Accounting Reporting Complexity and Firm-Level Investment Efficiency

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ABSTRACT

This paper is the first to examine the relationship between accounting reporting complexity and real economic activity. In doing so, it answers the call in Leuz and Wysocki (2016) for a better understanding of the real effects of disclosure and reporting activities. The results presented in this paper indicate that accounting reporting complexity is associated with increased firm-level investment efficiency, and that this is driven by both lower over-investment and lower under-investment. These results are robust to alternative specifications and to the effects arising from operating and linguistic complexity. The results suggest that managers facing more complex accounting reporting may be actively seeking to reduce informational frictions with the capital markets. This study is particularly relevant to standard-setters and regulators who are increasingly concerned with the potential implications of accounting reporting complexity.

Keywords: accounting reporting complexity; capital investment; XBRL; financial reporting quality.

JEL Classification: M41; G31

Data Availability: Data are available from the sources cited in the paper.

I. INTRODUCTION

Firm-level investment is a fundamental determinant of both micro- and macro-economic viability. This study is the first to look at the relationship between accounting reporting complexity and firm-level investment activity, and in doing so, answers the call in Leuz and Wysocki (2016) for a better understanding of the real effects of disclosure and reporting activities. Accounting reporting complexity (*ARC*) and its implications is of growing concern to standard-setters and regulators. This concern stems in part from the sheer volume of accounting standards and the increasing difficulty associated with applying these standards (SEC 2008). If firms are not able to produce financial reports that reflect economic and business reality, stakeholders – both external and internal to the firm – may not be able to accurately assess the firm’s economic position, which in turn may lead to misallocation of resources. As Leuz and Wysocki (2016) note, “[a]n important effect of disclosure and reporting is that they feed back into corporate decision-making and have real effects.” To date, the consequences, if any, of accounting reporting complexity as they relate to corporate investment are not clear. To my knowledge, this is the first study looking at the relationship between accounting reporting complexity and firm-level investment efficiency.

In a public statement, former SEC Commissioner Cynthia Glassman highlights the importance of addressing accounting reporting complexity, noting that “[w]hether financial statements are inaccurate because of fraud or complex financial standards, the result can be the same - an erosion of confidence in the disclosure that fosters investment, and adverse effects on the economy and people's financial wellbeing” (Glassman 2006). Commissioner Glassman further underlines the troubling trend in which some companies alter the way they otherwise would do business for the purpose of meeting reporting shortcuts of particularly complex

accounting regulation. This sentiment is echoed by FASB Chairman Russell Golden who acknowledges that some preparers avoid certain transactions in order to bypass the complexity in the corresponding accounting regulation (Golden 2017). Whether accounting reporting complexity impacts firm-level economic productivity remains a fundamentally important question. This paper takes an important step in addressing this question by examining whether accounting reporting complexity is associated with firm-level investment efficiency.

Two key constructs used in the analysis are investment efficiency and accounting reporting complexity. First, following Biddle and Hilary (2006) and Biddle, Hilary, and Verdi (2009), firm-level investment efficiency is defined as the undertaking of positive net present value (NPV) projects in a frictionless environment. Under-investment is defined as failing to invest in positive NPV projects even in the absence of market frictions, whereas over-investment is defined as investing in negative NPV projects. The second construct, accounting reporting complexity (*ARC*), is defined as the complexity associated with the volume of accounting concepts firms must apply to their financial statements, and operationalized using a novel measure introduced and validated by R. Hoitash and U. Hoitash (2018) which measures the count of unique monetary accounting concepts (e.g., sales revenue) disclosed in the firm's eXtensible Business Reporting Language (XBRL) filings, where each concept maps directly to the FASB's Accounting Standards Codification (ASC).²

As noted in Hoitash and Hoitash (2018), prior literature captures reporting complexity primarily via operating or linguistic measures.³ *ARC* is distinct from these measures and instead

² The SEC (2009) rule, *Interactive Data to Improve Financial Reporting*, requires firms using U.S. GAAP to provide their Item 8 disclosures in XBRL format as a separate filing. XBRL is a digital language that enables firms to label or "tag" all quantitative elements within financial statements and footnotes. The concepts are tagged using a standardized reporting terminology that maps to FASB codification.

³ These measures are discussed in Section II below. Briefly, commonly used proxies for operational complexity include the number of business and geographic segments and the existence of foreign operations; while these

captures the complexity of financial reports as measured by the volume of disclosed accounting concepts. Further, *ARC* can be divided into its two components: *ARC_Taxonomy*, which measures the count of standardized tags approved and maintained by FASB; and *ARC_Extension*, which is the count of company-specific extension tags created by the firm. The purpose of extension tags is to provide management with the discretion to faithfully represent the firm's reporting needs. Since extension tags introduce management discretion, and since prior literature is inconclusive on the relationship between extension tags and financial reporting (e.g., Debreceeny, Farewell, Piechocki, Felden Graning, and d'Eri 2011; Hoitash and Hoitash 2018; Kim, Li, and Liu 2019), I examine all three accounting reporting complexity measures in the analysis below: *ARC*, *ARC_Taxonomy*, and *ARC_Extension*.

It is not clear, however, in which direction, if at all, accounting reporting complexity would be associated with firm-level investment efficiency. Firms with greater economic activity use more accounting concepts to disclose their activities in financial reports. So, while we might expect more investment, we would not necessarily expect it to be more *efficient* investment. Prior studies (e.g., Biddle and Hilary 2006; Biddle et al. 2009) looking at the relationship between investment efficiency and financial reporting quality, find that higher financial reporting quality is associated with more efficient investment. However, these studies operationalize financial reporting quality via accruals quality and the Gunning-Fog-Index. Hoitash and Hoitash (2018) find no association between *ARC* and accruals quality, and find a negative association between *ARC* and the Gunning-Fog-Index, suggesting the two capture different measures of financial

proxies likely capture aspects of accounting complexity, they exhibit little within-firm variation and are not based on a comprehensive set of accounting disclosures. Commonly used proxies for linguistic complexity include the length (word count) and readability (Gunning-Fog-Index) of the annual reports; yet, Hoitash and Hoitash (2018) find little to no relation between these measures and the firm's underlying accounting and economic changes. In the analyses below, I control for these operational and linguistic measures. I also include the disclosure quality measure of Chen, Miao, and Shevlin (2015) to control for the level of disaggregation of the financial statements.

reporting.⁴ Furthermore, in recent work, Loughran and McDonald (2014, 2016) argue that the Gunning-Fog-Index may be poorly specified when used for the purpose of evaluating financial documents. *ARC*, on the other hand, is derived directly from the volume of accounting standards linked to the firm's economic transactions as reported in Item 8 of the 10-K. And while managers may be able to influence linguistic complexity, their ability to influence accounting standards used in financial reports is limited.

Though it may not be clear in which direction *ARC* would be associated with firm-level investment efficiency, it is possible that complexity in accounting reporting, may increase information asymmetry between firms and external suppliers of capital. If complexity in financial reports leads to inaccuracies in reporting (as suggested above by Commissioner Glassman), this may exacerbate adverse selection in the issuance of securities, and firms that rely on external capital to fund investments may forgo positive NPV projects, regardless of whether reporting complexity is an intentional choice to obfuscate information. Furthermore, monitoring firms with higher accounting reporting complexity may be more difficult. This difficulty in monitoring may in turn facilitate misallocation of resources, and potentially enable empire building in firms with ample capital.

On the other hand, if higher reporting complexity is a reflection of the firm's complex reporting environment and not an intentional choice by managers to obfuscate financial reports (Bloomfield 2008; Bushee, Gow, and Taylor 2018), firms with higher accounting reporting complexity may actively attempt to mitigate the informational frictions arising from increasing

⁴ The literature uses different proxies for the term 'Financial Reporting Quality' (FRQ). When possible, and to avoid confusion, I refer to the specific proxies used, rather than the generic term FRQ. Biddle and Hilary (2006), for example, proxy FRQ via accruals quality. Hoitash and Hoitash (2018) proxy FRQ in part using the firm's likelihood of misstatements and material weakness, as well as its accruals quality. While Hoitash and Hoitash (2018) find a negative association between *ARC* and FRQ (as defined by the likelihood of misstatements and material weakness disclosures), they find no association with FRQ as defined by accruals quality.

reporting complexity. Indeed, recent studies show that firms facing more complex reporting environments issue voluntary disclosures in the form of management earnings forecasts (Guay, Samuels, and Taylor 2016) and non-GAAP earnings disclosures (Brown, Cohen, and Huffman 2019). It could be argued that these firms may be actively seeking to inform markets in an attempt to reduce informational frictions with external users of financial statements, including external suppliers of capital. Firms that rely on external capital to fund investments may no longer be forced to forgo positive NPV projects. Furthermore, Chychyla, Leone, and Minutti-Meza (2019) find that firms facing higher reporting complexity actively invest in board-level expertise in order to mitigate the negative impact of financial reporting complexity. By extension, it could be argued that firms facing higher reporting complexity prioritize the acquisition of internal management expertise in general, thereby enhancing overall firm operations, including investment efficiency.

In the analysis below, I follow the work of Biddle and Hilary (2006) and Biddle et al. (2009) who use investment models to assess the relationship between financial reporting quality and firm-level investment efficiency. I examine whether *ARC* is associated with firm-level investment efficiency and find that *ARC* is associated with enhanced investment efficiency, and that this is due to both a reduction in over- and under-investment. Furthermore, these results are driven by the complexity associated with the FASB taxonomy tags. Interestingly, the firm-created extension tags are not associated with a decrease in investment efficiency, suggesting that managers are not trying to introduce opaqueness into financial reports via firm-created extension tags.⁵ Overall, the results suggest that managers may be trying to actively mitigate the negative impact of reporting complexity and reduce information asymmetry with the capital

⁵ This is consistent with Bushee et al. (2018) who find that components of linguistic complexity in firm disclosures may be informative and serve to decrease information asymmetry.

markets. The results are robust to alternative specifications, as well as the effects arising from operating and linguistic complexity, and a battery of control variables, including controls for corporate governance.

This paper makes several contributions to the literature and to practice. To my knowledge this is the first study looking at the relationship between accounting reporting complexity and firm-level investment activity. In doing so, it answers the call in Leuz and Wysocki (2016) for a better understanding of the real effects of disclosure and reporting activities. Second, it contributes to a nascent but growing body of research in the accounting literature looking at the role of external reporting and internal investment decisions (e.g., Biddle and Hilary 2006; McNichols and Stubben 2008; Biddle et al. 2009; Cheng, Dhaliwal, and Zhang 2013; Goodman, Neamtiu, Shroff, and White 2014). While these studies look at financial reporting quality attributes, they do not examine the relationship between accounting reporting complexity and investment decisions. This may be because, until recently, a comprehensive measure for capturing accounting reporting complexity did not exist. Therefore, this paper also extends a nascent body of literature examining the implications of reporting complexity using a newly developed comprehensive XBRL-based measure for accounting reporting complexity (e.g., Hoitash and Hoitash 2018; Brown et al. 2019; Chychyla et al. 2019; Hoitash, Hoitash, and Yezegel 2019).⁶ These studies have shown that accounting reporting complexity is associated with higher likelihood of misstatements and material weakness disclosures (Hoitash and Hoitash 2018) and lower analyst performance (Hoitash et al. 2019), and that firms actively try to mitigate the negative consequences of ARC by increasing accounting expertise on the board and audit

⁶ While these studies utilize data within the XBRL filings, other studies look at the capital market implications of XBRL adoption (e.g., Blankespoor, Miller, and White 2014; Bhattacharya, Cho, and Kim 2018; and Blankespoor 2019).

committee (Chychyla et al. 2019) and issuing non-GAAP earnings disclosures (Brown et al. 2019). The current paper provides evidence that ARC is associated with firm-level investment efficiency, suggesting that managers facing more complex accounting reporting may be actively seeking to reduce informational frictions with the capital markets. Given the growing concern among regulators and standard-setters over the potential implications of increasing accounting reporting complexity, this study offers unique insights about the relationship between external financial reporting and internal firm-level investing activities.

