TWO ESSAYS ON EARNINGS COMPARABILITY

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Abstract

Prior studies have established an extensive literature on accounting comparability, largely with the focus on its economic consequences. However, the current literature is characterised by at least two limitations. First, the prior studies on earnings comparability document evidence exclusively for GAAP earnings despite the fact that non-GAAP earnings are widely used by market participants. Second, while research has examined the economic consequences of comparability, limited attention has been given to the underlying mechanism that produces more comparable (or incomparable) earnings. My thesis, composed of two related studies, aims to contribute to these two gaps. Chapter 4 seeks to fill the first gap by bridging the literatures on accounting comparability and non-GAAP earnings. Specifically, I find that non-GAAP adjustments are associated with significant comparability benefits. Chapter 5 aims to close the second gap regarding the underlying mechanism that produces comparable (or incomparable) earnings. The main finding suggests that earnings comparability is partially driven by firms' accrual components. These findings combined contribute to the literature by furthering our understanding of the underlying determining factors for earnings comparability.

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On the flight to Urumqi

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Declaration of Authenticity

I, the undersigned, declare that this dissertation is original and authentic, and is the result of my own work. Except where acknowledged and referenced, all statements, views, and arguments are my own.

I also declare that an article based on the study in Chapter 4, entitled 'Do Non-GAAP Earnings Adjustments Deliver Comparability Benefits?', is under revision and resubmission by the undersigned together with Zhan Gao in Journal of Business Finance and Accounting. The contribution of the co-author has been limited to the reasonable contribution expected in a doctoral supervision setting in a research university in the United Kingdom.

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Chapter 1 Introduction

1.1 Motivation

As an important qualitative characteristic of accounting information, comparability is believed to enhance the quality of financial information. Practically, accounting comparability calls for like things being reported alike, and unlike things being reported differently (AICPA 1971: 59). Standard setters (FASB 2010) believe that greater comparability helps users to better identify and understand similarities in, and differences among, financial items. The perceived benefits of comparability are built on the grounds that many important economic decisions involve the evaluation of alternative opportunities and thus require comparable financial information as a key input to the decision making equation. Examples include investors choosing among potential investment projects, lenders making lending decisions, and companies evaluating potential acquisition targets.

The importance of comparability is also well appreciated by academics. There has been a fast-growing body of literature on accounting comparability, largely with the focus on its economic consequences. In particular, a wide range of studies examines the benefits of financial information with greater comparability: for instance, lower uncertainty to equity investors (Bradshaw et al. 2009, De Franco et al. 2011), better valuation outcomes (Young and Zeng, 2015), lower stock crash risk (Kim et al. 2016), improved acquisition performance (Chen et al. 2016), and lower credit risk to debt investors (Kim et al. 2013). However, the current literature is characterised by at least two limitations. First, the prior studies on earnings comparability document evidence exclusively for GAAP earnings despite the fact that non-GAAP earnings are widely used by market participants (Bradshaw and Sloan 2002). Second, while research has examined the economic consequences of comparability, limited attention has been

given to the underlying mechanism that produces more comparable (or incomparable) earnings. My thesis, composed of two related studies, aims to contribute to these two gaps in prior work.

Chapter 4 seeks to fill the first gap by bridging the literatures on accounting comparability and non-GAAP earnings. The chapter is centred on the following research question: do non-GAAP earnings adjustments deliver comparability benefits? Prior studies find that non-GAAP earnings are more value relevant than GAAP earnings ((Bradshaw and Sloan 2002; Brown and Sivakumar 2003; Bhattacharya et al. 2003; Lougee and Marquardt 2004). However, comparability serves as a dimension distinct from relevance insofar as it is concerned with the quality of information that enables users to identify similarities and differences between two sets of economic events. For example, comparability is found to render economic effects incremental to other within-firm accounting quality (Imhof et al. 2017). It can also be differentiated from other qualitative characteristics in that comparability does not relate to a single entity. Rather, it requires comparisons between two or more entities. Therefore, my thesis examines comparability as an independent dimension of non-GAAP earnings quality.

There exists a broader debate on the comparability of non-GAAP earnings in professional and financial media circles concerning the usefulness to investors and other users of non-GAAP earnings (Francis and Linebaugh 2015; PwC 2016; The Center for Audit Quality 2016; International Organization of Securities Commissions 2016). On the one hand, preparers and certain user groups such as financial analysts claim (among other benefits) that non-GAAP earnings adjustments are typically made to facilitate comparison of performance. Practically, they contend that non-GAAP earnings could better reflect firms' underlying performance and thus help information users identify the similarities and differences between firms (Kim et al. 2013; Standard & Poor's 2008;

Moody's 2010). As a result, non-GAAP earnings are perceived as a set of information that improves the comparability of financial statements. On the other hand, however, non-GAAP earnings adjustments could be motivated for opportunistic reasons. In the absence of consensus reporting standards, the opportunistic non-GAAP adjustments could cause the resulting earnings metric to deviate from the underlying economics, thereby concealing similarities in and differences between firms. In this situation, rather than facilitating performance comparisons, the distorted non-GAAP earnings metric is likely to reduce earnings comparability.

Compared to GAAP earnings, non-GAAP earnings possess features that have the potential to improve comparability. First, non-GAAP earnings exclude non-recurring items such as restructuring charges, gains and losses on mark-to-market securities, and impairments. To the extent these non-recurring items are not part of firms' core and continuing operations (Dechow et al. 1994; Barth et al. 2001; Riedl 2004; Gu and Lev 2011; Barker 2004; Dhaliwal et al. 1999), their inclusion in earnings is likely to distort reported performance and make earnings deviate from underlying economic reality. In contrast, excluding these items makes earnings more aligned with the underlying economics, which in turn facilitates cross-sectional comparisons of performance. Second, non-GAAP earnings are found to be less conditionally conservative than GAAP earnings (Heflin et al. 2015). This feature of non-GAAP earnings may provide comparability benefits by narrowing the earnings difference caused by differing levels of conservatism.

However, a number of reasons also exist why non-GAAP adjustments could reduce earnings comparability, with the most predominant one being lack of a standardized definition of non-GAAP earnings. While choice over exclusions allows management flexibility to accommodate varying circumstances across firms, it also

leaves non-GAAP reporting subject to the risk of inconsistency (Gu and Chen 2004; Black et al. 2009). Second, firms' GAAP earnings are subject to classification shifting where recurring expenses are misclassified as non-recurring items (Cready et al. 2010; Riedl and Srinivasan 2010; Johnson et al. 2011). Consequently, users such as equity analysts who work on firms' disclosure to construct non-GAAP earnings could be misled into excluding items inappropriately. Collectively, the comparability of non-GAAP earnings versus GAAP earnings therefore remains an empirical question that chapter 4 seeks to address.

My study concerns general non-GAAP adjustments in the US made by various parties not limited to management. IBES actual earnings are used as a proxy for generic non-GAAP earnings in the empirical tests. Employing De Franco et al. (2011)'s approach to measuring comparability, I find that overall non-GAAP earnings adjustments improve cross-sectional earnings comparability relative to GAAP earnings. Further analysis reveals that non-GAAP comparability benefits stem from exclusion of non-recurring items, while aggressive exclusion of recurring items serves to reduce earnings comparability. The comparability benefits from non-GAAP adjustments are also found to vary across firms with different information environment/different level of idiosyncrasy.

Chapter 4 makes three contributions to the extant research. First, it contributes to the literature by bridging the gap between the literature on comparability and the literature on non-GAAP earnings. The finding of this chapter contributes to our understanding of the properties and benefits of non-GAAP reporting. The documented evidence also enriches the fast growing literature on accounting comparability by extending the research focus from GAAP earnings to non-GAAP numbers. Second, evidence presented in this chapter provides another viable explanation for the increasing

popularity of non-GAAP earnings. While prior research largely attributes non-GAAP earnings' popularity to their higher persistence and predictability, the significant improvement in the cross-sectional comparability of street earnings provides an additional explanation for its broad use by preparers and practitioners. Third, findings provide guideline to securities regulators and standard setters who must balance between offering sufficient flexibility in financial reporting and imposing uniformity to prevent potential exploitation. More specifically, non-GAAP reporting presents a setting to examine earnings comparability in the absence of consensus reporting standards. The finding of non-GAAP earnings being even more comparable is consistent with the view that information usefulness can be enhanced by promoting an information-set approach where preparers and external users are allowed to construct earnings metrics to reflect their specific needs. This view is in agreement with the approach to performance reporting adopted by the UK Accounting Standards Board in Financial Reporting Standard 3: Reporting Financial Performance, as well as its successor Financial Reporting Standard 102 (FRS 102).

Chapter 5 aims to close the second gap regarding the underlying mechanism that produces comparable (or incomparable) earnings. Because accounting earnings are determined by the accrual process, it naturally raises an important but unexplained question about the impact of accrual components on the comparability of GAAP earnings. I therefore examine how accruals with different properties influence the comparability of the resulting earnings metrics. The research question is built on the assertion of FASB (2010) that the comparability of reported accounting information is associated with the relevance of the information. In the context of reported earnings, their comparability is expected to be associated with the relevance of components that constitute earnings. Since accruals represent an important component of earnings, the

relevance of accruals is likely related to the comparability of corresponding earnings. In my empirical tests, the relevance of accruals is proxyed by the proximity of different accruals to firms' operating activities. I first establish evidence on the association between earnings comparability and accrual process. Next, I conduct supplementary analysis to examine the moderating effect of accruals on comparability benefits to analyst forecast performance.

An important insight is drawn from the Conceptual Framework for Financial Reporting that accruals with high relevance are likely to improve the comparability of corresponding earnings. Specifically, the FASB asserts that "[s]ome degree of comparability is likely to be attained by satisfying the fundamental qualitative characteristics" (SFAC No. 8), suggesting that accruals that enhance the relevance of earnings would also enhance the comparability of earnings. Building on this insight, I empirically classify the entire accrual items from income statement into three categories according to the proximity of different accruals to firms' core operations. Then I test the comparability effect of three accrual categories. I measure earnings comparability following De Franco et al.'s (2011) approach where comparability is considered high if two firms report similar earnings for similar economic events. Using a US sample of non-financial public firms from 2003 to 2015, I find that core accruals enhance cross-sectional comparability of earnings, whereas non-core accruals reduce earnings comparability. The supplementary analyses examine the implications of my main finding for previously established evidence on how analysts benefit from greater earnings comparability. The finding suggests that the comparability benefits for analysts are more concentrated in the firms whose earnings include less core accruals/more non-core accruals and therefore are more difficult to predict. By contrast, the comparability benefits become significantly less pronounced when the firms'

earnings comprise more core accruals/less non-core accruals and thus are easier to predict. The finding is in agreement with prior evidence that comparability is more beneficial when the difficulty of processing financial information (and overcome information asymmetry) is high (Fan et al. 2016; Chen et al. 2016).

Chapter 5 makes two contributions to the literature. First, it establishes a direct link between the comparability of earnings and the relevance of accrual items. While the majority of prior studies focus on the economic consequences of comparability, there is insufficient research on the underlying mechanism that produces comparability. My research highlights a crucial association between accrual components and earnings comparability. It suggests that adjusting for accruals with distant proximity to operating activities reduces earnings comparability and therefore compromises the usefulness of reported earnings. In contrast, adjusting for accruals with close proximity to operating activities improves earnings comparability, which in turn enhances the usefulness of reported earnings. This knowledge facilitates our understanding of the underlying mechanism that drives earnings comparability. Second, the findings about the relation between comparability and accruals have important implications for the well-established evidence on how analysts can benefit from greater earnings comparability. While prior research documents evidence that greater earnings comparability improves analysts' forecast accuracy and reduces forecast dispersion (De Franco et al. 2011), my analyses suggest that this evidence is mainly driven by firms whose earnings are difficult to predict. For those firms with more straightforward/transparent earnings, the benefits of comparability become less significant to analysts. Overall, my findings suggest a cross-sectional difference in comparability benefits, and thus contribute to the literature on financial reporting, in particular the body of research on earnings comparability.

1.2 Thesis Structure

The remainder of the thesis is organized into 6 chapters. Chapter 2 reviews the literature on accounting comparability. Chapter 3 discusses the empirical measures of accounting comparability and introduces the comparability scores used throughout the thesis. Chapter 4 speaks to the debate on the comparability of non-GAAP earnings through examining the comparability effects of non-GAAP adjustments. Chapter 5 highlights the underlying mechanism that produces comparability by investigating the association between earnings comparability and accrual process. Chapter 6 concludes and makes suggestions for future research.

Chapter 2 Literature Review on Accounting Comparability

This section provides a literature review on accounting comparability. The empirical measurement issues for accounting comparability will be discussed separately in chapter 3. The literature review in this chapter is organized into 4 sections. Section 2.1 discusses the conceptual treatment of accounting comparability in standard setting and academic research. Section 2.2 reviews the research on cross-country accounting comparability, focusing on the studies on the effect of IFRS adoption on accounting comparability. Section 2.3 reviews the studies examining the determinants and consequences of accounting comparability. Section 2.4 summarizes the prior findings about accounting comparability and identifies the gaps in the literature, for which my thesis seeks evidence. While I appreciate comprehensiveness, this section is structured to focus on the research that is closely related to my thesis. As a result, it does not exhaustively cover all studies in the extant literature.

2.1 Importance of Accounting Comparability

Accounting comparability is appreciated as an important characteristic of financial information whose usefulness represents great value for firms, investors and regulators. Comparability is a key characteristic of accounting information. The FASB (2010) considers comparability an important enhancing qualitative characteristic of accounting information. The concept of cross-sectional comparability is distinguished from temporal comparability, with the later one being usually referred to as consistency. Comparability is expected to help financial statement users chose between alternatives such as selling or holding an investment or investing in one reporting entity or another. As a result, information about a reporting entity becomes more useful if it can be compared with similar information about other entities. In particular, FASB (2010)

emphasizes the important role of accounting comparability in investment decision making, by stating that more comparable information better fulfil the need of properly evaluating similarities and differences in competing investment opportunities. Greater accounting comparability calls for like economic events being reflected in similar accounting numbers, and unlike events being accounted by different accounting numbers.

There are two perspectives for achieving accounting comparability. The first perspective relates to the mere similarity of the accounting standards and rules and it is usually referred to as 'formal' harmonization/comparability. The second perspective concerns the inherent application of standards and rules, and it is usually referred to as 'material' harmonization/comparability (Tay and Parker 1990; Tas 1992). The interaction between two perspectives becomes more relevant in the context of IFRS adoption which imposed identical standards to firms that had previously used local GAAPs. This is because the perceived comparability benefit of standard harmonization could be compounded by national heterogeneity in standard implementation (Daske et al. 2013) or the disconnection of change in accounting standards and change in accounting choices (Kvaal and Nobes 2012).

In the pre-IFRS period when various local GAAPs were applied in different countries, the research largely focuses on 'formal' comparability, examining the effect of similarity or dissimilarity of standards and rules on comparability. The 'material' comparability has become the main subject of research in the post-IFRS period when researchers are more interested in the extent to which identical standards are commonly applied across countries with different institutional environments. The research on 'material' comparability also concerns the common implementation of accounting standards by different entities within the same country (e.g., US).

There is also a distinction between comparability and uniformity. While accounting standards are enacted to facilitate comparability, standardized reporting alone does not necessarily guarantee meaningful comparability, even though two numbers appear similar (Beechy 1999). First, applying uniform rules does not always result in comparable earnings if these rules distort the measurement of underlying business. To deliver meaningful comparability, accounting numbers should be able to accurately capture firms' underlying performance because "valid comparison is possible only if the measurements used—the quantities or ratios—reliably represent the characteristic that is the subject of comparison" (FASB, 1980). This is consistent with the notion that genuine comparability calls for fitting of accounting methods to firm-specific circumstances, while the one-size-fits-all philosophy only leads to superficial comparability (Zeff 2007).

Despite the importance of accounting comparability, there has been limited research on this topic (Schipper 2003) mainly due to the lack of a reliable empirical measure of accounting comparability until recently. Conceptually, accounting comparability captures the degree to which similar (different) economic events are mapped into similar (different) accounting numbers. De Franco et al. (2011) introduces an output-based measure of accounting comparability based on the similarity of parameters from firm-specific linear regressions of earnings on stock returns for a subject firm and its peer firms in the same industry. This measure was broadly embraced by researchers and has led to a fast-growing body of research on accounting comparability. More detailed discussion on De Franco et al. (2011)'s earnings comparability measure and other alternative measures of comparability will be discussed in section 3.

2.2 Comparability as a Standard Setting Objective

This section is concerned with studies that examine the effect of standard harmonization on accounting comparability across different countries. I review studies for the period of both pre- and post-IFRS adoption. The pre-IFRS studies observe that accounting standards have become increasingly similar across different countries over time on a voluntary basis. This observation is then linked to the corresponding increase in cross-country accounting comparability. The post-IFRS studies take advantage of the mandatory adoption of IFRS, where firms previously reporting under different local GAAPs are now confronted with identical accounting standards, and examine its effect on accounting comparability. Besides the literature centered around IFRS adoption, there are also studies exploring the convergence of IFRS and US GAAP and its influences on accounting comparability.

The trend in comparability prior to IFRS adoption is examined by Land and Lang (2002) and Beuselinck et al. (2007). An upwards trend in comparability is documented by both studies, with Beuselinck et al. (2007) also identifying firm-specific and country-specific factors determining comparability and its variation over time. In particular, Land and Lang (2002) document evidence of increasingly similar accounting standards across countries over time, and link it to the corresponding increase in accounting comparability. In line with Land and Lang (2002), Beuselinck et al. (2007) investigate the determinants of cross-country accounting comparability over time in EU countries prior to IFRS adoption. Their results indicate a time trend towards a greater cross-country comparability in the relation between accruals and cash flows. They also investigate the comparability effect of firm-specific and country-specific reporting incentives. On the firm level, the accrual-cash flow comparability is significantly affected by size, leverage, and labor intensity, while the accrual-cash flow relation is

influenced by the development of stock market, the importance of banking industry, and union membership on the country level.

Drawing on the convergence of IFRS and US GAAP after firms from IFRS adopting countries adopted IFRS, Barth et al. (2012) predict and find that the dissimilarity in accounting systems significantly declined after firms adopted IFRS. They also find that the difference in value relevance between IFRS and US GAAP firms is narrowed after firms from IFRS adopting countries adopted IFRS. Their findings are indicative of an increase in accounting comparability grounded in the adoption of IFRS, which is then strengthened by the evidence documented by Barth et al. (2013). Using an international sample of 27 different countries, Barth et al. (2013) investigate whether the voluntary IFRS adoption makes the firms more comparable with firms that have already adopted IFRS, but less comparable with non-adopting firms in the same countries. They hypothesize and find that IFRS adoption is associated with voluntary adopters reporting more similar accounting numbers to those adopted firms but less similar accounting numbers to those non-adopters.

Yip and Young (2012) extends the literature by separating the inherent 'similarity facet' in comparability from a 'difference facet'. Accordingly, they argue that comparable accounting standards should make '[…] similar things look more alike without making different things look less different'. They also separate within-country comparability from cross-country comparability. Their results suggest an increase in the similarity of accounting across countries for those similar firms after IFRS adoption, while the results are mixed on the difference facet and within-country comparability. Cascino and Gassen (2015) further enrich the literature on accounting comparability by investigating the moderating effect of compliance on the association between IFRS adoption and accounting comparability. They find that the increase in comparability

associated with IFRS adoption is more pronounced for firms with stronger compliance incentives.

Overall, the main findings of the literature suggest a positive association between IFRS adoption and accounting comparability. However, this is challenged by Lang et al. (2010) who argue against IFRS adoption increasing accounting comparability and in turn improving the information environment. The study draws on the assumption that comparability may not be desirable if it forces fundamentally dissimilar events be reported similarly in accounting numbers. Drawing on a sample period around IFRS adoption, their results show a negative association between cross-country earnings co-movement, a proxy for earnings comparability, and the quality of information environment. This finding contradicts the results on earnings co-movement documented by De Franco et al. (2011) in a single country setting for the US.

Jayaraman and Verdi (2014) find that convergence in incentives and accounting standards are complements in achieving cross-country accounting comparability. In particular, they first document an increase in comparability after the introduction of the Euro, which is consistent with the notion that greater economic integration generates incentives for more similar reporting in financial statements. However, the increase in accounting comparability is identified only after the mandatory IFRS adoption, which is in agreement with the view that reporting incentives complement accounting standards in achieving greater cross-country comparability.

2.3 Determinants and Consequences of Accounting Comparability

The determinants and the consequences of accounting comparability represent a crucial research objective. The understanding of these factors is not only relevant for standard setters but also to financial statement users and preparers. This section groups

the prior studies on comparability into two categories: those examining the determinants of comparability and those investigating its consequences.

There are a handful of papers concerning the determinants of accounting comparability and the events that lead to a change in comparability. However, most of these studies focus on cross-countries comparability (as discussed in the last section), with only one paper looking at the cross-sectional comparability within the same country. Focusing on cross-sectional earnings comparability for firms in the US, Francis et al. (2014) examine the relation between audit style and accounting comparability. In particular, they investigate whether companies audited by the same auditor produce more comparable financial statements than those audited by different auditors. They find that accounting comparability is positively associated with having the same Big 4 auditor, which is consistent with the view of audit style serving as an important determinant for comparability.

Compared with the research on determinants, there is a significantly larger literature regarding the consequences of accounting comparability. The studies along these lines largely focus on cross-sectional comparability, with most of them finding benefits associated with comparability. In particular, accounting comparability is found to be consistently beneficial to both equity and debt markets. There is also a small group of studies examining the benefits of cross-country accounting comparability.

De Franco et al. (2011) document evidence of more comparable financial statements increasing the analyst following, improving analysts' forecast accuracy, and reducing analysts' forecast dispersion. Bhojraj and Lee (2002) find that greater financial statement comparability leads to higher stock price valuation accuracy, with Young and Zeng (2015) documenting similar results in a cross-country setting around the time of IFRS adoption. Still along the line of stock valuation, Chen et al. (2016) examine the

beneficial effect of comparability in M&A markets. Viewing comparability as a mechanism to facilitate information processing, they find that acquirers can better understand the operations of more comparable target firms, which subsequently leads to more enhanced post-deal performance. Moreover, the corresponding benefit of the intra-industry comparability on acquisition performance only presents when the target firm and the acquirer firm do not belong to the same industry. This finding suggests that the effect of accounting comparability is likely to be more pronounced under circumstances where the relevant financial information is *ex ante* difficult to be gathered or processed, and thus warrants peer firms as an additional information channel.

Shane et al. (2014) identify a similar association between greater accounting comparability and the valuation of seasoned equity offerings (SEOs). To the extent that higher comparability helps underwriters to better assess the firms issuing secondary equity, SEO firms with greater comparability with their peers incur lower costs of issuing new equity and therefore experience a less severe underperformance in the five years following the SEO. The finding is in agreement with the view that accounting comparability delivers benefits through reducing the costs of information processing which in turn facilitates enhanced understanding of financial information. Drawing on the same logic, Kim et al. (2016) find that comparability enhances firms' information environment and thus reduces stock crash risks.

Comparability has also been found to be beneficial in debt markets. Fang et al. (2016) investigate the role of comparability in loan contracting under the setting of private debt market. They find a negative association between comparability and the cost of debt, as measured by the loan interest spread, which suggests the benefit of comparability in mitigating information asymmetries between lenders and borrowers in debt relationships. The negative association between comparability and debt costs

becomes weaker when more restrictive terms (e.g., collateral, financial covenants, and maturity) are included in the contract. This finding is consistent with the notion that the benefit of comparability is likely to be more (less) pronounced when the difficulty of processing information (and thus overcome information asymmetries) proves to be high (low).

Kim et al. (2013) document similar results in the setting of public debt. They find that Moody's fulfils the role of information intermediary by adjusting financial statements in purpose of "improving the comparability of financial statements" (Kim et al. 2013, p.788). Using a comparability measure based on Moody's adjustments, they examine the role of comparability in determining liquidity, credit spreads, and the steepness of the term structure. First, their analyses indicate a positive association between comparability and bond liquidity, which provides evidence of comparability helping to reduce information asymmetries in debt markets. Second, they identify a negative association between comparability and the credit spreads of bonds, indicating the implications of comparability for bond pricing. Third, comparability is found to be positively associated with the steepness of the term structure. To the extent that the steepness of term structure is interpreted as being negatively related to default uncertainty, the results lend support to the view that comparability reduces the uncertainty for debt investors.

Under the setting of cross-country comparability, Barth et al. (2013) find that IFRS adopters obtain increased accounting comparability which in turn leads to increases in liquidity, share turnover, and stock price synchronicity after IFRS adoption. Neel (2017) investigates the joint effect of reporting quality and accounting comparability on capital market outcomes. He finds that the market benefits of IFRS adoption (e.g., higher firm value and liquidity, lower information asymmetry) are more

concentrated in firms with larger improvement in accounting comparability. He concludes that accounting comparability has a first-order effect in improving firms' performance in capital markets.

2.4 Summary

Given the importance of accounting comparability, I have seen a fast-growing literature on the topic. There used to be limited research on this topic (Schipper 2003) mainly due to the lack of a reliable empirical measure of accounting comparability. The introduction of new empirical comparability measures by De Franco et al. (2011) among others has led to substantial growth in the literature. One stream of research examines cross-country comparability, with the focus on the comparability effect of IFRS adoption. Yip and Young (2012), Barth et al. (2013), and Cascino and Gassen (2015) find that the IFRS adoption is associated with improved comparability for firms across countries. The other stream of literature focuses on cross-sectional comparability within a single country (i.e., the US). The studies in the second stream attempt to explore the determinants and consequences of cross-sectional accounting comparability. A solid literature has been established on the consequences side where prior studies link accounting comparability to capital markets and find that accounting comparability brings about benefits to participants in both equity and debt markets. In contrast, the research on determinants side is sparse. While accounting harmonization has been found as a determining factor for cross-country comparability, the determinants of cross-sectional comparability within the same country have been rarely examined. One exception here is Francis et al. (2014). They investigate the effect of external auditors on firms' earnings comparability and find that firms audited by the same audit firm tend to have more comparable earnings.

Accordingly, prior studies acknowledge the lack of evidence on the determinants of accounting comparability. For example, De Franco et al. (2011) acknowledge that their study does not investigate the determinants of financial statement comparability and thus cannot speak to a firm's equilibrium level of comparability. Their analysis is also silent on what firms could do to improve cross-sectional comparability. As a result, further research is called for to address two unanswered questions: (1) what can be done to improve comparability; (2) which factors can determine accounting comparability. As a response, my thesis attempts to answer the two research questions. In Chapter 4 I respond to the first question by examining the comparability effect of non-GAAP earnings adjustments. Chapter 5 directly speaks to the second question, linking firms' earnings comparability to the accrual process.

Chapter 3 Summary of Empirical Comparability Measures

This chapter discusses the comparability measures that are developed by prior studies. Section 3.1 summarizes and compares the input-based and output-based comparability measures. Section 3.2 discusses and critiques De Franco et al. (2011)'s measure and earnings co-movement measure, two measures used in my thesis. Section 3.3 details the procedures to construct four alternative comparability scores which will be employed in subsequent chapters.

3.1 Input-based vs. Output-based Comparability Measures

To answer the research questions concerning accounting comparability, prior studies have developed a series of empirical measures for accounting comparability. These measures can be classified into two groups according to the underlying empirical variables they are relying on. The first group includes the measures that are based on input variables into accounting system, while the second group consists of measures that draw on output variables from accounting system. Section 3.1.1 summarizes the input-based comparability measures. Section 3.1.2 reviews the output-based comparability measures. The advantages/disadvantages of both measure groups are discussed in Section 3.1.3.

3.1.1 Input-based Accounting Comparability Measures

The first group of accounting comparability measures is largely constructed on qualitative input-based definitions of comparability, such as business activities or accounting methods. DeFond and Hung (2003) use accounting choice heterogeneity (e.g., LIFO vs. FIFO inventory methods) as a proxy for accounting comparability across different firms. Bradshaw et al. (2009) also construct a comparability measure based on

the commonality of accounting choices. They measure accounting comparability as the difference between a firm's accounting choices and those of its peers in the same sector. An alternative comparability measure based on accounting choices is introduced by Peterson et al. (2015) who employ a linguistic computing approach that is commonly used to conduct comparison of strings of text or documents (Hoberg and Phillips 2010; Brown and Tucker 2011). They apply the approach to the notes to the financial statements from 10-K filings and measure accounting comparability as the similarity across firms in their accounting policy disclosures.

DeFond et al. (2011) produce another two input-based measures. Their first measure is referred to as 'GAAP heterogeneity measure' which captures the reduction in accounting standard heterogeneity in a given sector. The second measure is 'GAAP peer measure' which is computed as the ratio of the number of firms in a given sector applying IFRS after IFRS adoption to the number of firms in the same sector using local GAAP prior to IFRS adoption.

3.1.2 Output-based Accounting Comparability Measures

In addition to input-based measures, there is another group of accounting comparability measures which are drawing on quantitative output-based metrics, with earnings being the most commonly used proxy for accounting system. The study by De Franco et al. (2011) is arguably the most influential paper in the literature on accounting comparability. They contribute to the literature by introducing an output-based approach to accounting comparability which can be applied to large sample with relatively low costs. Unlike prior studies that largely draw on financial statement inputs, De Franco et al. (2011) focus on earnings, the principal output of the financial reporting process. Their first comparability measure is based on the premise that '[f]or a given set

of economic events, two firms have comparable accounting systems if they produce similar financial statements'. They measure comparability as the extent to which economic events are mapped into accounting numbers for firms in the same sector. They use stock returns as a proxy for economic events and earnings as a proxy for the financial statement output. In addition to the measure based on the association between earnings and stock returns, they also develop an alternative comparability measure using the earnings co-movement across firms. The earnings comparability is measured as the degree to which a firm's earnings co-vary with those of its peers in the same sector. The firms whose earnings co-move more with those their peers are considered to have more comparable earnings.

Yip and Young (2012) employ other two output-based comparability measures in addition to a modified version of De Franco et al.'s (2011) earnings-returns approach. Their first alternative measure relates to degree of information transfer. That is, the accounting comparability is measured as the association in abnormal returns between announcing firms and non-announcing firms in the same sector. Stronger associations suggest higher degree of information transfer which in turn implies greater accounting comparability. The second alternative measure is constructed on similarity of the information content of earnings (ICE) and book value of equity (ICBV), an approach based on Ohlson (1995). In their model, firms' market values are regressed on net income, book value of equity, an industry or a country indicator, and the interaction of the respective indicator with net income and book value of equity. Firms are considered to be comparable (incomparable) if the coefficients on interaction terms are insignificant (significant). The focus on the insignificance of the two coefficients builds on the notion that an insignificant coefficient would suggest that firms from different

groups of countries/industries have the same ICE/ICBV and therefore are considered to be of high comparability.

Bhojraj and Lee (2002) present a method to select comparable firms based on valuation theory. The method aims to improve analysts' and researchers' selection of comparable firms. Their approach to identifying comparable firms is referred to as the 'warranted multiples method'. Two widely used reference multiples are considered: the price-to-book ratio and the enterprise-value-to-sales ratio. The warranted multiples are computed as the fitted values of annual cross-sectional models where two commonly used reference multiples (e.g., price-to-book ratio and enterprise-value-to-sales ratio) are regressed on nine explanatory variables regarding profitability, growth, and risk. The 'warranted multiples method' is specifically designed for equity investors and it is found to outperform typical matching methods which are largely based on similarity in size and industry. While Bhojraj and Lee (2002) apply the method to the US market, the method can also be applied to measure cross-country comparability. One example is Young and Zeng (2015) who employ the warranted multiples method in international setting. They find that higher comparability based on warrant multiples is associated with improved selection of international peer firms which in turn leads to more accurate valuation.

