0.543	0.958
E_{t+1}/P_t	103,645	0.020	0.206	0.001	0.049	0.089
Return $_{t+1}$ *(%)*	105,358	15.61	60.24	-15.36	13.75	43.41
Growth $_{t+2}$ *(%)*	97,595	3.48	96.38	-33.56	1.09	44.61
STE/P $_t$	103,645	-0.340	2.696	-0.854	0.283	0.928
LTE/P $_t$	103,645	0.580	2.681	-0.611	0.163	1.117
Market Value of equity (million $)	103,645	1979.3	12566	23.1	103.3	547.7

HR/P denotes hidden reserves, *Return* average annual future stock returns, *Growth* futue earnings growth, *B/P* book to price, *E/P* forward earnings to price, *STE (LTE)* short (long) term earnings where *B/P+STE/P+LTE/P=1* . The distributions are from data pooled over firms and years. Variables (except for returns, growth and MV) are winsorised to %1 and %99 to avoid extreme observations. See Appendix for variable definitions.

Table 3.2

Correlations: Pearson (above diagonal) and Spearman (below diagonal)

	HR/P_t	B/P_t	E_{t+1}/P_t	$Return_{t+1}$	$Growth_{t+2}$	STE/P_t	LTE/P_t
HR/P_t	-	0.40 ***	-0.19 ***	0.12 ***	0.07 ***	-0.24 ***	0.11 ***
B/P_t	0.38 ***	-	0.12 ***	0.13 ***	0.07 ***	-0.18 ***	-0.15 ***
E_{t+1}/P_t	-0.02 ***	0.37 ***	-	0.08 ***	-0.09 ***	0.50 ***	-0.62 ***
$Return_{t+1}$	0.10 ***	0.09 ***	0.04 ***	-	0.11 ***	0.11 ***	-0.15 ***
$Growth_{t+2}$	0.05 ***	0.04 ***	-0.09 ***	0.15 ***	-	-0.21 ***	0.20 ***
STE/P_t	-0.21 ***	-0.09 ***	0.47 ***	0.23 ***	-0.16 ***	-	-0.95 ***
LTE/P_t	0.07 ***	-0.23 ***	-0.51 ***	-0.27 ***	0.15 ***	-0.91 ***	-

The sample consists of 103,645 firm year observations. *HR/P* denotes hidden reserves, *Return* average annual future stock returns, *Growth* futue earnings growth, *B/P* book to price, *E/P* forward earnings to price, *STE (LTE)* short (long) term earnings where $B/P+STE/P+LTE/P=1$. The distributions are from data pooled over firms and years. Variables (except for returns and growth) are winsorised to %1 and %99 to avoid extreme observations. See Appendix for variable definitions. *** denotes the statistical significance at 1% level

Table 3.3

Characteristics of HR/P portfolios with respect to other variables used in the tests

HR/P portfolios	Mean B/P	Mean E/P	Mean Annual Returns (%)	Mean Earnings Growth (%)	Mean Residual Earnings Growth	Mean STE/P	Mean LTE/P
Low	0.544	0.038	8.76	-2.45	-6.24	0.185	0.269
2	0.562	0.045	9.80	-1.34	-5.53	0.264	0.175
3	0.571	0.044	12.16	-0.28	-3.94	0.211	0.216
4	0.592	0.046	12.91	0.39	-2.76	0.191	0.217
5	0.633	0.045	14.22	1.86	-1.18	0.144	0.223
6	0.693	0.041	16.89	2.72	1.97	-0.038	0.345
7	0.758	0.035	17.32	6.04	4.59	-0.191	0.433
8	0.838	0.022	20.59	8.56	9.9	-0.542	0.705
9	0.973	-0.005	23.56	12.48	14.3	-1.136	1.162
High	1.435	-0.107	32.23	19.97	20.73	-2.488	2.052
High-Low	**0.891**	**-0.145**	**23.47**	**22.42**	**26.97**	**-2.673**	**1.783**
t-stat	***50.02***	***-31.71***	***23.56***	***15.72***	***16.81***	***-58.51***	***53.17***