The remainder of the paper proceeds as follows: Section 2 provides background information and develops a testable hypothesis; Section 3 describes the research design; Section 4 presents the main results; Section 5 presents robustness tests; and Section 6 Concludes.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Investment Efficiency

In a frictionless environment, corporate investment should be solely a function of a firm's investment opportunity set (Modigliani and Miller 1958). Therefore, the extent to which corporate investment is associated with a firm's reporting activity is essential to our understanding of how disclosures impact real economic activity. In their survey paper, Leuz and Wysocki (2016) note that "there is relatively sparse empirical evidence on real effects of disclosure and reporting activities..." and that "we need more empirical research on the prevalence and magnitude of real effects with respect to corporate investment and other real economy actions."

The accounting literature looking at the role of external reporting and internal investment decisions is a nascent but growing area. Biddle and Hillary (2006) examine how financial reporting quality, as measured by accruals quality, relates to investment efficiency and find that

higher quality accruals are associated with greater investment efficiency. Biddle et al. (2009) extend this result and find that higher financial reporting quality, as measured by a combination of accruals quality and the Gunning-Fog-Index, is associated with a reduction of both over- and under-investment. And Cheng et al. (2013) extend this further by providing causal evidence on the relationship between financial reporting quality (as measured by a firm's transition from a pre- to post-disclosure period of internal control weakness) and investment efficiency. These studies are predicated in part on information asymmetry between firms and outside suppliers of capital.

Other studies have focused internally at firm management. Richardson (2006) provides evidence, consistent with agency theory, that managers tend to overinvest free cash flow, and that certain governance structures mitigate this overinvestment. McNichols and Stubben (2008) find a relationship between overinvestment and earnings management, suggesting a disconnect between managers making investment decisions and those distorting external financial reports. Goodman et al. (2014) show that firms in which managers make higher quality external earnings forecast make better investment decisions, suggesting that managers making investment decisions draw on the same skills used to generate management forecasts. Collectively, these studies look at the relationship between investment and financial reporting quality attributes, proxied primarily via earnings quality. They do not however examine the relationship between investment decisions and reporting complexity. This may be because, until recently, a comprehensive measure for capturing accounting reporting complexity did not exist.

Accounting Reporting Complexity

Until recently, measures that directly rely on accounting information to measure complexity have looked at specific stand-alone accounting standards; these include tax

accounting (Plumlee 2003), revenue recognition (Peterson 2012), accounting for derivatives (Chang et al. 2016; Guay et al. 2016), and fair value accounting (Guay et al. 2016). Hoitash and Hoitash (2018) introduce and validate a comprehensive measure of firm-level accounting reporting complexity (*ARC*) based on the reporting complexity definition set by the SEC (SEC 2008). *ARC* relies on the count of distinct XBRL monetary tags a firm must apply to its financial statements in compliance with SEC guidelines (SEC 2009), where each tag represents a unique accounting concept (e.g., current assets) used by the firm to communicate its business activities and financial results.

Prior studies seeking to capture a broad measure of reporting complexity rely primarily on operating and linguistic based measures. Examples of operating complexity proxies commonly used in the literature include the number of business and geographic segments and the existence of foreign operations. Since accounting complexity is inherently influenced by the firm's economic activities, *ARC* likely captures aspects of these operational complexity proxies. However, unlike these proxies, *ARC* is directly linked to corporate disclosures and allows for within-firm variation. Furthermore, as Hoitash and Hoitash (2018) find, *ARC* more faithfully reflects firm-level accounting and economic changes.

Linguistic complexity measures attempt to capture the readability of financial statements and are often proxied by the Gunning-Fog-Index or the length of the 10-K filings. While Dyer, Lang, and Stice-Lawrence (2017) find that disclosures related to the FASB and SEC requirements are responsible for much of the increase in annual report length, Hoitash and Hoitash (2018) find that, unlike *ARC*, annual report length and readability (Gunning-Fog-Index) exhibit little or no relation to underlying accounting and economic changes at the firm-level.

The *ARC* measure can be further divided into its two components: *ARC_Taxonomy*, which measures the count of standardized tags approved and maintained by FASB; and *ARC_Extension*, which is the count of company-specific extension tags created by the firm. In order to allow firms to faithfully capture their reporting needs, and because firms may have unique accounting concepts that are not covered by the XBRL taxonomy, the SEC allows for company-specific tags to be created. Unlike taxonomy tags, these tags are not standardized and not comparable across firms. While extension tags introduce managerial discretion, prior literature is inconclusive as to whether extension tags are associated with managerial obfuscation (e.g., Dechow et al. 2011; Hoitash and Hoitash 2018; Kim et al. 2019).

Hypothesis Development

It is not clear whether and in what direction accounting reporting complexity would be associated with investment efficiency. On the one hand, it is possible that complexity in accounting reporting may increase information asymmetry between firms and external suppliers of capital, regardless of whether reporting complexity is an intentional choice to obfuscate information. If complexity in financial reports leads to inaccuracies in reporting, this may exacerbate adverse selection in the issuance of securities. As a result, firms that rely on external capital to fund investments may forgo positive NPV projects. Indeed, Hoitash and Hoitash (2018) find that *ARC* is associated with inaccuracies in reporting, as measured by a greater likelihood of misstatements and material weakness disclosures. This may in turn negatively impact the issuance of securities.⁷ Similarly, it is also possible that complexity in accounting reporting may increase informational frictions among stakeholders within the firm. McNichols

⁷ Prior studies have shown that firms with higher linguistic complexity exhibit greater informational frictions with capital markets, including higher cost of public debt (Bonsall and Miller 2017) and greater reliance on bank lending to reduce these informational frictions (Chakraborty, Leone, Minutti-Meza, and Phillips 2018).

and Stubben (2008), in an earnings management setting, show that managers may be adversely impacted by the quality of the firm's external financial reports, leading them to make suboptimal firm-level investment decisions.

In addition, monitoring firms with higher accounting reporting complexity may be more difficult. In fact, Hoitash et al. (2019) find that analysts covering firms with higher accounting reporting complexity exhibit low forecast accuracy and high forecast dispersion, highlighting the difficulty accounting reporting complexity presents for these external monitors. Monitoring may be further exacerbated by the use of firm-specific extension tags (*ARC_Extension*). Given the discretion firms have in the usage of extension tags and that these tags are not standardized across firms, an increase in firm-specific accounting reporting complexity may make information processing more difficult for external monitors. This difficulty in monitoring may in turn facilitate misallocation of resources to negative NPV projects, potentially enabling empire building in firms with ample capital.

On the other hand, if higher reporting complexity is a reflection of the firm's complex reporting environment and not an intentional choice by managers to obfuscate financial reports (Bloomfield 2008; Bushee, Gow, and Taylor 2018), firms with higher accounting reporting complexity may actively attempt to mitigate the informational frictions arising from increasing reporting complexity. In their survey paper, Dichev, Graham, Harvey, and Rajgopal (2013) confirm that managers are indeed concerned about the increasing trend in reporting complexity linked to accounting rules. Brown et al. (2019) find evidence that as accounting reporting complexity increases, managers actively issue voluntary non-GAAP earnings disclosures in an effort to inform markets. Guay et al. (2016) find evidence that managers use management

forecasts to mitigate the negative effects of complex financial statements.⁸ It could be argued that these firms may be actively seeking to inform markets in an attempt to reduce informational frictions with external users of financial statements, including external suppliers of capital. Firms that rely on external capital to fund investments may no longer be forced to forgo positive NPV projects.

In addition to issuing voluntary disclosure to mitigate informational frictions with capital markets, firms may actively invest in internal management expertise. Goodman et al. (2014) show that firms providing more informative management forecasts are also associated with more efficient investment, suggesting that managers making investment decisions draw on the same skills used to generate external disclosures.⁹ Chychyla, Leone, and Minutti-Meza (2019) find that firms facing higher reporting complexity actively invest in board-level expertise in order to mitigate the negative impact of financial reporting complexity. By extension, it could be argued that, on average, firms facing increasing accounting reporting complexity attempt to mitigate informational frictions by prioritizing the acquisition of internal management expertise, thereby enhancing overall firm operations, including investment efficiency.

Given these competing arguments, I test the hypothesis in the null form as follows:

H1: *Accounting reporting complexity is not associated with firm-level investment efficiency.*

⁸ Guay et al. (2016) focus primarily on the relationship between management forecasts and financial statement readability. However, they also examine the issuance of management forecasts following the adoption of two particularly complex accounting standards, namely fair value and derivatives.

⁹ The link between external reporting and internal decision-making dates to Kaplan (1984) who suggests that firms typically use the same measurement rules for internal decision-making and external reporting. It is supported by theory that predicts a link between the quality of information used for managerial decision-making and external reporting (Hemmer and Labro 2008); and is further corroborated by Dichev et al. (2013) who find that managers use external financial statement numbers for internal decision-making purposes. Furthermore, Shroff (2017), examining changes in GAAP standards, suggests that managers' information sets may be affected by external reporting changes, which may in turn influence their investment decisions.

In the tests that follow I examine accounting reporting complexity in its aggregate form (*ARC*), and using its two subcomponents, *ARC_Taxonomy* and *ARC_Extension*.

III. RESEARCH DESIGN

Variable Definitions

All variables are defined in Appendix A. The main variables used in the analyses are highlighted below. To mitigate the influence of outliers, all continuous variables are winsorized at the 1 percent and 99 percent levels.

Investment

Following prior literature, I use an accounting-based framework to estimate the primary investment variables. Total investment (*Total Investment*) is calculated as the sum of capital expenditure, research and development, and acquisitions less the sale of property, plant and equipment (Richardson 2006; Biddle et al. 2009; Cheng et al. 2013). New investment (*New Investment*) is calculated as *Total Investment* less the investment used to maintain existing assets in place (Richardson 2006). I use *New Investment* as my primary measure of investment since I am interested in the firm's investment expenditure on new projects, rather than in the investment expenditure required to maintain the operation of existing assets.¹⁰

For robustness, I use three additional investment measures. I follow Biddle et al. (2009) and decompose aggregate investment into capital expenditure (*Capex*) and non-capital expenditure (*Non-Capex*). Furthermore, since Bates et al. (2009) document that during the past thirty years research and development has taken on a greater role in overall firm investment, I include research and development (*R&D*) as a separate investment measure.

OverInvestment

¹⁰ The results remain unchanged if *Total Investment* rather than *New Investment* is used in the primary tests. I include *Total Investment* in the robustness tests below.

To test the conditional relationship between accounting reporting complexity and investment, I follow prior literature (e.g., Biddle et al. 2009) suggesting that cash-rich and low-leverage firms are more likely to overinvest. I use these characteristics to proxy for the likelihood a firm deviates from expected level of investment. Following Biddle et al. (2009), I rank firms into deciles based on their cash balance and their leverage, and then rescale the average of these two decile ranks to range between zero and one.¹¹ The resulting variable *OverFirm* is increasing in the likelihood of overinvestment. Focusing the analysis on firms that are prone to suboptimal investment helps increase the power of the test. An additional proxy for *OverInvestment* (*OverIndustry*) is described in the Robustness Section below.