In contrast with Bhojraj and Lee's (2002) warranted multiples which are designed for equity valuation, Kim et al. (2013) present alternative measures of comparability for debt market participants. Their measures are based on the rating agencies' adjustments to reported earnings. For instance, rating agencies make adjustments to financial statements for the purpose of improving the comparability of financial statements (Moody's 2010; Standard & Poor's 2008). The measures are computed as the negative value of the dispersion of Moody's adjustments for non-

recurring items and interest-coverage ratio within the same sector peer group. Since the dispersion of adjustments is assessed with a quarter-industry group, Kim et al.'s (2013) measure is calculated for industry quarters rather firm quarter. Firms in a given peer group are considered to be more comparable to their peers if the variability of earnings adjustments for each peer firm is lower, while they are considered to be less comparable if the variability of adjustments is higher. Therefore, accounting comparability is perceived to decrease with the variability of earnings adjustments.

3.1.3 Comparison of Alternative Comparability Measures

This section discusses the advantages of output-based comparability measures over input-based measures. Earlier studies on accounting comparability are largely based on qualitative financial reporting inputs, such as accounting rules and accounting choices. However, more recent papers in this area turn to focus on quantitative outputs of the financial reporting process, with earnings being the most concerned financial output. The output-based measures have a number of advantages over input-based measures. First, output-based measures account for the variation in firms' implementation of the same accounting choices, while the input-based measures merely focus on the inputs themselves (i.e., accounting choices) and do not reflect the fact that the same accounting choices can be differently implemented. Second, a measure of comparability based on firms' accounting choices require researchers to make challenging and somewhat ad hoc decisions about which accounting choices to use and how to weight them. In contrast, out-put based employ the actual weights firms use when reporting accounting numbers (i.e., earnings).

Third, the focus on the outputs makes output-based measures more relevant in capturing accounting comparability. Holding the underlying economic events constant,

firms that use the same accounting inputs are bound to produce the same output. However, it is possible that two firms using different accounting inputs may still get the same output (e.g., LIFO vs. FIFO when prices and inventory levels remain unchanged). Such a lack of input similarity is not relevant to financial statement users' demand for accounting comparability. Finally, since it is usually hard or costly to collect data on a comprehensive set of accounting choices, there are difficulties in applying input-based measures to a large sample. In contrast, output-based measures largely draw on quantitative financial outcomes which are readily available in established databases, and thus can be easily applied to a large sample.

3.2 De Franco et al.'s (2011) Approach on Earnings Comparability

This section provides a more detailed discussion about De Franco et al.'s (2011) approaches to measuring accounting comparability. Section 3.2.1 presents and discusses the comparability measure which is based on earnings-returns association. Section 3.2.2 discusses another comparability measure based on earnings co-movement. The methodological advantages and inherent limitations of both measures will be discussed in each section.

This thesis follows De Franco et al.'s (2011) approaches to measuring accounting comparability. Alternative comparability scores are constructed based on earnings-returns association and used for the main tests in the subsequent chapters, while the comparability scores based on earnings co-movement are employed in robustness check. The construction process of these alternative comparability scores will be discussed in the next section.

3.2.1 Earnings-Returns Mapping Based Measure

The first accounting comparability measure developed by De Franco et al. (2011) is based on the association between earnings and stock returns, and it is labelled as $CompAcct_{ijt}$. The approach measures the similarity with which firms' accounting functions map the same underlying economic events into earnings. The principle underlying the approach is that given a similar set of economic transactions, as reflected in stock returns, firm *j*'s earnings should be similar to firm *i*'s when the two firms' accounting systems are comparable.

Implementing this method involves the following three steps. In the first step, earnings are regressed on contemporaneous stock returns, where stock returns capture economic events and the earnings is the output of an accounting system. Specifically, for each firm-year the following equation is estimated using the 16 previous quarters of data (minimum 14 quarters):

$$Earnings_{it} = \alpha_i + \beta_i Return_{it} + \varepsilon_{it} , \quad (1)$$

where *Earnings* is a quarterly earnings before extraordinary items, *Return* is the quarterly stock returns. Coefficients $\widehat{\alpha_i}$ and $\widehat{\beta_i}$ reflect how economic events are captured by the earnings metric and therefore represent a summary of the accounting system. The accounting function of firm j ($\widehat{\alpha_j}$ and $\widehat{\beta_j}$), which is in the same 2-digit-SIC industry, is estimated similarly.

In the second step, the similarity of the accounting system for firms *i* and *j* is estimated. They predict firm *i*'s and *j*'s earnings based on the accounting function of each firm and firm *i*'s stock return ($Return_{it}$):

$$E(Earnings_{iit}) = \hat{\alpha}_i + \hat{\beta}_i Return_{it} \quad (2)$$

$$E(Earnings_{ijt}) = \hat{\alpha}_j + \hat{\beta}_j Return_{it} , \quad (3)$$

where $E(Earnings_{iit})$ is the expected earnings of firm *i* given firm *i*'s accounting function and firm *i*'s return. $E(Earnings_{ijt})$ is the expected earnings of firm *j* given firm *j*'s

accounting function and also firm *i*'s return. Firm *i*'s return is used in both predictions so that economic events are held constant for both firms.

In the third step, the pair-year comparability score between firms *i* and *j* ($CompAcct_{ijt}$) is defined as the negative value of the average absolute difference between the predicted earnings for both firms shown in (2) and (3):

$$CompAcct_{ijt} = -1/16 \times \sum_{t-15}^{t} \left| E(Earnings_{iit}) - E(Earnings_{ijt}) \right|, \quad (4)$$

averaged over the preceding 16 quarters. A *less negativ*e pair-year comparability score indicates greater accounting comparability between the two firms in a year.

This measure has been widely used in studies on accounting comparability (Yip and Young 2012; Barth et al. 2012; Barth et al. 2013; Kim et al. 2016; Chen et al 2016). It has a number of advantages over previous comparability measures. First, the measure is based on earnings, one of the most important outputs of accounting system. Focusing on an output allow the measure to capture the heterogeneity in implementation of identical accounting choice across firms. Second, the measure makes a clear distinction between earnings comparability and earnings similarity. While comparable earnings can be similar in amount, two earnings numbers carrying similar (or even same) amount cannot guarantee their comparability. De Franco et al.'s (2011) measure addresses this concern by holding the underlying economic events constant before examining earnings numbers. The approach is consistent with the notion that comparability requires 'like things be reported alike, and unlike things be reported differently'. Finally, as a practical matter, the measure can be easily applied to a large sample because the required variables are readily available in established databases.

However, some questions have been recently raised about the empirical construct and validity of this measure. The first question is concerned with the output variable (e.g., earnings) on which the measure is constructed. While earnings are

arguably the most followed summary measure of accounting performance, earnings merely reflect one dimension of financial statement (an income statement perspective), with important performance metrics from, for example, balance sheet being left uncaptured. To the extent that balance sheet numbers are of prime interest to lenders, credit rating agencies, and bank regulators, merely focusing on earnings may not guarantee a multidimensional measure of accounting comparability. The second question relates to the measure's validity. While the measure aims to capture the comparability of accounting systems, there are concerns that it may also capture the similarity in underlying economics across firms (Chen et al. 2016). That is, firms having similar underlying economics (i.e., similar business model) are more likely to be manifested as being comparable regardless of their accounting systems. The third question concerns the effect of other financial reporting attributes on the measure. Although the comparability is viewed as a distinct dimension of accounting information, it is likely correlated with other earnings attributes. Earnings, accruals and cash flows are all defined by the accounting system that maps economic events into accounting numbers (Dechow et al. 2010). Therefore, firms' accounting is expected to be more comparable if it produces high quality earnings and less comparable when it produces low quality earnings.

3.2.2 Earnings Co-Movement Based Measure

The second measure of comparability is based on the firm-pairwise co-movement of earnings. It measures comparability as the degree to which firms' earnings co-vary over time and represents a different conceptual idea of comparability. Compared with the measure based on the similarity of the mapping between earnings and stock returns, the measure based on earnings co-movement likely captures a

different characteristic of reported earnings (Lang et al. 2010). While the earnings-returns mapping based measure aims to assess whether earnings are similarly capturing the underlying economics, the earnings co-movement based measure captures anything that creates similarity in earnings, irrespective of whether the underlying economics are similar or not. The comparability score is computed as the adjusted R-Squared value of a time-series regression of one firm's earnings on another firm's earnings. The following regression is estimated for every firm pair in the same SIC 2-digit industry with data from the previous 16 quarters:

$$Earnings_{iq} = \alpha_{ij} + \beta_{ij} Earnings_{jq} + \varepsilon_{ijq} \,, \tag{5}$$

where *Earnings* represents earnings before extraordinary items for firm *i* and firm *j* in quarter *q*. They are scaled by the average total assets of each firm. The adjusted R-Squared value of equation (5) is taken as an alternative firm-pairwise comparability measure and it is labelled CMV_ERN_{ijt}. Higher values of CMV_ERN_{ijt} indicate greater earnings comparability between firms, while lower values suggest lower earnings comparability.

While the mapping based measure is that it explicitly controls for the underlying economic events and thus manages to isolate accounting comparability, one could argue that earnings could fulfil a comparability role to investors even when the accounting functions per se are not identical. To the extent that two firms' earnings co-vary over time, information about the earnings of one firm can be informative to investors who are interested in forecasting the earnings of another firm. Therefore, earnings co-movement can manifest accounting comparability from financial statement users' perspective. One advantage of earnings co-movement based measure is it focuses on earnings per se and does not require researchers to specify and estimate the accounting system which is often a challenging task.

The earnings co-movement based measure broadens the definition of accounting to incorporate the effect of economic events on earnings, and therefore introduces an inherent limitation. That is, it initially lacks a control for economic events, which brings about concerns that the comparability score could be driven by differences in the economic events rather than how these events are accounted. This limitation can be problematic when the comparability score is used as an independent variable to explain capital market outcomes that are likely affected by firms' underlying economics. However, this concern can be alleviated by controlling for variables of underlying economics in the regression. For example, De Franco et al. (2011) attempt to resolve this potential problem by including firm-pairwise cash flow co-movement and stock return co-movement measured analogously to ERN_CMV_{ijt}. Overall, earnings co-movement based comparability measure captures a different aspect of comparability and can be used as an alternative measure for robustness check.

3.3 Measures of Comparability Used in the Thesis

The last section discusses two approaches to measuring accounting comparability, mapping based approach and earnings co-movement based approach. Drawing on the two approaches, I use four alternative comparability scores. They are defined and constructed in this section and will be used in the subsequent chapters in this thesis. Two alternative comparability scores are constructed based on mapping based approach. The first score is constructed at firm-pair-year level and it is labelled as $CompAcct_{ijt}$, while the second score is constructed at firm-year level, labelled as $CompAcctInd_{it}$. Another two alternative comparability scores stem from the earnings co-movement based approach. The first one is computed a firm-pair-year level and it is labelled as CMV_ERN_{ijt}. The second one is a score at firm-year level, labelled as

CMV_Ind$_{it}$. In the subsequent chapters, *CompAcctInd*$_{it}$ and *CompAcct*$_{ijt}$ are used as the primary measures of comparability in my tests, with the other two alternative scores being used for robustness checks.

The construction of alternative comparability scores is briefly discussed as follows. First, *CompAcct*$_{ijt}$ is constructed as demonstrated in equation (4). It is computed at firm-pair-year level as the average absolute difference in predicted earnings between firm *i* and firm *j* over time. Second, I generate a firm-year comparability score (*CompAcctInd*$_{it}$), as opposed the firm-pair-year comparability score in equation (4). For firm *i* in time *t*, I compute the firm-year comparability score as the median pair-year comparability score over all *i-j* pairs within a 2-digit SIC industry in a year.[1] *CompAcct*$_{ijt}$ and *CompAcctInd*$_{it}$ are constructed to carry negative values. More negative scores suggest lower comparability, while less negative scores indicate higher comparability.

Third, *CMV_ERN*$_{ijt}$ is computed as the adjusted R-Squared value of the regression in equation (5). It aims to capture accounting comparability at firm-pair-year level. Finally, I construct a corresponding firm-year level score (*CMV_Ind*$_{it}$) by taking the industry median of *CMV_ERN*$_{ijt}$ for all the firm-pairs with firm *i* in year *t*. *CMV_ERN*$_{ijt}$ and *CMV_Ind*$_{it}$ both carry positive values, with more positive scores for higher comparability and less positive scores for lower comparability.

[1] Alternatively, I average the four least negative pair-year comparability scores between firm *i* and firm *j*s (in the same industry): $CompAcct_{it} = 1/4 \times \sum_{j \in \{4\ least\ negtive\ pair-year\ scores\}} CompAcct_{ijt}$. Results are robust to this method of generating the firm-year comparability score.

Chapter 4 Comparability of Non-GAAP Earnings

4.1 Introduction

Comparability is attracting increasing attention in the debate about earnings quality in general and non-GAAP earnings reporting in particular. As an enhancing quality of financial information, comparability involves like things being reported alike, and unlike things being reported differently (AICPA 1971: 59). Comparability enables users to identify and understand similarities in, and differences among, financial items (FASB 2010). This paper undertakes the first empirical investigation of the comparability effects of non-GAAP earnings adjustments.

On the one hand, preparers and certain user groups such as financial analysts often claim (among other benefits) that non-GAAP earnings are more comparable than GAAP earnings. For example, Kraft Heinz contends that non-GAAP earnings better reflect their underlying business, implying the ability of such earnings to capture similarities and differences between firms (2016 Third Quarter Earnings Release: 5). Similarly, analysts often adjust GAAP "to better reflect the underlying economics of transactions and events and to improve the comparability of financial statements" (Moody's 2010: 2). On the other side of the debate, some commentators have raised concerns about the potential comparability problems associated with non-GAAP earnings. For example, PwC (2014) highlight the inconsistent calculation of non-GAAP earnings across firms and over time, which can potentially reduce the comparability of non-GAAP earnings. Securities regulators share a similar concern and have taken steps to address the issue. For example, the Sarbanes-Oxley Act (2002) explicitly targeted the objective of enhancing the comparability of non-GAAP reporting, leading the Securities and Exchange Commission (SEC) to issue Regulation G which requires firms to

reconcile non-GAAP earnings with the nearest GAAP number in their earnings press releases.

This paper empirically investigates the comparability of various non-GAAP earnings metrics relative to GAAP earnings. While the non-GAAP earnings literature provides ample evidence on the value relevance impact of adjusting GAAP earnings (Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Lougee and Marquardt 2004; Black and Christensen 2009), no research to the best of my knowledge has examined the effect on earnings comparability of non-GAAP adjustments. Instead, prior research on accounting comparability focuses primarily on GAAP numbers (De Franco et al. 2011; Kim et al. 2013; Peterson et al. 2015; Young and Zeng 2015; Fang et al. 2016; Chen et al. 2016).

The comparability of non-GAAP earnings numbers constitutes an important part of the broader debate in professional and financial media circles regarding the usefulness of such measures to investors and other users (Francis and Linebaugh 2015; PwC 2016; The Center for Audit Quality 2016; International Organization of Securities Commissions 2016). In particular, SEC Chair Mary Jo White calls for enhancing the comparability associated with the use of non-GAAP information (White 2016). Many important business decisions involve comparing performance across firms or over time. Non-GAAP earnings are considered beneficial to users if they facilitate these comparisons by removing transitory items from GAAP earnings and providing a better measure of sustainable performance. However, no large-sample empirical evidence currently exists to support this claim. My study concerns general non-GAAP adjustments made by various parties not limited to management. IBES actual earnings are used as a proxy for generic non-GAAP earnings in my empirical tests. Bentley et al. (2018) show a substantial overlap between the IBES actual earnings and managers' non-

GAAP earnings. They find that non-GAAP metrics in I/B/E/S agree with the managers' non-GAAP metrics 73.3 percent of the time. They also find that IBES earnings often excludes managers' lower quality non-GAAP numbers, and sometimes provides higher quality non-GAAP measures when managers do not explicitly disclose a non-GAAP earnings. Given this, cautions should be implemented when interpreting the results of my study, since using IBES actual earnings to identify managers' non-GAAP disclosures may underestimate the aggressiveness of their reporting choices.

Relative to GAAP earnings, non-GAAP earnings have the potential to be more comparable. Non-recurring items such as restructuring charges, gains and losses on mark-to-market securities, and impairments are not generated by firms' core and continuing operations (Dechow et al. 1994; Barth et al. 2001; Riedl 2004; Gu and Lev 2011; Barker 2004; Dhaliwal et al. 1999). Further, recurring items such as depreciation and amortization can be distorted under accounting standards which prioritize conservatism (Basu 1997; Ball and Shivakumar 2006). By removing such items from GAAP earnings, the resulting non-GAAP metric could better reveal the performance of core operations and provide more relevant information to users whose primary decision making focus revolves around core operations. Anecdotally, a popular version of non-GAAP earnings known as street earnings is constructed purposely by analysts to facilitate superior cross-firm comparison (Moody's 2010; Standard & Poor's 2008). Evidence that street earnings are less conditionally conservative than GAAP earnings (Heflin et al. 2015) also suggests that the former may provide comparability advantages.

However, there are a number of reasons why non-GAAP adjustments could compromise on earnings comparability. First, there is no standardized definition of non-GAAP earnings. While this flexibility can be beneficial in accommodating varying circumstances across firms, it also opens the possibility of inconsistency. There is

evidence that recurring items are sometimes aggressively excluded from earnings (either by firms or users), impairing the quality of non-GAAP earnings and impeding comparability (Black and Christensen 2009; Whipple 2014). Second, evidence suggests that management misclassify recurring expenses as non-recurring (Cready et al. 2010; Riedl and Srinivasan 2010; Johnson et al. 2011). Consequently, users such as analysts who rely on firms' disclosure to construct non-GAAP earnings could be misled into adjusting incorrect items. Therefore, the relative comparability of non-GAAP earnings versus GAAP earnings remains an open empirical question on which this paper seeks evidence.

Using a broad sample of US non-financial firms over the period 2003 through 2015, the empirical analysis evaluates the incremental comparability of a suite of earnings metrics relative to GAAP earnings before extraordinary items (hereinafter *EB_X*): GAAP net income, street earnings (i.e., IBES actual earnings). I use street earnings as a generic proxy for earnings metrics that are reported on non-GAAP basis. The concept of generic non-GAAP earnings includes management generated non-GAAP earnings and analysts generated non-GAAP earnings. I also examine a set of self-constructed alternative earnings metrics that exclude various combinations of non-recurring and key recurring items. This analysis allows me to examine the comparability effect of specific individual non-GAAP exclusions. Specifically, I identify common non-GAAP earnings exclusions in the form of nonrecurring items (i.e., restructuring charges, gains and losses on mark-to-market securities, litigation settlement fees, write-downs, and impairments) and recurring items (i.e., share-based compensation expense and depreciation and amortization) (Brown and Sivakumar 2003; Gu and Chen 2004; Barth et al. 2012; Whipple 2014; Brown et al. 2015).

To quantify comparability, I follow the methodology in De Franco et al. (2011) to compute a firm-year comparability score for each earnings metric. Using *EB_X* as a benchmark, I then conduct pair-sample tests of the equality of mean (median) comparability scores of an alternative earnings metric and *EB_X*. An important feature of this research design—pairwise comparison of alternative earnings metrics—allows firms to serve as their own control and thus minimizes firm-specific confounding factors.

Findings reveal that street earnings are statistically and economically more comparable than *EB_X*, which supports the view that analysts' consensus adjustments enhance cross-sectional earnings comparability. The self-constructed non-GAAP earnings metric that excludes aggregate nonrecurring items is also incrementally more comparable than *EB_X*, although the magnitude of the improvement is less pronounced than in the case of street earnings. This is consistent with the view that mechanistic adjustments may not always be appropriate for comparisons which are often complex and contextual. I find that excluding recurring items associates with deteriorated comparability, which casts doubt on claims that excluding persistent components from GAAP earnings enhances performance comparability.

To pinpoint the source of comparability improvements, I examine the impact of individual line items by evaluating the incremental comparability of *EB_X* with that particular component excluded. Results show that excluding impairments, write-downs, restructuring charges, share-based compensation expense, gains and losses on mark-to-market securities, s yields incremental earnings comparability benefits (in a declining order of magnitude). Conversely, excluding depreciation and amortization significantly reduces earnings comparability relative to GAAP earnings, which suggests that aggressive exclusion of recurring expenses is associated with negative comparability effects.

Supplementary analyses examine how the incremental comparability of non-GAAP earnings varies with key firm characteristics. I predict that the incremental comparability benefits of non-GAAP exclusions are more pronounced where information environments are richer and demand for analyst services are stronger. Moreover, I expect greater non-GAAP comparability benefits be associated with firms having higher idiosyncrasy. Consistent with the predictions, I find that the superior comparability of street earnings relative to *EB_X* is increasing in size, analyst following, and return volatility. A similar pattern is also found with idiosyncratic risks and the uniqueness of firms' growth opportunity.

This paper makes the following three contributions. First, it fills a gap in the literature regarding the comparability of non-GAAP earnings. The paper finds evidence on the comparability improvement of (certain) non-GAAP earnings over GAAP earnings, as well as contextual evidence concerning the conditioning effect of firms' information environment, all of which contributes to our understanding of the properties and benefits of non-GAAP reporting. The evidence also enriches the growing literature on accounting comparability more generally, which to date has focused on GAAP numbers (De Franco et al. 2011; Kim et al. 2013; Peterson et al. 2015; Young and Zeng 2015; Chen et al. 2016; Fang et al. 2016). Second, the paper presents evidence that speaks to the controversy over the increasing popularity of non-GAAP earnings. Besides higher persistence and predictability as documented by prior research (Bradshaw and Sloan 2002; Bhattacharya et al. 2003; Lougee and Marquardt 2004), the significant improvement in comparability of street earnings provides an additional reason for its widespread adoption by preparers and practitioners. Third, the findings in this paper can also serve as an input to securities regulators and standard setters who must balance between offering adequate flexibility in financial reporting and imposing

restrictions to prevent potential abuse. One implication is that rather than defining a single, universal measure of earnings whose relevance and reliability is hard to guarantee in all situations, regulators could promote an information-set approach where preparers and external users construct earnings metrics to suit their particular needs. This idea is consistent with the approach to performance reporting adopted by the UK Accounting Standards Board in Financial Reporting Standard 3: Reporting Financial Performance, as well as its successor Financial Reporting Standard 102 (FRS 102).

The remainder of the chapter is organized as follows. Section 4.2 reviews the prior literature on accounting comparability and non-GAAP earnings. Section 4.3 develops predictions on the comparability effect of non-GAAP earnings adjustments. Section 4.4 describes the research design, data and summary statistics of key measures. Section 4.5 presents the main empirical results, which is followed by the supplementary results in Section 4.6. Section 4.7 concludes.

4.2 Prior Literature

Comparability is a key characteristic of accounting information. The FASB (2010) considers comparability an important enhancing qualitative characteristic of accounting information. Comparability is expected to help financial statement users chose between alternatives such as selling or holding an investment or investing in one reporting entity or another. As a result, information about a reporting entity becomes more useful if it can be compared with similar information about other entities.

A fast-growing body of literature examines comparability as a distinct dimension of accounting information which allows for better across-firm comparisons (De Franco et al. 2011; Chen et al. 2016; Young and Zeng 2015). First, greater comparability enhances earnings quality and improves the ability of stock returns to

reflect earnings information (Peterson et al. 2015; Choi et al. 2015). Second, greater comparability is beneficial to analysts. Bradshaw et al. (2009) and De Franco et al. (2011) find that analysts make more accurate and less dispersed earnings forecasts for firms that are more comparable with their peers. Kim et al. (2013) also find a reverse relation between financial statement comparability and analysts' over-optimism. Third, greater comparability can facilitate more efficient capital allocation decisions, as indicated by research on private loan and public debt markets (Fang et al. 2016; Kim et al. 2013). In addition, Chen et al. (2016) find greater comparability helps acquirers better evaluate target firms. Please refer to Chapter 2 for a more detailed literature review on accounting comparability.

The majority of extant research on financial reporting comparability focuses exclusively on GAAP earnings. In contrast, the comparability of non-GAAP earnings has received little attention in the academic literature despite the widespread use of non-GAAP earnings for financial decision making and valuation, and frequent claims that such metrics enhance comparability (Frederickson and Miller 2004; Zhang and Zheng 2011; Huang and Skantz 2016). Prior research does not examine how comparability varies across different earnings constructs; instead the focus is on the consequences of higher or lower comparability holding the underlying earnings construct (i.e., GAAP earnings) constant. The comparability impact of non-GAAP adjustments to net income is therefore an open question on which this paper seeks evidence.

Prior studies on non-GAAP earnings document evidence that non-GAAP earnings adjustments lead to higher predictability and persistence (Bradshaw and Sloan 2002; Brown and Sivakumar 2003; Bhattacharya et al. 2003; Lougee and Marquardt 2004). However, comparability is distinct from predictability and persistence insofar as it is concerned with the quality of information that enables users to identify similarities

in and differences between two sets of economic events. Unlike other qualitative characteristics, comparability does not relate to a single entity. Rather, it requires comparisons between two or more entities. I therefore examine comparability as an independent dimension of non-GAAP earnings quality.

A recent paper by Black et al. (2017b) is closely related to this chapter. They address the market participants' concerns about non-GAAP reporting by examining non-GAAP earnings' consistency and comparability. They find that management generated non-GAAP earnings are more comparable than their GAAP counterparts. My study is differentiated from their paper in the following three points. First, while they focus on management generated non-GAAP earnings, my study uses street earnings to proxy for generic non-GAAP earnings. Second, my study is based on a more comprehensive sample, whereas the sample of Black et al. (2017b) is limited due to hand collection. My sample includes all US public firms during the period of 2003 through 2015, leading to a sample of 19,686 firm-years. In contrast, Black et al. (2017b) is limited to S&P 500 firms from 2009 to 2014, having only 2,746 firm-year observations in their tests. One advantage of having a more extensive sample is greater generalizability. While Black et al. (2017b) focus on the largest group of companies (i.e., S&P 500), the findings of my study can be potentially generalized to small and medium-sized companies. Third, my study attempts to pinpoint the source of comparability benefits of non-GAAP earnings. I also document evidence on the cross-sectional variation in non-GAAP comparability benefits. Black et al. (2017b) are, however, silent on these two questions.

The remainder of this section provides a general review on non-GAAP earnings literature. It focuses on the research that is closely related to my thesis. Section 4.2.1 provides an overview on the increasing popularity of non-GAAP earnings. Section 4.2.2

reviews the prior findings about how non-GAAP earnings are constructed. Section 4.2.3 presents the extant debate on reporting incentives behind non-GAAP reporting and reviews the main findings from both sides. While the content in this section means to be comprehensive, it is structured to only focus on those closely related work and thus is not inclusive of every single piece of work in the literature.

4.2.1 Increasing Popularity of Non-GAAP Earnings

The last two decades have seen a rise in non-GAAP reporting, which has resulted in the popularity of such non-standard earnings metrics as an important way to evaluate firm performance among managers, analysts, and investors. Accordingly, standard setting and regulatory attentions have been increasingly shifted to non-GAAP reporting as a result of the increasing popularity of these constructs (Rapoport 2016; Golden 2017). As non-GAAP reporting becomes increasingly common, questions have been raised about the reporting incentives for non-GAAP earnings.

In the early days of non-GAAP reporting in the US (i.e., mid-1990s to early 2000s), these metrics were less common and used exclusively in certain industries. The uncommonness and opaqueness of non-GAAP reporting warranted concerns by regulators questioning the motives behind non-GAAP disclosures. For example, the SEC issued warnings to financial statement users about the potential misleading risks associated with non-GAAP earnings (Dow Jones, 2001; SEC, 2001a; 2001b). The scepticism on non-GAAP earnings led to stricter regulation on these metrics. In response to the provision of Sarbanes-Oxley Act (SOX) in 2002, the SEC enacted Regulation G (Reg G) in 2003 to tighten the regulation on non-GAAP reporting, whereby non-GAAP metrics are required to be reconciled to the most directly comparable GAAP-based metric. For example, the most recent regulation requires non-

GAAP earnings numbers be reconciled to the GAAP-based net income. Many studies document evidence that Reg G has led to improvement in the transparency and overall quality of non-GAAP reporting (e.g., Kolev et al., 2008; Heflin and Hsu, 2008; Black et al., 2017c). Specifically, Heflin and Hsu (2008) document a decline in the magnitude of non-GAAP exclusions, as well as a reduced probability of non-GAAP earnings being used to meet strategic target (e.g., analyst consensus). Kolev et al. (2008) find that after Reg G the non-GAAP exclusions become more transitory, which indicates higher quality of non-GAAP earnings. Black et al. (2017c) suggest that managers' non-GAAP exclusions become more cautious after Reg G, as evidenced by the lower likelihood of managers excluding recurring items incremental to those excluded by analysts.

A decline in the frequency of non-GAAP reporting was observed in the wake of Reg G, whereas the incidence of non-GAAP earnings has resurged and increased consistently. The use of non-GAAP earnings has currently reached a peak as increasingly more firms embrace such reporting activity. For instance, Bentley et al. (2018) find that approximately 60% of all US firms have a non-GAAP EPS metric in 2013, while Black et al (2017b) report that non-GAAP earnings are disclosed by 71% of S&P 500 firms in 2014. Moreover, Black et al. (2017a) find that the frequency of non-GAAP reporting has increased across all sectors during the period of 2009 through 2014.

The recent prominence of non-GAAP earnings has also ignited standard setters' interest in the practice. In particular, the "Financial Performance Reporting" project undertaken by the FASB in 2014 is examining the implications of current proliferation of non-GAAP earnings for GAAP standard. The FASB's initiative attempts to evaluate the need to better organize the income statement. One example is to include more disaggregated numbers which might help financial statement users with constructing

their own customized performance metrics (Siegel, 2014; Linsmeier, 2016; Golden, 2017). A similar approach is also adapted in 1993 in the UK under FRS3, as well as its successor Financial Reporting Standard 102 (FRS 102). The SEC's attempt is echoed by their international counterpart, with the IASB's Disclosure Initiative considering the implication of the increasing frequency of non-GAAP reporting for standard setting. In particular, the chairman of IASB acknowledges the potential value of non-GAAP reporting by noting that the IASB is "open to the idea of learning from the use of non-GAAP measures" (Hoogervorst 2015, p.5).

4.2.2 Practice of Constructing Non-GAAP Earnings

Typically, discretionary exclusions are made for certain line items over GAAP earnings to construct non-GAAP earnings. The difference between GAAP earnings and non-GAAP earnings had been widened throughout the late 1980s and 1990s (Bradshaw and Sloan 2002). They also find that the increasing difference is largely driven by the exclusion of special items (also labelled as on-time, nonrecurring, or transitory items in the literature). Numerous studies further examine the nature of non-GAAP exclusions and find that one-time items (e.g., gains and losses on asset disposals, merger and acquisition costs, and extraordinary items) are often excluded as an attempt to emphasize sustainable earnings (Bhattacharya et al., 2003; 2004; Lougee and Marquardt 2004; Entwistle et al. 2005; 2006, Nichols et al., 2005).