The sample consists of 103,645 firm year observations. Portfolios are formed each year between 1963-2014 by ranking firms in equal numbers into ten deciles three months after fiscal year end according to their HR/P from low to high. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each HR/P portfolio, we then observe B/P, E/P, LTE/P, STE/P, future earnings growth and future stock returns (buy and hold returns are accumulated over twelve months following the portfolio formation date each year. We report the average of these annual returns). Other numbers reported are the means over years of portfolio means for each year. The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios (as are the other t-statistics in the following tables). *HR/P* denotes hidden reserves, *Return* average annual future stock returns, *Growth* futue earnings growth, *B/P* book to price, *E/P* forward earnings to price, *STE (LTE)* short (long) term earnings where *B/P+STE/P+LTE/P=1.* The distributions are from data pooled over firms and years. Variables (except for returns and growth) are winsorised to %1 and %99 to avoid extreme observations. See Appendix for variable definitions.

Table 3.4

Mean Annual Returns (%) to LTE/P and HR/P portfolios

Ranking on LTE/P (a reverse ranking on E/P)		**Low**	**2**	**3**	**4**	**High**	**H-L**	***t-stat***
		35.9	21.7	12.2	3.2	1.5	-34.4	*-79.06*
		LTE/P						
HR to Price (HR / P)	**Low**	35.1	19.8	9.8	-1.7	-4.1		
	2	36.7	20.9	11.3	-0.6	-1.9		
	3	37.1	21.5	10.8	1.7	2.4		
	4	41.1	22.5	12.3	5.4	6.1		
	High	40.5	26.3	18.1	13.3	14.4		
	H-L	5.4	6.5	8.3	15	18.5		
	t-stat	*5.06*	*7.40*	*8.25*	*13.23*	*12.89*		

The sample consists of 103,645 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their LTE/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each LTE/P portfolio, we observe future returns (buy and hold stcok returns are accumulated over twelve months following the portfolio formation date each year. We report the average of these annual returns). The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except returns) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each LTE/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their HR/P from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future returns as defined above.

Table 3.5

Mean Earnings Growth (%) to LTE/P and HR/P portfolios

Ranking on LTE/P (a reverse ranking on E/P)		Low	2	3	4	High	H-L	*t-stat*
		-2.1	2.9	10.8	39.4	54.9	57	*69.32*
		LTE/P						
HR to Price (HR / P)	**Low**	-5.1	1.5	8.5	27.9	44.7		
	2	-3.4	3.0	7.3	30.9	46.1		
	3	-3.9	1.5	7.3	35.2	51.6		
	4	-1.9	3.8	10.5	47.1	62.1		
	High	3.8	5.6	20.4	55.9	70.0		
	H-L	8.9	4.1	11.9	28	25.3		
	t-stat	*6.95*	*3.43*	*8.04*	*10.93*	*10.88*		

The sample consists of 97,595 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their LTE/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each LTE/P portfolio, we observe future earnings growth (after t+1). We report the annual average of these growth rates. The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except growth rate) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each LTE/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their HR/P from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future earnings growth (after t+1).

Table 3.6

Mean annual returns (%) to B/P and HR/P portfolios

		Low	2	3	4	High	H-L	*t-stat*
Ranking on B/P alone		9.6	12.5	15.1	18.5	22.9	13.3	*25.65*
				B/P				
HR to Price (HR / P)	**Low**	6	10	13	17.7	19.5		
	2	9.3	12.7	14.9	18.2	22.3		
	3	12.1	14.7	16.0	19.3	26.4		
	4	12.5	16.3	19.4	22.6	28.5		
	High	23	23.7	24.8	28.7	29.9		
	H-L	17	13.7	11.8	11	10.4		
	t-stat	*10.13*	*9.16*	*8.53*	*7.65*	*6.98*		

The sample consists of 103,645 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their B/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each B/P portfolio, we observe future returns (buy and hold stcok returns are accumulated over twelve months following the portfolio formation date each year. We report the average of these annual returns). The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except returns) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each B/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their HR/P from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future returns as defined above.