Accounting Reporting Complexity

Accounting reporting complexity (*ARC*) is defined as the complexity associated with the volume of accounting concepts companies must apply to their financial statements (SEC 2008). The measure for *ARC* follows directly from Hoitash and Hoitash (2018). It is the natural log of the number of unique monetary XBRL tags applied and reported in Item 8 of the firm's 10-K filing. Each XBRL tag on a company's filing represents an accounting concept (e.g., current assets) that maps directly to FASB codification. Firms with more complex accounting transactions rely on a greater number of accounting standards and therefore a greater number of XBRL tags in their financial statements. As such, the number of distinct XBRL tags applied corresponds to the volume and complexity of economic activities a firm undertakes (Hoitash and Hoitash 2018). The *ARC* measure is further divided into its two separate components:

ARC_Taxonomy, which represents the count of standardized tags that directly map to FASB

¹¹ Prior to ranking, leverage is multiplied by minus one so that it is also increasing in the likelihood of over-investment.

codification; and *ARC_Extension*, which represents the count of company-specific extension tags created by the firm.

Other Forms of Complexity

Hoitash and Hoitash (2018) find that *ARC* is distinct from traditional measures of operating and linguistic complexity. However, given the prevalence of these measures in the literature, I include them as control variables in order to assess the differential effect of *ARC* on investment efficiency. Operating complexity is captured using three proxies: the number of business segments (*Bus_Seg*); the number of geographic segments (*Geo_Seg*); and an indicator variable for the existence of foreign operations (*Foreign*). While these proxies likely capture some aspects of the firm's economic complexity, unlike *ARC*, they are not directly associated with the accounting codification a firm must follow, and as Hoitash and Hoitash (2018) note, they do not allow for within-firm variation that would capture economic changes.

Linguistic, or textual, complexity is measured using two proxies commonly used in the literature: the Gunning-Fog Index (*Fog*), popularized by Li (2008), to capture the readability level of annual filings; and the natural log of the total number of words within the 10-K (*Length*) to capture filing length. Biddle et al. (2009) use the Gunning-Fog Index (along with accruals quality) to measure reporting quality, as they investigate the relationship between financial reporting quality and investment efficiency.¹² However recently, Loughran and McDonald (2014, 2016) suggest that the Gunning-Fog Index may be poorly specified when used for the purpose of evaluating financial documents; they also note that the measure offers little variation across 10-Ks. Furthermore, while Dyer et al. (2017) note that length of financial reports has

¹² Biddle et al. (2009) multiply the Gunning-Fog Index by minus one so that it is increasing in reporting quality. I do not do so since *FOG* enters the models as a measure of linguistic complexity. However, it is important to keep this sign difference in mind when comparing the regression coefficient obtained here with that of Biddle et al. (2009).

increased in part due to the increase in complexity of accounting standards, Hoitash and Hoitash (2018) find no relation between linguistic measures and the underlying firm-level economic changes. Instead, they present evidence suggesting that linguistic complexity measures capture aspects of disclosure complexity distinct from accounting reporting complexity as measured by *ARC*.

I also control for the level of disaggregation of the financial statements. Chen, Miao, and Shevlin (2015) introduce a measure of disclosure quality (*DQ*) based on the level of disaggregation of financial statement information on Compustat (captured via the number of non-missing Compustat items). I construct this measure based on Chen et al. (2015) and introduce it as a control. It is worthy to note, however, that Hoitash and Hoitash (2018) find that *DQ* and *ARC*, while separately capturing some level of disclosure detail, appear to capture two different constructs.

Finally, to ensure that the relationship between *ARC* and investment efficiency is not merely capturing the occurrence of complex or transitory transactions, I follow Brown et al. (2019) and control for the occurrence or existence of certain economic activities that may increase *ARC*. These controls include: the occurrence of a merger and/or acquisition (*Merger*); the occurrence of restructuring event (*Restructure*); and the discontinuation of operations (*DiscOps*).

Additional Control Variables

A comprehensive list of control variables that prior literature has identified to influence investment efficiency are included in the models and further described in Appendix A.

The Relationship between ARC and Investment Efficiency

To test the relationship between accounting reporting complexity and investment efficiency, I follow the approach presented in Biddle et al. (2009): first, using the conditional relationship between accounting reporting complexity and investment; and second, using the deviation from expected level of investment.¹³

Conditional Relationship between ARC and Investment

Following the approach in Biddle et al. (2009), I test whether accounting reporting complexity is associated with investment when firms are more likely to either over- or under-invest. Specifically, I estimate the following model:

$$Investment_{i,t+1} = \alpha + \beta_1 ARC_{i,t} + \beta_2 ARC_{i,t} * OverInvestment_{i,t+1} + \beta_3 OverInvestment_{i,t+1} + \Sigma \gamma_j Controls_{j,i,t} + \varepsilon_{i,t+1} \quad (1)$$

In this analysis, *OverInvestment* is captured via *OverFirm* as defined above (and in Appendix A). The coefficient on *ARC* (β_1) measures the association between accounting reporting complexity and investment when under-investment is more likely. The coefficient on the interaction between accounting reporting complexity and *OverFirm* (β_2) measures the incremental relationship between accounting reporting complexity and investment as overinvestment becomes more likely. The joint significance of the sum of the coefficients on the main and interaction effects ($\beta_1 + \beta_2$) measures the association between accounting reporting complexity and investment when over-investment is more likely. As mentioned above, *OverFirm* is increasing in the likelihood of overinvestment; focusing the analysis on firms that are prone to suboptimal investment helps increase the power of the test. A negative (positive) relationship between *ARC* and *Investment* when firms are more likely to over-invest (under-invest) would indicate that *ARC* is associated with investment efficiency, whereas a positive (negative)

¹³ Additional tests following the work of Biddle and Hilary (2006) are presented in the Robustness Section.

relationship between *ARC* and *Investment* when firms are more likely to over-invest (under-invest) would indicate that *ARC* is associated with investment inefficiency. No relationship would indicate that *ARC* is not associated with either over- or under-investment when firms are prone to suboptimal investment.

Deviation from the Expected Level of Investment

In this section, I examine whether higher accounting reporting complexity reduces the *likelihood* that firms deviate from the expected level of investment. The difference between this section and the previous one is that the section above tests whether *ARC* is associated with differences in investment given the firm is in a condition more likely to either over- or under-invest, whereas this section directly tests whether *ARC* is associated with a lower likelihood that a firm over- or under-invests. Following the approach in Biddle et al. (2009), I first estimate the following firm-specific model of investment as a function of growth opportunities:¹⁴

$$Investment_{i,t+1} = \beta_0 + \beta_1 SalesGrowth_{i,t} + \varepsilon_{i,t+1} \quad (2)$$

Where *Investment* is aggregate new investment and *SalesGrowth* is the percentage change in sales as defined above (and in Appendix A). Equation (2) is estimated for each industry-year based on the Fama and French 48-industry classification for all industries with at least 20 observations in a given year. The residuals from this model, which measure deviations from predicted investment, are used as a proxy for firm-specific deviations from expected investment. Following Biddle et al. (2009) firms are grouped into quartiles based on the magnitude of the residuals. Firm-year observations in the bottom quartile (i.e., the most negative residuals) are classified as under-investing, observations in the top quartile (i.e., the most positive residuals) are classified as over-investing, and observations in the middle two quartiles serve as the

¹⁴ I follow Biddle et al. (2009) who suggest that sales growth may be a better proxy for growth opportunity. Results hold using Tobin's Q as a proxy for growth opportunity.

benchmark group. I form a variable *Inv_state* that takes the value of one if the firm is in the under-investing quartile, the value of two if the firm is in the middle two quartiles, and the value of three if it is in the over-investing quartile. Using *Inv_state* as the dependent variable, I then estimate a multinomial logit model that predicts the likelihood that a firm will be in one of the extreme quartiles as opposed to the middle quartiles.

If *ARC* is associated with investment efficiency, firms with higher *ARC* will be less likely to be in the top (bottom) quartile of unexplained investment. If *ARC* is associated with investment inefficiency, firms with higher *ARC* will be more likely to be in the top (bottom) quartile of unexplained investment. And we should not observe a significant relationship if *ARC* is not associated with either over- or under-investment.

IV. RESULTS

Sample Selection and Descriptive Statistics

I begin collecting the sample for U.S. firms from fiscal years 2011-2018. The annual XBRL tag-level data covers information in both the firm's financial statements and notes to the financial statements (i.e., Item 8 of the 10-K). I start the sample in 2011 because this is the year XBRL filings became mandatory for all firms reporting under U.S. GAAP. Financial institutions (SIC 6) are excluded because of the different economic nature of investments for these firms. The sample is further restricted to include only those firm-years with available data to calculate the variables used in the study. Data sources used to calculate the variables are identified in Appendix A.

Table 1 presents descriptive statistics for the variables used in the analysis. On average, sample firms report 309 distinct tags (*ARC*) in their financial statements and notes (Item 8 of the 10-K), of which 264 are standardized tags approved and maintained by FASB (*ARC_Taxonomy*) and 45 are company specific extension tags (*ARC_Extension*). The mean (median) *Investment* for sample firms equals 15.62% (8.50%) of prior years' assets. These and the remaining statistics

presented in Table 1 are comparable with prior studies using these measures (e.g., Biddle et al 2009; Hoitash and Hoitash 2018).

Figure 1 presents the univariate relationship between aggregate investment residuals (*Total Investment* and *New Investment*) across three groups of accounting reporting complexity (*ARC*). Panel A presents the relationship for firms that are more likely to under-invest; the positive trend between accounting reporting complexity and the investment residuals indicates that among firms that under-invest, those with higher accounting reporting complexity invest more than those with lower accounting reporting complexity. More interestingly, Panel B presents a univariate analysis for firms classified as over-investing. Here there is a negative trend between accounting reporting complexity and the investment residuals, indicating that among firms that over-invest, firms with higher accounting reporting complexity invest less than those with lower accounting reporting complexity.

The Relationship between ARC and Investment Efficiency

This section examines whether accounting reporting complexity is associated with investment efficiency. Specifically, I test whether accounting reporting complexity is associated with a reduction in over-investment, under-investment, or both. To do so, I examine both the conditional association and the unconditional association between accounting reporting complexity and firm-level investment.

Conditional Relationship between ARC and Investment

The analysis presented in Table 2 tests the relationship between accounting reporting complexity and investment, conditional on the firm being in a setting where over- or under-investment is more likely. The coefficient of interest (β_1) measures the association between accounting reporting complexity and investment when under-investment is more likely. The

coefficient is positive and significant on *ARC* (Column 1), *ARC_Taxonomy* (Column 2), and *ARC_Extension* (Column 3), indicating that accounting reporting complexity is positively associated with investment among firms with a higher likelihood of under-investing. The t-statistics range from 1.91 for *ARC_Extension* to 2.68 for *ARC_Taxonomy*, suggesting that the complexity stemming from the taxonomy tags is driving the positive association between *ARC* and investment (t-statistic = 2.58) among firms that are more likely to under-invest.