However, as one-time items are largely expenses, their exclusion can result in greater non-GAAP earnings than GAAP earnings, which raises the concern about non-GAAP exclusions being used to inflate reported performance (Lougee and Marquardt, 2004, Johnson and Schwartz, 2005, Doyle et al. 2013). This concern is legitimate but can be alleviated by the empirical evidence that one-time gains are also excluded, which

lowers the non-GAAP performance metric (Bhattacharya et al., 2003; Curtis et al., 2014, Baumker et al., 2014). For example, Curtis et al. (2014) find that approximately one-half of firms with one-time gains exclude them when constructing their non-GAAP earnings, though inconsistency still exists in their exclusion decisions regarding one-time expense and one-time gains. Overall, non-recurring items are found to account for the vast majority of non-GAAP adjustments, and these adjustments are frequently related to restructuring charges and acquisition related charges (Black et al. 2017b).

In addition to adjusting for non-recurring items, managers and analysts also exclude recurring items (i.e., depreciation and amortization, stock-based compensation) in their non-GAAP calculation. In spite of the recurring nature of those items, they are claimed to be non-operating or non-cash which warrants the exclusion of them. Bradshaw and Sloan (2002) find that the exclusion of amortization serves as a driver for the growing rift between GAAP and non-GAAP earnings, while Bhattacharya et al. (2003) document a dramatic increase in the frequency of depreciation, amortization, and stock based compensation exclusions. Drawing on more recent data, Black and Christensen (2009), Whipple (2016), and Black et al. (2017b) find that recurring items remain a common type of non-GAAP exclusions, and that these adjustments are primarily associated with stock based compensation, amortization, and investment gains and losses. Excluding recurring items seems to have become a more commonplace practice than in earlier non-GAAP reporting periods. This increase in recurring item exclusions is likely attributable to the corresponding changes in accounting standards, such as SFAS 141 (related to accounting for business combination) and SFAS 123R (related to accounting for stock-based compensation) which mandated the inclusion of these items in GAAP-based numbers[2]

[2] SFAS 141 requires firms to account for business combinations using the purchase method of accounting and to amortize certain acquired intangible assets. SFAS 123R requires firms to expense stock-based

Black et al. (2017a) find that firms are excluding more items from their non-GAAP calculations across time, with an average of 3.6 items in 2014 versus 3.1 in 2009. They also document a time trend indicating that the magnitude of exclusions has increased substantially from $0.73 of expenses in 2009 to $1.03 of expenses in 2014. Moreover, they find that the increase in exclusion magnitude is due to nonrecurring exclusions, which has nearly doubled in size over the period of 2009 through 2014.

4.2.3 Reporting Incentives of Non-GAAP Earnings

The informativeness of non-GAAP earnings has been questioned since their early reporting period. Critics in the financial press expressed their scepticism about this new reporting practice, where discretionary adjustments are made on GAAP earnings and the discretion involved might be exploited to serve for opportunistic purposes (Derby, 2001; Dreman, 2001; Elstein, 2001). The regulators were also concerned about the fast-growing trend toward non-GAAP reporting. For example, the former SEC Chief Accountant, Lynn Turner, criticized non-GAAP earnings for being an opportunistic tool that allows managers to report "everything but bad stuff" (Dow Jones 2001). The survey implemented by Graham et al. (2005) also documents evidence on the potential abuse of non-GAAP reporting where non-GAAP earnings are emphasized when GAAP earnings present unprofitability.

As a response to the questions and concerns from investors and regulators, a perspective is taken by Hirshleifer and Teoch (2003) who lay down the theoretical ground for examining the underlying motives for non-GAAP reporting. They assert that non-GAAP earnings are relevant as they can bias investors' assessments of future cash flows upwards, and they also show the potential informativeness of non-GAAP

compensation, which some would argue is defensible (Christensen, 2012).

reporting in that it can better align stock prices with fundamental value. Bradshaw and Sloan (2002) provide evidence along these lines but from an empirical perspective. They find that the US investors respond more to street earnings than to GAAP earnings after 1992. Bhattacharya et al. (2003) extend this literature with the finding that investors view non-GAAP earnings as being more value relevant than GAAP operating earnings. Subsequent studies document consistent evidence which is in support of non-GAAP information being more relevant to investors than GAAP-based numbers (Brown and Sivakumar 2003; Johnson and Schwartz 2005; Marques 2006; Wieland et al. 2013; Venter et al. 2014; Bradshaw et al. 2017).[3]

There are two potential reporting incentives behind management prepared non-GAAP reporting earnings. The first one is informativeness whereby non-GAAP earnings are reported to provide more relevant information to financial statement users, while the second one is opportunism which implies an attempt to misleading investors for self-serving purpose. The general finding of non-GAAP reporting being more informative suggests informativenss for non-GAAP reporting. In spite of the fact that non-GAAP measures deviate from the prescribed "standard" earnings number, prior studies document evidence that non-GAAP earnings are often more persistent than GAAP earnings (Bhattacharya et al. 2003) and more useful for valuation purpose (Bradshaw and Sloan 2002; Brown and Sivakumar 2003). This evidence is consistent with the notion that non-GAAP earnings are motivated by an incentive to better inform investors about core operations. In particular, (1) systematic exclusion of non-recurring items, inclusive of one-time gains, in constructing non-GAAP earnings provides a more accurate reflection of core performance (Bhattacharya et al. 2003; Lougee and

[3] Some researchers have offered alternative explanations for investors' preference for non-GAAP relative to GAAP earnings such as measurement error (Bradshaw, 2003; Cohen et al., 2007) or extreme exclusion values (Abarbanell and Lehavy, 2007).

Marquardt 2004; Curtis et al. 2014), (2) investors pay more attention to non-GAAP earnings than to GAAP earnings, indicating greater reliance on non-GAAP information (Bradshaw and Sloan 2002; Bhattacharya et al. 2003), and (3) non-GAAP reporting is not mean to mislead investors, particularly in the period after the Reg G (Johnson and Schwartz 2005; Zhang and Zheng 2011; Jennings and Marques 2011; Huang and Skantz 2016; Whipple 2016).

On the other hand, prior research finds numerous examples of potentially misleading non-GAAP reporting, which is indicative of an opportunism incentive. First, while excluding non-recurring items is largely believed to better reflect the underlying economics, the aggressive exclusion of recurring items is more susceptible to scepticism (Bhattacharya et al., 2003; Black and Christensen, 2009, Barth et al., 2012). Drawing on the same logic, several studies assess the quality of non-GAAP exclusions according to their predictive power for firms' future performance, and they find that recurring items exclusions are of the lowest quality and frequently lead to misleading perception of investors (Doyle et al. 2003; Landsman et al. 2007; Kolev et al. 2008; Bentley et al. 2018; Black et al. 2017b). Second, non-GAAP exclusions are found to be used as a tool to achieve strategic earnings targets (e.g., profit; analyst consensus) which GAAP-based numbers are not capable of meeting (Bhattacharya et al. 2003; Graham et al. 2005; McVay 2006; Black and Christensen 2009; Marques 2010; Doyle et al. 2013; Isidro and Marques 2015; Lopez et al. 2016; Leung and Veenman 2016; Bradshaw et al. 2017). One important inference from these studies is the non-GAAP exclusions are motivated to bias investor perception upward by promoting a false image that an "adjusted" earnings number meets or beats a desired target.

While the markets often question the reporting incentives behind non-GAAP earnings generated by managers, analysts' non-GAAP exclusions are generally believed

to be more driven by informativeness. First, the survey by Brown et al. (2015) finds that analysts generally exclude non-recurring items from their earnings forecasts. Rather than systematically excluding all non-recurring items, analysts are found to use their expertise in deciding which non-recurring items are warranted to be excluded for constructing a more informative metric for valuation (Gu and Chen 2004; Chen 2010). Second, Heflin et al. (2015) find that analysts' non-GAAP adjustments are informative in the sense that they reduce the conditional conservatism found in GAAP-based earnings. Third, by directly comparing managers' and analysts' non-GAAP exclusions, Bentley et al. (2018) find that analysts' exclusions are of higher quality and less aggressive. However, Baik et al. (2009) document evidence of uninformativeness incentives for analysts' exclusions. They find that analysts might be induced to report higher non-GAAP earnings in the situation where they have strong incentives to curry favour with managers.

4.3 Predictions on Comparability Impact of Non-GAAP Earnings Adjustments

There are several reasons why non-GAAP earnings may be more comparable than GAAP earnings. First, GAAP earnings contain non-recurring items, which negatively affect their comparability, whereas non-GAAP earnings typically adjust for such items. Non-recurring items are either infrequent in occurrence or unusual in nature, and usually not an integral part of firms' normal operating activities. While FASB (1980) recognizes that "valid comparison is possible only if the measurements used—the quantities or ratios—reliably represent the characteristic that is the subject of comparison" (pg. 28), the transactions and events behind non-recurring items clearly do not meet such consideration. Therefore, including non-recurring items may cause GAAP earnings severely deviate from firm's core and continuing operations. In contrast,

non-GAAP earnings inherently exclude non-recurring items. To the extent that the construction of non-GAAP earnings is not overly contaminated by managers' opportunism, excluding non-recurring items results in non-GAAP earnings that are more likely to capture a firm's underlying economics and thus facilitate meaningful comparison between firms and/or over time.

Second, (conditional) conservatism also hinders the comparability of GAAP earnings, whereas non-GAAP adjustments could partially address the issue with conservatism and thus make non-GAAP earnings more comparable than GAAP earnings. Conditional conservatism typically results in understated GAAP earnings. Examples include lower of cost or market rules for inventory, impairment rules for long-term assets (including property, plant, equipment, goodwill, and other intangible assets), and contingent liabilities. While they are intended to guard against management's aggressive reporting, evidence exists that too conservative reporting is likely to cause GAAP earnings deviate from underlying economic performance (Basu 1997; Ball and Shivakumar 2006).Since a good reflection of underlying economics serves as a prerequisite for valid comparison, deviation from the economic underlying inevitably conceals the similarities/differences between firms' performance, which in turn renders lower comparability. In contrast, non-GAAP earnings provided by analysts are shown to be less conservative (Heflin et al. 2015).Therefore, I expect non-GAAP earnings to render greater comparability as it mitigates the issue with conservatism.

Third, even within the perimeter of GAAP, managers can still exert considerable discretion in applying rules, which leads to substantially inconsistent reporting between different firms. The inconsistency makes firms' earnings less comparable. To the extent that non-GAAP adjustments undo, at least partially, managers' discretion and thus mitigate the inconsistency, the resulting non-GAAP earnings is likely to be more

comparable. Non-GAAP adjustments mitigating inconsistency include capitalizing operating leases and converting LIFO to FIFO.

Fourth, prior studies provide evidence that non-GAAP adjustments are made for improving cross-firm comparability (Kim et al. 2013). For example, credit rating analysts routinely adjust reported accounting numbers to facilitate comparisons across firms (Standard and Poor's 2008; Moody's 2010). Equity analysts also adjust current cash flows and earnings to better forecast sustainable future performance (Gu and Chen 2004; Brown et al. 2015).

However, several factors could counter the potential comparability benefit of non-GAAP earnings. First, there is no standardized concept of non-GAAP earnings. Lack of agreement on which items should be excluded from GAAP earnings leaves the decision on specific adjustments to preparers' judgement. If preparers' choices are driven by opportunistic incentives (Black and Christensen 2009; Barth et al. 2012; Brown et al. 2012; Doyle et al. 2013), then non-GAAP exclusions may further distort firm performance and compromise earnings comparability.

Second, there is evidence that the frequency of special items has increased substantially over time, suggesting that items previously perceived as non-recurring may have become more persistent in nature (Riedl and Srinivasan 2010; Johnson et al. 2011). This could be due to either that items previously considered as non-recurring gradually become an integral part of firms' regular operations, or that recurring items are purposely misclassified by management as nonrecurring (McVay 2006; Fan et al. 2010). In both scenarios, simply excluding such items from earnings would not necessarily guarantee an improvement in comparability.

Finally, prior research finds that recurring items such as depreciation and amortization and stock-based compensation expenses are sometimes aggressively

excluded when management compute non-GAAP earnings (Gu and Chen 2004; Barth et al. 2012; Brown et al. 2015). Aggressive exclusion of recurring items could make non-GAAP earnings less representative of firms' underlying performance, leading to lower earnings comparability.

Given the competing arguments discussed above, the relative comparability of non-GAAP earnings to GAAP earnings remains an open empirical question. To shed light on the comparability impact of non-GAAP earnings adjustments, I examine three research questions. First, I test whether aggregate non-GAAP exclusions of the type routinely made by preparers and analysts improve earnings comparability over GAAP earnings. Second and conditional on the incremental comparability benefits of aggregate non-GAAP adjustments, I examine the source of the comparability improvement. Finally, I explore how the incremental comparability of street earnings varies cross-sectionally as a function of characteristics of firms' information environments.

4.4 Research Design, Sample, and Data

4.4.1 Constructing Non-GAAP Earnings Metrics

The empirical analyses use both GAAP earnings metrics and alternative earning metrics constructed on non-GAAP basis. The set of non-GAAP earnings includes IBES actual earnings and three self-constructed earnings metrics each of which excludes various earnings components. Two GAAP earnings constructs are used: earnings before extraordinary items (*EB_X*) and net income (*NI*). *EB_X* serves as a benchmark, against which the comparability of all other earnings metrics is evaluated.

The first non-GAAP earnings is IBES actual earnings (per share), called as street earnings (*SE*). IBES states that it adjusts GAAP earnings to match analysts' forecasts,

which are on non-GAAP basis and normally do not attempt to forecast extraordinary, nonrecurring and incidental items. To the extent that IBES is able to mimic the common practice by majority analysts following a firm, this earnings metric captures consensus adjustments made by analysts based on their contextual judgements about which items are recurring versus transitory and core versus noncore. Given the considerable variation in practice, a standardized definition of street earnings is unlikely to exist. Examining the comparability of *SE* allows me to draw an inference about the comparability effect of the overall non-GAAP adjustments.

To further examine differential comparability effects of line items with different natures, I employ three self-constructed non-GAAP earnings metrics. They are constructed based on various incremental exclusions from *EB_X*, which provides me with a setting to trace the source of non-GAAP adjustments' comparability effect. Earnings before nonrecurring items (*EB_XNR*) are defined as *EB_X* net of the following items traditionally viewed by practitioners and the academic literature as nonrecurring: merger and acquisition cost (*M&A*), restructuring charges (*Restr*), gains and losses on mark-to-market securities (*G&L*), litigation settlements (*Legal*), write-downs (*WD*), and impairment of goodwill (*IMPM*). These earnings components more likely result from peripheral and nonrecurring activities and therefore are not expected to bear clear and consistent associations with current and future revenue generation. I therefore test whether excluding these nonrecurring items improves the comparability of earnings.

The second self-constructed non-GAAP earnings metric is designed to examine the comparability impact of excluding two recurring earnings components that often feature in non-GAAP constructs reported by management and analysts: stock compensation expense (*SC*) and depreciation and amortization (*D&A*). Earnings before recurring items (*EB_XR*) is defined as *EB_X* net of *SC* and *D&A*. Since *SC* and *D&A*

originate from recognizing and matching expenses associated with firms' core operating activities, excluding such items could reduce comparability, to the extent that earnings no longer reflect underlying economic activity during the reporting period. Conversely, some commentators argue that these accruals could reduce comparability because they are arbitrary in nature or subject to significant management discretion (Aboody et al. 2006). Accordingly, it is possible that excluding such items could enhance the comparability of earnings.

The third self-constructed non-GAAP earnings metric is a combination of the previous two measures. I define earnings before recurring and nonrecurring items (*EB_XR&NR*) as *EB_X* net of *M&A*, *Restr*, *G&L*, *Legal*, *WD*, *IMPM*, *SC* and *D&A*. This metric approximates the non-GAAP earnings number that management often report as part of their earnings announcement (Bhattacharya et al. 2003). I evaluate the impact on comparability of excluding transitory and key recurring items.

In addition to the earnings metrics described above, which are adjusted for a set of items, I also construct earnings metrics excluding individual nonrecurring items (i.e., *M&A*, *Restr*, *G&L*, *Legal*, *WD,* and *IMPM*), and recurring items (i.e., *SC* and *D&A*). They are named as *EB_XM&A*, *EB_XRestr*, *EB_XG&L*, *EB_XLegal*, *EB_XWD*, *EB_XImpm*, *EB_XSC,* and *EB_XD&A,* accordingly. These earnings metrics allow us to examine the incremental comparability effect of individual items.

4.4.2 Evaluating Comparability of Earnings Metrics

I apply the method in De Franco et al. (2011) to quantify the comparability of earnings metrics. The method seeks to measure accounting comparability based on the similarity of the mapping between earnings and stock returns. Despite potential drawbacks, the measure has been widely used in the literature since its introduction and

has been validated in many settings (Barth et al. 2012; Kim et al. 2013; Chen et al. 2016; Kim et al. 2016; Fang et al. 2016).

For an earnings metric k (k ∈ {*EB_X*, *NI*, *SE*, *EB_XR*, *EB_XNR*, *EB_XNR&R*}), I generate a set of firm-year comparability scores ($CompAcct_{it}^{k}$). Appendix 4.1 details the calculation of comparability scores. The corresponding statistics for the estimation of equation (1) is reported in Appendix 4.2. Panel A reports the fit statistics for GAAP earnings (*EB_X*), while Panel B reports the fit statistics for IBES earnings (*SE*).

I always evaluate the comparability of an earnings metric relative to that of *EB_X*. Statistically, I conduct paired-sample *t* (signed rank) tests for the equality of mean (median) between $CompAcct_{it}^{k}$ (k ≠ *EB_X*) and $CompAcct_{it}^{EB\_X}$, which allows us to draw inferences concerning the incremental comparability of an alternative earnings metric to *EB_X*.[4] The feature of pairwise comparison in this research design effectively uses firms as their own control and helps to minimize endogeneity problems.

4.4.3 Data and Sample

Historical accounting data are from COMPUSTAT, stock prices and returns from CRSP, and IBES actual earnings from IBES. The sample includes all US publicly listed non-financial firms in the merged COMPUSTAT-CRSP-IBES database from 2003 through 2015. The sample also satisfies the following selection criteria: (i) no holding firms, ADRs and limited partnerships; (ii) with valid stock prices, earnings and accrual data, and IBES actual earnings over preceding 16 quarters;[5] (iii) with fiscal year

[4] Operationally, we first calculate the pairwise difference between a metric *k* and *EB_X*:

$$Dif\_Comp_{it}^{k,EB\_X} = CompAcct_{it}^{k} - CompAcct_{it}^{EB\_X}.$$

We then test whether mean (median) $Dif\_Comp_{it}^{k,EB\_X}$ is significantly different from zero using *t* (signed rank) tests.

[5] The observations with no more than two missing values over lagged quarters in the key variables are retained.

ends of March, June, September or December; and (iv) an industry-year grouping with at least 10 firms. The above criteria lead to 20,564 firm-year observations, where 16 corresponding quarters are then assigned to each firm-year observation. Specifically, I take the year end of each firm-year observation as the starting point, and then trace back for 16 quarters for each year end. This is because the De Franco et al.'s (2011) approach requires the previous 16 quarters data for estimating firms' accounting system in equation (1). As a result, I construct an intermediate sample with 324,099 firm-quarter observations. This intermediate sample is only used for estimating firms' accounting system as required in equation (1). The construction process of comparability scores results in 20,564 firm-years with comparability scores of all earnings metrics considered in this study. They are then trimmed at 0.5 and 99.5 percentiles to minimize the impact of extreme observations on the analysis. The final sample contains 19,686 firm-year observations. Table 4.1 illustrates the sample selection process.

[Insert Table 4.1 here]

4.4.4 Descriptive Statistics

Table 4.2 reports descriptive statistics of the inputs for the comparability score calculation. Panel A presents descriptive statistics the suite of GAAP and non-GAAP earnings metrics, which are scaled by lagged market capitalization. The mean value of *NI* is less than *EB_X*, consistent with the fact that *NI* including extraordinary items which are typically negative. While *EB_X* only excludes extraordinary items and discontinued operations, *SE* further excludes additional items (mostly expenses) related to merger and acquisition and restructuring. Accordingly, the mean value of *SE* is larger than that of *EB_X*. The mean values of the remaining three non-GAAP earnings

metrics—*EB_XR*, *EB_XNR*, and *EB_XR&NR*—are also larger than that of *EB_X*, because the exclusions are generally expenses.

[Insert Table 4.2 here]

Table 4.2, Panel B presents descriptive statistics for individual items of exclusion (also scaled by lagged market capitalization). More than 97% (65%) of firm-years have a non-zero value for *D&A* (*SC*). The high frequency of these items is consistent with their recurring nature. On average, *D&A* is 1.76% of firms' market capitalization, representing one of the largest expenses; the average value of *SC* is also non-trivial at 0.28% of market capitalization.

Individual non-recurring items occur less frequently, consistent with their more transitory nature. Missing values are set to zero to avoid removing otherwise valid observations. The most commonly occurring non-recurring item is restructuring charges (22% of the sample). Other non-recurring items occur less frequently: *M&A* (9%), *G&L* (5%), *Legal* (7%), *WD* (6%), and *IMPM* (2%).

The key sample firm characteristics shown in Panel C are consistent with those of the COMPUSTAT (non-financial) universe. The negative mean *ROA* and *ROE* reflect the recent trend of more frequent losses under GAAP. Some users of financial statements may find this as undesirable because some importance applications of earnings, for example, valuing a firm using a P/E multiple, would be impossible. They thus are motivated to develop their own non-GAAP earnings.

4.5 Main Empirical Results

4.5.1 Comparability of GAAP and Non-GAAP Earnings

This section discusses the empirical findings that aim to answer the first research question: are non-GAAP earnings more comparable than GAAP earnings? Table 4.3,

Panel A presents the summary statistics (columns 1-5) of the comparability scores of the GAAP and non-GAAP earnings metrics, where scores closer to zero suggest greater comparability. The last two columns formally test the equality of mean (median) comparability scores of an alternative metric and the GAAP-based earnings before extraordinary items (*EB_X*), where positive figures indicate an improvement in comparability. Because consistent inferences can be drawn from both mean and median comparability differences, the subsequent discussion focuses on the mean difference (column 6).

The mean difference in comparability scores between *NI* and *EB_X* is -0.037 ($p < 0.01$), suggests that *NI* is less comparable than *EB_X*. The finding is consistent with the notion that extraordinary items and discontinued operations generally reduce earnings' comparability, due to their non-recurring nature.

[Insert Table 4.3 here]

Most notably, street earnings (*SE*) are found to be more comparable than *EB_X*, with the mean comparability difference being 0.250 ($p < 0.01$), implying that the exclusion in street earnings does improve earnings comparability. Moreover, this magnitude is also economical significant, presenting a 38% reduction of the mean comparability score of *EB_X*. The improvement of comparability by *SE* can be attributed to analysts' expertise and firm-specific judgement that are embedded in the construction of street earnings. This finding also addresses the controversy concerning the merit of street earnings: the lack of a standardized definition of street earnings street does not appear to materially impair its comparability.[6]

[6] In order to isolate the financial crisis period, the comparability of GAAP earnings relative to IBES earnings is reported for each year in the sample period. The comparability of a series of adjusted earnings metrics is also reported for each sample year. Please refer to Appendix 4.3 for the details.

Among other non-GAAP earnings metrics, the mean difference between earnings excluding recurring items (*EB_XR*) and *EB_X* -0.048 ($p < 0.01$) suggests the former underperforms GAAP earnings, consistent with my expectation that excluding recurring items reduces comparability. In contrast, earnings excluding non-recurring items (*EB_XNR*) is more comparable than *EB_X*, based on the positive mean difference 0.129 ($p < 0.01$). This finding is consistent with the belief that excluding non-recurring items can make earnings more in line with underlying economics, and in turn improves earnings comparability. Economically, the improvement of comparability by *EB_XNR* is merely 51.6% of that by *SE*, indicating the limitation of a formulaic approach of adjustment. One implication is that, given the complexity of business circumstances and corporate events, imposing standardized adjustments to earnings could lead to an outcome of uniformity, rather than comparability. *EB_XR&NR*, which excludes both recurring and non-recurring items, is found to be more comparable than *EB_X* (mean difference 0.061, $p < 0.01$). This result suggests that the undesirable effect of excluding recurring items is compensated for by excluding non-recurring items.

In summary, I find evidence that street earnings and earnings excluding non-recurring items are significantly more comparable than GAAP earnings. The findings demonstrate one benefit (i.e., enhanced comparability) of removing idiosyncratic, peripheral, and transient elements from earnings, especially when guided by financial analysts' professional expertise and judgment. The resulting earnings become more reflective of core and continuing operations, which serves as an essential pre-requisite for achieving great comparability. In contrast, the results show that removing from earnings recurring expenses such as deprecation and stock-based compensation diminishes comparability, calling into question the validity of such practice.

4.5.2 Comparability Effect of Individual Items

Having examined the comparability effect of recurring and non-recurring items collectively, I next investigate how each individual item influences earnings comparability. Specifically, I construct six (non-GAAP) adjusted earnings by excluding one individual item from *EB_X* at a time, and then calculate their comparability scores as detailed in Appendix 4.1. Table 4.3 Panel B reports summary statistics of comparability scores of the eight adjusted earnings in the first four columns, and tests the pairwise mean/median difference in comparability scores between an individual-item-adjusted earnings and *EB_X* in the last two columns.

Among the recurring items, the exclusion of depreciation and amortization expense (*D&A*) leads to less comparability, evident by the significantly positive mean difference 0.054 ($p < 0.01$). The finding is sensible because *D&A*, despite being non-cash based, approximates a key activity of a firm's operation, i.e., deploying long-term fiscal and intangible assets. An earnings metric not capturing such activities clearly does not properly reflect the firm's underlying economics and therefore are unlikely to help users identify differences and similarities across firms (or over time).

By contrary, the exclusion of the second recurring item, stock-based compensation (*SC*), leads to an improvement of comparability (mean difference 0.009; $p < 0.01$). A potential explanation is that stock compensation expense, despite being recurring, contains too much measurement errors. Admittedly, the options pricing models commonly used for estimating stock option values are relatively crude and allow great discretion from firms in setting up parameters (Aboody et al. 2006; Bartov et al. 2007). The noise introduced by stock-based compensation expense could outweigh its decisional useful information, and in particular, hinders the ability of earnings reflecting underlying economics; its removal addresses this problem. Another possible

explanation relates to how stock markets react to stock-based compensation information. There is some evidence that some users exclude stock-based compensation expense, suggesting the information not being embedded into stock prices (Barth et al. 2012). Therefore, the removal of *SC* actually helps to improve the mapping between (adjusted) earnings and stock returns, which is manifested as greater comparability scores.

Among non-recurring items, the exclusion of restructuring charges (*Restr*) and gains and losses on mark-to-market securities (*G&L*) improves comparability scores significantly from *EB_X* (mean difference 0.020 and 0.003, respectively; both $p < 0.01$). Comparability improvement is much more limited due to excluding M&A-related charges (*M&A*) and litigation expense (*Legal*): the mean differences are 0.001 and 0.002, and $p < 0.1$ and 0.05, respectively (no improvement in terms of median difference). Restructuring charges are incurred during infrequent events of restructuring, while gains and losses on mark-to-market securities arise from holding market securities, which for most firms are non-core, peripheral activities. Removing these items restores earnings' ability to reflect a firm's core, and continuing activities, which leads to better comparability. The lack of strong evidence concerning *M&A* and *Legal* is surprising, considering that they are commonly treated as non-recurring, just like *Restr* and *G&L*. According to Panel C of Table 4.2, *M&A* and *Legal* are considerably smaller than the other two non-recurring items, which could make it more difficult to detect their impact on comparability empirically. Moreover, excluding write-downs (*WD*) improves the earnings comparability by 0.034 ($p<0.01$), while the largest comparability improvement comes from excluding impairment of goodwill (*IMPM*). Specifically, adjusting GAAP earnings for impairment of good will improves comparability by 0.082 ($p<0.01$). Although the frequency of impairment stays low (2%), it seems to have substantial impact on earnings comparability when incurred.

In summary, this analysis provides additional evidence concerning the comparability of non-GAAP earnings by examining individual items' impact. The results show that the comparability of earnings can be most effectively enhanced when the adjustments involve material non-recurring items and/or recurring items with large measurement errors. These findings thus complement the earlier ones based on earnings metrics, which reflect the combined effect of many items.

4.5.3 Additional Evidence on the Effect of Excluding Non-Recurring Items

This section presents additional supporting results for comparability benefits being associated with excluding non-recurring items. The results in Table 4.4 suggest that excluding non-recurring items brings comparability benefits, and the magnitude of comparability benefits is positively correlated with the magnitude of non-recurring items excluded. For example, if a firm has substantially larger non-recurring items in its GAAP earnings, then there is expected to be an accordingly larger non-GAAP exclusion of non-recurring items (Gu and Chen 2004). As a results, the exclusion of larger non-recurring items leads to greater comparability benefits, as evidenced by the greater positive difference in comparability scores between street earnings and GAAP earnings shown in Table 4.

[Insert Table 4.4 here]

In Table 4.4, all the firm-years in my sample are classified into different groups according to the magnitude of non-recurring items in their GAAP earnings. First, the sample is partitioned into 5 quintiles based on the magnitude of special items and a more refined group of non-recurring items (i.e., *NR*), respectively. The first two columns of Table 4.4 show the mean comparability scores of *SE*, as well as the mean differences in comparable scores between *SE* and *EB_X*. As shown in the second column, the mean

difference of comparability scores between *SE* and *EB_X* becomes larger for those firm-years with larger special items that are potentially excluded from *SE*. The mean score difference in quintile 5 is almost three times as large as that of quintile 1, which suggests that greater comparability benefits are associated with larger non-recurring exclusions.

The forth column demonstrates the same results for the partitioning based on *NR*. Specifically, the mean comparability score differences between *SE* and *EB_X* experience a substantial increase for the firm-years where larger non-recurring items in GAAP earnings are excluded from street earnings. Specifically, the mean comparability score difference in quintile 5 is more than twice as large as that of quintile 1. The increase in comparability benefits here out of *NR* exclusion is more modest than that out of special items exclusion. And this modesty is driven by the fact that *NR* represents a more refined group than the category of special items does. *NR* only consists of four non-recurring items that are most frequently excluded from non-GAAP earnings (i.e., *M&A*, *Restr*, *G&L* and *Legal*), while the category of special items covers more extensive items. The F-test on the bottom of the table rejects the null hypothesis that the mean differences are all equal across the quintiles.[7]

In the rest part of Table 4.4, I do the similar analyses for three individual non-recurring items. The sample is partitioned into (1) below-median group and (2) above-median group based on the magnitude of *M&A*, *Restr* and *G&L*, respectively.[8] As demonstrated in column 6, the mean difference in comparability between SE and *EB_X* is 0.339 for the firm-years with above-median M&A charges, while it is merely 0.262

[7] In the untabulated results, t-test is conduct for the difference in (1) the mean comparability of *SE* and (2) the mean comparability difference between *SE* and *EB_X*, between highest and lowest quintiles. The corresponding t-values suggest that the differences between highest and lowest quintiles are all statistically significant at conventional levels.