Table 3.7

Mean Earnings Growth (%) to B/P and HR/P portfolios

		Low	2	3	4	High	H-L	*t-stat*
Ranking on B/P alone		15.8	14.2	17.4	23.7	35.4	19.6	*22.28*
				B/P				
HR to Price (HR / P)	**Low**	10.7	12.4	12.3	17.3	29.4		
	2	8.9	11.7	10.5	18.9	31.4		
	3	13.2	12.6	13.0	20.4	39.4		
	4	15.35	17.3	17.6	26.2	41.2		
	High	22.5	24.9	31.9	35.9	35.5		
	H-L	11.8	12.5	19.6	18.6	6.1		
	t-stat	*6.80*	*6.75*	*10.79*	*9.17*	*2.85*		

The sample consists of 97,595 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their B/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each B/P portfolio, we observe future earnings growth (after t+1). We report the annual average of these growth rates. The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except growth rate) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each B/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their HR/P from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future earnings growth (after t+1).

Table 3.8

Mean Earnings Growth (%) to B/P and returns portfolios

		Low	2	3	4	High	H-L	*t-stat*
Ranking on B/P alone		15.8	14.2	17.4	23.7	35.4	19.6	*22.28*
				B/P				
Annual Stock Returns (%)	**Low**	-18.1	-15.5	-14.1	-6.5	8.5		
	2	-10.6	-10.4	-7.8	-3.6	4.4		
	3	1.6	2.2	1.8	2.4	7.8		
	4	6.7	7.6	7.7	10.3	15.1		
	High	15.1	16.7	17.5	19.1	24.7		
	H-L	33.2	32.2	31.6	25.6	16.2		
	t-stat	*18.29*	*17.94*	*16.97*	*12.82*	*7.51*		

The sample consists of 97,595 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their B/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each B/P portfolio, we observe future earnings growth (after t+1). We report the annual average of these growth rates. The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except growth rate) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each B/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their annual returns (at t+1) from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future earnings growth (after t+1).

Table 3.9

Mean Earnings Growth (%) to HR/P and returns portfolios

Ranking on HR/P alone		Low	2	3	4	High	H-L	*t-stat*
		-2.0	0.3	2.4	7.2	16.7	18.7	*18.83*
		HR/P						
Annual Stock Returns (%)	**Low**	-21.7	-19.5	-13.6	-14.4	-15.5		
	2	-9.2	-10.1	5.9	3.2	6.7		
	3	0	-1.9	1.2	3.6	8.1		
	4	5.8	7.9	10.1	12.4	16.7		
	High	12.9	17.6	18.4	18.6	26.3		
	H-L	34.6	37.1	32	33	41.8		
	t-stat	*15.79*	*17.27*	*14.09*	*8.41*	*4.27*		

The sample consists of 97,595 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their HR/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each B/P portfolio, we observe future earnings growth (after t+1). We report the annual average of these growth rates. The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except growth rate) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each HR/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their annual returns (at t+1) from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future earnings growth (after t+1).

Table 3.10

Mean Annual Returns (%) to ALTE/P and HR/P portfolios

		Low	2	3	4	High	H-L	*t-stat*
Ranking on ALTE/P alone		24.4	18.5	14.0	11.9	11.9	-12.5	*-15.17*
				ALTE/P				
HR to Price (HR / P)	**Low**	21.0	15.6	12.9	8.5	9.7		
	2	22.8	17.2	12.7	11.2	10.9		
	3	22.9	20.6	15.0	10.7	13.1		
	4	24.7	19.6	17.2	12.7	13.9		
	High	33.7	24.8	18.7	16.5	16.7		
	H-L	12.7	9.2	5.8	8	7		
	t-stat	*4.54*	*4.72*	*3.22*	*4.47*	*3.36*		