The coefficient on the interaction between accounting reporting complexity and *OverFirm* (β_2) measures the incremental relationship between accounting reporting complexity and investment as over-investment becomes more likely. It is negative and significant for *ARC* (t-statistic = -2.87) and *ARC_Taxonomy* (t-statistic = -3.51), however it is not statistically significant for *ARC_Extension*. This too suggests that the association between *ARC* and *Investment* is driven by the taxonomy tags and not the firm-created extension tags.

The joint significance of the sum of the coefficients on the main and interaction effects ($\beta_1 + \beta_2$) measures the association between accounting reporting complexity and investment when over-investment is more likely. This joint significance is negative and significant for *ARC* (Column 1) and *ARC_Taxonomy* (Column 2), however, as for the interaction term, it is not significant for *ARC_Extension* (Column 3). This suggests that among firms that over-invest, there is a negative relationship between investment and accounting reporting complexity, and that this relationship is driven by the taxonomy tags.

Overall, the results in Table 2 suggest that there is a relationship between accounting reporting complexity and firm-level investment efficiency, and that this relationship is characterized by both lower over-investment and lower under-investment. Furthermore, the results suggest that the FASB taxonomy tags are driving the association rather than firm created

extension tags. Interestingly, the extension tags are not associated with a decrease in investment efficiency, suggesting that on average firms use extension tags to inform rather than obfuscate information. Given that the SEC examines use of extended tags (SEC 2019) this may also be an indication of successful monitoring.

Deviation from the Expected Level of Investment

The analysis above tests the relationship between accounting reporting complexity and investment, conditional on the firm being in a setting where over- or under-investment is more likely. Next, I directly model the association between accounting reporting complexity and over- or under-investing using a multinomial logistic regression that tests the likelihood that a firm might be in the extreme investment residual quartiles as a function of accounting reporting complexity. Results of this estimation are reported in Table 3. Panel A presents results predicting the likelihood that a firm will be in the ‘Low’ quartile or the under-investment group (*Inv_state* equals 1); Panel B presents results predicting the likelihood that a firm will be in the ‘High’ quartile or the over-investment group (*Inv_state* equals 3); the case when *Inv_state* equals 2 (i.e., the middle two quartiles) is used as the benchmark. Column 1, in both Panels A and B, presents results using total *ARC*, whereas Column 2 and Column 3 present results for *ARC_Taxonomy* and *ARC_Extension*, respectively.

In all three Columns of Panel A, the coefficient of interest is negative and significant, suggesting that firms with higher accounting reporting complexity are less likely to be in the bottom quartile of unexplained investment. The t-statistics range from -2.15 for *ARC_Extension* to -5.23 for *ARC*. *ARC_Taxonomy* has a t-statistic of -5.22, suggesting, as before, that the complexity stemming from taxonomy tags is driving the association between *ARC* and investment. It is interesting to note that the Gunning-Fog-Index (*FOG*) is positive and

significant, suggesting that firms with lower readability scores are more likely to be in the bottom quartile of unexplained investment; in other words, a decrease in financial statement readability is associated with less efficient investment. This is comparable with Biddle and Hilary (2006) and Biddle et al. (2009) who find that higher financial reporting quality is associated with investment efficiency.¹⁵ It is also consistent with Hoitash and Hoitash (2018), who find that *FOG* and *ARC* are two distinct measures of complexity.

In Panel B of Table 3, the coefficients on *ARC* and *ARC_Taxonomy* are significant (t-statistic of -2.71 and -3.24, respectively), indicating that firms with higher accounting reporting complexity are less likely to be in the top quartile of unexplained investment. The coefficient on *ARC_Extension* is not statistically significant, suggesting that the results observed for *ARC* is driven by the taxonomy tags. The coefficient on *Length* is positive and significant suggesting that firms with higher linguistic complexity are more likely to be in the top quartile of unexplained investment; in other words, an increase in linguistic complexity is associated with less efficient investment.

Taken together, Table 3 suggests that accounting reporting complexity is associated with more efficient investment, as indicated by a decreased likelihood of being in the top or bottom quartiles of unexplained investment, and that this association is driven by the complexity of FASB taxonomy rather than firm created extension tags. Interestingly, the firm-created extension tags are not associated with a decrease in investment efficiency, as would be indicated by a positive and significant coefficient on *ARC_Extension*. Instead, the coefficient on *ARC_Extension* is negative and significant in Panel A and insignificant in Panel B. This suggests

¹⁵ Note that Biddle et al. (2009) multiply the Gunning-Fog Index by minus one so that it is increasing in reporting quality. I do not do so since *FOG* enters the model as a measure of linguistic complexity, with higher *FOG* indicating higher linguistic complexity.

that on average firms use extension tags to inform rather than obfuscate information. Given that the SEC examines use of extended tags (SEC 2019) this may also be an indication of successful monitoring.

V. ROBUSTNESS TESTS

Three additional sets of tests are conducted for robustness purposes. First, I reexamine the analysis using disaggregated measures of investment. Second, I use an alternative measure for the conditioning *OverInvestment* variable. And third, I reexamine the relationship between accounting reporting complexity and firm-level investment efficiency using the approach presented in Biddle and Hilary (2006).

Alternative Investment Variables

In addition to the aggregate investment measure used in the primary analysis above, I rerun the conditional test (Equation 1) using three subcomponents of the aggregate measure: non-capital expenditure (*Non-Capex*), capital expenditure (*Capex*), and research and development (*R&D*). Non-capital expenditure (*Non-Capex*) is total investment less capital expenditure (*Capex*). As discussed below, the results are not affected by the choice of the dependent variable.

Table 4 Panel A presents results using *Non-Capex* as the dependent variable. Consistent with the main results presented in Table 2 above, the coefficient of interest (β_1) on *ARC* (Column 1), *ARC_Taxonomy* (Column 2), and *ARC_Extension* (Column 3) is positive and significant, indicating that accounting reporting complexity is negatively associated with under-investment (i.e., positively associated with investment among firms with a higher likelihood of under-investing). Also consistent with the main results, the overall relationship between accounting reporting complexity and non-capex investment among firms that are more likely to overinvest

(i.e. the joint significance of $\beta_1 + \beta_2$) is negative and significant for *ARC* (t-statistic = -2.45) and *ARC_Taxonomy* (t-statistic = -3.45), but insignificant for *ARC_Extension*. This suggests that accounting reporting complexity is negatively associated with over-investment and that this relationship is driven by the FASB taxonomy tags.

Table 4 Panel B presents results using *Capex* as the dependent variable. Here too, the coefficient of interest (β_1) on *ARC* (Column 1), *ARC_Taxonomy* (Column 2), and *ARC_Extension* (Column 3) is positive and significant, indicating that accounting reporting complexity is negatively associated with under-investment. Also, the coefficient on the interaction term between accounting reporting complexity and overinvestment (β_2) is negative and significant for *ARC* (t-statistic = -2.49) and *ARC_Taxonomy* (t-statistic = -3.01) but insignificant for *ARC_Extension*. The overall relationship between accounting reporting complexity and capital expenditure investment among firms that are more likely to overinvest (i.e. the joint significance of $\beta_1 + \beta_2$) is negative and significant only for *ARC_Taxonomy* (t-statistic = -1.86), again suggesting that the taxonomy tags, rather than the extension tags, are driving the overall relationship between accounting reporting complexity and firm-level investment efficiency. The association between accounting reporting complexity and investment efficiency is relatively weaker when *Capex* is used as the dependent variable rather than *Non-Capex*. This is consistent with Biddle et al. (2009) who also find weaker results for *Capex* than for *Non-Capex*. One possible explanation for this is offered in Bates et al. (2009) who document that capital expenditure among U.S. firms has decreased significantly over the past thirty years, making it an overall less significant component of total investment.

Table 4 Panel C presents results using *R&D* as the dependent variable. These are also similar to the main results reported in Table 2 for aggregate investment. The coefficient on

accounting reporting complexity (β_1) in all three columns is positive and significant indicating that accounting reporting complexity is negatively associated with under-investment (i.e., positively associated with investment among firms with a higher likelihood of under-investing). Also, the coefficients on interaction term between accounting reporting complexity and overinvestment (β_2) and the coefficient on the joint significance ($\beta_1 + \beta_2$), are both negative and significant for *ARC* and *ARC_Taxonomy*, suggesting that accounting reporting complexity is negatively associated with over-investment. However, the coefficient is insignificant for *ARC_Extension*, suggesting that here too, that the complexity stemming from the taxonomy tags is driving the negative association between *ARC* and over-investment.

Additional Over-Investment Proxies

In the main analysis above, the *OverInvestment* conditioning variable *OverFirm* is a ranked variable increasing in the likelihood of over-investment. The rank is based on firm characteristics (cash and leverage) to proxy for the likelihood that a firm will over- or under-invest. For robustness, I follow Biddle et al. (2009) and construct an additional partitioning variable *OverIndustry*. To do so, I estimate an investment model at the industry level using the average aggregate *Investment* and average *Sales Growth* for all industries with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification for each year. The residuals from the industry-year estimation of Eq. (2) is then ranked into deciles to form a measure of aggregate industry-year over-investment, *OverIndustry*. I then estimate Eq. (1) using *OverIndustry* as a proxy for *OverInvestment*.

The results are presented in Table 5. Panel A depicts results using *New Investment* as the dependent variable; and for robustness, Panel B presents results using *Total Investment* as the dependent variable. The results in both Panels A and B are qualitatively similar. The coefficient

on the accounting reporting complexity measure (β_1) is positive and significant for *ARC*, *ARC_Taxonomy*, and *ARC_Extension*, indicating that accounting reporting complexity is positively associated with investment among firms that are more likely to underinvest. The incremental relationship between accounting reporting complexity and overinvestment as depicted by coefficient on the interaction term between all three accounting reporting complexity measures and *OverIndustry* (β_2) is negative and significant. The joint significance ($\beta_1 + \beta_2$) is negative and significant for *ARC* and *ARC_Taxonomy*, suggesting that accounting reporting complexity is associated with lower investment among firms that are more likely to overinvest; however, it is not significant for *ARC_Extension*, suggesting once more that the complexity stemming from the taxonomy tags is driving the negative association between *ARC* and overinvestment.

Additional Tests of the Relationship between ARC and Investment Efficiency

For robustness, to test the relationship between investment efficiency and accounting reporting complexity, I follow Biddle and Hilary (2006) and proxy for investment efficiency via the firm's investment-cash flow sensitivity. As explained in Biddle and Hilary (2006), to the extent that a firm relies on internally generated cash flow (i.e., its investment-cash flow sensitivity) suggests that it is not pursuing value-increasing investment opportunities. I first estimate the following model for each industry-year combination with at least 20 observations in a given year (using Fama and French 48-industry classification), and using firm fixed effects:

$$Investment_{i,t} = \beta_0 + \beta_1 CFO_{sale_{i,t-1}} + \beta_2 SalesGrowth_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

Where *Investment* is aggregate new investment as defined above, *CFO_{sale}* is operating cash flow, and *SalesGrowth*, the percentage change in sales, proxies for investment opportunity.¹⁶

¹⁶ I follow Biddle et al. (2009) who suggest that sales growth may be a better proxy for growth opportunity. Results hold using Tobin's Q as a proxy for growth opportunity.