[8] Rather than using quintiles, here we classify the sample into two groups: above-median group and below-median group. This is because there are a substantial number of zero values for each of three individual partitioning variables (i.e., *M&A*, *Restr*, and *G&L*). The binary classification based on median allows the sample to be sorted into more balanced groups, while quintile classification would produce one oversized group with all zero values and other 4 groups with substantially less firm-years.

for those firm-years with below-median M&A charges. This evidence indicates greater comparability benefits being associated with larger non-GAAP exclusion of M&A charges. The larger M&A charges presented in firms' GAAP earnings are effectively excluded from their non-GAAP earnings. As a result, the corresponding non-GAAP exclusion leads to greater comparability benefits. The similar results also hold for the non-GAAP exclusion of *Restr* and *G&L* as shown in column 8 and column 10, respectively. Collectively, the results in Table 4.4 suggest that the exclusion of non-recurring items acts as the source of comparability benefits from non-GAAP earnings. This finding reinforces my main results.

4.6 Comparability Benefit of Street Earnings and Information Environment

This section investigates the association between the comparability benefit of street earnings and firm information environment/firms' idiosyncratic featuresThe preceding section finds strong evidence that street earnings have an advantage to GAAP earnings in terms of comparability, which I attribute to the inputs by analysts. It then follows naturally that this advantage of street earnings is likely to be more pronounced in information environments where analysts' expertise and judgements are particularly beneficial.

Relying on extant literature, I identify several key measures of firms' information environment. First, firm size is widely used to proxy for firms' information environment, with larger firms being considered to have more informative environments (Collins et al. 1987; Lang and Lundholm 1996; Richardson 2000; Bushman et al. 2004). The production of information for large firms is more prolific, via channels such as more disclosure by firms themselves, better media coverage, and more analysts following. Analysts are able to access and process richer information,

which can help them make more informed non-GAAP exclusions when constructing the street earnings. Thus, I predict the incremental comparability of street earnings over GAAP earnings is greater for larger firms than for smaller firms.

Second, analyst following has long been viewed as a proxy for resources devoted to information collection (Lang and Lundholm 1996; Hong et al. 2000) and more analysts following a firm generally results in a richer information environment. Prior studies indicate that better analyst coverage increases analysts' collective ability to uncover information with respect to firms' operations (Bowen et al. 2008) and also allow them to monitor firms more effectively (Cheng and Subramanyam 2008; Yu 2008). I expect the incremental comparability of street earnings over GAAP earnings is greater when firms are followed by more analysts.

Third, stock return volatility is commonly used to indicate a firm's level of uncertainty. GAAP earnings are likely to be uninformative under high uncertainty and analysts' information acquisition can mitigate it (Zhang 2006). Moreover, Frankel et al. (2006) argue that return volatility is positively related to the demand for analyst services and find evidence that analyst research is more informative for firms with high stock return volatility. Under either scenario, the involvement of analysts is more beneficial and such benefit manifests itself in terms of higher comparability of street earnings.

To test my predictions, I annually sort the sample into quintiles based on market capitalization, the number of analysts following, and stock return volatility. I then report mean comparability scores of *EB_X* and *SE*, as well as mean differences between *SE* and *EB_X* by quintiles in Table 4.5.[9]

The first two columns of Table 4.5 show mean comparability scores of *SE*, as well as mean differences in comparable scores between *SE* and *EB_X*. It is apparent that

[9] Using median comparability scores yields qualitatively similar results.

SE's comparability improves with firm size for SE: the mean comparability score of *SE* in quintile 5 is only 22.4% of that in quintile 1. More importantly, the mean difference of comparability scores between *SE* and *EB_X* follows the same pattern of improvement. The mean score difference in quintile 5 is more than twice that of quintile 1, which suggests that non-GAAP exclusions bring greater comparability benefits for firms with larger size. The F-test on the bottom of the table rejects the null hypothesis that the mean differences are all equal across the size quintiles. I also conduct t-test for the corresponding differences between quintile 1 and quintile 5. The corresponding t-values suggest that all the differences between two extreme quintiles are statistically significant at conventional levels.

[Insert Table 4.5 here]

The next two columns in Table 4.5 show means (mean differences) of comparability scores by quintiles based on analyst following. While *SE* becomes more comparable with more analysts following, unlike size, the mean difference of comparability scores between *SE* and *EB_X* does not monotonically increase. Instead, the incremental comparability of *SE* peaks in quintile 3 (even though it is still more comparable in quintile 5 than in quintile 1). Unreported results show that the comparability of *EB_X* also improves with analyst following, likely due to the spill-over benefit of analyst information production and/or monitoring on the quality of GAAP earnings. Consequently, the incremental comparability of street earnings to GAAP earnings demonstrates an inverted U shape.

The last two columns in Table 4.5 show the sorting by return volatility. The comparability of *SE* declines with the sorting variable, which appears to contradict my prediction earlier. However, the mean difference in comparability scores between *SE* and *EB_X* indeed increase with return volatility, consistent with the prediction that

analysts' expertise is most beneficial when uncertainty is high. Economically, the comparability improvement in quintile 5 is more than twice of that in quintile 1.

Moreover, I test how non-GAAP comparability benefits relate to firms' own idiosyncratic features. I expect firms that are subject to more idiosyncratic economic shocks to have less comparable GAAP earnings, which allows for more room for improvement in comparability. Accordingly, non-GAAP adjustments, as driven by professional judgements and contextual expertise, are thus likely to bring greater incremental comparability benefits over GAAP earnings. To empirically capture the idiosyncrasy of firms, I use two proxies. The first one is idiosyncratic risk (*ID_RISK*) developed based on firms' stock returns. The second one draws on market-to-book ratio (*MTB*) to reflect firms' growth opportunity. Then the uniqueness of a firm's growth opportunity is measured relative to its peer firms in the same SIC-2 industry. I use the deviation of *MTB* from industrial peers (*MB_DEV*) as the second proxy for firms' idiosyncrasy. The corresponding results are reported in Panel B of Table 4.5.

The first two columns in Panel B report the results for idiosyncratic risk (*ID_RISK*). The sample is first ranked based on the level of *ID_RISK* to form 5 quintiles. Then for each quintile, I report mean comparability scores of *SE*, as well as mean differences in comparable scores between *SE* and *EB_X*. It is shown that *SE*'s comparability decreases with the level of idiosyncratic risk. For example, the mean comparability score of *SE* in the quintile of highest idiosyncratic risk (quintile 5) is only 21.2% of that in the quintile of lowest idiosyncratic risk (quintile 1). More importantly, the mean difference of comparability scores between *SE* and *EB_X* follows the same pattern of improvement. That is, the mean score difference in quintile 5 is 27% higher than that of quintile 1. It suggests that non-GAAP exclusions bring greater comparability benefits for firms with higher idiosyncratic risk. The F-test on the bottom

of the table rejects the null hypothesis that the mean differences are all equal across the idiosyncratic risk quintiles. I also conduct t-test for the corresponding differences between quintile 1 and quintile 5. The corresponding t-values suggest that all the differences between two extreme idiosyncratic risk quintiles are statistically significant at conventional levels.

The last two columns in Panel B show the sorting by the firms' uniqueness of growth opportunity (*MB_DEV*). The comparability of *SE* declines as the uniqueness of firms' growth opportunity increases. This pattern is consistent with the notion that firms' uniqueness makes their earnings less comparable to their peers. As for the mean difference in comparability scores between *SE* and *EB_X*, I find that the difference in the highest uniqueness quintile (quintile 5) is 57.4% larger than that in the lowest uniqueness quintile (quintile 1). This finding suggests that higher idiosyncrasy of firms, as reflected by their uniqueness of growth opportunity, creates a circumstance where non-GAAP adjustments can add more value by making earnings more comparable. However, when this pattern is observed across all five quintiles, it demonstrates an inverted U shape, and this may warrant further examinations.

In summary, these findings indicate that the superior comparability of street earnings over GAAP earnings is more pronounced when firms are larger, followed by more analysts, and surrounded with more uncertainty. Moreover, non-GAAP adjustments are found to render greater comparability benefits when firms are subject to more idiosyncratic economic shocks. Under these circumstances analysts' expertise and professional judgment are most beneficial and their inputs are more effective in enhancing the comparability of earnings.

4.7 Conclusion

This paper seeks to fill the gap in the literature concerning the comparability of non-GAAP earnings. Although prior research has examined the comparability of GAAP earnings, no study has investigated whether non-GAAP exclusions lead to greater comparability. Meanwhile, whereas prior studies document extensive evidence on non-GAAP earnings being more value relevant, they remain silent on the comparability of non-GAAP earnings, a key characteristic of decisional useful accounting information.

I find that street earnings, which benefit from non-GAAP adjustments by analysts, are significantly more comparable than GAAP earnings. The self-constructed non-GAAP earnings excluding nonrecurring items is also found to be statistically more comparable than GAAP earnings, but to a much lesser extent than in the case of street earnings. The more substantial improvement of street earnings is likely due to analysts' expertise and professional judgment which are embedded in street earnings adjustments. Excluding recurring items or both non-recurring and recurring items from GAAP earnings, however, results in less comparable earnings, casting doubt on the claimed benefit of such a practice. Moreover, I find that the exclusion of material non-recurring items (i.e., restructuring charges and gains and losses on mark-to-market securities), or recurring items with considerable measurement errors (e.g., stock-based compensation cost) is most effective in improving earnings' comparability.

In the supplementary analysis, I find that street earnings bring greater comparability improvement for firms that are larger, followed by more analysts, and have more volatile stock returns. These are circumstances where analysts' judgement and expertise are more beneficial and/or the demand for analyst information production is greater.

Focusing on the comparability of non-GAAP earnings, this study makes contributions to both the literature and standard setting. It fills the gap in the literature concerning the comparability of non-GAAP earnings, which has so far received limited attention. Furthermore, the paper is relevant to the ongoing debate over the increasing popularity of non-GAAP earnings. The evidence of the superior comparability of street earnings to GAAP earnings suggests that the widespread use of street earnings could meet users' demand for more comparable accounting information. Finally, the findings that unstandardized street earnings are more comparable than GAAP earnings raises an interesting question to securities regulators and accounting standard setters—how accounting standards and disclosure regulation facilitate financial statements users to reconstruct earnings measures that are most suitable for their specific purposes.

Future research opportunities include examining the implications of more comparable non-GAAP earnings. Prior research suggests that high quality non-GAAP adjustments mainly comprise non-recurring items which are not expected to predict future performance. A potential research question here is whether the comparability benefits of non-GAAP adjustments can simultaneously improve the quality of themselves. Another research question worth further exploration is the market reaction to more comparable non-GAAP earnings. Prior research finds non-GAAP earnings being more value relevant (i.e., higher ERC), and comparability is perceived to enhance relevance of financial information. I would, therefore, expect an association between comparability benefits of non-GAAP earnings and stronger market reactions. The third potential research question is whether the comparability benefits attenuate investors discounting of non-GAAP earnings. Investors are found to discount the pricing message from non-GAAP earnings when the reporting of non-GAAP earnings is susceptible to opportunistic incentives. To the extent that the improved comparability of non-GAAP

earnings alleviates the concern about opportunism, the investors are expected to be more confident with non-GAAP adjustments that make earnings more comparable. As a result, the investors may apply less discounting to non-GAAP earnings which are associated with incremental comparability benefits.

Appendix 4.1: Measuring Earnings' Comparability

I use the De Franco et al. (2011) method to estimate firm-year comparability scores for a certain earnings metric. The De Franco et al. (2011) approach measures the similarity with which firms' accounting functions map the same underlying economic events into earnings. The principle underlying the approach is that given a similar set of economic transactions, as reflected in stock returns, firm *j*'s earnings should be similar to firm's when the two firms' accounting systems are comparable.

The operation of De Franco et al. (2011) method involves the following four steps. In the first step, an earnings metric is regressed on contemporaneous stock returns, where stock returns capture economic events and the earnings metric is the output of an accounting system. Specifically, for each firm-year I estimate the following equation using the 16 previous quarters of data (minimum 14 quarters):

$$Earnings_{it} = \alpha_i + \beta_i Return_{it} + \varepsilon_{it} , \quad (1)$$

where *Earnings* is a quarterly earnings metric, *Return* is the quarterly stock returns. Coefficients $\widehat{\alpha_i}$ and $\widehat{\beta_i}$ reflect how economic events are captured by the earnings metric and therefore represent a summary of the accounting system. The accounting function of firm *j* ($\widehat{\alpha_j}$ and $\widehat{\beta_j}$), which is in the same 2-digit-SIC industry, is estimated similarly.

In the second step, the similarity of the accounting system for firms *i* and *j* is estimated. Following De Franco et al. (2011), I predict firm *i*'s and *j*'s earnings based on the accounting function of each firm and firm *i*'s stock return ($Return_{it}$):

$$E(Earnings_{iit}) = \hat{\alpha}_i + \hat{\beta}_i Return_{it} \quad (2)$$

$$E(Earnings_{ijt}) = \hat{\alpha}_j + \hat{\beta}_j Return_{it} , \quad (3)$$

where $E(Earnings_{iit})$ is the expected earnings of firm *i* given firm *i*'s accounting function and firm *i*'s return. $E(Earnings_{ijt})$ is the expected earnings of firm *j* given firm *j*'s

accounting function and also firm *i*'s return. Firm *i*'s return is used in both predictions so that economic events are held constant for both firms.

In the third step, the pair-year comparability score between firms *i* and *j* ($CompAcct_{ijt}$) is defined as the negative value of the average absolute difference between the predicted earnings for both firms shown in (2) and (3):

$$CompAcct_{ijt} = -1/16 \times \sum_{t-15}^{t} \left| E(Earnings_{iit}) - E(Earnings_{ijt}) \right| , \quad (4)$$

averaged over the preceding 16 quarters. A *less negativ*e pair-year comparability score indicates greater accounting comparability between the two firms in a year.

In the last step, I generate a *firm-year* comparability score, as opposed to the pair-year comparability score in equation (4). For firm *i* in time *t*, I average the four least negative pair-year comparability scores between firm *i* and firm *j*s (in the same industry):

$$CompAcct_{it} = 1/4 \times \sum_{j \in \{4\ least\ negtive\ pair-year\ scores\}} CompAcct_{ijt} . \quad (5)$$

Alternatively, I compute the firm-year comparability score as the median pair-year comparability score over all *i-j* pairs within a 2-digit SIC industry in a year. Results are robust to the method of generating the firm-year comparability score.

Appendix 4.2: Descriptive Statistics from Estimation of Equation (1)

Panel A. Estimation of Equation (1) for GAAP earnings (*EB_X*)

Variables	N	Mean	STD	P10	Median	P90
Intercepts (a_i)	20564	0.002	0.035	-0.035	0.010	0.022
β_i coefficient	20564	0.015	0.076	-0.034	0.008	0.067
Regression R^2 (%)	20564	12.02	13.70	0.250	6.850	31.59

Panel B. Estimation of Equation (1) for IBES earnings (*SE*)

Variables	N	Mean	STD	P10	Median	P90
Intercepts (a_i)	20564	0.002	0.027	-0.029	0.011	0.020
β_i coefficient	20564	0.007	0.042	-0.021	0.006	0.031
Regression R^2 (%)	20564	13.21	0.144	0.300	8.058	34.27

This table provides descriptive statistics of the intercept, beta coefficient, and the R^2 from firm-year-specific regressions specified in equation (1). Panel A reports the statistics for using GAAP earnings (*EB_X*), while Panel B reports the statistics for using IBES earnings (*SE*).

Appendix 4.3: Comparability of Multiple Earnings Metrics by Years

YEAR	2003	2004	2005	2006	2007	2008	2009
GAAP							
EB_X	-0.739	-0.653	-0.617	-0.518	-0.462	-0.698	-0.802
NI	-0.831	-0.732	-0.695	-0.563	-0.495	-0.720	-0.819
Non-GAAP							
SE	-0.451	-0.422	-0.387	-0.352	-0.327	-0.465	-0.481
EB_XR	-0.814	-0.712	-0.666	-0.567	-0.501	-0.722	-0.841
EB_XNR	-0.698	-0.616	-0.574	-0.498	-0.446	-0.673	-0.765
EB_XR&NR	-0.789	-0.689	-0.645	-0.555	-0.492	-0.711	-0.811

YEAR	2010	2011	2012	2013	2014	2015
GAAP						
EB_X	-0.801	-0.773	-0.707	-0.524	-0.502	-0.632
NI	-0.820	-0.790	-0.726	-0.534	-0.515	-0.634
Non-GAAP						
SE	-0.455	-0.431	-0.425	-0.315	-0.301	-0.330
EB_XR	-0.838	-0.808	-0.748	-0.588	-0.570	-0.676
EB_XNR	-0.756	-0.738	-0.680	-0.517	-0.493	-0.626
EB_XR&NR	-0.808	-0.791	-0.740	-0.578	-0.563	-0.671

This table reports the comparability of GAAP and non-GAAP earnings metrics for each year in our sample period. The main results hold for each sample year, even during the international financial crisis period (i.e., 2008, 2009). The above results suggest that IBES earnings (SE) are consistently more comparable than GAAP earnings (EB_X) throughout the sample period (2003 – 2015). During the financial crisis period, although GAAP earnings become less comparable due to the fluctuating economics, non-GAAP adjustments by IBES earnings still enhance the earnings comparability, even to a greater extent given that there is potentially more room for improvement when GAAP earnings comparability is contaminated by economic shocks. Other inferences about the comparability effect of recurring and non-recurring items also hold for all sample years.

Appendix 4.4: Variable Definitions

Variables	Abbreviation	Calculation
Bottom line earnings	*NI*	Quarterly net income (*NIQ*) scaled by beginning-of-period market capitalization.
Earnings before extraordinary items and discontinued operations	*EB_X*	Quarterly earnings before extraordinary items and discontinued operations (*IBCQ*) scaled by beginning-of-period market capitalization.
Non-GAAP earnings	*SE*	Street earnings (*Actual EPS*SHROUT*) scaled by beginning-of-period market capitalization.
Earnings excluding recurring items	*EB_XR*	*EB_X* excluding depreciation and amortization (*D&A*) and stock-based compensation expenses (*SC*), scaled by beginning-of-period market capitalization.
Earnings excluding non-recurring items	*EB_XNR*	*EB_X* excluding merger and acquisition fees (*M&A*), restructuring charges (*Restr*), gains and losses (*G&L*), and litigation fees (*Legal*), scaled by beginning-of-period market capitalization.
Earnings excluding both recurring & non-recurring items	*EB_XR&NR*	*EB_X* excluding both recurring and non-recurring items listed above, scaled by beginning-of-period market capitalization.
M&A cost	*M&A*	*AQPQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Restructuring charges	*Restr*	*RCPQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Gains and losses	*G&L*	*GLPQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.

Settlement from litigation or insurance	*Legal*	*SETQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Write-downs	*WD*	*WDPQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Impairment of goodwill	*IMPM*	*GDWLIPQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Depreciation and amortization	*D&A*	*DPQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Stock-based compensation expenses	*SC*	*STKCOQ* from COMPUSTAT, scaled by beginning-of-period market capitalization.
Stock returns	*Return*	*Return* is the stock returns during the quarter, measured by compounding the monthly stock returns (*RET*) from the CRSP.
Beginning-of-period market capitalization	*MKTC*	It is computed as beginning-of-period closing stock price *(PRC)* times the corresponding number of outstanding common shares (*SHROUT*) from CRSP.
Analyst following	*ANALYST*	It is computed as the average number of analysts providing earnings forecasts for a firm in IBES during the last four years.
Stock returns volatility	*VOLA*	It is computed as the standard deviation of the quarterly stock returns during the last four years.
Idiosyncratic risks	*ID_RISK*	*ID_RISK* is constructed following Chun et al. 2008. Specifically, we regress firms' quarterly stock return on the corresponding industry return and market return for 16 quarters. The residual from the regression is taken to measure the firms' idiosyncratic risk.

Growth opportunity deviation	*MB_DEV*	*MB_DEV* is constructed as the absolute difference between firms' MTB and the corresponding industry average MTB. Both firms' MTB and industry MTB are measured by taking the average for the prior16 quarters.
Comparability measures on firm-pair level	$CompAcct_{ijt}^{k}$	It measures the comparability of k^{th} earnings metric *between* firm *i* and *j* in year *t*. It is calculated for firm *i* and each of its SIC 2-digit peer firms *j*.
Comparability measures on firm-year level	$CompAcct_{it}^{k}$	It measures the comparability of k^{th} earnings metric for firm *i* in year *t*, by averaging $CompAcct_{ijt}^{k}$ among the closed 4 peers.

This appendix demonstrates how variables are defined and measured. All financial data are from COMPUSTAT and IBES, while stock data are from CRSP. Note that all earnings metrics are scaled by the beginning-of-period market capitalization (*PRC*SHROUT*).

Table 4.1

Sample Selection Process and Change of Sample Size

Sample selection process	Firm-years
1. Construct the initial sample	
Matched COMPUSTAT-CRSP, with fiscal year ends in March, June, Sept. or Dec.	92,675
Less:	
Not matched with IBES	(12,884)
No SIC codes	(1,589)
Financial firms	(17,573)
Holding firms, ADRs and limited partnerships	(5,598)
Initial sample	55,031
2. Intermediate sample for calculating the comparability measure	
Less:	
Don't have required data for earnings/accruals	(6,329)
Don't have required data for IBES actual earnings	(5,374)
Don't have required data for returns/prices	(2,719)
Don't have data for all lagged 16 quarters	(17,996)
Industry groups with fewer than 10 peer firms	(2,049)
Intermediate sample	**20,564**
(corresponding to 324,099 firm-quarters, including lagged 16 quarters)	
3. Final Sample (Trimmed at 0.5 and 99.5 percentile)	**19,686**

This table presents the sample selection process to construct the final sample. The screening criteria follow De Franco et al. (2011). Comparability scores of all earnings measures are required to be non-missing and trimmed by 0.5% at both tails.

Table 4.2
Descriptive Statistics: Quarterly Sample of 324,099 Observations

Panel A. Summary statistics of GAAP and non-GAAP earnings

	Mean	STD	Min	Q1	Median	Q3	Max
GAAP							
EB_X	-0.001	0.067	-1.838	-0.004	0.010	0.018	0.882
NI	-0.002	0.071	-2.759	-0.005	0.010	0.018	0.990
Non-GAAP							
SE	0.002	0.044	-1.426	0.001	0.011	0.017	0.269
EB_XR	0.018	0.070	-1.535	0.008	0.020	0.034	1.294
EB_XNR	0.007	0.073	-1.823	-0.002	0.013	0.026	1.128
EB_XR&NR	0.029	0.088	-1.245	0.012	0.031	0.044	1.453

Panel B. Items for exclusion

	% of non-zero	Non-zero						
		Mean	STD	Min	Q1	Med	Q3	Max
Recurring								
D&A	97.62%	0.018	0.034	-0.848	0.004	0.009	0.019	1.726
SC	65.60%	0.003	0.005	-0.124	0.001	0.002	0.003	0.467
Non-recurring								
M&A	9.190%	-0.002	0.017	-0.304	-0.002	-0.001	-0.000	1.150
Restr	21.83%	-0.007	0.025	-1.271	-0.005	-0.002	-0.001	0.140
G&L	5.360%	0.009	0.039	-0.388	0.000	0.001	0.005	1.131
Legal	6.830%	-0.000	0.030	-0.593	-0.002	-0.000	0.002	0.688
WD	6.262%	-0.018	0.060	-1.521	-0.011	-0.003	-0.001	0.199
IMPM	2.220%	-0.099	0.185	-1.507	-0.108	-0.022	-0.003	0.093

Panel C. Key firm characteristics

	Mean	STD	Min	Q1	Median	Q3	Max
Market cap ($ mil.)	4,912	14,439	8.650	215.5	739.6	2,896	168,315
ROA	-0.011	0.188	-1.345	-0.019	0.037	0.078	0.326
ROE	-0.004	0.478	-4.691	-0.036	0.084	0.156	3.767
P/E	13.76	59.14	-489.5	-2.780	15.01	24.28	619.0

This table presents descriptive statistics of the intermediate sample with quarterly observations. Panel A presents statistics for measures of GAAP and non-GAAP earnings. *EB_X* is earnings before extraordinary items, *NI* is net earnings, *SE* is street earnings (IBES actual earnings), *EB_XR* is *EB_X* excluding recurring items, *EB_XNR* is *EB_X* excluding non-recurring items, and *EB_XR&NR* is *EB_X* excluding both recurring and non-recurring items. All earnings metrics are scaled by lagged market capitalization. Panel B presents statistics for individual items for non-GAAP exclusion. There are two recurring items: *D&A* represents depreciation and amortization, and *SC* is stock based compensation expenses. There are four non-recurring items: *M&A* is merger and acquisition cost, *Restr* is restructuring charges, *G&L* is gains and losses, and *Legal* is litigation settlement. The second column reports the percentage of non-zero observations for each individual item. All items are scaled by lagged market capitalization. The statistics for individual items are reported based on non-zero observations. Panel C presents statistics for key firm characteristics. All variables are defined in the Appendix 4.4.

Table 4.3

Comparability of Measures of Earnings: Annual Sample of 19,686 Observations

Panel A. Comparability of GAAP and non-GAAP earnings

	Distributional properties					Pairwise difference against *EB_X*	
Earning metrics	Mean	STD	Q1	Med.	Q3	Mean	Median
GAAP							
EB_X	-0.650	1.133	-0.643	-0.260	-0.122		
NI	-0.687	1.185	-0.680	-0.274	-0.128	-0.037***	-0.001***
Non-GAAP							
SE	-0.400	0.713	-0.389	-0.167	-0.081	0.250***	0.044***
EB_XR	-0.698	1.170	-0.708	-0.314	-0.154	-0.048***	-0.022***
EB_XNR	-0.521	0.924	-0.502	-0.219	-0.107	0.129***	0.011***
EB_XR&NR	-0.589	1.004	-0.594	-0.231	-0.136	0.061***	0.007***

Panel B. Comparability of non-GAAP earnings after the exclusion of individual items

	Distributional properties					Pairwise difference against *EB_X*	
	Mean	STD	Q1	Median	Q3	Mean	Median
Recurring							
EB_XD&A	-0.704	1.176	-0.709	-0.317	-0.156	-0.054***	-0.023***
EB_XSC	-0.642	1.125	-0.637	-0.256	-0.122	0.009***	0.002***
Non-recurring							
EB_XM&A	-0.649	1.135	-0.642	-0.259	-0.121	0.001*	0.000
EB_XRestr	-0.630	1.095	-0.627	-0.256	-0.121	0.020***	0.001***
EB_XG&L	-0.647	1.130	-0.637	-0.258	-0.121	0.003***	0.000***
EB_XLegal	-0.648	1.134	-0.636	-0.258	-0.122	0.002**	0.000
EB_XWD	-0.616	1.078	-0.613	-0.247	-0.115	0.034***	0.006**
EB_XImpm	-0.568	1.013	-0.545	-0.232	-0.112	0.082***	0.014**

This table presents the averaged comparability scores of earnings measures. Panel A presents the summary statistics of the comparability scores of the GAAP and non-GAAP earnings metrics. The first (fourth) column shows mean (median) comparability scores. The last two columns formally test the equality of mean (median) comparability scores of an alternative metric and the GAAP-based earnings before extraordinary items (*EB_X*). Comparability scores are constructed so that scores closer to zero suggest greater comparability. *Positive* comparability differences suggest the earnings metrics are *more* comparable than *EB_X*, while *negative* differences indicate the earnings metrics are *less* comparable than *EB_X*. Panel B presents the summary statistics of comparability scores of the six self-constructed non-GAAP earnings metrics. They are constructed by adjusting *EB_X* for six individual recurring or non-recurring items, respectively. Being similar to Panel A, the last two columns report and test the pairwise mean/median difference in comparability scores between a self-constructed non-GAAP earnings metric and *EB_X*. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean (median).

Table 4.4
Additional Evidence on the Comparability Effect of Excluding Non-recurring Items: Analyses Based on Partitioning

Panel A. Comparability Effect of Overall Non-Recurring Items

	Quintiles based on Special items		Quintiles based on NR	
	(1)	(2)	(3)	(4)
Quintile	*SE*	Dif. vs. *EB_X*	*SE*	Dif. vs. *EB_X*
1 (Low)	-0.389	0.158***	-0.394	0.152***
2	-0.391	0.333***	-0.376	0.287***
3	-0.347	0.259***	-0.388	0.271***
4	-0.407	0.292**	-0.435	0.309***
5 (High)	-0.459	0.447***	-0.399	0.392***
F Tests of equality of mean differences vs. *EB_X* across quintiles				
F statistics		50.03***		29.58***

Panel B. Comparability Effect of Individual Non-Recurring Items

	Sorting on M&A charges		Sorting on Restructuring charges		Sorting on Gains & Losses	
	(1)	(2)	(3)	(4)	(5)	(6)
Group	*SE*	Dif. vs. *EB_X*	*SE*	Dif. vs. *EB_X*	*SE*	Dif. vs. *EB_X*
below-median	-0.427	0.262***	-0.39	0.214***	-0.41	0.238***
above-median	-0.307	0.339***	-0.408	0.355***	-0.371	0.380***
F Tests of equality of mean differences vs. *EB_X* across groups						
F statistics		80.93***		20.09***		9.89***

In this table, I classify the sample into different groups based on the magnitude of non-recurring item(s). In Panel A, the sample is sorted into quintiles based on their magnitude of (1) special items and (2) a refined group of non-recurring items (*NR*), respectively. *NR* includes four non-recurring items that are most frequently excluded from non-GAAP earnings (i.e., *M&A*, *Restr*, *G&L* and *Legal*). For each firm-year, the magnitude of the partitioning variable is calculated as its absolute value divided by the absolute value of the corresponding GAAP earnings. I calculate the magnitudes for the last four years and take the average of them. As such, I make the measurement window consistent with that of comparability scores (i.e., 16 quarters). For each category, I

report mean comparability scores of street earnings (*SE*), as well as the mean differences between *SE* and *EB_X* by quintiles. The first two columns show the comparability results based on the magnitude of overall special items, where quintile 1 represents the firm-years with lowest special items and quintile 5 represents the ones with the largest special items. The next two columns report the comparability results based on the magnitude of *NR*. Quintile 1 represents the firm-years with the lowest amount of *NR*, while quintile 5 represents the group of firm-years with the largest amount of *NR*. In Panel B I do the similar analyses for three individual non-recurring items (i.e., *M&A*, *Restr*, *G&L*). The sample is partitioned into two groups based on the magnitude of each of three items, respectively. Below-median group includes the firm-years with below-median amounts of the corresponding partitioning variables, while above-median group includes the firm-years with above-median amounts. Column 1, 3 and 5 demonstrate the mean comparability scores of *SE* for both groups based on *M&A*, *Restr* and *G&L* partitioning, respectively. And their adjacent column 2, 4 and 6 present the corresponding mean differences between *SE* and *EB_X* for both groups. F-tests are made to compare the comparability differences across quintiles/groups. The F statistics are reported in the last row. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean.