ALTE denotes the long term earnings (LTE) computed using the initial analysts' consensus earnings forecast for year t+1 (after the year t earnings is announced). Forecasts are obtained from the IBES files during 1977-2014 period (available data period). The sample consists of 52,235 firm year observations. To form portfolios in the upper part of the Table, between 1977-2014 each year, we rank firms in equal numbers into five quintiles on their ALTE/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each ALTE/P portfolio, we observe future returns (buy and hold stcok returns are accumulated over twelve months following the portfolio formation date each year. We report the average of these annual returns). The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except returns) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each ALTE/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their HR/P from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future returns as defined above.

Table 3.11

Mean Annual Returns (%) to LTE/P and HR/NOA portfolios

Ranking on LTE/P (a reverse ranking on E/P)		Low	2	3	4	High	H-L	*t-stat*
		35.9	21.7	12.2	3.2	1.5	-34.4	*-78.80*
				LTE/P				
HR/NOA	**Low**	34.0	19.2	10.2	0.4	-3.3		
	2	35.3	20.0	9.4	-0.2	-0.1		
	3	36.0	21.5	10.1	2.9	0.4		
	4	39.3	23.4	14.4	5.3	4.7		
	High	44.4	30.3	20.1	9.3	9.8		
	H-L	10.4	11.1	9.9	8.9	13.1		
	t-stat	*9.67*	*11.90*	*10.34*	*7.61*	*7.61*		

The sample consists of 103,645 firm year observations. To form portfolios in the upper part of the Table, between 1963-2014 each year, we rank firms in equal numbers into five quintiles on their LTE/P from low to high three months after fiscal year end. Cut-off points for the allocation of stocks to the portfolios are those for the prior year data to avoid look-ahead bias as in P&R. For each LTE/P portfolio, we observe future returns (buy and hold stcok returns are accumulated over twelve months following the portfolio formation date each year. We report the average of these annual returns). The t-statistics are calculated as the mean differences over years between the highest and lowest portfolios. See Appendix for variable definitions. Variables (except returns) are winsorised to %1 and %99.

To form joint portfolios in the lower part of the table, within each LTE/P quintile formed above, we regroup firms each year in equal numbers into five quintiles this time on their HR/NOA from low to high three months after fiscal year end. This process results in twenty-five joint portfolios, and for each joint portfolio, we observe future returns as defined above.

Table 3.12

Return regressions on HR/P and B/P (1963-2014)

$$Ret_{it+1} = \beta_0 + \beta_1 HR/P_{it} + \beta_2 B/P_{it} + \delta_j X_{it} + \varepsilon_{it+1}$$

	B/P alone		**HR/P alone**		**HR/P and B/P together**	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Intercept	0.262 ***		0.245 ***		0.242 ***	
HR/P (a)			0.091 ***	*25.17*	0.086 ***	*22.57*
B/P (b)	0.008 ***	*11.69*			0.003 ***	*3.63*
Diff (a-b)					0.083 ***	*20.25*
CONTROLS	*YES*		*YES*		*YES*	
%R^2	72.2		72.3		72.4	
N	103.289		103.289		103.289	

Table reports the results of equations (4). Ret denotes annual buy and hold returns for firm i at time t+1 accumulated over 12 months starting from after three month of fiscal year end. X denotes controls; firm size (logMv), market Beta, E/P and past returns. Beta is estimated by 60 month rolling regression using the market model (Reti-Rf)=α+βi(Retm-Rf)+εi. Rf is the risk free rate (the 10-year US Treasury bond rate) from the US Federal Reserve, H15 report for the relevant year, (Retm-Rf) the equity risk premium of the market portfolio, Retm the CRSP monthly value weighted return on a market portfolio cumulated over 12 months. Variables (except return and LogMV) are winsorised to 1% and 99% to eliminate extreme observations. *** denotes the statistical significance at 1% level.

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