Investment-cash flow sensitivity (*ICFS*) is capture via β_1 . Following Biddle and Hilary (2006), I then regress the investment-cash flow sensitivity (*ICFS*) on accounting reporting complexity (*ARC*) and a battery of control variables that prior literature has shown to influence a firm's investment-cash flow sensitivity.

$$ICFS_{i,t} = \beta_0 + \beta_1 ARC_{i,t-1} + \sum_j \gamma_j Controls_{j,i,t-1} + \varepsilon_{i,t} \quad (4)$$

A significant positive sign on β_1 would suggest that *ARC* is associated with an increase in investment inefficiency, whereas a significant negative sign would suggest that *ARC* is associated with a decrease in investment inefficiency (or in other words, an increase in investment efficiency). An insignificant relationship would indicate *ARC* is not associated with firm-level investment efficiency.

Table 6 presents the results looking at the relationship between accounting reporting complexity and investment efficiency. Results are presented using total *ARC* (Column 1), as well as its two components, *ARC_Taxonomy* (Column 2) and *ARC_Extension* (Column 3). The coefficients on all three complexity measures are negative and significant (at the $p < .01$ level), indicating that accounting reporting complexity is associated with a reduction in the investment-cash flow sensitivity. That is, higher accounting reporting complexity is associated with more efficient firm-level investment, even after controlling for the differential effects of operating and linguistic complexity.

It is interesting to note that, the Gunning-Fog-Index (*FOG*) is positive and significant indicating that a decrease in readability leads to less efficient investment. This is comparable with Biddle and Hilary (2006) and Biddle et al. (2009) who find that higher financial reporting quality is associated with investment efficiency. It is also consistent with Hoitash and Hoitash (2018), who find that *FOG* and *ARC* are two distinct measures of complexity. Also noteworthy is

that the *DQ* measure, which captures the level of disclosure disaggregation on Compustat and proxies for disclosure quality, is negative and significant (however at the $p < .10$ level). *ARC* therefore exhibits significant association with firm-level investment efficiency even after controlling for the differential effect of *DQ*. The remaining control variables have the expected signs that are consistent with prior literature. Taken together, the results in Table 6 suggest that accounting reporting complexity is associated with more efficient firm-level investment.

VI. CONCLUSION

Accounting reporting complexity and its implications is of growing concern to standard-setters and regulators. This paper is the first to examine the relationship between accounting reporting complexity and firm-level investment efficiency. In doing so, it answers the call in Leuz and Wysocki (2016) for a better understanding of the real effects of disclosure and reporting activities. The results presented in this paper indicate that accounting reporting complexity is associated with increased firm-level investment efficiency, and that this is driven by both lower over-investment and lower under-investment.

Furthermore, when *ARC* is divided into its subcomponents, the results indicate that this relationship is driven by the FASB taxonomy tags; interestingly, the extension tags are not associated with a decrease in investment efficiency, suggesting that, on average, firms use extension tags to inform rather than obfuscate information. Given that the SEC continuously examines use of extension tags (SEC 2019) this may also be an indication of successful monitoring.

The results are robust to alternative specifications and to the effects arising from operating and linguistic complexity. Contrary to prior studies that document the negative consequences of *ARC*, the findings here suggest that *ARC* is associated with enhanced firm-level economic

activity. These results suggest that managers facing more complex accounting reporting may be actively seeking to reduce informational frictions with capital markets. Future work can address the channels by which such a relationship exists.

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APPENDIX A – Variable Definitions

Investment Variables	
<i>Total_Investment</i>	The sum of research and development expenditure (XRD), capital expenditure (CAPX), and acquisition expenditure (AQC) less sale of property, plant, and equipment (SPPE) multiplied by 100 and scaled by lagged total assets (AT) [Compustat].
<i>New_Investment</i>	Investment as defined above minus depreciation and amortization (DPC) [Compustat].
<i>Capex</i>	Capital Expenditure (CAPX) multiplied by 100 and scaled by lagged PPE (PPENT) [Compustat].
<i>Non-Capex</i>	The sum of research and development expenditure (XRD) and acquisition expenditure (AQC) multiplied by 100 and scaled by lagged total assets (AT) [Compustat].
<i>R&D</i>	Research and Development (XRD) multiplied by 100 and scaled by lagged total assets (AT) [Compustat].
Over-investment (<i>OverInvestment</i>) Proxies	
<i>OverFirm</i>	The average rank of a ranked measure of cash and leverage, as in Biddle et al. (2009) and Cheng et al. (2013). Leverage is multiplied by minus one before ranking so that both variables are increasing in the likelihood of over-investment. This variable is scaled to range between zero and one [Compustat].
<i>OverIndustry</i>	A ranked variable based on the unexplained industry-year investment, as in Biddle et al. (2009). Aggregate average investment is measured in each industry-year and regressed on aggregate average industry-year sales growth. The residual from this model is then ranked into deciles and re-scaled from zero to one [Compustat].
Accounting Reporting Complexity	
<i>ARC</i>	The natural log of the total number of distinct monetary XBRL tags in Item 8 of the 10-K filings, as in Hoitash and Hoitash (2018) and available: http://www.xbrlresearch.com/ . ARC is the sum of the number of distinct monetary U.S. GAAP XBRL taxonomy tags (ARC_Taxonomy) and the number of distinct monetary extended tags reported in Item 8 (ARC_Extension).
<i>ARC_Taxonomy</i>	The natural log of the total number of distinct monetary U.S. GAAP XBRL taxonomy tags in Item 8 of the 10-K filings, as in Hoitash and Hoitash (2018) and available: http://www.xbrlresearch.com/ .
<i>ARC_Extension</i>	The natural log of the total number of distinct extended (custom) monetary XBRL tags in Item 8 of the 10-K filings, as in Hoitash and Hoitash (2018) and available: http://www.xbrlresearch.com/ .
Control Variables – Other Forms of Complexity	
<i>Length</i>	The natural log of the number of words (WORDCOUNT) in the 10-K filings [WRDS SEC Analytics Suite].
<i>Fog</i>	The natural log of the Gunning-Fog Readability Index (GUNNING_FOG_INDEX) for the 10-K filings [WRDS SEC Analytics Suite].

<i>Bus-Segment</i>	The sum of reported business segments (BUSSEG) [Compustat Segment file].
<i>Geo-Segment</i>	The sum of reported geographic segments (GEOSEG) [Compustat Segment file].
<i>Foreign</i>	Equals 1 if the company reports nonzero foreign currency translation costs (FCA), and 0 otherwise [Compustat].
<i>DQ</i>	The level of disaggregation of the financial statements as in Chen et al. (2015), calculated using annual non-missing Compustat items.
<i>Merger</i>	Equals one if the firm engages in a significant merger/acquisition as identified in the sales footnote in the 10-K filing (item SALE_FN = "AA" or "AB") in period t , and zero otherwise [Compustat].
<i>Resturcture</i>	Equals one if any of the following items are nonzero: RCP, RCA, RCEPS, or RCD in period t , and zero otherwise [Compustat].
<i>DiscOps</i>	Equals one if the firm reports nonzero discontinued operations (DO) in period t , and zero otherwise [Compustat].
Control Variables - Governance	
<i>Institutions</i>	The percentage of firm shares held by institutional investors. This variable is scaled to range between zero and one [Thomson Reuters 13f Institutional Holdings].
<i>Analysts</i>	The number of analysts following the firm [IBES Summary file].
<i>AQ</i>	The standard deviation of the firm-level residuals from the augmented Dechow and Dichev (2002) model during the years $t-5$ to $t-1$ and multiplied by negative one. The model is a regression of working capital accruals on lagged, current, and future cashflows; change in revenue; and PPE (Francis, LaFond, Olsson, and Schipper 2005). All variables are scaled by average total assets. The model is estimated cross-sectionally for each industry with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification [Compustat].
Control Variables - Determinants of Investments	
<i>Size</i>	The natural log of total assets (AT) [Compustat].
<i>Mkt-to-Book</i>	The ratio of market value of total assets ((CSHO*PRCC_F) + AT - CEQ - TXDB) to book value of total assets (AT) [Compustat].
$\sigma(CFO)$	Standard deviation of cash flow from operations (OANCF) deflated by average total assets (AT) from years $t-5$ to $t-1$ [Compustat].
$\sigma(Sales)$	Standard deviation of sales (SALE) deflated by average total assets (AT) from years $t-5$ to $t-1$ [Compustat].
$\sigma(Investment)$	Standard deviation of <i>Total Investment</i> from years $t-5$ to $t-1$ [Compustat].
<i>Z-Score</i>	The likelihood of bankruptcy from the Altman Z-score, computed as in Biddle et al. (2009): $3.3 * \text{pre-tax income (PI)} + \text{net sales (SALE)} + 0.25 * \text{retained earnings (RE)} + 0.5 * ((\text{current assets (ACT)} - \text{current liabilities (LCT)}) / \text{total assets (AT)})$ [Compustat].
<i>Tangibility</i>	The ratio of property, plant and equipment (PPENT) to total assets (AT) [Compustat].

<i>Leverage</i>	The ratio of long-term debt (DLTT) to the sum of long-term debt (DLTT) and the market value of equity (CSHO*PRCC_F) [Compustat].
<i>Ind Leverage</i>	Mean <i>Leverage</i> for firms in the same SIC three-digit industry [Compustat].
<i>CFOsale</i>	Net cash flow from operating activities (OANCF) scaled by total sales (SALE) at the beginning of the year [Compustat].
<i>Dividend</i>	An indicator variable that takes the value of one if the firm paid a dividend ($DV > 0$ or $DVC > 0$), and zero otherwise [Compustat].
<i>Operating Cycle</i>	The natural log of receivables (RECT) to sales (SALES) plus inventory (INVT) to cost of goods sold (COGS) multiplied by 360 [Compustat].
<i>Loss</i>	An indicator variable that takes the value of one if earnings before extraordinary items (item IB) is negative, and zero otherwise [Compustat].
<i>Age</i>	The difference between the first year when the first appears in Compustat and the current year [Compustat].

FIGURE 1

Panel A

Panel B

Notes: Investment residuals across accounting reporting complexity groups. Panel A – under-investment and Panel B – over-investment.

TABLE 1
Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Median	75th
Total Investment	17,493	15.62	24.40	8.50	17.24
New Investment	17,493	10.54	23.57	3.88	12.20
Non-Capex	17,493	10.48	21.72	2.24	11.31
Capex	17,493	5.17	7.36	3.08	6.15
R&D	17,493	6.78	16.65	0.20	6.23
ARC	17,493	308.98	151.88	295.00	399.00
ARC_Taxonomy	17,493	264.25	122.73	256.00	342.00
ARC_Extension	17,493	44.73	45.39	34.00	59.00
Fog	17,493	20.17	1.47	20.07	20.75
10K Length	17,493	47,766	28,043	43,015	56,724
DQ	17,493	0.70	0.10	0.72	0.77
Bus Seg	17,493	2.35	2.04	1.00	4.00
Geo Seg	17,493	2.93	3.24	2.00	4.00
Foreign	17,493	0.34	0.47	0.00	1.00
Restructure	17,493	0.35	0.48	0.00	1.00
DiscOps	17,493	0.17	0.37	0.00	0.00
Merger	17,493	0.16	0.36	0.00	0.00
AQ	17,493	-0.05	0.08	-0.03	-0.02
Institutions	17,493	0.67	0.32	0.78	0.89
Analysts	17,493	9.88	9.35	7.00	15.00
Age	17,493	26.63	16.77	21.00	36.00
Mkt-to-Book	17,493	2.92	8.80	1.60	2.44
LogAsset	17,493	6.42	2.45	6.61	8.15
Tangibility	17,493	0.27	0.28	0.17	0.40
Cash	17,493	0.23	0.35	0.12	0.29
CFOsale	17,493	-0.85	6.04	0.09	0.17
σ (Sales)	17,493	0.21	0.24	0.14	0.26
σ (CFO)	17,493	0.08	0.15	0.05	0.08
σ (Investment)	17,493	10.63	16.53	4.88	11.59
Leverage	17,493	0.18	0.21	0.11	0.28
Ind Leverage	17,493	0.17	0.11	0.14	0.22
Dividend	17,493	0.44	0.50	0.00	1.00
Loss	17,493	0.33	0.47	0.00	1.00
Z-score	17,493	6.73	2.82	7.00	9.00
OpCycle	17,493	4.56	1.00	4.65	5.11

Notes: Table 1 presents summary statistics for variables used in the analyses. All variables are defined in Appendix A.