Table 4.5

Comparability of Street Earnings and Firm Characteristics: Levels and Differences Relative to *EB_X*

Panel A. Comparability of Street Earnings and Information Environment

	Capitalization		Analysts following		Return volatility	
	(1)	(2)	(3)	(4)	(5)	(6)
Quintile	*SE*	Dif. vs. *EB_X*	*SE*	Dif. vs. *EB_X*	*SE*	Dif. vs. *EB_X*
1 (Low)	-0.781	0.153***	-0.693	0.176***	-0.138	0.148***
2	-0.470	0.244***	-0.498	0.265***	-0.208	0.193***
3	-0.341	0.262***	-0.377	0.305***	-0.321	0.228***
4	-0.230	0.249***	-0.266	0.263***	-0.493	0.300***
5 (High)	-0.175	0.347***	-0.179	0.234***	-0.846	0.380***
F Tests of equality of means (mean differences vs. *EB_X*) across quintiles						
F Value.	497.6***	22.95***	326.4***	11.92***	703.05***	38.77***
t Value (Low VS. High)	-34.84***	-8.51***	-30.9***	-3.06***	-38.46***	-9.78***

Panel B. Comparability of Street Earnings and Firms' Idiosyncrasy

	Idiosyncratic Risks		B/M Dev.	
	(1)	(2)	(3)	(4)
Quintile	*SE*	Dif. vs. *EB_X*	*SE*	Dif. vs. *EB_X*
1 (Low)	-0.125	0.163***	-0.280	0.141***
2	-0.190	0.205***	-0.291	0.193***
3	-0.265	0.207***	-0.348	0.245***
4	-0.348	0.214***	-0.315	0.223***
5 (High)	-0.589	0.227***	-0.357	0.222***
F Tests of equality of means (mean differences vs. EB_X)				
F Value	334.41***	16.83***	221.93***	10.55***
t Value (Low VS. High)	26.07***	-1.67*	5.02***	-3.31***

In this table, I sort the sample into quintiles based on their (1) market capitalization, (2) the number of analyst following, and (3) stock return volatility, respectively. For each firm-year, firm characteristics are measured for the last four years so as to make the measurement window consistent with that of comparability scores (i.e., 16 quarters).

For each category, I report mean comparability scores of street earnings (*SE*), as well as the mean differences between *SE* and *EB_X* by quintiles. The first two columns show the results based on firm size (*MKTC*), where quintile 1 represents the smallest firms and quintile 5 represents the largest ones. The next two columns report the results based on analyst following (*ANALYST*). Quintile 1 represents the firms with the weakest analyst coverage, while quintile 5 represents the group of firms with the strongest analyst coverage. For each firm-year, the analyst following is measured by the average number of analysts covering the firm during the last four years. The last two columns present the results based on return volatility (*VOLA*). Quintile 1 represents the firms with the least volatility, while quintile 5 represents the firms having the most volatile stock returns. F-tests are made to compare the differences in comparability levels and comparability differences across the five quintiles. The F statistics are reported at the bottom of each column. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean.

Chapter 5 Earnings Comparability and Accrual Process

5.1 Introduction

This paper investigates the relation between the comparability of earnings and the properties of accruals. The importance of comparability is well established among practitioners, accounting standard setters, and academics. Important economic decisions requiring the evaluation of alternative opportunities and comparable financial information include: investors choosing among possible investments, lenders making lending decisions, and corporations evaluating potential acquisition targets. Accordingly, the demand for comparable accounting information has been credited as one of the principal motives for accounting regulation (SFAC 2, p. 40). Reflecting the practical importance of comparability, a fast-growing body of literature examines and documents the benefits of more comparable accounting information to financial statement users such as equity investors (e.g., Bhojraj and Lee 2002; Bradshaw et al. 2009; De Franco et al. 2011; Young and Zeng, 2015), debt investors (Kim et al. 2013; Fang et al. 2016), and M&A acquirers (Chen et al.2016).

Despite the expanding body of literature concerning the economic consequences of accounting comparability, there is limited research on the underlying mechanism that produces comparable (or incomparable) earnings. This lack of knowledge could hinder users' ability to assess the comparability of accounting information that they receive, and may also hamper accounting standard setters' effort to improve comparability through better rule setting. This study seeks to close this research gap by examining how accruals, the key component of earnings, affect the comparability of the resulting earnings measures. Since earnings are the outcome of the accrual process which adjusts cash flows for accruals, the properties of accruals ought to manifest through the property of earnings. Therefore, an important unanswered question concerns how properties of

accruals are associated with earnings comparability. As the starting point, I draw on an important insight from the Conceptual Framework for Financial Reporting that accounting information with high relevance is likely to be more comparable. Specifically, the FASB asserts that "[s]ome degree of comparability is likely to be attained by satisfying the fundamental qualitative characteristics" (SFAC No. 8), implying that accruals that enhance (or diminish) the relevance of earnings would in turn improve (reduce) earnings comparability.

Accruals that originate from a company's core operations ("core accruals") are likely to be most relevant to decision marking, because they reveal the company's key business activities. As a result, adjusting operating cash flow for core accruals is expected to lead to earnings which better reflects the company's underlying performance, and which in turn facilitates a more meaningful performance comparison. In many important uses of earnings such as forecasting and valuation, users are primarily interested in core operations because they represent the recurring part of business and the principal source of value creation. Accruals originating from core operations precisely serve the purpose of transforming cash flows into core earnings and allow users to meaningfully evaluate and compare core operations based on such earnings measures. As a result, inclusion of accruals that are close to core operations enables users to correctly identify key similarities and differences in firms' reported performance, thereby enhancing cross-sectional comparability. The definition of core earnings shares the similar spirit of Standard & Poor's (S&P) "Core Earnings". Since its introduction in 2002, S&P's "Core Earnings" has been broadly used for equity valuation and debt rating activities. S&P's definition emphasizes the link between line items and a company's primary businesses, which forms the conceptual ground for the definition of core earnings in this study.

By contrast, accruals originating from non-core and/or peripheral business activities are less relevant and the inclusion of these non-core accruals is not expected to lead to more comparable earnings. Specifically, these non-core accruals are less likely to reasonably reflect the link between earnings numbers and underlying economic performance, and may distort this link in certain cases where the non-core accruals are perceived to be extraordinary. For example, impairment of goodwill is primarily driven by mark-to-market accounting and are not directly related to the revenue generating process. Therefore, impairments may not be as relevant as core accruals, such as accounts receivable. Then adjusting for such non-core accruals is not expected to reflect the link with the underlying economics to an equal extent to core accruals. Moreover, adjusting for non-core accruals of extraordinary nature, such as gain (loss) from sale of long-term assets, can largely distort earnings by causing a deviation from the underlying economics. And this deviation from underlying economics can conceal similarities and differences in firms' reported performance, which consequently reduces cross-sectional comparability. Collectively, I expect the adjustment of core (non-core) accruals to facilitate (handicap) the cross-sectional comparisons of firms' performance. This leads to my main prediction: the comparability of earnings is positively associated with the proximity of transactions and hence accruals to core operations.

Operationally, I classify common accruals according to their proximity to core operations. Examples of core accruals include changes in working capital and depreciation, while examples of non-core accruals are impairment changes, gain (loss) of selling long-term assets, etc. The accruals which are classified neither as "core" nor "non-core" are deemed as "intermediate". To corroborate this classification, we examine the correlations between accruals with sales, and find patterns which are consistent with this classification. Next, I construct a series of alternative earnings

measures by adjusting operating cash flows for different categorize of accruals (e.g., core, intermediate, and non-core accruals). I measure the comparability of an earnings measure by the comparability score based on De Franco et al (2011). The comparability score is defined to capture the extent of similarity between two firms' accounting systems, which map firms' underlying economics to their earnings. To demonstrate the robustness of our findings and overcome the drawbacks of the comparability score, I also measure comparability by the co-movement between two firms' earnings measures (De Franco et al. 2011).

I conduct three sets of empirical analysis to test the relation between earnings comparability and accruals' proximity to core operations in a US sample of 19,842 firm-year observations. First, as univariate analyses, I sort firms into quintiles based on the proportion of core (non-core) accruals in net earnings, and compare incremental comparability of net earnings beyond *OCF* across quintiles. I find that the comparability improvement of net earnings increases (declines) with the proportion of core (non-core) accruals in net earnings. The finding is consistent with my prediction, Moreover, I construct measures of earnings by progressively adjusting *OCF* with accruals whose relations with core operations become increasingly distant (i.e., in the order of core, intermediate, and non-core accruals). Comparing the comparability scores of various earnings measures confirms the sorting results: while core accruals improves the comparability of the resulting earnings measures, non-core accruals reduces it.

Second, as multivariate analysis, I regress the comparability scores on different categories of accruals and find that both core and intermediate accruals are positively associated with comparability, while non-core accruals are negatively related. The findings are consistent with my prediction for differential roles of accruals in enhancing

the comparability of earnings. These results are robust to the inclusion of a wide range of control variables, and to alternative comparability scores.

Third, I examine the implications of accrual properties to the usefulness of comparability. While prior studies find the evidence of earnings comparability improving the quality of analysts forecast (De Franco et al. 2011), I document evidence on a cross-sectional variation in the improvement of analyst forecast performance due to greater earnings comparability. The benefit of greater comparability is more pronounced to analysts when earnings comprise of less core accruals (or more non-core accruals). In contrast, when earnings are made up of more core accruals (or less non-core accruals), the benefit of comparability, in terms of analyst forecast quality, is significantly reduced. These findings reveal an important, moderating role of accruals in the benefit of accounting comparability, and they are consistent with prior evidence on earnings comparability being more beneficial in the event of high information asymmetries (Chen et al. 2016; Fang et al. 2016).

My paper makes two contributions to the literature. First, I directly link the comparability of earnings to the relevance of accruals and thus shed light on the underlying accounting process that determines comparability. While a growing body of research examines the economic consequences of comparability, there is relatively little research on the mechanism that leads to comparable (or incomparable) earnings. The latter knowledge is particularly relevant as standard setters strive to provide guidance on the recognition of relevant information. As indicated by the conceptual framework, relevance not only acts as a primary qualitative characteristic facilitating information usefulness, but also delivers benefits by enhancing secondary characteristics, such as comparability. My research highlights the crucial association between relevance and comparability. It suggests that allowing less relevant information into accounting

numbers can reduce earnings comparability, while recognizing relevant accruals can improve comparability which in turn enhances the usefulness of earnings.

Second, my findings about the association between comparability and accrual components have implications for prior studies examining the consequences of earnings comparability. Research finds evidence that greater comparability is beneficial and its benefits include improving analyst forecast performance, enhancing merger and acquisition performance, and reducing investor perceived stock crash risks. My evidence contributes to this literature by shedding more light on how the benefit of comparability works. Particularly, in the supplementary analyses I find the effect of comparability on analysts' performance is more pronounced for firms with less core accruals and more non-core accruals. This finding suggests that greater comparability is more beneficial to analysts when they are covering a firm whose earnings are difficult to predict. In contrast, the perceived benefit of comparability is substantially less pronounced for firms whose earnings are relatively easy to predict. My findings provide further evidence on the benefit of comparability and have the potential to enrich the literature that finds evidence regarding beneficial consequences of accounting comparability to financial statement users, such as improving analyst forecast performance, enhancing merger and acquisition performance, reducing cost of capital in debt market, and reducing investor perceived stock crash risks (Bhojraj and Lee 2002; Bradshaw et al. 2009; De Franco et al. 2011; Young and Zeng, 2015; Kim et al. 2013; Fang et al. 2016; Chen et al.2016; Kim et al. 2016).

The remainder of the chapter is organized as follows. Section 5.2 reviews the prior literature and develop the main prediction. Section 5.3 discusses the categorization of accruals. Section 5.4 describes the research design, while Section 5.5 discusses the

sample and data. Section 5.6 presents the main empirical results, and Section 5.7 examines the implications of my main results on prior literature. Section 5.8 concludes.

5.2 Prior Literature and Prediction

5.2.1 Prior Literature

The principal role of reported earnings is to measure firms' periodic financial performance (SFAC No. 1, pg. 43) and comparability "enables users to identify and understand similarities in, and differences among, items" (SFAC No. 8, QC21). I therefore operationalize the comparability of earnings as a quality that allows users to reliably compare financial performances across firms (or over time) based on their reported earnings. Comparable earnings allow users to determine the financial performance of several enterprises (SFAC No. 1, pg. 43; SFAC No. 8, pg. 19).

Prior research and standard setting suggests that earnings quality is a function of relevance (Dechow et al. 2010, Schipper 2003) and that comparability is an important dimension of earnings quality (FASB 1980, 2010). Since earnings result from adjusting operating cash flows with accruals, accruals ought to play an essential role in determining the comparability of earnings. My starting point is the "Conceptual Framework for Financial Reporting" (Statement of Accounting Concepts No.8, FASB 2010; CF hereafter), which asserts that "[s]ome degree of comparability is likely to be attained by satisfying the fundamental qualitative characteristics". Therefore, it is natural to anticipate that accruals that are relevant will improve earnings comparability, whereas accruals that lack this fundamental characteristic will lower earnings' comparability.

Essentially, comparability is the ability of an accounting system to accurately capture the economic effect of events and transactions in the period in which they occur.

The accuracy and timeliness with which events and transactions are reflected in earnings is a function of the accrual process. Accrual accounting adjusts cash flows with the aim of making the resulting earnings reflect underlying economic transactions and events during the reporting period (Dechow 1994). Earnings comparability is enhanced by accruals that are relevant in the sense that they make the resulting earnings number a legitimate proxy for underlying economic performance.[10] In the following discussion I argue that the relevance of accruals is manifested by their relation to core operations.

5.2.2 Development of Predictions

I argue that the relevance of accruals is manifested by their proximity to core operations because core operations are considered particularly relevant in the principal uses of earnings. Prior research reveals the difference between accrual components in reflecting core operations (e.g., Barth et al. 2001 and Bushman et al. 2016) and emphasizes the central importance to financial statement users of core earnings (e.g., Beaver 1981; Revsine et al. 1999; Jonas and Blanchet 2000). Core operations are defined as "ongoing major and central" activities, in contrast to non-core operations that reflect "incidental and peripheral" activities (Statement of Accounting Concepts No.5, FASB 1984, para. 36). While the latter information can be useful in specific circumstances, core earnings are considered particularly relevant for the two principal earnings objectives of prediction and confirmation (Statement of Financial Accounting Concepts No.8, FASB 2010).

With respect to their predictive role, earnings from core operations are more useful for predicting future financial performance because the underlying activities are

[10] The quality of accruals is also related to their reliability (Richardson et al. 2005). FASB (2010) propose that higher measurement error is expected to reduce earnings comparability, while lower measurement error is expected to enhance earnings comparability. However, this study focuses on the comparability effect of accruals relevance.

recurring and strategically important (Ohlson 1999; Brown and Sivakumar 2003). Conversely, users such as financial analysts do not normally attempt to predict non-core operations due to their transient, unpredictable, and auxiliary nature (Gu and Chen 2004; Doyle et al. 2013). The confirmation role of earnings (e.g., performance evaluation) also emphasises core operations because performance is usually evaluated against a target defined in terms of core operations (Kasznik and McNichols 2002; Matsumoto 2002; Burgstahler and Eames 2006; Rapoport 2013). Accordingly, adjusting periodic cash flow by core accruals is predicted to make earnings more reflective of core economic activities, whereas inclusion of non-core accruals is expected to cause earnings to deviate from economic fundamentals.

Accruals with close proximity to core operations originates from recognizing revenues and matching direct expenses with revenues. They precisely serve the purpose of transforming cash flows into core earnings and allow users to meaningfully evaluate and compare core operations based on such earnings measures. Example of accruals close to core operations include change in accounts receivable, change in accounts payable, change in inventory, and depreciation and amortization. Adjusting operating cash flows for accruals that are close to core operations enables users to correctly identify key similarities and differences of two firms and therefore by definition leads to an earnings metric with higher cross-sectional comparability. In contrast, there are accruals with distant proximity to core operations. These accruals do not bear clear and reasonable relations with the revenue generating process and therefore appear to be more detached from core operations. They are more likely to be driven by mark-to-market accounting and other events that are not directly related to operating cash flows. When adjusted upon cash flows, these accruals are likely to cause the resulting earnings metric deviate from the underlying performance. The deviation from underlying

economics may consequently conceal underlying economic similarities or differences and therefore make the resulting earnings metric less comparable. This study aims to investigate the association between accruals' proximity to core operations and cross-sectional earnings comparability. I predict that core accruals are more likely to improve cross-sectional earnings comparability relative to non-core accruals.

Prediction: *Ceteris paribus*, adjusting for accruals with close (distant) proximity to core operations leads to an earnings metric with higher (lower) cross-sectional comparability.

5.3 Accruals Categorization

To operationalize the prediction in the preceding section, I first classify all accruals that reconcile net earnings and operating cash flows. The classification is according to accruals' proximity to core operations. I categorize accruals into three discrete groups. The proximity to core operations is characterized by a continuous spectrum ranging from "close" to far "distant". As a result, my ability to rank all individual accruals in order is inevitably limited. I therefore adapt a discrete classification approach for the feature based on a three-way classification: close, ambiguous and distant. Accruals that are close to core operations are believed to be more relevant for information usefulness, and thus are termed as *core* accruals, while accruals that are distant from core operations are deemed to be less relevant, and thus are termed as *non-core* accruals. The remaining accruals are termed as *intermediate* accruals due to their ambiguous relations to companies' core operations. Note that the above classification is based the relevance of a group of accruals relative to another group. Specifically, accruals are classified as non-core only because they are perceived to be *less* relevant than those classified as core, but not because they are believed to be

not relevant at all. Even within the non-core group, certain accruals (e.g., restructuring costs) are significantly more relevant than others (e.g., extraordinary items), but they are still classified as non-core because they are not as relevant as the accruals in the core group (e.g., accounts receivable). My predictions focus primarily on core and non-core accruals, although for completeness I also consider accruals in the intermediate categories.

5.3.1 Accruals Categorization: Conceptualization

The categorization of accruals is based on their proximity to core operations. I consider three groups of accruals: (1) accruals with close proximity to core operations, (2) accruals with remote proximity to core operations, and (3) accruals with intermediate/ambiguous relation to core operations. This classification corresponds to prior research grouping line items in financial statements by their roles in recognizing revenues and matching expenses (Richardson et al. 2005). Prior literature suggests that there is variation in accruals according to their ability to make earnings more reflective of firm performance (Dechow 1994; Barth et al. 2001). Cheng and Hollie (2008) distinguish core and non-core cash flows by their different proximities to operating activities. Similarly, Bushman et al. (2016) argue that while some accruals originate from core operations and serve to offset random fluctuations in cash flows, other accruals stem from events and estimates that are not directly related to core operations.

The group of accruals with close proximity to core operations originates from recognizing revenues and matching direct expenses with revenues. In this group I include (1) change in accounts receivable; (2) change in accounts payable; (3) change in inventory; (4) depreciation and amortization. The combination of accruals in this group corresponds to the definition of working capital accruals and is believed to be

closely related to core operations (Healy 1985; Barth et al. 2001). For example, accounts receivable is employed to recognize earned and realizable revenue without cash receipt, whereas the accrual "deferred revenue" allows for the postponing of recognizing a cash inflow as revenue should it is deemed as unearned. The centrality of revenue generating in any firm means that these accruals are closely related to core operations and therefore their inclusion in earnings is predicted to improve earnings' relevance by enhancing comparability. Similarly, change in inventory is included because it arises from matched expenses associated with cost of goods sold, and therefore directly relates to core operations. These accruals are expected to result in more comparable earnings because matching reduces the negative autocorrelation in cash flows and hence volatility in earnings (Dechow et al. 1998). I also include depreciation and amortization because this accrual is believed to be an expense arising from the periodic consumption of assets and thus has strong predictive value (Barth et al. 2001; Barker 2004).

At the other extreme are accruals that do not bear clear and reasonable relations with the revenue generating process and therefore appear to be more detached from core operations. Rather than offsetting random fluctuations in cash flows, these accruals are more likely to be driven by mark-to-market accounting and other events that are not directly related to operating cash flows (Bushman et al. 2016). As such, the development of these accruals is beyond management control, and thus unlikely constitutes a key strategy. Such accruals usually take the form of one-time items and non-operating items. One example is the impairment of long-term assets (including goodwill). These accruals are recorded not because of their role in generating revenue but because of the need to recognize the loss of future economic benefits from these assets. For example, goodwill impairment charges are excluded from S&P's core earnings because 'the amortization of goodwill is not considered a period cost expended

in the creation of revenues, the inclusion of goodwill impairment charges would distort the company's operating performance' (Standard & Poor's 2008 p.10). They are infrequent, idiosyncratic, and inherently difficult to predict. Causes of impairments include changing market conditions and past erroneous decisions that often do not pertain to financial performance in the period when impairment is charged (Riedl 2004; Beatty and Weber 2006). Gu and Lev (2011) find that goodwill write-offs could be driven by the overpricing of acquirers' stocks. As a result, asset impairments are clearly not directly relevant for predicting future performance (Barker 2004). Moreover, when determining impairment amounts, firms often accelerate loss recognition and deviate further from matching.

Another example of an accrual with low relevance to core operations is unrealized gains and losses on marketable securities. Most firms do not rely on changes in asset/liability values as the basis for their business models. Dhaliwal et al. (1999) find that marketable securities adjustment is of relevance only for financial sector firms. These accruals do not form an integral part of firms' operating strategy because unrealized gains and losses are driven by market-wide factors over which managers have no control (Chambers et al. 2007). Accordingly, I also include gain (loss) from sale of long-term assets and restructuring charges in the group of accruals with weak link to core operations.

Finally, the intermediate accrual category comprises those accrual adjustments whose relation to core operations is ambiguous. The ambiguity is caused mainly by two reasons. The first reason is certain accruals possess mixed nature as to their relevance. That is, although these accruals are not directly derived from core operations, some of their characteristics could still be viewed as relevant. One example is tax-related items (e.g., deferred tax expense and changes in tax assets/liabilities). On the one hand, they

are perceived as non-core because rather than being driven by operating activities, taxes are determined primarily by policies and strategies that are unrelated to firms' core operations (Cheng and Hollie 2008). On the other hand, although tax-related items cannot be directly matched to revenue generating activities, they ultimately represent a recurring periodic financial obligation. The second reason is there are certain line items that are only provided in an aggregated manner by COMPUSTAT, and these aggregated line items include multiple accruals with conflicting nature of relevance. For example, the line item 'other assets and liabilities' (AOLOCH) includes write-downs and deferred revenue. While write-downs is expected to be less relevant, deferred revenue is deemed to be more relevant. Given this, 'other assets and liabilities' is classified as *intermediate* due to the fact that it includes two accruals where one accrual's relevance can hardly be aligned to other's.

5.3.2 Accruals Categorization: Operationalization

I obtain accruals directly from the statement of cash flows and follow a comprehensive definition of accruals. Some prior studies use an indirect balance sheet approach to calculate accruals and focus on working capital components. For example, Healy (1985) and Sloan (1996) define accruals as the change in non-cash working capital less depreciation expense. However, subsequent research suggests that this definition of accruals omits many accruals and deferrals relating to non-current operating assets, non-current operating liabilities, non-cash financial assets and financial liabilities (Richardson et al. 2005). In light of this, I use a comprehensive definition of accruals covering both working capital accruals and other accruals beyond working capital. I take accruals directly from the cash flow statements to avoid measures being biased by non-operating activities (Hribar and Collins 2002).

I focus on quarterly accrual items available in COMPUSTAT. These accrual items collectively account for the difference between COMPUSTAT operating cash flows (*OCF*) and income before extraordinary items (*IBCQ*). Next I categorize these accruals are categorized into three groups based on their proximity to core operations. The detailed categorization is summarized in Appendix 5.1. I mainly follow COMPUSTAT's approach where some specific accruals are aggregated into one single item. For example, funds from operations – other (*FOPOQ*) include impairment of goodwill, impairment of strategic investment, provision for bad debts and restructuring charges. Similarly, assets and liabilities – other (*AOLOCHQ*) contain unrealized gains and losses of investment, write-down of assets, customer deposits and deferred revenues. Given the aggregated nature of accrual items in COMPUSTAT, I do not specifically classify disaggregated individual accrual items; instead I based my classification on the aggregated items that are readily available in COMPUSTAT.

As reported in Appendix 5.1, all accruals are first categorized into three groups based on their proximity to core operations. The first group includes accruals considered to be *close* to core operations. Accruals in this group include depreciation and amortization (*DPCQ*), changes in accounts receivable (*RECCHQ*), changes in accounts payable (*APALCHQ*) and changes in inventories (*INVCHQ*). They relate to sales, cost of goods sold and other operating activities. Accruals in the second group are those *distant* from firms' core operations. They include extraordinary items and discontinued operations (*XIDOCQ*), sale of PPE and investment (*SPPIVQ*). The distant group also includes other funds from operations (*FOPOQ*) which comprise items such as restructuring cost and impairment of goodwill. These accruals result from peripheral or incidental activities and thus do not have clear and reasonable relations with revenue generating. Beyond these accruals with a relatively clear relation (either close or distant)

to core operations, other accruals exist whose relation to core operations is more ambiguous. I include these ambiguous accruals in the third group which includes deferred taxes (*TXDCQ*), equity in net loss / earnings (*ESUBCQ*), and accrued income taxes (*TXACHQ*). The ambiguous group also includes changes in other assets and liabilities (*AOLOCHQ*) which are composed of accruals such as write-downs and changes in deferred revenue. Given the ambiguity as to their relation to core operations, the accruals in this group are labelled as *Intermediate*.

5.4 Research Design

5.4.1 Construction of Earnings Measures

I construct alternative earnings measures by adjusting quarterly operating cash flow for each group of accruals. Specifically, I gradually adjust operating cash flows for one (or multiple) groups of accruals, which results in a series of earnings measures. I take operating cash flows (*OCF*) as the starting point and then adjust for accruals (1) close to, (2) intermediate to and (3) distant from core operations.

First, I adjust *OCF* by accruals that are closely related to core operations to produce an intermediate earnings construct (*IE_Core*), designed to reflect core operations. As I argued earlier, these accruals are intended to better reveal core operations and thus improve earnings' comparability. Second, I take *IE_Core* and further adjust it for intermediate accruals whose relation to core operations is unclear, termed as *IE_Core_Inter*. Given the ambiguity of their relation to core operations, the net effect of these accruals on comparability is difficult to predict ex ante. Third, I adjust *IE_Core_Inter* for non-core accruals which are clearly unrelated with core operations. The above adjustments collectively bridge the gap between cash flow and net income,

and the resulting number is effectively GAAP net income (*NI*). The detailed process of construction is reported in Appendix 5.1.

5.4.2 Measurement of Comparability

Following the prior research using output-based comparability measures (De Franco et al. 2011; Barth et al. 2012), I use two approaches to measure accounting comparability. The first approach measures comparability based on how underlying economic events map into accounting numbers. This approach generates cross-sectional comparability scores at both firm-pair-year level and firm-year level. Despite potential drawbacks, the approach has been widely used in the literature since its introduction and has been validated in many settings (Barth et al. 2012; Kim et al. 2013; Chen et al. 2016; Kim et al. 2016; Fang et al. 2016).

Two comparability scores are computed following the first approach. *CompAcctInd* is computed at firm-year level and *CompAcct* is computed at firm-pair-year level. They are used as the prime comparability scores in this chapter. *CMV_Ind* and *CMV_ERN* are constructed following the second approach whereby earnings comparability is measured based on the degree to which firms' earnings co-vary over time (Barth et al. 2012; De Franco et al. 2011). *CMV_Ind* is computed at firm-year level, and *CMV_ERN* is computed at firm-pair-year level. Please refer to Section 3.3 for detailed procedures of constructing the comparability scores.

5.4.3 Empirical Tests

I conduct three sets of empirical tests to examine the association between earnings comparability and accruals' proximity to core operations. The first set of test includes three univariate analyses examining the comparability effect of different

accrual components. First, I partition the full sample into quintiles based on comparability scores (e.g., $CompAcctInd_{it}$) of *NI*, and I compare the proportion of core, intermediate and non-core accruals (*Core, Inter, NCore*) across quintiles. The proportion of accruals are defined as the absolute value of an accrual category divided by the sum of absolute values of three accrual categories. For example, the proportion of core accruals *Core* is computed as the absolute value of core accruals divided by the sum of absolute values of core accruals, intermediate accrual and non-core accruals. Since I predict a positive association between earnings comparability and accruals' proximity to core operations, I expect the quintiles with higher comparability scores presents earnings with higher (lower) proportion of core (non-core) accruals. Second, I partition the sample into quintiles according to the *difference* in comparability scores between *OCF* and *NI*, and I compare the proportion of different accruals across quintiles. To the extent that core (non-core) accruals bring more (less) incremental comparability beyond *OCF*, I expect that the quintiles with higher difference in comparability scores present earnings with higher (lower) proportion of core (non-core) accruals. Third, I partition the sample into quintiles based on the proportion of core, intermediate and non-core accruals, respectively. For each quintile, I report the comparability score of *NI* and the difference in comparability score between *NI* and *OCF*. I expect the quintiles with higher proportion of core accruals have higher comparability scores of *NI* and present higher difference in comparability score between *NI* and *OCF*. Collectively, the univariate analyses manifest the association between comparability and accrual components.

Second, I conduct a further analysis to confirm the results in univariate analyses. The above univariate analyses merely examine the aggregated effect of accruals and have limitations in clearly distinguishing the effect of one accrual group from another.

This analysis allows me to pinpoint the specific comparability effect of each accrual category. Specifically, I calculate the prime firm-year comparability score $CompAcctInd_{it}^{k}$ for each earnings metric *k* (i.e., *OCF*, *IE_Core*, *IE_Core_Inter*, *NI*). Then I conduct pairwise tests of alternative earnings metrics for the *same* firm. I conduct paired-sample *t* (signed rank) tests for the equality of mean (median) between all pairwise calculations of earnings metrics (e.g., $CompAcct_{it}^{IE\_Core}$ VS.$CompAcct_{it}^{OCF}$). This allows me to draw inferences about the comparability effect of each accrual group.[11]

For example, *OCF* and *IE_Core* are paired for firm *i* in time *t* and the difference in *CompAcctInd*$_{it}$ between *OCF* and *IE_Core* is indicative of the comparability effect of core accruals (i.e., the difference between *OCF* and *IE_Core*). As predicted, I expect the difference in *CompAcctInd*$_{it}$ to be positive, which means adjusting for core accruals improves earnings comparability. Similarly, the pairwise test for *IE_Core* and *IE_Core_Inter* suggests the comparability effect of intermediate accruals, while the test for *IE_Core_Inter* and *NI* suggests the comparability effect of non-core accruals. I expect the adjustment for non-core accruals reduces earnings comparability, and this is reflected by a negative difference in comparability score between *IE_Core_Inter* and *NI*. The feature of pairwise comparison in this research design effectively uses firms as their own control and helps minimize endogeneity problems.

Third, as multivariate analysis, I estimate a regression that controls for the underlying economic similarity. As discussed in Section 3.2, there are criticism that the comparability scores used here may wrongly capture the economic similarity. Therefore,

[11] Operationally, we first calculate the pairwise difference between two earnings metrics:
For example, $Dif\_Comp_{it}^{IE\_Core,OCF} = CompAcct_{it}^{IE\_Core} - CompAcct_{it}^{OCF}$.

We then test whether mean (median) $Dif\_Comp_{it}^{IE\_Core,OCF}$ is significantly different from zero using *t* (signed rank) tests.

it is crucial to separate earnings comparability from similarity in underlying economics. The regression analysis follows the specification suggested by Francis et al. (2014), modified slightly to accommodate my specific research questions. Specifically, I estimate the following model on a firm-pair-year basis:

$$Comparability_{ijt} = \beta_1 \times Accrual\_Ratio_{ijt} + \beta_2 \times Controls_{ijt} + \varepsilon_{ijt}, \quad (3)$$

where the dependent variable *Comparability* is the prime firm-pair-year comparability score $CompAcct_{ijt}$. The variable of interest is *Accrual_Ratio* which captures the relative proportion of core accruals (*Core_Pair*), intermediate accruals (*Inter_Pair*), and non-core accruals (*NCore_Pair*), respectively. I predict a positive association between core accruals and earnings comparability. Therefore, the coefficient on core accruals proportion (*Core_Pair)* is expected to be positive. In contrast, I predict a negative association between non-core accruals and earnings comparability and thus expect a negative coefficient on non-core accruals proportion (*NCore_Pair*). Due to the ambiguous nature of intermediate accruals, I do not have an ex ante prediction for the sign of the coefficient on intermediate accruals proportion (*Inter_Pair*). Instead, I take it as an empirical question.

To control for underlying economic similarity, my analyses are conducted annually on firm-pairs within the same SCI 2-digit industry. This allows me to control for common economic fundamentals and shocks within the same industry. Moreover, I control for contemporaneous stock return co-movement (*RET_CMV*), which is measured analogously to *ERN_CMV*. Specifically, *RET_CMV* is created in an identical manner to *ERN_CMV* except that in Equation (2) I replace *Earnings* with monthly stock returns. Stock returns will reflect all economic shocks and serve as a further control for the effect of underlying economic fundamentals on earnings.

I also control for a series of variables concerning firms' fundamental characteristics. First, I include control variables for size and market-to-book on the basis that these variables are widely used to capture many unobservable firm-specific characteristics. I also control for a wider range of other variables identified in the literature that could results in the earnings between two firms being similar due to either economic fundamental (e.g., volatility of operations) or the propensity to manage earnings (e.g., market-to-book ratio or leverage). The full set of control variables are: size, leverage, market-to-book, cash flows from operations, losses, standard deviation of sales, standard deviation of cash flows, and sales growth.

Following prior research that has used pairs of firms, I control for both the *levels* and *differences* in firm-pair characteristics (Francis et al. 2014; De Franco et al. 2011). Specifically, I control for levels by entering the average value in each year *t* for the paired control variables for firm *i* and *j*. The differences are measured as the absolute values of yearly differences in the control values for firm *i* and *j*. The dependent variable in the model is constructed using the data across 16 consecutive quarters. I therefore estimate the average of each control variable across the corresponding 16 quarters. I use the averages of each firm (firm-pair) to construct the *levels* metrics, and differences in these averaged values are used to construct *differences* metrics. Due to the absence of theory, I make no predictions as to what the signs of the coefficients on the control variables. Overall, regression model (3) examines how different accrual categories affect earnings comparability. I also include firm-pair and year fixed effect. The models are estimated with the standard errors clustered on each firm and year.

5.5 Sample and Data

I construct the sample by including only US non-financial firms. The sample period is from 2003 to 2015. As De Franco et al.'s (2011) approaches require the previous 16-quarter data (at least previous 14 quarters) when computing comparability scores for firm *i* at time *t*, quarterly data is taken for the period of January 2000 through December 2015. Table 5.1 illustrates the sample selection procedure. The sample includes all US publicly listed non-financial firms in the merged COMPUSTAT-CRSP-IBES database from 2003 through 2015. As demonstrated in Panel A, the data selection starts with all firm-year observations in the universe of COMPUSTAT, CRSP and IBES. Following De Franco et al. (2011), I retain only those observations with a fiscal year-end month in March, June, September or December. Observations with missing SIC codes are removed. Financial firms (SIC 60-69) are also excluded from the sample. I also exclude holding companies, ADRs and limited partnerships. These criteria result in an initial sample with 57,511 firm-year observations.

[Insert Table 5.1 here]

I continue to further select the data so that my main sample also satisfies the following selection criteria: (i) with valid stock prices, earnings and accrual data over preceding 16 quarters;[12] (ii) with an SIC 2-digit industry-year grouping with at least 10 firms. All the quarterly earnings metrics considered in this study and stock returns are trimmed at 0.5 and 99.5 percentiles to minimize the impact of extreme observations on the analysis. The final main sample contains 19,842 firm-year observations.[13] The comparability scores for these 19,482 firm-year observations are constructed based on

[12] The observations with no more than two missing values over lagged quarters in the key variables are retained.

[13] In the final main sample, I winsorize the firm-year comparability scores of all earnings metrics considered in this study at 1 and 99 percentiles. The main sample comprises 19,482 firm-year observations, while the sample size varies slightly for different sets of analyses. We have a variation in sample size because some analyses require more control variables and thus further reduce the corresponding sample size.

a richer sample corresponding to 314,531 firm-quarters, including the lagged 16 quarters for each fiscal year end.

Table 5.2 provides descriptive statistics for 314,531 firm-quarter observations which are the input for constructing comparability scores.[14] The table presents descriptive statistics for classified accrual groups and a series of earnings metrics, which are scaled by lagged market capitalization. The mean value of core accruals (0.017) is higher than non-core accruals (0.008). While both core and non-core accruals carry a significant value, the magnitude of intermediate accruals does not materialize. Accordingly, my predictions focus on core and non-core accruals but take the effect of intermediate accruals as an empirical question. The mean values for operating cash flow and net income are reported at the top and bottom of the table. The value of net income is less than that of operating cash flow, which is consistent with the fact that accruals are composed primarily of expenses.

[Insert Table 5.2 here]

The last two columns in Table 5.2 report correlations between each accrual/earnings measure and revenue and their persistence. The correlation between core accruals and revenue is -0.447, while the same number is only -0.306 for non-core accruals. This is consistent with the notion that core accruals are more closed to firms' core operations and thus more correlated with revenue, whereas non-core accruals are distant from core operations and thus less correlated with revenue. Also, core accruals are found to be more persistent (0.125) than non-core accruals (0.086). Collectively, the evidence in Table 5.2 supports my classification method based on accruals' proximity to core operations.

[14] Data for non-recurring items are collected to construct alternative earnings metric. Considering their infrequency and unusualness, missing values for non-recurring items are regarded as 0 in my analysis.

5.6 Main Empirical Results

The section presents result of analyses examining the association between earnings comparability and different accrual components. I first show the results of the univariate analyses which conceptually manifest how different accrual components could affect earnings comparability. Then I present the results of a more refined analysis where I compare the comparability scores of various constructed earnings metrics. This refined analysis is designed so that I can pinpoint the comparability effect of different accruals more clearly. Third, I report the results of the regression-based analyses. A wide range of control variables are included in the regressions in purpose of further controlling for the underlying economic similarities. As a result, the regression analyses provide a setting where I can better isolate accounting comparability from economic similarities. The overall results are consistent with my predictions, indicating that the presence of core accruals improve earnings comparability whereas the inclusion of non-core accruals reduce earnings comparability.

5.6.1 Results of Univariate Analyses

Table 5.3 presents results for univariate analyses on the potential effect of different accruals on earnings comparability. In Panel A I report the results based on the prime firm-year comparability score (i.e., $CompAcctInd_{it}$). The sample of 19,842 observations is classified into quintiles according to the proportion of core, intermediate and non-core accruals, respectively (*Core*, *Inter*, *NCore*). The partitioning on accruals allows me to examine the association between different accruals categories and earnings comparability. For each quintile of accrual proportion, I report (1) comparability score of *NI* and (2) the difference in comparability score between *NI* and *OCF*. Specifically, columns 1 and 2 present results for the partitioning on the proportion of core accruals

in earnings (*Core*), where quintile 1 represents firm-years with the lowest ratio of core accruals, while quintile 5 includes those with the highest ratio of core accruals. The first column reports the comparability scores of *NI* for each quintile, and the comparability scores are found to be increasing from the lowest core accrual quintile (i.e., -3.042) to the highest core accrual quintile (i.e., -1.905). The second column reports the incremental comparability of net earnings beyond cash flow. I find that the comparability benefits associated with accruals increase with the ratio of core accruals. Findings suggest that adjusting for accruals (i.e., the difference between net income and operating cash flow) reduce earnings comparability score by 0.301 for those firm-years with the lowest proportion of core accruals, whereas the adjustment of accruals improves comparability score by 1.331 for firm-years with the highest proportion of core accruals.

[Insert Table 5.3 here]

The last two columns of Table 5.3 present results based on a sorting of non-core accruals (*NCore*), where quintile 1 includes firm-years with the lowest proportion of non-core accruals and quintile 5 represents those with the highest proportion of non-core accruals. Column 5 demonstrates that the comparability of *NI* is decreasing with the proportion of non-core accruals, with the comparability score being the highest (i.e., -1.799) for the lowest non-core accrual quintile, and lowest (i.e., -3.527) for the highest non-core accrual quintile. In addition, column 6 reports the association between non-core accruals and the incremental comparability of *NI* over *OCF*. That is, the comparability benefits associated with accruals decrease with the proportion of non-core accruals. While the adjustment of accruals improves earnings comparability by 1.229 when the proportion of non-core accruals is at the lowest level, the corresponding benefits become negative (i.e., -0.561) when the proportion of non-core accruals is at

the highest level. The *F*-test in the final row of Table 5.3 rejects the null hypothesis that the mean differences are all equal across different accrual quintiles. Collectively, the above findings indicate that earnings comparability is positively correlated with core accruals and negatively correlated with non-core accruals. By contrast, results for intermediate accruals do not manifest consistent patterns. While the comparability scores of net income seem to increase with the magnitude of intermediate accruals, the results for comparability benefits of net income relative to OCF fail to present a consistent pattern. As a result, the comparability effect of intermediate accruals remains ambiguous. For robustness check, I conduct the same analyses but using an alternative firm-year comparability score based on earnings co-movement (i.e., CMV_Ind_{it}). The results are presented in Panel B and remain consistent.

As suggested in Table 5.2, accrual categories are correlated. For a firm-year, when the proportion of core accruals is higher, the corresponding proportion of non-core accruals is by construction lower. Therefore, the results presented above need to be interpreted with carefulness. The patterns of comparability scores might be driven by the joint effect of core and non-core accruals, as opposed to the independent effect of them. For example, the quintiles of high core accruals present high comparability scores not only because the quintiles benefit from high proportion of core accruals, but also because the quintiles are by construction impacted by lower non-core accruals.

[Insert Table 5.4 here]

Table 5.4 reports the results for an additional univariate analysis where the sample is partitioned into 5 quintiles based on (1) the comparability scores of net income or (2) the comparability improvement of net income over cash flow. The comparability is measured by the prime firm-year comparability score, $CompAcctInd_{it}$. For each quintile of comparability score, I report the proportion of different accruals (i.e., *Core*,

Inter, *NCore*). Rather than independently examining each accrual category as demonstrated in Table 5.3, the analysis in Table 5.4 allows for a more comprehensive view where I can observe how the presence of three different accrual categories is associated with earnings comparability. In Panel A, the sample is partitioned based on comparability scores of net income into 5 quintiles, for each of which I report the accrual structure. I find that firms with low comparability scores have a higher proportion of non-core accruals and a lower proportion of core accruals in their earnings. For example, the overall accruals for the firm-years with the least comparable net income include 46.08% core accruals and 31.64% non-core accruals. In contrast, cases in the highest comparability portfolio are associated with 56.96% core accruals and only 19.11% non-core accruals. The *F*-test in the final row of panel A rejects the null hypothesis that the mean differences in accrual proportions are all equal across different comparability quintiles. Given the ambiguous nature of intermediate accruals, I find no clear pattern for their comparability effect.

Panel B of Table 5.4 presents results after partitioning according to the comparability improvement of net income over cash flow (*Diff_Comp*). *Diff_Comp* is computed as the difference in comparability score $CompAcctInd_{it}$ between *NI* and *OCF*. And it represents the comparability benefits associated with total accruals. The sample is partitioned into 5 quintiles based on *Diff_Comp,* and I report accrual structures for each quintile. Specifically, the portfolio with the lowest comparability increase for net income over *OCF* is associated with 45.65% core accruals and 31.55% non-core accruals. In contrast, the portfolio with the highest comparability increase for net income over *OCF* are associated with 57.69% core accruals and 19.85% non-core accruals. The findings suggest that greater comparability benefits are associated with higher core accruals and lower non-core accruals. The *F*-test in the final row of Panel

B rejects the null hypothesis that the mean differences in accrual proportions are all equal across different comparability quintiles. I do not find a clear pattern for intermediate accruals due to their ambiguous nature. To check the robustness of the above results, I run the same analyses but with an alternative firm-year comparability score (i.e., CMV_Ind_{it}). I find similar results which are presented in Table 5.5. Specifically, the portfolio with the highest comparability is associated with 52.21% core accruals and 17.40% non-core accruals, while the portfolio with the lowest comparability is associated with 48.89% core accruals and 20.88% non-core accruals. The comparability increase for net income over OCF presents similar patterns. The portfolio with the highest (lowest) comparability benefits are associated with 51.48% (50.86%) core accruals and 18.03% (19.33%) non-core accruals.

[Insert Table 5.5 here]

5.6.2 Further Analysis

Table 5.6, Panel A presents summary statistics of $CompAcctInd_{it}$ for the operating cash flow (*OCF*) and a series of intermediate earnings measures, where scores closer to zero suggest greater comparability. The intermediate earnings measures are constructed by gradually adjusting *OCF* for core, intermediate and non-core accruals. Specifically, *IE_Core* represents *OCF* adjusted for core accruals, and *IE_Core_Inter* represents *IE_Core* adjusted for intermediate accruals. I further adjust *IE_Core_Inter* for non-core accruals to reach net income (*NI*). The construction of intermediate earnings measures is detailed in panel C of Appendix 5.1. I compare the comparability scores between adjacent intermediate earnings measures, which allows me to draw inferences about the comparability effect of each accrual category.

The mean value of comparability score for *OCF* is -2.773, while the mean comparability score for *NI* (-2.419) is substantially greater. The comparability increase for net income over *OCF* suggests that accruals in aggregate enhance earnings comparability. I continue to examine the comparability effect of different accrual categories. First, adjusting *OCF* for core accruals leads to *IE_Core*. The mean comparability score for *IE_Core* (-2.327) is larger than that of *OCF* (-2.773), which suggests that adjusting for core accruals improve earnings comparability. Second, a further adjustment of intermediate accruals on *IE_Core* gives *IE_Core_Inter*. The comparability score for *IE_Core_Inter* (-2.047) is larger than that of *IE_Core* (-2.327). The finding indicates that intermediate accruals are associated with incremental comparability benefits, and adjusting for intermediate accruals improves comparability. Third, a final adjustment for non-core accruals on *IE_Core_Inter* reaches *NI* and *NI* (-2.419) is found to be less comparable than *IE_Core_Inter*. However, *NI* remains to be more comparable than *OCF* due to the comparability benefits gained from core accruals. Since consistent inferences can be drawn from both mean and median comparability scores, the subsequent discussion focuses on the mean values.

[Insert Table 5.6 here]

I report the comparability differences across *OCF* and various earnings measures in Panel B of Table 5.6. I conduct pairwise tests of *OCF* and alternative earnings measures for the *same* firm. Specifically, paired-sample *t* (signed rank) tests are conducted for the equality of mean (median) comparability scores between all pairwise calculations of earnings metrics (e.g., $CompAcctInd_{it}^{IE\_Core}$ VS. $CompAcctInd_{it}^{OCF}$). Compared with the analysis in section 5.6.1, this research design has the advantage of being able to pinpoint the individual effect of the three accrual categories on earnings comparability. It also has advantage compared with the

test in panel A of Table 5.6 in that this design provides a clearer image of the comparability of certain earnings measure relative to all the others. Positive differences suggest comparability improvement and negative differences indicate comparability reduction.

The upper part of Panel B tests the differences in mean comparability scores. The difference in mean comparability score between *IE_Core* and *OCF* is 0.446, which suggests that adjusting for core accruals improves comparability. Using *OCF* as the benchmark, the adjustment for core accruals is associated with a 16.08% comparability improvement (i.e., |0.446/-2.773|). Further, the difference in mean comparability score between *NI* and *IE_Core_Inter* is -0.372, indicating that the inclusion of non-core accruals reduces comparability. This represents a 13.42% reduction in comparability relative to *OCF* (i.e., |-0.372/-2.773|). The above results are consistent with the notion that core accruals improve comparability while non-core accruals reduce comparability. Moreover, the difference in comparability score between *IE_Core_Inter* and *IE_Core*, (i.e., 0.280) suggests that the adjustment of intermediate accruals seems to improve comparability. It represents a 10.10% improvement in comparability over *OCF* (i.e., |0.28/-2.773|). The comparability differences across earnings measures are all statistically significant ($p < 0.01$).

De Franco et al. (2011) argue that investors incline to focus on a group of most comparable peers rather than all peers in the sector when evaluating firm performance. Drawing on this logic, they propose an alternative comparability measure (i.e., $CompAcctM4_{it}$) which is based on the target firm's top 4 comparable peers in the sector, as opposed to all its peer firms. Using this alternative measure, I rerun the above analyses for comparability of various earnings metrics and report the results in Table 5.7. The results remain consistent with those in Table 5.6.

[Insert Table 5.7 here]

5.6.3 Regression Analyses

The main results based on the regression model in Equation (3) are reported in Table 5.8. Following Francis et al. (2014), I regress comparability scores on the proportion of different accrual categories. The regressions are estimated using annual firm-fair observations. The dependent variable is the prime firm-pair-year comparability score $AcctComp_{ijt}$. The model is estimated with the proportion of core, intermediate and non-core accruals as independent variables. Variable *Core_Pair* is the proportion of core accruals, while *NCore_Pair* represents the proportion of non-core accruals. The proportion of intermediate accruals is proxied by *Inter-Pair*. I also control for a wide range of variables regarding firms' economic similarity. I include firm-pair fixed effect and year fixed effect, with the standard errors being clustered at the firm-pair level.

I predict earnings comparability increases with the proportion of core accruals. Therefore, the coefficient on *Core_Pair* is expected to be positive. In contrast, I predict earnings comparability decreases with the proportion of non-core accruals and thus expect a negative coefficient on *NCore_Pair*. Given the ambiguous relation between intermediate accruals and firms' core operations, I do not have a specific prediction for the sign of the coefficient on *Inter_Pair*. In the first three columns of Table 5.8, I report the regression results for *Core_Pair*, *Inter_Pair*, and *NCore_Pair*, respectively. Column 4 reports the model for both the proportion of core and non-core accruals. In column 1, the coefficient on the test variable *Core_Pair* is positive (i.e., 2.592) and statistically significant at the $p < 0.01$ level. This finding is consistent with earnings comparability being positively associated with the proportion of core accruals.

Specifically, an increase of one standard deviation in *Core_Pair* improves the comparability score by 0.253 which is equivalent for 8.15% of the mean firm-pair comparability score (i.e., -3.103).[15]

Column 2 presents the model for intermediate accruals. The coefficient on test variable *Inter_Pair* is 1.320 which is also positive and statistically significant at $p <$ 0.01 level. It suggests that the presence intermediate accruals improve comparability. An increase of one standard deviation in *Inter_Pair* improves comparability by 0.108 which translate into 3.47% of the mean comparability score. Column 3 reports the model for non-core accruals. The coefficient on test variable *NCore_Pair* is negative (i.e., -4.683) and statistically significant at $p < 0.01$ level. This finding supports my prediction that the inclusion of more non-core accruals reduces earnings comparability. An increase of one standard deviation in *NCore_Pair* reduces the comparability by 0.412 which equals 13.29% of the mean firm-pair earnings comparability. The last column presents the model including both *Core_Pair* and *NCore_Pair* so that I can capture the joint effect of core and non-core accruals. The coefficient on *Core_Pair* (*NCore_Pair*) remains to be positive (negative) and statistically significant. However, the comparability effect is found to concentrate in non-core accruals, whereas the incremental effect of core accruals appears relatively marginal.[16]

[Insert Table 5.8 here]

Signs of the coefficients on the control variables in Table 5.8 are largely consistent with prior studies. Specifically, firm-pair with more similar stock return covariation (*RET_COV*) have more comparable earnings, which is consistent with

[15] The inference remains similar if depreciation and amortization are excluded from *core* accruals. However, the removal of depreciation nd amortization would result in a smaller coefficient on the test variable.

[16] Adding the test variables, *Core_Pair* and *NCore_Pair*, to Model (4) in Table 5.8 significantly increases the explanatory power of the model. Specifically, the adjusted R-squared value increases from 72.17% to 85.07%.

earnings comparability being correlated underlying economics. The negative coefficients on *Size_Diff*, *Cash_Diff*, *Lev_Diff*, *MB_Diff* and *LossProb_Diff* are consistent with less earnings comparability when there is a greater difference in firms' financial fundamentals. Finally, the negative coefficients on *STD_Sales_Avg*, *STD_CFO_Avg* and *STD_Sales_Grth_Avg* are consistent with a greater variation in sales (growth) and cash flows leading to less earnings comparability.

Collectively, the results in Table 5.8 suggest that earnings comparability is positively associated with the proportion of core accruals, while it is negatively associated with the proportion of non-core accruals. My finding also supports intermediate accruals being positively associated with earnings comparability. Because this is the first study to examine the effect of accruals on comparability, I have no empirical evidence to inform my priors as to what the magnitudes should be. However, I believe the magnitudes for both core and non-core accruals are plausible and can be categorized as large enough to matter in an economic as well as statistical sense.

[Insert Table 5.9 here]

I also estimate the model in Equation (3) in a *firm-year* setting using the prime firm-year comparability score $CompAcctInd_{it}$ as the dependent variable. In the model I only include *levels* control variables at firm-year level. The sample includes 17,391 firm-year observations which is slightly less than the sample size for early firm-year analyses in section 5.6.1 and section 5.6.2 (i.e., 19,842 firm-years). This is because regression-based analyses require more control variables which result in further restriction on data. The corresponding results are reported in Table 5.9 and they are consistent with the findings in Table 5.8.

[Insert Table 5.10 here]

To further check the robustness of my analyses, I rerun the same regression

using other two alternative comparability scores based on earnings co-movement (i.e., CMV_ERN_{ijt} and CMV_Ind_{it}). The new results based on alternative firm-pair-year score CMV_ERN_{ijt} are reported in Table 5.10, while the new results based on alternative firm-year score CMV_Ind_{it} are presented in Table 5.11. The results in both tables remain similar with those from the aforementioned analyses where comparability measures based on earnings-return mapping (i.e., $AcctComp_{ijt}$ and $CompAcctInd_{it}$) are used.

[Insert Table 5.11 here]

5.7 Supplementary Test for Economic Implications

Results in previous sections demonstrate how different accrual categories impact earnings comparability. Based on this finding, this section examines the moderating effect of different accrual categories on the association between earnings comparability and analyst forecasts. De Franco et al. (2011) find that greater earnings comparability improves the quality of analyst forecasts, which suggests benefits of accounting comparability to financial statement users. Meanwhile, prior studies also document evidence that the benefit of accounting comparability become more pronounced when the difficulty of processing information (and thus overcome information asymmetry) is high (Fang et al. 2016; Chen et al. 2016). Therefore, I expect the benefit of comparability to be more pronounced to analysts under circumstances where firms' earnings involve higher uncertainty and thus more difficult to forecast. In the context of forecasting earnings, analysts are found to have more difficulties and thus lower forecast quality when earnings involve more items unrelated to firms' operating activities (Lee et al. 2013; Liang and Riedl 2013; Chen et al. 2015). Collectively, I predict that the benefit of accounting comparability is more (less) pronounced when the proportion of non-core (core) accruals is high.

Since analysts do not mechanically remove all transitory items (inclusive of non-core accruals) when forecasting, they need to make contextual judgements on exclusions. Having higher proportion of non-core accruals would require substantially more efforts from analysts to make their judgements. In that case, greater accounting comparability is likely to bring more benefits in the sense that it can help analysts make more sensible forecasting judgement for a firm by referring to its peer firms. In order to examine the moderating effect of accrual components, I estimate the following model to see how different proportion of accrual components influence the association between accounting comparability and analysts' forecast performance:

$$Analyst\_Performance_{it+1} = \beta_1 \times Comparability_{it} + \beta_2 \times Accruals_{it} + \beta_3 \times Comparability_{it} * Accruals_{it} + \beta_4 \times Controls_{it} + \varepsilon_{it+1}, \quad (4)$$

where *Analyst_Performance* is either *Accuracy* or *Dispersion*. *Accuracy* is the absolute value of the forecast error deflated by lagged stock prices where forecast error equals the difference between analysts' mean IBES forecast of firm *i*'s annual earnings for firm *t* and IBES actual earnings. For a given fiscal year (e.g., December of year *t+1*), I collect the earliest forecast available during the year (i.e., I use the earliest forecast from January to December of year *t+1* for a December fiscal year end firm). As the absolute forecast error is multiplied by -100, higher values of *Accuracy* suggest more accurate forecasts. *Dispersion* is the cross-sectional standard deviation of the earliest individual analysts' annual forecasts for a given firm, deflated by stock price and multiplied by 100. Prior studies find that accuracy is increasing in comparability, and that dispersion is decreasing in comparability.

Comparability represents the prime firm-year comparability score *CompAcctInd*. *Accruals* is an indicator variable which represents either $High_{core}$ or $High_{core}Low_{ncore}$,

measuring the fraction of core and no-core accruals in total accruals. Specifically, $High_{core}$ equals one if the proportion of core accruals is above the median, zero otherwise. $High_{core}Low_{ncore}$ equals one if the firm has above median proportion of core accruals as well as below median proportion of non-core accruals, zero otherwise. Firms whose earnings comprise higher core accruals/lower non-core accruals are expected to be relatively easier to predict. The test variable is the interaction term between *Comparability* and *Accruals*. It captures the extent to which the effect of comparability is moderated by accrual components.

Following De Franco et al. (2011), I control for a wide range of determinants of analysts forecast performance as previously documented in the literature. *SUE* is the absolute value of firm i's unexpected earnings in year t scaled by the lagged stock price. Unexpected earnings are actual earnings minus the earnings from the prior year. Firms whose earnings are more variable are more difficult to forecast, so forecast accuracy should be lower and forecast dispersion should be higher (Kross et al. 1990; Lang and Lundholm 1996). As evidenced by Heflin et al. (2003), earnings with more transitory components should also be more difficult to forecast. Accordingly, I include the following three control variables to control for the difficulty in forecasting earnings. *Neg_UE* equals 1 if firm i's earnings are below the reported earnings a year ago, zero otherwise. *Neg_SI* equals the absolute value of the special items scaled by total assets if negative, zero otherwise. *Days* is the measure of the forecast horizon, computed as the logarithm of the number of days from the forecast date to firm i's earnings announcement date. I control for forecast horizon because the literature documents that forecast horizon substantially affect forecast accuracy (Sinha et al. 1997; Clement 1999; Brown and Mohd 2003). I also control for *Size* as firm size is found to be associated with analysts' forecast performances (Lang and Lundholm 1996). Last, I include

industry fixed effect. Also, I estimate the model as a panel and cluster the standard errors at the firm and year levels.

[Insert Table 5.12 here]

Model 1 and 2 in Table 5.12 present the regression results for analysts' forecast accuracy. Model 1 is estimated for the full sample of 13,856 firm-years, while model 2 is estimated for a more refined sample of 10,238 firm-years. As documented by prior studies, comparability is positively associated with forecast accuracy in both models. The variable of interest for model 1 is $CompAcctInd \times High_{core}$, and its coefficient is negative (-12.71) and statistically significant at $p < 0.1$ level. It suggests that the effect of comparability is substantially less pronounced for firms having higher core accruals. Specifically, the comparability benefits are 44.96% weaker (i.e., -12.71/28.27) for the analysts' forecast accuracy for firm-years with above median core accruals.

The variable of interest for model 2 is $CompAcctInd \times High_{core}Low_{ncore}$. Model 2 is estimated for a more refined sample including the firm-years having either (1) above median core accruals as well as below median non-core accruals, or (2) below median core accruals as well as above median non-core accruals. Accordingly, the test variable in model 2 reflects joint criteria of core and non-core accruals, as opposed to a single criterion of core accruals in model 1. Therefore, I expect a stronger moderating effect for model 2. Consistently, I find that the coefficient on $CompAcctInd \times High_{core}Low_{ncore}$ remains to be negative and statistically significant at $p < 0.05$ level. More importantly, I find the coefficient -16.98 indicates that the comparability effect is 63.60% weaker (i.e., -16.98/26.70) for firm-years having higher core accruals alongside with lower non-core accruals. The finding is consistent with my expectation of a stronger moderating effect for the more refined sample in model 2. Collectively, the findings about forecast accuracy suggest that the benefits of comparability are more pronounced when firms'

earnings include more non-core accruals/less core accruals and thus are more difficult to predict. In contrast, the benefits of comparability become substantially weaker when firms' earnings comprise more core accruals/less non-core accruals and thus are relatively easy to predict.

The results for forecast dispersion are presented in model 3 and 4 of Table 5.12. As documented by prior studies, comparability is negatively associated with forecast dispersion in both models. That is, greater comparability helps analyst to reduce forecast dispersion and thus improve analysts' forecast performance. Model 3 is estimated for the full sample of 13,856 firm-years, and the test variable for model 3 is $CompAcctInd \times High_{core}$. The coefficient on test variable is positive (7.13) and statistically significant at $p < 0.05$ level. The sign on test variable is opposite to that on *CompAcctInd*, which suggests that the effect of comparability is substantially less pronounced for firms having higher core accruals. Specifically, the comparability benefits are 62.87% weaker (i.e., 7.13/-11.34) for the analysts' forecast dispersion for firm-years with above median core accruals.

The variable of interest for model 4 is $CompAcctInd \times High_{core}Low_{ncore}$. Model 4 is estimated for a more refined sample of 10,238 firm-years having either (1) above median core accruals as well as below median non-core accruals, or (2) below median core accruals as well as above median non-core accruals. Accordingly, the test variable in model 4 reflects joint criteria of core and non-core accruals, as opposed to a single criterion of core accruals in model 3. Therefore, I expect a stronger moderating effect for model 4. Consistently, I find that the coefficient on $CompAcctInd \times High_{core}Low_{ncore}$ remains to be positive and statistically significant at $p < 0.05$ level. More interestingly, I find the coefficient 10.70 indicates that the comparability effect is 87.35% weaker (i.e., 10.70/-12.25) for firm-years having higher core accruals alongside with lower non-core

accruals. The finding is consistent with my expectation of a stronger moderating effect for the more refined sample in model 4. Collectively, the findings about forecast dispersion suggest that the benefits of comparability are more pronounced when firms' earnings include more non-core accruals/less core accruals and thus are more difficult to predict. In contrast, the benefits of comparability become substantially weaker when firms' earnings comprise more core accruals/less non-core accruals and thus are relatively easy to predict.

Following the original model in De Franco et al. (2011), I also estimate the above models using an alternative firm-year level comparability score, *CompAcctM4* which is based on the target firm's top 4 comparable peers in the same sector. Table 5.13 reports the alternative results which are in agreement with those in Table 5.12.

[Insert Table 5.13 here]

The results extend our understanding of the moderating effect of accruals on comparability benefits to analysts. The finding is consistent with my prediction that accounting comparability is more beneficial to analysts under circumstances that the difficulty of forecasting firms' earnings is high. Prior studies document evidence that accounting comparability improves the quality of analyst forecasts. Specifically, comparability is found to be positively related to forecast accuracy and negatively associated with forecast dispersion. My results present evidence in support of a cross-sectional variation in comparability benefits to analysts. That is, the comparability benefits are more pronounced when firms' earnings have less core accruals/more non-core accruals, whereas the comparability benefits become substantially weaker when earnings comprise more core accrual/less non-core accruals. Though analysts generally benefit from the high quality information sets associated with greater comparability, the corresponding benefits concentrate in firms whose earnings are more complex and thus

more difficult to forecast.