TABLE 2

Conditional Relation between Investment and Accounting Reporting Complexity

Dependent Variable: <i>New Investment</i>			
	(1)	(2)	(3)
ARC	2.333 (2.58)***		
ARC*OverFirm	-5.417 (-2.87)***		
ARC_Taxonomy		2.588 (2.68)***	
ARC_Taxonomy*OverFirm		-6.932 (-3.51)***	
ARC_Extension			0.955 (1.91)*
ARC_Extension*OverFirm			-0.937 (-0.94)
Joint significance	-3.084 (-2.27)**	-4.343 (-3.03)***	0.017 0.03
OverFirm	25.554 (2.35)**	32.882 (2.96)***	-1.027 (-0.27)
Fog	-0.021 (-0.18)	-0.024 (-0.20)	-0.014 (-0.12)
Length	1.87 (3.71)***	1.901 (3.79)***	1.736 (3.40)***
DQ	5.919 (1.65)*	5.424 -1.51	7.442 (2.06)**
Bus Seg	0.02 -0.24	0.023 -0.28	0.002 -0.02
Geo Seg	0.169 (2.40)**	0.172 (2.44)**	0.162 (2.33)**
Foreign	-0.432 (-0.97)	-0.385 (-0.86)	-0.553 (-1.24)
Restructure	-0.636 (-1.66)*	-0.612 (-1.60)	-0.669 (-1.76)*
DiscOps	-0.837 (-2.03)**	-0.803 (-1.94)*	-0.924 (-2.27)**
Merger	-0.119 (-0.28)	-0.092 (-0.21)	-0.167 (-0.39)
AQ	10.641 -1.2	10.663 -1.21	11.363 -1.28
Institutions	5.749 (6.47)***	5.813 (6.52)***	5.664 (6.37)***
Analysts	0.258 (6.92)***	0.257 (6.92)***	0.257 (6.89)***
Age	-0.004	-0.004	-0.003

	(-0.29)	(-0.28)	(-0.21)
Mkt-to-Book	0.449	0.449	0.45
	(3.92)***	(3.91)***	(3.91)***
LogAsset	-1.576	-1.536	-1.683
	(-4.70)***	(-4.57)***	(-5.07)***
Tangibility	-1.309	-1.337	-1.22
	(-1.05)	(-1.08)	(-0.99)
CFOsale	-0.399	-0.396	-0.402
	(-4.41)***	(-4.37)***	(-4.45)***
$\sigma(\text{Sales})$	-2.238	-2.23	-2.189
	(-1.35)	(-1.35)	(-1.32)
$\sigma(\text{CFO})$	14.398	14.319	14.48
	(2.27)**	(2.26)**	(2.28)**
$\sigma(\text{Investment})$	0.169	0.169	0.169
	(6.20)***	(6.21)***	(6.16)***
Ind Leverage	-11.102	-11.175	-10.823
	(-3.58)***	(-3.59)***	(-3.49)***
Dividend	-0.583	-0.572	-0.585
	(-1.37)	(-1.34)	(-1.37)
Loss	-2.874	-2.872	-2.892
	(-5.28)***	(-5.28)***	(-5.28)***
Z-score	-0.633	-0.625	-0.629
	(-2.93)***	(-2.89)***	(-2.93)***
OpCycle	-1.086	-1.063	-1.123
	(-2.56)**	(-2.50)**	(-2.66)***
Intercept	-11.296	-12.752	-0.395
	(-1.48)	(-1.65)*	(-0.06)
Industry-Year Fixed Effects	Yes	Yes	Yes
Observations	16,775	16,775	16,775
Adjusted R-squared	0.242	0.243	0.242

Notes: Table 2 presents pooled time-series cross-sectional regression OLS coefficients of a model predicting investments as in Equation (1). Joint significance tests the joint effect of β_1 and β_2 in Equation (1). All other variables are defined in Appendix A. The model includes year and industry fixed effects based on the Fama-French 48 industry classifications. Standard errors are robust and clustered by firm. The t-statistics are presented in parentheses below the coefficients. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

TABLE 3

Accounting Reporting Complexity and Deviations from Expected Investment

Dependent Variable: *Inv state* = 1

Panel A: under-investment versus normal investment

	(1)	(2)	(3)
ARC	-0.270 (-5.23)***		
ARC_Taxonomy		-0.285 (-5.22)***	
ARC_Extension			-0.067 (-2.15)**
Fog	0.053 (1.99)**	0.052 (1.97)**	0.056 (2.06)**
Length	-0.001 (-0.02)	-0.004 (-0.07)	-0.032 (-0.59)
DQ	0.09 -0.20	0.116 -0.25	0.094 -0.20
Bus Seg	0.003 -0.16	0.002 -0.14	0.002 -0.09
Geo Seg	0.019 (1.83)*	0.019 (1.85)*	0.017 (1.66)*
Foreign	0.12 -1.59	0.122 -1.61	0.105 -1.39
Restructure	0.087 -1.38	0.091 -1.45	0.069 -1.10
DiscOps	0.092 -1.23	0.091 -1.22	0.075 -1.00
Merger	0.225 (3.68)***	0.227 (3.72)***	0.211 (3.46)***
AQ	-0.423 (-0.85)	-0.372 (-0.75)	-0.432 (-0.87)
Institutions	-0.565 (-4.61)***	-0.556 (-4.53)***	-0.577 (-4.72)***
Analysts	-0.01 (-1.54)	-0.01 (-1.53)	-0.009 (-1.47)
Age	0.00 (-0.11)	0.00 (-0.07)	-0.001 (-0.22)
Mkt-to-Book	0.017 (1.65)*	0.017 (1.65)*	0.017 -1.62
LogAsset	0.059 -1.60	0.057 -1.55	0.048 -1.28
Tangibility	0.145 -0.88	0.145 -0.88	0.159 -0.96
Cash	-0.065	-0.064	-0.047

	(-0.57)	(-0.56)	(-0.41)
CFOsale	0.012	0.012	0.011
	(2.69)***	(2.76)***	(2.52)**
σ (Sales)	-0.276	-0.27	-0.265
	(-1.91)*	(-1.87)*	(-1.84)*
σ (CFO)	0.445	0.432	0.475
	-1.40	-1.36	-1.5
σ (Investment)	0.009	0.009	0.009
	(4.22)***	(4.25)***	(4.18)***
Leverage	1.299	1.299	1.272
	(6.74)***	(6.73)***	(6.60)***
Ind Leverage	-5.258	-5.267	-5.262
	(-9.47)***	(-9.50)***	(-9.46)***
Dividend	0.033	0.036	0.02
	-0.44	-0.47	-0.26
Loss	0.203	0.203	0.195
	(2.82)***	(2.82)***	(2.71)***
Z-score	-0.092	-0.091	-0.093
	(-4.40)***	(-4.35)***	(-4.47)***
OpCycle	0.048	0.049	0.045
	-1.28	-1.31	-1.19
Intercept	0.283	0.336	-0.604
	-0.37	-0.44	(-0.81)
Firm Cluster	Yes	Yes	Yes
Observations	16,263	16,263	16,263
Pseudo R-squared	0.085	0.085	0.085

TABLE 3, continued

Dependent Variable: *Inv state* = 3

Panel B: over-investment versus normal investment

	(1)	(2)	(3)
ARC	-0.146 (-2.71)***		
ARC_Taxonomy		-0.185 (-3.24)***	
ARC_Extension			0.001 -0.03
Fog	0.004 -0.16	0.003 -0.12	0.007 -0.28
Length	0.219 (3.53)***	0.224 (3.59)***	0.185 (3.07)***
DQ	0.023 -0.05	0.031 -0.07	0.056 -0.13
Bus Seg	0.008 -0.51	0.008 -0.52	0.006 -0.43
Geo Seg	0.035 (3.93)***	0.035 (3.96)***	0.034 (3.82)***
Foreign	-0.046 (-0.72)	-0.043 (-0.68)	-0.055 (-0.87)
Restructure	0.095 -1.60	0.099 (1.68)*	0.084 -1.42
DiscOps	-0.018 (-0.25)	-0.015 (-0.21)	-0.035 (-0.48)
Merger	0.244 (3.72)***	0.247 (3.77)***	0.234 (3.57)***
AQ	0.811 -1.61	0.834 (1.66)*	0.848 (1.68)*
Institutions	0.536 (4.36)***	0.543 (4.42)***	0.531 (4.33)***
Analysts	0.014 (2.70)***	0.014 (2.69)***	0.014 (2.78)***
Age	-0.006 (-2.79)***	-0.006 (-2.75)***	-0.006 (-2.90)***
Mkt-to-Book	0.025 (2.36)**	0.025 (2.37)**	0.025 (2.37)**
LogAsset	-0.113 (-3.17)***	-0.112 (-3.15)***	-0.125 (-3.50)***
Tangibility	0.705 (4.96)***	0.703 (4.94)***	0.717 (5.04)***
Cash	0.343 (3.72)***	0.341 (3.71)***	0.357 (3.83)***

CFOsale	-0.004 (-0.89)	-0.004 (-0.85)	-0.004 (-0.92)
$\sigma(\text{Sales})$	-0.144 (-1.09)	-0.143 (-1.08)	-0.131 (-1.00)
$\sigma(\text{CFO})$	0.753 (2.35)**	0.743 (2.33)**	0.764 (2.38)**
$\sigma(\text{Investment})$	0.019 (9.66)***	0.019 (9.68)***	0.019 (9.64)***
Leverage	-1.512 (-7.68)***	-1.507 (-7.66)***	-1.541 (-7.84)***
Ind Leverage	-0.812 (-2.33)**	-0.818 (-2.35)**	-0.817 (-2.35)**
Dividend	-0.184 (-2.83)***	-0.181 (-2.78)***	-0.191 (-2.94)***
Loss	-0.105 (-1.49)	-0.103 (-1.46)	-0.113 (-1.60)
Z-score	-0.093 (-4.35)***	-0.092 (-4.31)***	-0.093 (-4.35)***
OpCycle	-0.062 (-2.19)**	-0.061 (-2.15)**	-0.063 (-2.24)**
Intercept	-1.423 (-1.93)*	-1.302 (-1.77)*	-1.853 (-2.60)***
Firm Cluster	Yes	Yes	Yes
Observations	16,263	16,263	16,263
Pseudo R-squared	0.085	0.085	0.085

Notes: Table 3 presents results from the multinomial logit pooled regressions. The dependent variable (*Inv_state*) is based on the level of unexplained investment as proxied by the residuals from the firm-specific investment model as a function of growth opportunities as in Equation (2). *Inv_state* takes the value of one if firm-year observations are in the under-investing quartile (bottom quartile of unpredicted investment); *Inv_state* takes the value of three if firm-year observations are in the over-investing quartile (top quartile of unpredicted investment); and *Inv_state* takes the value of two if firm-year observations are in the benchmark group, i.e. the middle two quartiles. Panel A (B) presents results for a model predicting the likelihood that a firm will be in the under-investing (over-investing) group. All variables are defined in Appendix A. Standard errors are robust and clustered by firm. The t-statistics are presented in parentheses below the coefficients. ***, **, and * denotes significance at the 0.01, 0.05, and 0.10, respectively.