5.8 Conclusion

This paper establishes the association between earnings comparability and accrual components. It extends the literature on earnings comparability by linking comparability to accruals with different proximity to firms' core operations. The main findings have important implications for prior studies on the benefits of greater comparability.

I find that earnings comparability, which is an important enhancing characteristic of financial numbers, is affected by firms' accrual components. Specifically, earnings comparability is positively associated with the relative magnitude of core accruals which represent the set of accruals that are closed to firms' operating activities. In contrast, earnings comparability is found to be negatively related to the magnitude of non-core accruals which comprise the set of accruals that are distant from firms' operating activities. I also find empirical evidence on intermediate accruals being positively related to comparability, though I do not have a specific prediction for intermediate accruals due to their ambiguous nature. Thanks to the positive comparability benefits from total accruals, net income is found to be more comparable than cash flow. However, the inclusion of non-core accruals makes net income less comparable than those earnings metrics where cash flow is adjusted purely for comparability improving accruals (e.g., core accruals).

In the supplementary analyses, I test the implication of my main finding for prior studies on benefits of greater comparability. While prior studies document evidence on greater earnings comparability being practically beneficial to analysts' forecast performance, I find that the corresponding comparability benefits are asymmetric across

different firms. The comparability benefits are found to be more pronounced for firms having higher non-core accruals and/or lower core accruals, whereas the corresponding benefits become substantially weaker for firms with lower non-GAAP earnings and/or higher core accruals. These findings suggest cross-sectional difference in comparability benefits. They are consistent with the notion that greater comparability is perceived more beneficial when analysts are confronted with firms whose earnings include more complex accruals and thus more difficult to forecast. On the other hand, the incremental benefits of comparability on analysts' forecasts become fairly limited when firms' earnings contain less complex accruals and thus easier to forecast.

Focusing the potential link between earnings comparability and accruals components, this study makes two contributions to the literature. First, I establish the empirical association between the comparability of earnings to the relevance of accruals. As such, I am able to shed further light on the underlying accounting process that determines comparability. As indicated by the conceptual framework, relevance not only secure information usefulness as a primary qualitative characteristic, but also deliver benefits by enhancing secondary characteristics, particularly comparability. My research highlights the crucial association between relevance and comparability and suggests that allowing less (more) relevant information into accounting numbers can reduce (improve) earnings comparability. Second, the established association between comparability and accrual components have important implications for prior studies on benefits of earnings comparability. While prior studies find greater earnings comparability having overall beneficial effects on analysts' forecast performance, I find that the benefits of comparability largely concentrate in firms whose earnings are ex ante more difficult to forecast. The corresponding comparability effects become significantly weaker when it comes to firms whose earnings are ex ante easier to

forecast. My main finding contributes to this literature by shedding more light on how the benefit of comparability works. My findings suggest a cross-sectional difference in the comparability benefits, and therefore add to the literature on financial reporting, in particular earnings comparability.

There are, however, at least two caveats in this study. First, the results are subject to endogeneity concerns as it is difficult to rule out the possibility that the results are driven by some omitted variables. Regarding the main results, firm innovation can cause both a reduced earnings comparability and higher level of irrelevant line items in financial statement. The supplementary results are also subject to firm innovation, as it causes both a reduced earnings comparability and a poorer information environment which may translate into weaker analyst forecast performance. Second, as opposed to firms' financial reporting feature affecting analysts' actions, as I imply in the supplementary analyses, a reverse causality is also possible in that analysts may exert influences on firms' operation and/or their financial reporting behaviour. For example, equity analysts are found to be able to interfere with both accrual-based (Yu 2008) and real earnings management (Irani and Oesch 2016). Moreover, prior studies document evidence of firms' operational decision-making being influenced by analysts (He and Tian 2013; Chang et al. 2007).

Appendix 5.1: Accruals and the Construction of Earnings Measures

Panel A. Classification of accruals

Items	Acronym	Relation to core operations	Reasons
Depreciation and amortization	DPCQ	Close	Depreciation and depletion are believed to be an expense arising from the periodic consumption of assets and thus closely relates to core operations.
Changes in accounts receivable	RECCHQ	Close	Accounts receivable originates from recognizing revenues. It is employed to recognize earned and realizable revenue without cash receipt. So it is closely related to core operations.
Changes in inventories	INVCHQ	Close	Change in inventory arises from matched expenses associated with cost of goods sold, and therefore directly relates to core operations.
Changes in accounts payable & accrued liabilities	APALCHQ	Close	Accounts payables and accrued liabilities originate from recognizing expenses. They are employed to recognize incurred expenses that have not been paid in cash and thus closely relate to core operations.
Stock-based compensation expense	STKCOQ	Close	Share-based compensation is used to compensate employees for their services. It effectively represents an expense, either capital or operating, and thus is viewed as close to core operations.

Profit (loss) of associates under the equity method	ESUBCQ	Intermediate	***For:*** It represents the firm's share of income from another firm (investee) where it has significant influence. ***Against:*** As the firm has no controlling stakes in the investee, it unlikely constitutes a core strategy.
Deferred tax expense	TXDCQ	Intermediate	***For:*** Although they cannot be directly matched to revenue generating, they effectively represent a recurring periodic financial obligation. ***Against:*** Deferred taxes are determined mostly by the difference between financial reporting and tax-reporting requirements which is beyond firm's core operations.
Changes in tax assets/liabilities.	TXACHQ	Intermediate	***For:*** Similar to accounts payable, accrued income taxes reflect the carrying value of the unpaid sum of amounts payable to satisfy tax obligations. ***Against:*** They cannot be directly matched to revenue generating. They are determined mostly by tax policies and a firm's tax strategies which are beyond firm's core operations.
Changes in other assets and liabilities, net	AOLOCH	Intermediate	Given that the items in this category is mixed (as explained in the following), the changes in other assets and liabilities are expected to have a mixed nature which fits in my definition of intermediate accruals.
(1) Write-downs	WDA		A write-down occurs when the book value of an asset is overvalued compared to its market value. It is driven by mark-to-market accounting and thus does not constitute a core strategy of firms.
(2) Changes in Deferred revenue	ΔDRCQ		In principle deferred revenue largely stems from firms' operation and thus is considered to be directly related to firms' operating activities.

Gain (loss) from sale of long-term assets	SPPIV	Distant	As firms are not expected to build their business upon disposing assets, sale of long-term assets unlikely constitutes firms' key strategy. Therefore, the resulting gain or loss is far from core operations.
Other funds from operations	FOPOQ	Distant	Other funds from operations are primarily composed of items that are not directly related to firms' operating activities. Accordingly, they are classified as being distant from firms' operating activities.
(1) Restructuring cost	RCAQ		Restructuring costs are viewed as a short-term expense and firms are not expected to do restructuring frequently. The non-recurring nature of restructuring costs makes it far from core operations.
(2) Impairment of long-term assets (including goodwill)	GDWLIAQ		Impairment of goodwill is incurred by factors that often do not pertain to financial performance in the period when impairment is charged (e.g., changing market conditions). It is thus far from core operations.
Extraordinary items and discontinued operations	XIDOC	Distant	Items in this category derive from activities that are either infrequent in occurrence or unusual in nature. As a result, they are perceived to be distant from firms' operating activities.

Panel B. Summary statistics of individual accruals (314,531 firm-quarters)

	% non-missing	Among non-missing				
		Mean	STD	Q1	Median	Q3
DPC	98.50	0.018	0.033	0.005	0.010	0.020
RECCH	87.97	-0.001	0.054	-0.010	-0.001	0.007
INVCH	68.53	-0.0002	0.040	-0.006	-0.001	0.004
APALCH	68.99	0.0003	0.046	-0.007	0.001	0.009
TXDC	67.45	0.0004	0.021	-0.002	0.000	0.004
TXACH	27.24	0.0002	0.019	-0.003	0.0002	0.003
ESUBC	17.47	-0.0001	0.014	-0.001	-0.000	0.001
AOLOCH	99.09	-0.0002	0.043	-0.007	-0.000	0.006
SPPIV	41.16	-0.002	0.020	-0.000	-0.000	0.0001
XIDOC	12.75	-0.0002	0.043	-0.001	-0.000	0.001
FOPO	94.13	0.009	0.052	-0.000	0.002	0.006

Panel C. Construction of earnings measures

Items	Acronym
Operating cash flows	***OCF***
Adjusted for *core accruals*, including	
Depreciation and amortization	DPCQ
Changes in accounts receivable	RECCHQ
Changes in inventories	INVCH
Changes in accounts payable & accrued liab.	APALCH
Stock-based compensation expense	STKCO
Intermediate earnings 1	***IE_Core***
Adjusted for *intermediate accruals*, including	
Profit (loss) of associates under the equity method	ESUBC
Deferred tax expense	TXDC
Changes in tax assets/liab.	TXACH
Changes in other assets and liabilities, net	AOLOCH
(1) Write-downs	
(2) Deferred revenue	
Intermediate earnings 2	***IE_Core_Inter***
Adjusted for *non-core accruals*, including	
Gain (loss) from sale of long-term assets	SPPIV
Extraordinary items and discontinued operations	XIDOC
Other funds from operations	FOPOQ
(1) Restructuring cost	
(2) Impairment of long-term assets (including goodwill)	
Net income before extraordinary items	***NI***

Assets and Liabilities – Other is defined by COMPUSTAT to include (1) assets and liabilities reported as an entity, (2) changes in current deferred taxes, (3) other asset and liability accounts, (4) other balance sheet items reported in the operating activities which are combined. Examples in annual reports are unrealized gain and loss of investment, write-down of assets, customer deposit & deferred revenue, employee benefits & other liabilities. Funds from Operations – Other is defined to include (1) Amortization of negative intangibles, (2) minority interest, (3) special items, (4) amortization of goodwill on unconsolidated subsidiaries, (5) provision for losses on accounts receivable, (6) unrealized gain (loss) on sale of PPE. Examples include impairment of goodwill, impairment of strategic investment, provision for bad debts, and restructuring charges.

Appendix 5.2: Variable Definitions

Variables	Abbreviation	Calculation
Earnings Metrics		
Operating cash flow	*OCF*	Quarterly operating cash flow (*OCFQ*) scaled by beginning-of-period market capitalization.
Intermediated earnings metric 1	*IE_Core*	Quarterly operating cash flow adjusted for core accruals, scaled by beginning-of-period market capitalization.
Intermediate earnings metric 2	*IE_Core_Inter*	*IE_Core* adjusted for intermediate accruals, scaled by beginning-of-period market capitalization.
Net Income	*NI*	*IE_Core_Inter* further adjusted for non-core accruals, scaled by beginning-of-period market capitalization.
Comparability Measures		
Firm-year level comparability measure 1	$CompAcctInd_{it}$	It measures the comparability of k^{th} earnings metric *for* firm *i* in year *t*. It is calculated as the industry mean of all firm-pair measures for firm *i* and each of its SIC 2-digit peer firms *j*.
Firm-year level comparability measure 2	CMV_Ind_{it}	It measures the comparability of k^{th} earnings metric *for* firm *i* in year *t* It is calculated as the industry mean of all firm-pair earnings co-movement measures for firm *i* and each of its SIC 2-digit peer firms *j*.
Firm-pair level comparability measure 1	$CompAcct_{ijt}$	It measures the comparability of k^{th} earnings metric *between* firm *i* and *j* in year *t*. It is calculated based on the difference in accounting function between firm *i* and each of its SIC 2-digit peer firm *j*.
Firm-pair level comparability measure 2	ERN_CMV_{ijt}	It measures the comparability of k^{th} earnings metric *between* firm *i* and *j* in year *t*. It is calculated based on the

		earnings co-movement between firm *i* and each of its SIC 2-digit peer firm *j*.
Test Variables		
Magnitude of different accruals	*Core/Inter/NCore*	The absolute value of different accrual groups (i.e., core, intermediate and non-core accruals) deflated by the absolute value of total accruals.
Magnitude of different accruals (firm-pair based)	*Core_Pair/Inter_Pair/NCore_Pair*	The sum of absolute values of different accrual groups (i.e., core, intermediate and non-core accruals) for firm *i* and *j*, deflated by the sum of absolute values of total accruals for the firm-pair.
Control Variables (Main Results)		
Size difference	*Size_Diff*	Absolute value of difference in size in firm-pair of firm *i* and firm *j*. Size equals natural logarithm of total assets.
Average size	*Size_Avg*	Mean value of size in firm-pair of firm *i* and firm *j*.
Leverage difference	*LEV_Diff*	Absolute value of the difference in leverage in firm-pair of firm *i* and firm *j*, where leverage is a debt-to-asset ratio of a company.
Average leverage	*LEV_Avg*	Mean value of leverage in firm-pair of firm *i* and firm *j*.
Market-to-book difference	*MB_Diff*	Absolute value of the difference in market-to-book ratio in firm-pair of firm *i* and firm *j*, where market-to-book ratios is calculated as market value of equity divided by book value of equity.
Average market-to-book ratio	*MB_Avg*	Mean value of market-to-book ratio in firm-pair of firm *i* and firm *j*.
Difference in cash flows	*Cash_Diff*	Absolute value of the difference in cash flows from operations (scaled by lagged total assets) in firm-pair of firm *i* and firm *j*.

Average cash flows	*Cash_Avg*	Mean value of cash flows from operations in firm pair of firm *i* and firm *j*.
Difference in loss probability	*LossProb_Diff*	Absolute value of the difference in loss probability in firm pair of firm *i* and firm *j*. Loss probability is the proportion of quarters for which the firm reports a negative quarterly income before extraordinary items in the past 16 quarters.
Average loss probability	*LossProb_Avg*	Mean value of loss probability in firm pair of firm *i* and firm *j*.
Difference in sales volatility	*STD_Sales_Diff*	Absolute value of the difference in standard deviation of quarterly sales in firm pair of firm *i* and firm *j*. Standard deviation of sales is calculated over the preceding 16 quarters.
Average sales volatility	*STD_Sales_Avg*	Mean value of standard deviation of quarterly sales in firm pair of firm *i* and firm *j*.
Difference on cash flows volatility	*STD_CFO_Diff*	Absolute value of the difference in standard deviation of quarterly operating cash flows in firm pair of firm *i* and firm *j*, where standard deviation of cash flows is calculated over the preceding 16 quarters.
Average cash flow volatility	*STD_CFO_Avg*	Mean value standard deviation of quarterly sales in firm pair of firm *i* and firm *j*.
Difference in growth volatility	*STD_Sales_Grth_Diff*	Absolute value of the difference in standard deviation of sales growth in firm pair of firm *i* and firm *j*, where standard deviation of sales growth is calculated over the preceding 16 quarters. Sales growth equals sales in current year *t* minus sales in year *t*-1 divided by sales in year *t*-1.

Average growth volatility	*STD_Sales_Grth_Avg*	Mean value of standard deviation of sales growth in firm pair of firm *i* and firm *j*.
Stock return comovement	*RET_CMV*	Within-industry return co-movement across 16 consecutive quarters in firm-pair of firm I and firm j, calculated as defined in Section IV.
Variables in Supplementary Analyses		
Forecast accuracy	*Accuracy*	Absolute value of the forecast error multiplied by -100, scaled by the stock price at the end of the prior fiscal year, where the forecast error is the IBES analysts' mean annual earnings forecast less the actual earnings reported by IBES.
Forecast dispersion	*Dispersion*	Cross-sectional standard deviation of individual analysts' annual forecasts, scaled by the stock price at the end of the prior fiscal year.
Analyst coverage	*Coverage*	Logarithm of the number of analysts issuing a forecast for the firm.
Indicator of high core accruals	$High_{core}$	Indicator variable which equals one if the firm has above median core accruals, and zero otherwise.
Indicator of high core accruals/low non-core accruals	$High_{core}Low_{ncore}$	Indicator variable which equals one if the firm has above median core accruals alongside with below median non-core accruals, and zero otherwise.
Forecast horizon	*Days*	Logarithm of the number of days from the forecast date to the earnings announcement date.
Loss indicator	*Loss*	Indicator variable that equals one if the current earnings are less than zero, zero otherwise.
Special items	*Neg_SI*	Absolute value of the special item deflated by total assets if negative, zero otherwise.

Unexpected earnings	*Neg_UE*	Indicator variable that equals one if firm *i*'s earnings are below the reported earnings a year ago, zero otherwise.
Earnings predictability	*Predictability*	R-squared value of a regression of annual earnings on prior-year annual earnings for the same firm.
Firm size	*Size*	Logarithm of the market value of equity measured at the end of the year.
SUE	*SUE*	Absolute value of unexpected earnings, scaled by the stock price at the end of the prior year, where unexpected earnings is actual earnings less the earnings reported in the prior year.
Earnings volatility	*Vol_ERN*	Standard deviation of 16 quarterly earnings.
Stock return volatility	*Vol_RET*	Standard deviation of 48 months of stock returns.

This appendix demonstrates how variables are defined and measured. All financial data are from COMPUSTAT and IBES, while stock data are from CRSP.

Table 5.1
Sample Selection Process and Change of Sample Size

Sample selection process	Firm-years
1. Construct the initial sample	
Matched COMPUSTAT-CRSP, with fiscal year ends in March, June, Sept. or Dec. between 2003-2015	92,691
Less:	
Financial firms	(29,254)
Holding firms, ADRs and limited partnerships	(5,926)
Initial sample	57,511
2. Sample for calculating the Comparability Score	
Less:	
Don't have required data for earnings/accruals	(8,832)
Don't have required data for returns/prices	(3,269)
Don't have data for all lagged 16 quarters	(19,649)
Industry groups with fewer than 10 peer firms	(1,977)
Trim all earnings metrics by year at 0.5 and 99.5 percentiles	(3942)
Sample for calculation the Comparability Score	**19,842**
(corresponding to 314,531 firm-quarters, including lagged 16 quarters)	

This table presents the sample selection process to construct the final sample. The screening criteria follow De Franco et al. (2011) and Francis et al. (2014). Comparability scores of all earnings measures are required to be non-missing and are winsorized for each year by 0.5% at both tails.

Table 5.2

Descriptive Statistics of the Comparability Score Sample: Properties of Components of Earnings and Measures of Earnings (314,531 Quarterly Observations)

	Mean	STD	Min	Q1	Med.	Q3	Max	Corr. With revenue	Persistence
OCF	0.027	0.074	-0.708	0.003	0.020	0.041	2.370	0.720	1.037
Accruals									
Core	0.017	0.065	-0.880	-0.002	0.008	0.026	1.897	-0.447	0.125
Intermediate	0.000	0.046	-1.143	-0.007	0.000	0.008	1.709	-0.047	0.300
Non-core	0.008	0.052	-1.446	0.000	0.002	0.006	2.091	-0.306	0.086
Earnings measures									
IE_Core	0.010	0.063	-1.074	-0.004	0.012	0.025	2.446	0.616	1.246
IE_Core_Inter	0.010	0.051	-1.117	0.002	0.013	0.022	2.088	0.754	1.254
NI	0.002	0.065	-1.837	-0.001	0.011	0.018	1.474	0.707	1.017

This table presents descriptive statistics of the intermediate sample with firm-quarter observations. The intermediate sample is used for constructing comparability scores for multiple earnings metrics. Since the data for accruals and earnings metrics are collected and constructed on quarterly basis, the corresponding descriptive statistics are reported based on the intermediate sample with quarterly observations. It presents statistics for cash flow, constructed intermediate earnings metrics and net income, along with the statistics for accruals in different categories. *Core* accruals include those accruals with closely related to firms' operating activities, while *Non-core* accruals comprise those accruals without a direct link with firms' operating activities. *Intermediate* accruals contain the remaining accruals whose relation with operating activities is ambiguous. *IE_Core* is an intermediate earnings metric constructed by adjusting *OCF* for *Core* accruals. *IE_Core_Inter* is another intermediate earnings metric which further adjusts *IE_Core* for Intermediate accruals. *NI* represent the earnings metric which eventually adjust *IE_Core_Inter* for *Non-core* accruals. All items are scaled by lagged market capitalization. The statistics for earnings metrics are reported with missing accrual items as zero. The second last column presents the spearman correlations between earnings metrics/accruals and revenue. All these correlations are statistically significant at 5%

level. The last column presents the persistence of each variable. Their persistence is measured as the persistence coefficient on each items in the regression where future earnings are regressed on current value of these accruals and/or intermediate earnings metrics. All variables are defined in the Appendix 5.1.

Table 5.3

Comparability Effect of Accruals and the Magnitude of Different Accruals

Panel A. Results based on De Franco et al. (2011) measure (19,842 firm-years)

Quintile	Core Accruals		Intermediate Accruals		None-Core Accruals	
	NI	Dif. vs. *OCF*	*NI*	Dif. vs. *OCF*	*NI*	Dif. vs. *OCF*
Low	-3.042	-0.301***	-2.924	0.470***	-1.799	1.229***
2	-2.705	-0.070**	-2.408	0.356***	-1.860	0.708***
3	-2.350	0.239***	-2.335	0.343***	-2.219	0.406***
4	-2.091	0.573**	-2.240	0.295***	-2.688	0.010
High	-1.905	1.331***	-2.186	0.309***	-3.527	-0.561***
F Tests of equality of means (mean differences vs. *OCF*) across quintiles						
F statistics	99.48***	215.15***	40.61***	2.41*	246.68***	248.43***

Panel B. Results based on earnings co-movement measure (18,596 firm-years)

Quintiles	Core Accruals		Intermediate Accruals		None-Core Accruals	
	NI	Dif. vs. *OCF*	*NI*	Dif. vs. *OCF*	*NI*	Dif. vs. *OCF*
Low	0.069	0.014***	0.081	0.016***	0.086	0.022 ***
2	0.072	0.014***	0.076	0.015***	0.080	0.015***
3	0.078	0.015***	0.074	0.015***	0.076	0.014***
4	0.079	0.015***	0.076	0.016***	0.071	0.015***
High	0.086	0.020***	0.077	0.016***	0.069	0.012***
F Tests of equality of means (mean differences vs. *OCF*) across quintiles						
F statistics	49.44***	5.99***	5.71***	0.52	55.47***	12.70***

In this table, I sort the sample into quintiles based on the proportion of (1) non-core accruals, (2) core accruals, and (3) intermediate accruals in total accruals, respectively. For example, the proportion of core accruals is calculated as the absolute value of core accruals divided by the sum of absolute values of core, intermediated and non-core accruals. For each firm-year, the proportion of different accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). That is, since the comparability scores of *NI* and *OCF* are computed based on the prior 16 quarters, the construction of corresponding sorting variables (e.g., proportion of different accruals) also need to be based on the same time window. Then the corresponding proportions are ranked into 5 quintiles. For each quintile, I report mean comparability scores of GAAP net income (*NI*), as well as the mean differences between *NI* and *OCF* by quintiles. The first two columns show the

results based on the magnitude of non-core accruals, where quintile 1 represents the firms with smallest non-core accruals and quintile 5 represents the firms with largest ones. The next two columns report the results based on the magnitude of core accruals. Quintile 1 represents the firms with the smallest overall core accruals, while quintile 5 represents the group of firms with the largest core accruals. The last two columns present the results based on intermediate accruals. Quintile 1 represents the firms with the smallest intermediate accruals, while quintile 5 represents the firms having the largest intermediate accruals. Panel A demonstrates the results based on De Franco et al (2011) firm-year comparability scores (*CompAcctInd*), while Panel B presents the results based on firm-year earnings co-movement comparability scores (*CMV_Ind*). F-tests are made to compare the differences in comparability levels and comparability differences across the five quintiles. The F statistics are reported at the bottom of each column. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean.

Table 5.4
Comparability Effect of Accruals and the Magnitude of Different Accruals
(19,842 firm-years based on De Franco et al. measure)

Panel A. Comparability scores and proportion of different accruals

Comparability Quintiles	Core Accruals		Intermediate Accruals		Non-Core Accruals	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
Low	46.08%	45.55%	22.28%	19.88%	31.64%	30.19%
2	50.44%	50.86%	23.67%	21.09%	25.89%	23.99%
3	49.81%	50.15%	24.27%	22.18%	25.92%	23.29%
4	51.79%	52.78%	24.65%	22.66%	23.55%	20.95%
High	56.96%	58.64%	23.93%	21.35%	19.11%	16.19%
F Tests for equality of *mean* accrual ratios across quintiles						
F statistics	194.64***		18.83***		338.97***	

Panel B. Comparability improvement and proportion of different accruals

Comparability Improvement Quintiles	Core Accruals		Intermediate Accruals		Non-Core Accruals	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
Low	45.65%	45.14%	22.80%	20.67%	31.55%	30.14%
2	48.22%	48.20%	25.00%	22.96%	26.78%	24.73%
3	49.22%	49.71%	24.97%	22.93%	25.82%	22.90%
4	54.31%	55.92%	23.57%	20.85%	22.12%	19.33%
High	57.69%	59.52%	22.45%	19.79%	19.85%	16.65%
F Tests for equality of *mean* accrual ratios across quintiles						
F statistics	305.39***		32.33***		334.42***	

In Panel A, I sort the sample into quintiles based on their comparability scores. The comparability scores are measured as De Franco et al (2011) firm-year comparability scores (*CompAcctInd*). Quintile 1 represents the firm-year observations with smallest comparability scores, while quintile 5 represents the firm-year observations with greatest comparability scores. For each quintile of comparability scores, I report the mean/median proportions of (1) Core, (2) Intermediary, and (3) Non-core accruals. For each firm-year, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). In Panel B, I sort the sample into quintiles based on the comparability improvement of net income over operating cash flow. The corresponding comparability improvement is calculated as the comparability differences between net income (*NI*) and operating cash flow (*OCF*). Quintile 1 represents the firm-year observations with smallest comparability improvement, while quintile 5 represents the firm-year observations with greatest comparability improvement. For each quintile of

comparability improvement, I report the mean/median proportions of (1) Core, (2) Intermediary, and (3) Non-core accruals. For each firm-year, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). F-tests are made to compare the differences in comparability scores and comparability improvement across the five quintiles in both Panel A and Panel B. The *F* statistics are reported at the bottom of each column. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean.

Table 5.5

Comparability Effect of Accruals and the Magnitude of Different Accruals

(18,596 firm-years based on earnings co-movement measure)

Panel A. Comparability scores and proportion of different accruals

Comparability Quintiles	Core Accruals		Intermediate Accruals		Non-Core Accruals	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
Low	48.89%	49.01%	30.23%	29.43%	20.88%	18.97%
2	49.09%	49.22%	30.72%	30.17%	20.19%	18.24%
3	50.12%	50.33%	30.49%	29.85%	19.39%	17.35%
4	50.08%	50.07%	30.50%	29.72%	19.42%	17.37%
High	52.21%	52.44%	30.39%	29.25%	17.40%	15.30%
F Tests for equality of *mean* accrual ratios across quintiles						
F statistics	34.42***		0.89		43.86***	

Panel B. Comparability improvement and proportion of different accruals

Comparability Improvement Quintiles	Core Accruals		Intermediate Accruals		Non-Core Accruals	
	Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
Low	50.86%	50.86%	29.81%	28.72%	19.33%	17.25%
2	49.15%	49.25%	30.36%	29.86%	20.49%	18.57%
3	49.05%	49.33%	30.90%	30.11%	20.05%	18.05%
4	49.84%	49.94%	30.78%	30.02%	19.38%	17.33%
High	51.48%	51.58%	30.48%	29.56%	18.03%	15.90%
F Tests for equality of *mean* accrual ratios across quintiles						
F statistics	22.53***		5.12***		22.25***	

In Panel A, I sort the sample into quintiles based on their comparability scores. The comparability scores are measured as De Franco et al (2011) firm-year comparability scores (*ERN_CMV*). Quintile 1 represents the firm-year observations with smallest comparability scores, while quintile 5 represents the firm-year observations with greatest comparability scores. For each quintile of comparability scores, I report the mean/median proportions of (1) Core, (2) Intermediary, and (3) Non-core accruals. For each firm-year, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). In Panel B, I sort the sample into quintiles based on the comparability improvement of net income over operating cash flow. The corresponding comparability improvement is calculated as the comparability differences between net income (*NI*) and operating cash flow (*OCF*). Quintile 1 represents the firm-year observations with smallest comparability improvement, while quintile 5 represents the firm-year observations with greatest comparability improvement. For each quintile of

comparability improvement, I report the mean/median proportions of (1) Core, (2) Intermediary, and (3) Non-core accruals. For each firm-year, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). F-tests are made to compare the differences in comparability scores and comparability improvement across the five quintiles in both Panel A and Panel B. The *F* statistics are reported at the bottom of each column. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean.

Table 5.6

Prime Comparability Scores of Different Earnings Measures (19,842 firm-years based on *CompAcctInd*$_{it}$)

Panel A. Comparability Scores of earnings measures

Earnings measures	Mean	STD	P1	Q1	Median	Q3	P99
OCF	-2.773	3.736	-15.500	-2.958	-1.875	-1.310	-0.696
IE_Core	-2.327	2.848	-12.969	-2.461	-1.499	-1.052	-0.539
IE_Core_Inter	-2.047	2.802	-12.364	-2.093	-1.241	-0.851	-0.404
NI	-2.419	2.932	-14.583	-2.597	-1.450	-0.942	-0.377

Panel B. Difference in comparability scores between earnings measures

	Pairwise difference (column - row) (Upper: mean; lower: median)			
Earnings measures	*OCF*	*IE_Core*	*IE_Core_Inter*	*NI*
OCF		0.446***	0.726***	0.354***
IE_Core	0.268***		0.280***	-0.092***
IE_Core_Inter	0.466***	0.181***		-0.372***
NI	0.310***	0.039***	-0.140***	

This table presents the comparability scores of earnings measures. I use the firm-year level comparability score *CompAcctInd*$_{it}$ which is based on the earnings-return mapping. Please refer to section 3.3 for a more detailed discussion of *CompAcctInd*$_{it}$. Panel A presents comparability scores of cash flow, intermediate earnings and net income. The first (fifth) column shows mean (median) comparability scores. Comparability scores are constructed so that scores closer to zero suggest greater comparability. Panel B presents the differences in the comparability scores across earnings metrics. *Positive* comparability differences suggest the earnings metrics are *more* comparable, while *negative* differences indicate the earnings metrics are *less* comparable. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean (median).

Table 5.7

Alternative Comparability Scores of Different Earnings Measures (19,842 firm-years based on *CompAcctM4*$_{it}$)

Panel A. Comparability Scores of earnings measures

Earnings measures	Mean	STD	P1	Q1	Median	Q3	P99
OCF	-0.851	1.759	-9.073	-0.771	-0.368	-0.185	-0.052
IE_Core	-0.731	1.403	-7.776	-0.690	-0.302	-0.153	-0.045
IE_Core_Inter	-0.613	1.294	-7.107	-0.542	-0.233	-0.113	-0.033
NI	-0.744	1.479	-8.365	-0.646	-0.266	-0.117	-0.032

Panel B. Difference in comparability scores between earnings measures

	Pairwise difference (column - row) (Upper: mean; lower: median)			
Earnings measures	*OCF*	*IE_Core*	*IE_Core_Inter*	*NI*
OCF		0.120***	0.239***	0.107***
IE_Core	0.036***		0.118***	-0.013*
IE_Core_Inter	0.087***	0.046***		-0.131***
NI	0.065***	0.028***	-0.016***	

This table presents the comparability scores of earnings measures. I use an alternative firm-year level comparability score *CompAcctM4*$_{it}$ which is based on the earnings-return mapping. Please refer to section 3.3 for a more detailed discussion of *CompAcctM4*$_{it}$. Panel A presents comparability scores of cash flow, intermediate earnings and net income. The first (fifth) column shows mean (median) comparability scores. Comparability scores are constructed so that scores closer to zero suggest greater comparability. Panel B presents the differences in the comparability scores across earnings metrics. *Positive* comparability differences suggest the earnings metrics are *more* comparable, while *negative* differences indicate the earnings metrics are *less* comparable. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean (median).