TABLE 4

**Conditional Relation between Investment and Accounting Reporting Complexity:
Alternative Dependent Variables**

Panel A: <i>Non-Capex</i>			
	(1)	(2)	(3)
ARC	2.623 (4.51)***		
ARC*OverFirm	-5.027 (-3.75)***		
ARC_Taxonomy		2.762 (4.44)***	
ARC_Taxonomy*OverFirm		-6.409 (-4.50)***	
ARC_Extension			0.786 (2.37)**
ARC_Extension*OverFirm			-0.57 (-0.79)
Joint significance	-2.404 (-2.45)**	-3.647 (-3.45)***	0.216 0.43
OverFirm	34.01 (4.40)***	40.667 (5.08)***	8.311 (3.11)***
Fog	-0.082 (-1.05)	-0.086 (-1.09)	-0.08 (-1.00)
Length	1.551 (4.95)***	1.596 (5.09)***	1.466 (4.60)***
DQ	3.2 -1.27	2.675 -1.06	4.559 (1.78)*
Bus Seg	-0.098 (-2.06)**	-0.094 (-1.98)**	-0.113 (-2.32)**
Geo Seg	0.106 (2.25)**	0.11 (2.33)**	0.104 (2.22)**
Foreign	0.193 -0.57	0.241 -0.72	0.099 -0.29
Restructure	-0.113 (-0.46)	-0.087 (-0.35)	-0.119 (-0.49)
DiscOps	-0.931 (-4.04)***	-0.888 (-3.83)***	-0.964 (-4.18)***
Merger	-0.57 (-2.70)***	-0.541 (-2.56)**	-0.592 (-2.80)***
AQ	0.329 -0.05	0.258 -0.04	0.917 -0.14
Institutions	2.14	2.189	2.055

	(3.39)***	(3.46)***	(3.25)***
Analysts	0.207	0.207	0.206
	(8.20)***	(8.21)***	(8.14)***
Age	0.028	0.028	0.03
	(3.17)***	(3.19)***	(3.30)***
Mkt-to-Book	0.299	0.299	0.3
	(3.84)***	(3.84)***	(3.84)***
LogAsset	-0.811	-0.759	-0.866
	(-3.24)***	(-3.04)***	(-3.53)***
Tangibility	-2.396	-2.439	-2.362
	(-3.29)***	(-3.35)***	(-3.26)***
CFOsale	-0.346	-0.343	-0.348
	(-5.09)***	(-5.05)***	(-5.13)***
σ (Sales)	-3.857	-3.86	-3.826
	(-3.25)***	(-3.26)***	(-3.22)***
σ (CFO)	14.236	14.175	14.32
	(2.73)***	(2.72)***	(2.74)***
σ (Investment)	0.111	0.111	0.111
	(6.32)***	(6.34)***	(6.28)***
Ind Leverage	1.384	1.356	1.754
	-0.94	-0.91	-1.18
Dividend	-0.219	-0.21	-0.213
	(-0.84)	(-0.81)	(-0.82)
Loss	1.971	1.98	1.98
	(5.90)***	(5.93)***	(5.89)***
Z-score	-0.826	-0.819	-0.817
	(-5.00)***	(-4.96)***	(-4.94)***
OpCycle	-1.315	-1.293	-1.345
	(-4.19)***	(-4.11)***	(-4.29)***
Intercept	-18.419	-19.358	-6.084
	(-3.78)***	(-3.94)***	(-1.58)
Industry-Year Fixed Effects	Yes	Yes	Yes
Observations	16,775	16,775	16,775
Adjusted R-squared	0.469	0.470	0.468

TABLE 4, continued

Panel B: <i>Capex</i>			
	(1)	(2)	(3)
ARC	6.024 (3.45)***		
ARC*OverFirm	-9.445 (-2.49)**		
ARC_Taxonomy		6.484 (3.61)***	
ARC_Taxonomy*OverFirm		-12.440 (-3.01)***	
ARC_Extension			2.062 (2.26)**
ARC_Extension*OverFirm			-0.982 (-0.53)
Joint significance	-3.421 (-1.20)	-5.956 (-1.86)*	1.080 (0.83)
OverFirm	67.540 (3.15)***	82.204 (3.60)***	18.861 (2.81)***
Fog	-0.019 (-0.08)	-0.026 (-0.11)	-0.012 (-0.05)
Length	2.571 (3.74)***	2.670 (3.86)***	2.372 (3.43)***
DQ	24.774 (3.24)***	23.574 (3.12)***	27.533 (3.49)***
Bus Seg	-0.326 (-2.09)**	-0.316 (-2.02)**	-0.352 (-2.23)**
Geo Seg	-0.363 (-3.53)***	-0.356 (-3.48)***	-0.364 (-3.55)***
Foreign	-1.193 (-1.39)	-1.100 (-1.29)	-1.335 (-1.55)
Restructure	-4.281 (-5.65)***	-4.242 (-5.59)***	-4.252 (-5.62)***
DiscOps	-0.054 (-0.06)	0.026 -0.030	-0.093 (-0.11)
Merger	2.056 (2.53)**	2.110 (2.61)***	2.031 (2.46)**
AQ	-29.496 (-2.06)**	-29.840 (-2.09)**	-27.939 (-1.95)*
Institutions	5.692 (3.53)***	5.749 (3.54)***	5.578 (3.49)***
Analysts	0.244 (3.98)***	0.245 (3.99)***	0.241 (3.93)***
Age	-0.107 (-4.48)***	-0.107 (-4.49)***	-0.104 (-4.34)***

Mkt-to-Book	0.040	0.042	0.038
	-0.330	-0.340	-0.320
LogAsset	-1.024	-0.921	-1.122
	(-1.72)*	(-1.58)	(-1.94)*
Tangibility	-23.942	-24.032	-23.900
	(-10.19)***	(-10.27)***	(-10.16)***
CFOsale	-0.297	-0.292	-0.296
	(-1.81)*	(-1.78)*	(-1.81)*
σ (Sales)	8.068	8.048	8.146
	(2.34)**	(2.33)**	(2.35)**
σ (CFO)	23.706	23.566	23.801
	(2.36)**	(2.35)**	(2.38)**
σ (Investment)	-0.019	-0.019	-0.019
	(-0.48)	(-0.48)	(-0.49)
Ind Leverage	-14.160	-14.164	-13.659
	(-2.91)***	(-2.92)***	(-2.78)***
Dividend	-2.837	-2.827	-2.792
	(-3.20)***	(-3.19)***	(-3.15)***
Loss	-6.865	-6.849	-6.852
	(-5.97)***	(-5.92)***	(-5.99)***
Z-score	-1.193	-1.182	-1.161
	(-3.05)***	(-3.01)***	(-2.95)***
OpCycle	0.216	0.255	0.182
	-0.250	-0.290	-0.210
Intercept	-34.024	-36.714	-6.683
	(-2.29)**	(-2.47)**	(-0.62)
Industry-Year Fixed Effects	Yes	Yes	Yes
Observations	16,650	16,650	16,650
Adjusted R-squared	0.107	0.108	0.107

TABLE 4, continued

Panel C: <i>R&D</i>			
	(1)	(2)	(3)
ARC	2.623 (4.51)***		
ARC*OverFirm	-5.027 (-3.75)***		
ARC_Taxonomy		2.762 (4.44)***	
ARC_Taxonomy*OverFirm		-6.409 (-4.50)***	
ARC_Extension			0.786 (2.37)**
ARC_Extension*OverFirm			-0.57 (-0.79)
Joint significance	-2.404 (-2.45)**	-3.647 (-3.45)***	0.216 0.43
OverFirm	34.01 (4.40)***	40.667 (5.08)***	8.311 (3.11)***
Fog	-0.082 (-1.05)	-0.086 (-1.09)	-0.08 (-1.00)
Length	1.551 (4.95)***	1.596 (5.09)***	1.466 (4.60)***
DQ	3.2 -1.27	2.675 -1.06	4.559 (1.78)*
Bus Seg	-0.098 (-2.06)**	-0.094 (-1.98)**	-0.113 (-2.32)**
Geo Seg	0.106 (2.25)**	0.11 (2.33)**	0.104 (2.22)**
Foreign	0.193 -0.57	0.241 -0.72	0.099 -0.29
Restructure	-0.113 (-0.46)	-0.087 (-0.35)	-0.119 (-0.49)
DiscOps	-0.931 (-4.04)***	-0.888 (-3.83)***	-0.964 (-4.18)***
Merger	-0.57 (-2.70)***	-0.541 (-2.56)**	-0.592 (-2.80)***
AQ	0.329 -0.05	0.258 -0.04	0.917 -0.14
Institutions	2.14 (3.39)***	2.189 (3.46)***	2.055 (3.25)***
Analysts	0.207 (8.20)***	0.207 (8.21)***	0.206 (8.14)***
Age	0.028	0.028	0.03

	(3.17)***	(3.19)***	(3.30)***
Mkt-to-Book	0.299	0.299	0.3
	(3.84)***	(3.84)***	(3.84)***
LogAsset	-0.811	-0.759	-0.866
	(-3.24)***	(-3.04)***	(-3.53)***
Tangibility	-2.396	-2.439	-2.362
	(-3.29)***	(-3.35)***	(-3.26)***
CFOsale	-0.346	-0.343	-0.348
	(-5.09)***	(-5.05)***	(-5.13)***
$\sigma(\text{Sales})$	-3.857	-3.86	-3.826
	(-3.25)***	(-3.26)***	(-3.22)***
$\sigma(\text{CFO})$	14.236	14.175	14.32
	(2.73)***	(2.72)***	(2.74)***
$\sigma(\text{Investment})$	0.111	0.111	0.111
	(6.32)***	(6.34)***	(6.28)***
Ind Leverage	1.384	1.356	1.754
	-0.94	-0.91	-1.18
Dividend	-0.219	-0.21	-0.213
	(-0.84)	(-0.81)	(-0.82)
Loss	1.971	1.98	1.98
	(5.90)***	(5.93)***	(5.89)***
Z-score	-0.826	-0.819	-0.817
	(-5.00)***	(-4.96)***	(-4.94)***
OpCycle	-1.315	-1.293	-1.345
	(-4.19)***	(-4.11)***	(-4.29)***
Intercept	-18.419	-19.358	-6.084
	(-3.78)***	(-3.94)***	(-1.58)
Industry-Year Fixed Effects	Yes	Yes	Yes
Observations	16,775	16,775	16,775
Adjusted R-squared	0.469	0.470	0.468

Notes: Table 4 presents pooled time-series cross-sectional OLS regression coefficients of a model predicting Non-Capex (Panel A); Capex Investment (Panel B); and Research & Development (Panel C). Joint significance tests the joint effect of β_1 and β_2 in Equation (1). All other variables are defined in Appendix A. Standard errors are robust and clustered by firm. The t-statistics are presented in parentheses below the coefficients. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