Table 5.8

Earnings Comparability and the Magnitude of Different Accruals: Results Based on De Franco et al. (2011)'s Firm-Pair-year Comparability Scores *AcctComp*$_{ijt}$

		Dep. Var. = *AcctComp*$_{ijt}$			
Variable	Pred.	(1)	(2)	(3)	(4)
Core_Pair	+	2.592***			0.378***
		(41.27)			(5.29)
Inter_Pair	+		1.320***		
			(19.75)		
NCore_pair	-			-4.682***	-4.438***
				(-62.97)	(-51.90)
RET_COV	+	0.221***	0.247***	0.177***	0.177***
		(6.12)	(6.83)	(4.93)	(4.91)
Size_Diff	-	0.032***	0.040***	0.042***	0.041***
		(3.09)	(3.8)	(3.97)	(3.89)
Cash_Diff	-	-20.59***	-20.70***	-20.25***	-20.25***
		(-63.03)	(-63.56)	(-62.21)	(-62.21)
Lev_Diff	-	-0.114**	-0.113**	-0.162***	-0.161***
		(-1.98)	(-1.97)	(-2.83)	(-2.81)
MB_Diff	-	-0.145***	-0.139***	-0.141***	-0.142***
		(-43.63)	(-42.03)	(-42.73)	(-42.81)
LossProb_Diff	-	-3.049***	-3.035***	-3.072***	-3.073***
		(-106.65)	(-107.72)	(-109.75)	(-109.78)
STD_Sales_Diff	+	0.000***	0.000***	0.000***	0.000***
		(3.03)	(3.57)	(3.49)	(3.44)
STD_CFO_Diff	-	0.357	1.472***	0.996**	0.891**
		(0.88)	(3.62)	(2.46)	(2.20)
STD_Sales_Grth_Diff	-	0.169***	0.193***	0.173***	0.171***
		(5.54)	(6.33)	(5.70)	(5.64)
Size_Avg	+	-0.086***	-0.103***	-0.006	-0.007
		(-4.27)	(-5.09)	(-0.30)	(-0.36)
CFO_Avg	+	7.439***	6.315***	9.166***	9.198***
		(13.06)	(11.08)	(16.09)	(16.14)
Lev_Avg	+	-3.434***	-3.299***	-3.174***	-3.192***
		(-33.43)	(-32.02)	(-31.11)	(-31.26)
MB_Avg	+	0.347***	0.332***	0.344***	0.345***
		(53.43)	(51.56)	(53.21)	(53.24)
LossProb_Avg	-	-3.074***	-3.150***	-2.670***	-2.705***

		(-62.47)	(-63.64)	(-54.34)	(-54.45)
STD_Sales_Avg	+	-0.001***	-0.001***	-0.001***	-0.001***
		(-6.58)	(-7.53)	(-7.63)	(-7.52)
STD_CFO_Avg	-	-16.41***	-17.31***	-18.46***	-18.33***
		(-22.60)	(-23.76)	(-25.49)	(-25.29)
STD_Sales_Grth_Avg	-	-0.192***	-0.249***	-0.202***	-0.197***
		(3.18)	(-4.10)	(-3.35)	(-3.27)
Pair FE		YES	YES	YES	YES
Year FE		YES	YES	YES	YES
Adj. R^2		84.96%	84.90%	85.06%	85.07%
No. of Obs.		1,700,024	1,700,024	1,700,024	1,700,024

This table reports an OLS regression that examines the impact of accruals structure on earnings comparability. The dependent variable is the firm-pair De Franco et al. (2011) comparability score $AcctComp_{ijt}$. The test variables are *Core_Pair*, *Inter_Pair* and *NCore_Pair*. For each firm-pair, the test variables are constructed as the average proportion of each accrual category of the total accruals. For example, *Core_Pair* is measured by averaging the absolute value of core accruals divided by the sum of absolute values of core accruals between firm *i* and firm *j*. For each firm-pair, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). Consistently, all the control variables are constructed using a time window of the last four years. For each firm-pair, I include control variables on both difference and average basis. Column (1) to column (3) reports the comparability effects of core, intermediate, and non-core accruals, respectively. Panel 4 reports the corresponding comparability effects when multiple groups of accruals are considered all together. Since the three test variables (i.e., *Core_Pair*, *Inter_Pair* and *NCore_Pair*) always add up to 1, column (4) include only two of them (i.e., *Core_Pair* and *NCore_Pair*) to avoid potential collinearity. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean. All t-statistics are based on robust standard errors clustered at the firm-pair level. There are 433,209 unique firm-pairs/clusters for the t-tests.

Table 5.9

Earnings Comparability and the Magnitude of Different Accruals: Results Based on De Franco et al. (2011)'s Firm-Year Comparability Scores *CompAcctInd*$_{it}$

		Dep. Var. = *CompAcctInd*$_{it}$			
Variable	Pred.	(1)	(2)	(3)	(4)
Core	+	1.128***			0.081
		(5.07)			(0.32)
Inter	+		0.664***		
			(2.66)		
NCore	-			-2.227***	-2.175***
				(-7.17)	(-6.05)
RET_COV	+	-0.282	-0.255	-0.328	-0.328
		(-0.72)	(-0.65)	(-0.85)	(-0.85)
Size	+	0.175**	0.174**	0.204***	0.204***
		(2.25)	(2.24)	(2.64)	(2.63)
CFO	+	4.641*	4.151*	5.548**	5.555**
		(1.93)	(1.74)	(2.32)	(2.32)
Leverage	+	-1.557***	-1.460***	-1.415***	-1.420***
		(-3.79)	(-3.57)	(-3.50)	(-3.51)
MTB	+	0.064***	0.059***	0.064***	0.064***
		(4.93)	(4.68)	(4.97)	(4.96)
LossProb	-	-2.965***	-2.992***	-2.788***	-2.789***
		(-15.06)	(-14.92)	(-13.94)	(-13.93)
STD_Sales	+	0.000**	0.000***	0.000***	0.000***
		(2.48)	(2.65)	(2.79)	(2.78)
STD_CFO	-	-6.660***	-6.693***	-7.524***	-7.512***
		(-2.70)	(-2.71)	(-3.05)	(-3.04)
STD_Sales_Grth	-	0.084	0.068	0.089	0.089
		(0.94)	(0.76)	(0.99)	(0.99)
Firm FE		YES	YES	YES	YES
Year FE		YES	YES	YES	YES
Adj. R^2		77.38%	77.31%	77.57%	77.57%
No. of Obs.		17,391	17,391	17,391	17,391

This table reports an OLS regression that examines the impact of accruals structure on earnings comparability. The dependent variable is the firm-year De Franco et al (2011) comparability scores *CompAcctInd*$_{it}$. The test variables are *Core*, *Inter* and *NCore*, and they are constructed as the proportion of each accrual category of the total accruals. For

example, *Core* is measured by taking the absolute value of core accruals divided by the sum of absolute values of core, intermediary and non-core accruals. For each firm-year, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). Consistently, all the control variables are constructed by taking their average during the last four years. Column (1) to column (3) reports the comparability effects of core, intermediate, and non-core accruals, respectively. Panel 4 reports the corresponding comparability effects when multiple groups of accruals are considered all together. Since the three test variables (i.e., *Core_Pair*, *Inter_Pair* and *NCore_Pair*) always add up to 1, column (4) include only two of them (i.e., *Core_Pair* and *NCore_Pair*) to avoid potential collinearity. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean. All t-statistics are based on robust standard errors clustered at the firm level. There are 2,483 unique firms/clusters for the t-tests.

Table 5.10

Earnings Comparability and the Magnitude of Different Accruals: Results Based on Firm-Pair-year Earnings Co-movement Comparability Scores *CMV_ERN$_{ijt}$*

		Dep. Var. = *CMV_ERN$_{ijt}$*			
Variable	Pred.	(1)	(2)	(3)	(4)
Core_Pair	+	0.053***			0.030***
		(13.57)			(6.51)
Inter_Pair	+		-0.004		
			(-0.86)		
NCore_pair	-			-0.065***	-0.045***
				(-14.25)	(-8.28)
RET_COV	+	0.065***	0.065***	0.064***	0.064***
		(23.52)	(23.72)	(23.42)	(23.40)
Size_Diff	-	-0.002***	-0.002***	-0.001***	-0.002***
		(-2.90)	(-2.75)	(-2.61)	(-2.75)
Cash_Diff	-	0.014	0.011	0.018	0.018
		(0.81)	(0.61)	(1.04)	(1.02)
Lev_Diff	-	-0.014***	-0.013***	-0.014***	-0.014***
		(-4.18)	(-4.12)	(-4.39)	(-4.34)
MB_Diff	-	-0.001***	-0.001***	-0.001***	-0.001***
		(-8.28)	(-7.85)	(-7.89)	(-8.13)
LossProb_Diff	-	-0.017***	-0.016***	-0.017***	-0.017***
		(-11.87)	(-11.60)	(-12.04)	(-12.05)
STD_Sales_Diff	+	-0.000***	-0.000***	-0.000***	-0.000***
		(-4.33)	(-4.28)	(-4.25)	(-4.29)
STD_CFO_Diff	-	-0.129***	-0.114***	-0.116***	-0.124***
		(-5.29)	(-4.68)	(-4.75)	(-5.09)
STD_Sales_Grth_Diff	-	-0.016***	-0.016***	-0.016***	-0.016***
		(-6.65)	(-6.53)	(-6.59)	(-6.64)
Size_Avg	+	-0.009***	-0.009***	-0.007***	-0.008***
		(-7.98)	(-8.61)	(-7.09)	(-7.20)
CFO_Avg	+	-0.098***	-0.123***	-0.082**	0.081**
		(-2.92)	(-3.66)	(-2.45)	(-2.40)
Lev_Avg	+	-0.013**	-0.012**	-0.009	-0.010*
		(-2.27)	(-2.15)	(-1.56)	(-1.82)
MB_Avg	+	0.003***	0.003***	0.002***	0.003***
		(8.41)	(7.77)	(8.07)	(8.36)

LossProb_Avg	-	0.023***	0.020***	0.027***	0.026***
		(8.45)	(7.29)	(9.98)	(9.79)
STD_Sales_Avg	+	0.000***	0.000***	0.000***	0.000***
		(9.45)	(9.35)	(9.25)	(9.34)
STD_CFO_Avg	-	1.081***	1.076***	1.050***	1.061***
		(24.39)	(24.26)	(23.70)	(23.95)
STD_Sales_Grth_Avg	-	0.031***	0.030***	0.030***	0.031***
		(6.39)	(6.24)	(6.31)	(6.38)
Pair FE		YES	YES	YES	YES
Year FE		YES	YES	YES	YES
Adj. R^2		47.25%	47.33%	42.02%	47.35%
No. of Obs.		1,869,300	1,869,300	1,869,300	1,869,300

This table reports an OLS regression that examines the impact of accruals structure on earnings comparability. The dependent variable is the firm-pair earnings comovement based comparability score CMV_ERN_{ijt}. The test variables are *Core_Pair*, *Inter_Pair* and *NCore_Pair*. For each firm-pair, the test variables are constructed as the average proportion of each accrual category of the total accruals. For example, *Core_Pair* is measured by averaging the absolute value of core accruals divided by the sum of absolute values of core accruals between firm *i* and firm *j*. For each firm-pair, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). Consistently, all the control variables are constructed using a time window of the last four years. For each firm-pair, I include control variables on both difference and average basis. Column (1) to column (3) reports the comparability effects of core, intermediate, and non-core accruals, respectively. Panel 4 reports the corresponding comparability effects when multiple groups of accruals are considered all together. Since the three test variables (i.e., *Core_Pair*, *Inter_Pair* and *NCore_Pair*) always add up to 1, column (4) include only two of them (i.e., *Core_Pair* and *NCore_Pair*) to avoid potential collinearity. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean. All t-statistics are based on robust standard errors clustered at the firm-pair level. There are 468,263 unique firm-pairs/clusters for the t-tests.

Table 5.11

Earnings Comparability and the Magnitude of Different Accruals: Results Based on Firm-Year Earnings Comovement Comparability Scores *CMV_Ind*$_{it}$

		Dep. Var. = *CMV_Ind*$_{it}$			
Variable	Pred.	(1)	(2)	(3)	(4)
Core	+	0.022***			0.009
		(2.96)			(1.07)
Inter	+		0.0024		
			(0.29)		
NCore	-			-0.033***	-0.026**
				(-3.66)	(-2.51)
RET_COV	+	0.126***	0.127***	0.125***	0.125***
		(7.64)	(7.66)	(7.62)	(7.62)
Size	+	-0.004**	-0.004**	-0.004*	-0.004*
		(-2.07)	(-2.13)	(-1.87)	(-1.89)
CFO	+	0.038	0.027	0.048	0.049
		(0.57)	(0.41)	(0.73)	(0.74)
Leverage	+	-0.008	-0.007	-0.006	-0.007
		(-0.84)	(-0.74)	(-0.60)	(-0.66)
MTB	+	0.000	0.000	0.000	0.000
		(-0.27)	(0.46)	(0.31)	(0.26)
LossProb	-	0.002	0.001	0.005	0.005
		(0.48)	(0.27)	(0.94)	(0.91)
STD_Sales	+	0.000***	0.000***	0.000***	0.000***
		(3.83)	(3.81)	(3.74)	(3.76)
STD_CFO	-	0.484***	0.487***	0.473***	0.474***
		(5.99)	(6.00)	(5.83)	(5.85)
STD_Sales_Grth	-	-0.005**	-0.005**	-0.005**	-0.005**
		(-2.10)	(-2.19)	(-2.10)	(-2.08)
Firm FE		YES	YES	YES	YES
Year FE		YES	YES	YES	YES
Adj. R^2		41.99%	41.93%	42.02%	42.03%
No. of Obs.		18,192	18,192	18,192	18,192

This table reports an OLS regression that examines the impact of accruals structure on earnings comparability. The dependent variable is the firm-year earnings co-movement based comparability scores *CMV_Ind*$_{it}$. The test variables are *Core*, *Inter* and *NCore*, and they are constructed as the proportion of each accrual category of the total accruals.

For example, *Core* is measured by taking the absolute value of core accruals divided by the sum of absolute values of core, intermediary and non-core accruals. For each firm-year, the magnitude of accruals is measured for the last four years in order to make the measurement window consistent with that of comparability scores (i.e., 16 quarters). Consistently, all the control variables are constructed by taking their average during the last four years. Column (1) to column (3) reports the comparability effects of core, intermediate, and non-core accruals, respectively. Panel 4 reports the corresponding comparability effects when multiple groups of accruals are considered all together. Since the three test variables (i.e., *Core_Pair*, *Inter_Pair* and *NCore_Pair*) always add up to 1, column (4) include only two of them (i.e., *Core_Pair* and *NCore_Pair*) to avoid potential collinearity. *, **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean. All t-statistics are based on robust standard errors clustered at the firm level. There are 2,605 unique firms/clusters for the t-tests.

Table 5.12
Accounting Comparability and Analysts' Performance: The Moderating Effect of Accrual Components (Results Based on *CompAcctInd$_{it}$*)

	Dep.Var. = *Accuracy*			Dep.Var. = *Dispersion*		
	Pred.	Full Sample (1)	Refined Sample (2)	Pred.	Full Sample (3)	Refined Sample (4)
CompAcctInd	+	**28.27*** **	**26.70*** **	-	**-11.34*** **	**-12.25** **
		(4.25)	**(3.22)**		**(-3.52)**	**(-2.96)**
H_{core}	?	-0.42**		?	0.26***	
		(-2.49)			(3.39)	
CompAcctInd*×*H$_{core}$	-	**-12.71***		+	**7.13** **	
		(-1.89)			**(2.68)**	
$H_{core}L_{ncore}$	?		-0.58**	?		0.38***
			(-2.79)			(3.13)
CompAcctInd*×*H$_{core}$L$_{ncore}$	-		**-16.98** **	+		**10.70** **
			(-2.52)			**(2.85)**
Coverage	+	0.16	0.33**	-	0.17**	0.19**
		(0.92)	(2.20)		(2.45)	(3.03)
SUE	-	-4.77**	-4.28**	?	2.32***	2.08***
		(-3.01)	(-2.34)		(4.86)	(4.47)
Neg UE	-	-0.24*	-0.15	+	0.19***	0.18***
		(-1.91)	(-1.09)		(3.99)	(3.14)
Loss	-	-1.09**	-1.05**	+	0.88***	0.77***
		(-2.25)	(-2.74)		(9.06)	(11.42)
Neg SI	-	11.66***	11.08***	+	-6.30***	-5.75***

		(3.48)	(3.05)		(-5.59)	(-4.79)
Days	-	-0.96**	-0.89**	+	0.30*	0.25**
		(-2.32)	(-2.14)		(2.12)	(2.39)
Size	+	0.29**	0.19*	-	-0.27***	-0.26***
		(2.32)	(1.76)		(-5.45)	(-5.99)
Predictability	+	-0.63*	-0.67*	-	0.07	0.06
		(-1.81)	(-1.95)		(0.58)	(0.44)
Vol_ERN	-	1.94	0.09	+	0.75	0.89
		(0.51)	(0.02)		(0.45)	(0.44)
Vol_RET	-	-5.16	-7.06*	+	5.08**	5.87**
		(-1.71)	(-2.11)		(2.84)	(2.49)
Industry FE		YES	YES		YES	YES
Year FE		YES	YES		YES	YES
Adj. R-Squared		11.45%	11.39%		21.24%	21.24%
No. of Obs.		13,856	10,238		13,172	9,728

This table reports the regression that examines the cross-sectional variation in the benefits of earnings comparability. The dependent variable is analysts' forecast metrics including *Accuracy* and *Dispersion*. The test variables *CompAcctInd*×$High_{core}$ and *CompAcctInd*×$High_{core}Low_{ncore}$ are interaction terms between comparability measure (e.g., *CompAcctInd*) and indicator variables for accrual components. $High_{core}$ is an indicator variable which equals one if the magnitude of core accruals is above the median, zero otherwise. $High_{core}Low_{ncore}$ is another indicator variable which equals one if the firms have both above median core accruals and below median non-core accruals, zero otherwise. Model 1 and 2 are for forecast accuracy, with model 1 being estimated for the full sample of 13,856 firm-years. Model 2 is estimated for a more refined sample of 10,238 firm-years, which includes only the observations having above-median core accruals alongside with below-median non-core accruals, or vice versa. The refined sample excludes the observations having above-median core accruals alongside with above-median non-core accruals, or vice versa. Similarly, model 3 and 4 are for forecast dispersion, with model 3 being estimated for the full sample and model 4 being estimated for the refined sample. I follow De Franco et al. (2011) to control for a series of variables that are previously found to be determinants of analysts' forecast performance. **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean. I include industry and year fixed effect in the model. All t-statistics are based on robust standard errors clustered at firm and year level.

Table 5.13
Accounting Comparability and Analysts' Performance: The Moderating Effect of Accrual Components (Results Based on *CompAcctM4*$_{it}$)

	Dep.Var. = *Accuracy*			Dep.Var. = *Dispersion*		
	Pred.	Full Sample (1)	Refined Sample (2)	Pred.	Full Sample (3)	Refined Sample (4)
CompAcctM4	+	**24.67*** **	**25.99** **	-	**-13.61*** **	**-15.79** **
		(3.52)	**(2.86)**		**(-3.10)**	**(-2.93)**
High$_{core}$	?	-0.11		?	0.10	
		(-1.06)			(1.66)	
***CompAcctM4×High*$_{core}$**	-	**-7.26**		+	**7.72** **	
		(-0.78)			**(2.19)**	
High$_{core}$*Low*$_{ncore}$	?		-0.20	?		0.15*
			(-1.56)			(1.88)
***CompAcctM4×High*$_{core}$*Low*$_{ncore}$**	-		**-18.02** **	+		**14.08*** **
			(-2.23)			**(3.21)**
Coverage	+	0.23	0.39**	-	0.15**	0.17**
		(1.31)	(2.57)		(2.33)	(2.93)
SUE	-	-4.91**	-4.39**	?	2.34***	2.09***
		(-3.08)	(-2.35)		(4.82)	(4.39)
Neg UE	-	-0.22	-0.13	+	0.19***	0.17**
		(-1.73)	(-0.74)		(3.90)	(3.01)
Loss	-	-1.16**	-1.11**	+	0.91***	0.79***
		(-2.39)	(-2.90)		(8.83)	(11.39)
Neg SI	-	11.59***	10.97**	+	-6.30***	-5.71***

		(3.42)	(2.96)		(-5.50)	(-4.69)
Days	-	-0.92**	-0.87*	+	0.29*	0.25**
		(-2.21)	(-1.90)		(2.04)	(2.39)
Size	+	0.24*	0.15	-	-0.26***	-0.26***
		(1.91)	(1.27)		(-5.45)	(-6.10)
Predictability	+	-0.65*	-0.69*	-	0.08	0.08
		(-1.85)	(-1.97)		(0.66)	(0.52)
Vol_ERN	-	-0.36	-2.07	+	1.34	1.53
		(0.10)	(0.47)		(0.85)	(0.80)
Vol_RET	-	-6.61*	-8.39**	+	5.46**	6.24**
		(-2.10)	(-2.44)		(2.96)	(2.61)
Industry FE		YES	YES		YES	YES
Year FE		YES	YES		YES	YES
Adj. R-Squared		11.10%	11.11%		21.04%	21.02%
No. of Obs.		13,856	10,238		13,172	9,728

This table reports the regression that examines the cross-sectional variation in the benefits of earnings comparability. The dependent variable is analysts' forecast metrics including *Accuracy* and *Dispersion*. The test variables *CompAcctM4*×$High_{core}$ and *CompAcctM4*×$High_{core}Low_{ncore}$ are interaction terms between comparability measure (e.g., *CompAcctM4*) and indicator variables for accrual components. $High_{core}$ is an indicator variable which equals one if the magnitude of core accruals is above the median, zero otherwise. $High_{core}Low_{ncore}$ is another indicator variable which equals one if the firms have both above median core accruals and below median non-core accruals, zero otherwise. Model 1 and 2 are for forecast accuracy, with model 1 being estimated for the full sample of 13,856 firm-years. Model 2 is estimated for a more refined sample of 10,238 firm-years, which includes only the observations having above-median core accruals alongside with below-median non-core accruals, or vice versa. The refined sample excludes the observations having above-median core accruals alongside with above-median non-core accruals, or vice versa. Similarly, model 3 and 4 are for forecast dispersion, with model 3 being estimated for the full sample and model 4 being estimated for the refined sample. I follow De Franco et al. (2011) to control for a series of variables that are previously found to be determinants of analysts' forecast performance. **, *** indicate being significant at the 10%, 5%, and 1% levels, respectively, from two-sided pair-sample tests of equality of mean. I include industry and year fixed effect in the model. All t-statistics are based on robust standard errors clustered at firm and year level.

Chapter 6 Conclusion

6.1 Summary and Conclusion

This thesis aims to fill the gap in the literature regarding the underlying mechanism that produces comparable (or incomparable) earnings. Chapter 2 provides a general review on the literature regarding accounting comparability. Chapter 3 discusses alternative empirical measures of accounting comparability. Chapter 4 takes advantage of the setting of non-GAAP earnings so as to shed light on the effects of non-GAAP adjustments on earnings comparability. Excluding non-recurring items is found to produce more comparable earnings, while the aggressive exclusion of recurring items produces incomparable earnings. Overall non-GAAP adjustments are associated with incremental comparability benefits over GAAP earnings. Chapter 5 links earnings comparability to accrual process where cash flows are adjusted for accruals with different properties. The accrual process is found to be an underlying mechanism that drives earnings comparability. While the accrual items collectively improve comparability, I observe a significant distinction between different accruals.

This thesis seeks new knowledge on the driving factors of earnings comparability. Chapter 4 and 5 attribute comparability to non-GAAP adjustments and accrual process, respectively. Each chapter contributes to the literature by answering relevant research questions. The findings in both chapters consistently suggest that earnings comparability is not solely driven by implementation of accounting standards. Rather, comparability is also related to earnings structure (non-recurring VS. recurring

items; core accruals VS. non-core accruals). The overall earnings comparability is jointly determined by the two factors.

Chapter 4 attempts to fill the gap in the literature concerning the comparability of non-GAAP earnings. In spite of the fast-growing literature on earnings comparability, no study has investigated the comparability effects of non-GAAP adjustments. Meanwhile, although prior studies establish adequate evidence on non-GAAP earnings having higher value relevance, they have not directly spoken to the comparability of non-GAAP earnings, an important and independent dimension of accounting information usefulness. This study represents one of the first attempts to bridge the aforementioned research gap. Specifically, I find that non-GAAP adjustments by equity analysts bring comparability benefits, making street earnings significantly more comparable than GAAP earnings. Moreover, excluding material non-recurring items, or recurring items with substantial measurement errors leads to improvement in comparability. In contrast, aggressive exclusion of recurring items results in deterioration in comparability. The findings contribute to both the academic literature and practical standard setting. First, it closes the gap in the literature regarding the comparability of non-GAAP earnings. Second, it documents evidence which provides another viable explanation for the increasing popularity of non-GAAP earnings. Finally, the findings that unstandardized street earnings are more comparable than standardized GAAP earnings provide securities regulators and accounting standard setters with new

insight into how standards and regulations help financial statement users to construct earnings measures that are reflective of their contextualized needs.

Chapter 5 examines the within-GAAP mechanism that produces comparable (or incomparable) earnings. Although I have seen a fast-growing body of research on the economic consequences of earnings comparability, very limited efforts have been put into exploring the underlying mechanism that drives earnings comparability. While attempts have been made to examine the effect of external monitors on earnings comparability (Francis et al. 2014), this study focuses on the factors inside of earnings reporting, in particular the accrual process. It first establishes evidence on the association between earnings comparability and different accrual components, and then highlights the implications of this evidence for prior studies on earnings comparability. I find that adjusting for core accruals improve earnings comparability, whereas the presence of non-core accruals reduces comparability. More interestingly, this finding has important implications for prior studies on how equity analysts benefit from greater comparability. While prior studies document evidence on analyst forecasts performing better for firms whose earnings are more comparable, this study suggests that the corresponding comparability benefits are not equally distributed across all firms. The comparability benefits for analysts concentrated in firms whose earnings possess less core accruals/more non-core accruals and thus are ex ante more difficult to predict. The comparability benefits become significantly less pronounced when it comes to firms whose earnings comprise more core accruals/less non-core accruals and therefore are

relatively easier to predict. This study contributes to the literature mainly in two ways. First, it sheds new light on the underlying mechanism that drives earnings comparability. Second, its implications for prior studies extend my understanding of how earnings comparability delivers benefits to financial statement users.

6.2 Limitations and Suggestions for Future Research

There are two limitations in this thesis. First, while the De Franco et al. (2011)'s measurement aims to quantify the extent to which firms' accounting systems are comparable, the empirical execution of the measure inevitably captures the effect of firms' underlying economics. That is, the comparability scores produced by this approach are determined by not only the implementation of accounting standards (e.g., accounting choices/management discretion), which is the initial target of the measure, but also firms' operations. In that sense, firms can achieve high comparability scores simply by, for example, having more similar operations with peers, but not necessarily having as similar accounting system. Although my analyses attempts in several ways to control for underlying economics and thus isolate the effect of accounting system, this caveat may still affect the interpretation of my findings.

Second, the comparability measure I employ in this study implicitly assumes that the rate at which economic information is incorporated into stock prices is the same across firms. However, prior studies document evidence that stock prices can possibly incorporate firm-specific news before they are reported in earnings, that is, "prices lead

earnings" (Collins et al. 1994). If "prices lead earnings" is driven by factors beyond financial accounting (e.g., information environment), then two firms with equally timely accounting earnings could be shown as incomparable due to outside activities influencing stock return before my measurement of quarterly return. De Franco et al. (2011) propose an alternative measure to alleviate this concern, though it is not employed in this thesis. Moreover, the comparability measure in use does not account for the conditional conservatism which could also affect the rate at which economic information is mapped into earnings.

An opportunity exists in Chapter 4 to examine the implication of more comparable non-GAAP earnings. First, prior studies evaluate the quality of non-GAAP adjustments by testing their predictive power for firms' future performance. Ideally, high quality non-GAAP adjustments mainly comprise non-recurring items which should have very low predictive power for future performance. A potential research question here is whether the comparability benefits of non-GAAP adjustments can simultaneously improve the quality of themselves.

The second research question worth further exploration is the market reaction to more comparable non-GAAP earnings. Prior research finds non-GAAP earnings being more value relevant (i.e., higher ERC), and comparability is perceived to enhance relevance of financial information. Future research could investigate whether the comparability benefits of non-GAAP earnings are associated with stronger market reaction. Another potential research question along these lines is whether the

comparability benefits attenuate investors discounting of non-GAAP earnings. Investors are found to discount the pricing message from non-GAAP earnings when the reporting of non-GAAP earnings is susceptible to opportunistic incentives. To the extent that the comparability benefits alleviate this concern, the investors are expected to be more confident with non-GAAP adjustments that make earnings more comparable. As a result, the investors would apply less discounting to non-GAAP earnings which are associated with incremental comparability benefits.

Building on the association between earnings comparability and accrual process, Chapter 5 highlights the important implications of this finding for prior studies on how equity analysts benefit from greater comparability. In addition to this, the main finding in Chapter 5 also has the potential to extend my understanding of other two pieces of interesting evidence. First, Chen et al. (2016) find that when target firms have higher comparability scores, then the M&A deal will have better post-deal performance. Basically, the authors attribute the incremental post-deal benefits to target firms' greater pre-deal comparability which can reduce the information processing costs for acquirers through referring to their peers. However, the pre-deal earnings structure may also play a role here. That is, those target firms whose earnings are mainly composed of core (non-core) accruals would be easier (more difficult) to be understood by the acquirers. If this is the case, then the finding in Chen et al. (2016) may have an issue of correlated omitted variable. That is, the variable of earnings structure (core accruals VS. non-core

accruals) is correlated with both dependent (post-deal performance) and independent variable (comparability), but is omitted in their analysis.

The second study for which my finding can have an important implication is Kim et al. (2016) who find that expected stock crash risk decreases with financial statement comparability. In their paper, firm-specific stock price crash risk is attributed to sudden releases of bad news previously hoarded by managers. To the extent that the managers of more comparable firms have less incentive and ability to hoard bad news, the corresponding firm-specific expected crash risk is expected to be lower. That is, greater comparability leads to lower expected crash risk. However, rather than being affected by comparability, the expected crash risk might also be affected by firms' earnings structure. Firms whose earnings are mainly made up of core (non-core) components tend to have more straight forward (more complex) operations. And firms with more straight forward (more complex) operations might be easier (harder) to be understood by investors, which makes it harder (easier) for managers to opportunistically withhold bad news. In this way, earnings structure may in its own right have a first order effect on expected crash risk. And this represents an interesting question for future research.

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