TABLE 5

Alternative Over-Investment Partition: Over Industry Ranked Variable

Panel A

<i>Dependent variable: New Investment</i>			
	(1)	(2)	(3)
ARC	3.104 (6.47)***		
ARC*OverIndustry	-6.202 (-5.74)***		
ARC_Taxonomy		3.257 (6.34)***	
ARC Taxonomy*OverIndustry		-6.994 (-6.06)***	
ARC Extension			1.39 (5.42)***
ARC_Extension*OverIndustry			-1.928 (-3.36)***
Joint Significance	-3.099 (-3.94)***	-3.737 (-4.53)***	-0.538 (-1.25)
OverIndustry	37.583 (5.97)***	40.96 (6.26)***	9.489 (4.29)***
Fog	-0.008 (-0.08)	-0.011 (-0.11)	-0.014 (-0.14)
Length	1.893 (4.40)***	1.932 (4.49)***	1.807 (4.22)***
DQ	1.461 -0.52	1.32 -0.47	1.996 -0.71
Bus Seg	0.03 -0.43	0.032 -0.47	0.013 -0.19
Geo Seg	0.138 (3.05)***	0.141 (3.12)***	0.127 (2.82)***
Foreign	-0.883 (-2.72)***	-0.853 (-2.63)***	-0.961 (-2.95)***
Restructure	-0.003 (-0.01)	0.013 -0.04	-0.045 (-0.14)
DiscOps	-0.27 (-0.76)	-0.244 (-0.68)	-0.35 (-0.98)
Merger	0.278 -0.76	0.293 -0.8	0.259 -0.71
AQ	10.949 -1.62	11.018 -1.63	11.386 (1.68)*
Institutions	4.09 (6.02)***	4.105 (6.04)***	4.104 (6.02)***
Analysts	0.142	0.141	0.146

	(5.50)***	(5.46)***	(5.62)***
Age	-0.011	-0.011	-0.009
	(-1.11)	(-1.12)	(-0.94)
Mkt-to-Book	0.479	0.479	0.481
	(5.31)***	(5.31)***	(5.32)***
LogAsset	-0.861	-0.847	-0.922
	(-4.07)***	(-4.01)***	(-4.34)***
Tangibility	1.251	1.258	1.188
	-1.27	-1.28	-1.21
Cash	2.742	2.737	2.803
	(2.74)***	(2.74)***	(2.80)***
CFOsale	-0.37	-0.368	-0.373
	(-5.07)***	(-5.05)***	(-5.10)***
σ (Sales)	-2.376	-2.342	-2.451
	(-1.85)*	(-1.83)*	(-1.90)*
σ (CFO)	12.677	12.622	12.742
	(2.76)***	(2.75)***	(2.76)***
σ (Investment)	0.178	0.178	0.178
	(9.62)***	(9.62)***	(9.60)***
Leverage	-12.006	-11.95	-12.058
	(-12.50)***	(-12.47)***	(-12.54)***
Ind Leverage	-3.588	-3.534	-3.38
	(-1.83)*	(-1.81)*	(-1.73)*
Dividend	-1.083	-1.077	-1.086
	(-3.19)***	(-3.17)***	(-3.20)***
Loss	-1.46	-1.462	-1.504
	(-3.37)***	(-3.37)***	(-3.46)***
Z-score	-0.424	-0.418	-0.432
	(-2.93)***	(-2.89)***	(-3.00)***
OpCycle	-0.861	-0.85	-0.889
	(-2.65)***	(-2.62)***	(-2.74)***
Intercept	-22.009	-22.869	-8.072
	(-4.02)***	(-4.13)***	(-1.63)
Industry Fixed Effects	Yes	Yes	Yes
Observations	16,791	16,791	16,791
Adjusted R-squared	0.250	0.250	0.249

Panel B

Dependent variable: <i>Total Investment</i>			
	(1)	(2)	(3)
ARC	2.912 (6.11)***		
ARC*OverIndustry	-5.571 (-5.04)***		
ARC_Taxonomy		3.147 (6.15)***	
ARC_Taxonomy*OverIndustry		-6.504 (-5.50)***	
ARC_Extension			1.281 (5.03)***
ARC_Extension*OverIndustry			-1.471 (-2.49)**
Joint Significance	-2.659 (-3.24)***	-3.356 (-3.90)***	-0.191 (-0.42)
OverIndustry	33.95 (5.26)***	38.208 (5.69)***	7.758 (3.38)***
Fog	-0.026 (-0.26)	-0.028 (-0.28)	-0.031 (-0.30)
Length	2.159 (4.78)***	2.196 (4.87)***	2.061 (4.59)***
DQ	0.607 -0.21	0.444 -0.15	1.232 -0.43
Bus Seg	0.058 -0.82	0.062 -0.88	0.039 -0.55
Geo Seg	0.123 (2.64)***	0.127 (2.71)***	0.114 (2.45)**
Foreign	-0.639 (-1.91)*	-0.608 (-1.81)*	-0.713 (-2.12)**
Restructure	0.423 -1.24	0.436 -1.27	0.387 -1.13
DiscOps	-0.629 (-1.70)*	-0.604 (-1.63)	-0.715 (-1.94)*
Merger	0.446 -1.19	0.459 -1.22	0.42 -1.12
AQ	9.145 -1.31	9.185 -1.32	9.682 -1.38
Institutions	4.729 (6.68)***	4.73 (6.68)***	4.76 (6.70)***
Analysts	0.213 (7.97)***	0.212 (7.94)***	0.216 (8.03)***
Age	-0.013 (-1.34)	-0.014 (-1.37)	-0.011 (-1.14)

Mkt-to-Book	0.55 (5.67)***	0.55 (5.66)***	0.553 (5.69)***
LogAsset	-1.411 (-6.43)***	-1.396 (-6.37)***	-1.483 (-6.71)***
Tangibility	5.777 (5.60)***	5.777 (5.61)***	5.74 (5.57)***
Cash	0.854 -0.85	0.848 -0.85	0.921 -0.92
CFOsale	-0.383 (-5.18)***	-0.382 (-5.16)***	-0.385 (-5.19)***
$\sigma(\text{Sales})$	-2.207 (-1.63)	-2.164 (-1.60)	-2.293 (-1.69)*
$\sigma(\text{CFO})$	13.037 (2.67)***	12.99 (2.67)***	13.047 (2.67)***
$\sigma(\text{Investment})$	0.191 (9.94)***	0.191 (9.93)***	0.191 (9.92)***
Leverage	-11.133 (-11.53)***	-11.067 (-11.48)***	-11.197 (-11.59)***
Ind Leverage	-6.07 (-3.20)***	-6.019 (-3.17)***	-5.893 (-3.10)***
Dividend	-1.1 (-3.14)***	-1.095 (-3.13)***	-1.103 (-3.16)***
Loss	-0.683 (-1.51)	-0.686 (-1.52)	-0.729 (-1.61)
Z-score	-0.42 (-2.82)***	-0.415 (-2.78)***	-0.419 (-2.83)***
OpCycle	-1.164 (-3.44)***	-1.153 (-3.41)***	-1.191 (-3.52)***
Intercept	-15.366 (-2.77)***	-16.686 (-2.98)***	-2.051 (-0.40)
Industry Fixed Effects	Yes	Yes	Yes
Observations	16,791	16,791	16,791
Adjusted R-squared	0.252	0.252	0.251

Notes: Table 5 presents pooled time-series cross-sectional regression OLS coefficients of a model predicting investment. The dependent variable in Panel A (B) is *New Investment (Total Investment)*. The *OverInvestment* partition used, *OverIndustry*, is a ranked variable based on the unexpected investment on the industry-year level. Joint significance tests the joint effect of β_1 and β_2 in Equation (1). All other variables are defined in Appendix A. Standard errors are robust and clustered by firm. The t-statistics are presented in parentheses below the coefficients. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

TABLE 6

Accounting Reporting Complexity and Investment Efficiency

Dependent Variable: <i>Investment-Cash Flow Sensitivity (ICFS)</i>			
	(1)	(2)	(3)
ARC_Total	-3.943 (-9.98)***		
ARC_Taxonomy		-4.194 (-9.66)***	
ARC_Extensions			-1.707 (-8.56)***
FOG	0.197 (2.28)**	0.193 (2.26)**	0.179 (2.19)**
Length	0.245 -0.860	0.261 -0.920	0.216 -0.760
DQ	-6.167 (-1.84)*	-6.195 (-1.85)*	-6.326 (-1.88)*
Bus Seg	-0.027 (-0.17)	-0.027 (-0.18)	-0.046 (-0.30)
Geo Seg	-0.012 (-0.10)	-0.011 (-0.10)	-0.027 (-0.24)
Foreign	-0.187 (-0.31)	-0.174 (-0.29)	-0.222 (-0.37)
Restructure	-0.184 (-0.46)	-0.181 (-0.45)	-0.233 (-0.58)
DiscOps	-0.142 (-0.30)	-0.149 (-0.31)	-0.271 (-0.57)
Merger	0.523 -1.320	0.531 -1.340	0.465 -1.170
AQ	0.052 -0.020	0.247 -0.090	-0.137 (-0.05)
Institutions	-0.421 (-0.30)	-0.401 (-0.29)	-0.510 (-0.36)
Analysts	-0.333 (-4.71)***	-0.328 (-4.63)***	-0.359 (-5.07)***
Age	-0.206 (-2.23)**	-0.181 (-1.91)*	-0.379 (-4.38)***
Mkt-to-Book	-0.004 (-0.34)	-0.006 (-0.46)	-0.003 (-0.24)
LogAsset	1.207 (3.07)***	1.231 (3.13)***	1.012 (2.56)**
Tangibility	-2.038 (-1.63)	-2.054 (-1.64)	-1.895 (-1.52)
Cash	-0.306 (-0.94)	-0.332 (-1.03)	-0.202 (-0.61)
CFOsale	-0.007	-0.007	-0.010

	(-0.67)	(-0.64)	(-0.81)
$\sigma(\text{Sales})$	1.481	1.506	1.387
	-1.580	-1.610	-1.470
$\sigma(\text{CFO})$	1.391	1.365	1.441
	-1.110	-1.100	-1.130
$\sigma(\text{Investment})$	0.015	0.015	0.017
	-1.200	-1.210	-1.380
Leverage	-3.031	-3.019	-3.185
	(-2.26)**	(-2.25)**	(-2.36)**
Ind Leverage	-21.567	-21.647	-20.512
	(-4.58)***	(-4.60)***	(-4.36)***
Dividend	-0.388	-0.373	-0.502
	(-0.57)	(-0.55)	(-0.74)
Loss	-0.157	-0.156	-0.195
	(-0.35)	(-0.35)	(-0.44)
Z-score	-0.066	-0.070	-0.081
	(-0.57)	(-0.61)	(-0.70)
OpCycle	0.193	0.176	0.211
	(1.72)*	-1.560	(1.85)*
Intercept	25.413	25.401	16.038
	(5.79)***	(5.78)***	(3.73)***
Firm Fixed Effects	Yes	Yes	Yes
Observations	15,796	15,796	15,796
Adjusted R-squared	0.243	0.242	0.240

Notes: Table 6 represents the OLS regression coefficients of Equation (4). The dependent variable is the investment cash flow sensitivity (*ICFS*), derived from the β_1 coefficient in Equation (3). All variables are defined in Appendix A. Standard errors are robust and clustered by firm. The t-statistics are presented in parentheses below the coefficients. ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.