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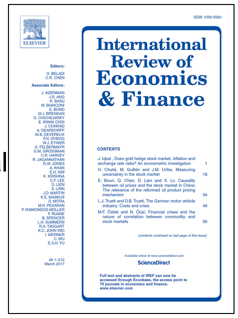

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Global Accounting Standards, Financial Statement Comparability, and the Cost of Capital

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Abstract: This paper studies how financial statement comparability affects the cost of capital and investor welfare. We show that the cost of capital decreases with comparability if and only if the quality of accounting standards is sufficiently high, thus supporting the relative importance of comparability as proposed in the Conceptual Framework. We also find that current investors and new investors have different demands for comparability. The welfare of current investors increases in comparability, while the welfare of new investors decreases in comparability. Moreover, the effects of comparability on the cost of capital and investor welfare are enhanced when firms' idiosyncratic accounting measurements are highly volatile and/or correlated. These basic findings hold in both an exchange economy and a production economy, but there is a certain threshold of investment cost above which the cost of capital and the welfare of new investors decreases with comparability in a production economy. These findings are helpful in understanding the role of comparability and have implications for the global convergence of accounting standards.

JEL Classification: D53; G12; G14; M41; M48

Keywords: Accounting Standards; Comparability; Cost of Capital; Investment; Investor Welfare

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1. Introduction

Financial statement comparability (hereafter, comparability) is one of the most desirable characteristics of financial reporting and is of fundamental interest to regulators and academics alike. As stated in the International Financial Reporting Standards (IFRS) Framework set by the International Accounting Standards Board (IASB), comparability enables users to identify and understand similarities in, and differences among, items (Conceptual Framework for Financial Reporting, IASB, 2010).[1] With the global convergence of accounting standards, a growing body of literature identifies various benefits of comparability (De Franco et al., 2011; Defond et al., 2011; Kim et al., 2013; Young and Zeng, 2015; Kim et al., 2016; Chen et al., 2018; Choi et al., 2019; Majeed and Yan, 2019).[2] Regulators even regard improving comparability as one of the main objectives of IFRS adoption, such as in the European Union (EU) (EC No. 1606/2002).

However, whether and how comparability affects the cost of capital and investor welfare remains a question. Imhof et al. (2017) provide preliminary evidence that greater comparability is associated with a lower cost of equity capital. However, Fang et al. (2018)'s model shows that comparability yields both information gains and losses, because it creates information spillover among firms through correlated accounting measurements ("spillover informativeness") while reducing firms' own reporting precision ("standalone informativeness"). Although a number of theoretical papers investigate the relationship between information disclosure and the cost of capital (Easley and O'Hara, 2004; Lambert et al., 2007; Hughes et al., 2007; Gao, 2010; Christensen et al., 2010; Johnstone, 2016; Dutta and Nezlobin, 2017a),[3] it is unclear how comparability affects the cost of capital and investor welfare. This paper investigates these questions theoretically.

We build a two-period, two-firm model with many risk-aversion investors in a perfect market. At the end of the first period, current investors disclose public financial reports (with some degree of comparability) about the expected profitability of the firm in the second period and then sell the firm to new investors. A unique equilibrium trading price exists. Comparability of information disclosure is incorporated into the price, which allocates the related risk among current investors and new investors. In our model, similar to the case in that of Fang et al. (2018), comparability is defined as firms' propensity to use common accounting methods that the regulators require through accounting standards. Following Lambert et al. (2007) and Zhang (2013), we extend the capital asset pricing model (CAPM) to incorporate the role of accounting information in asset

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[1] The Financial Accounting Standards Board (FASB) also has a consistent and similar statement in its Statement of Financial Accounting Concepts (SFAC) No.8 in September 2010.
[2] See De George et al. (2016) for a review of the IFRS adoption literature, especially on comparability.
[3] See Bertomeu and Cheyne (2016) for a survey of theoretical literature on disclosure and the cost of capital.

pricing and give the specific expression of the cost of capital.

In an exchange economy, we first show that the relationship between the cost of capital and comparability is not unanimous. The cost of capital decreases with comparability if and only if the quality of accounting standards is sufficiently high, which suggests that comparability itself cannot reduce the cost of capital. The thought behind the finding is similar to one recent study by Johnstone (2016), in which he opposes the idea that more precise information reduces the cost of capital merely by being more precise and proposes that it is essential to think of what that information "says" (i.e., "good news" or "bad news"), rather than merely considering its "precision". The finding is also consistent with the Conceptual Framework of FASB as follows:

"Comparable information, however, is not useful if it is not relevant and may mislead if it is not faithfully represented. Therefore, comparability is considered an enhancing qualitative characteristic instead of a fundamental qualitative characteristic." (SFAC No. 8, FASB, 2010)

Thus, our study supports the relative importance of comparability, i.e., although important, comparability is secondary to relevance and faithful representation. The IFRS Framework (2010) also regards comparability as an enhancing qualitative characteristic that is not as important as relevance and faithful representation (i.e., fundamental qualitative characteristics). However, regulators usually list comparability as one of the most important reasons to push a set of new common accounting standards. Since comparability itself has no benefits toward reducing the cost of capital, it should be treated prudently to avoid overstating the function of comparability.

We also find that current investors and new investors have different demands for comparability. Under the condition that accounting standards have the highest quality, current shareholders unambiguously prefer the most comparable disclosure regime as their welfare increases in comparability; however, future investors will not prefer comparable information as their welfare decreases in comparability. This result suggests that current investors' welfare and the cost of capital are negatively associated, which is consistent with conventional wisdom indicating that investors benefit from a lower cost of capital. In contrast, future investors' welfare and the cost of capital are positively associated. This finding might be surprising, but it is interesting. The reason why comparability affects the welfare of current investors and new investors differently is that they bear different risks. For the current investors, changes in the disclosure policy (comparability) affect their welfare mainly through the trading price, and their welfare is dominated by the price risk. Since the trading price increases in comparability, current investors prefer more comparable disclosure. For the new investors, their welfare is dominated by the cash flow risk. As the conditional covariance (variance) of cash flows decreases in comparability, more comparable accounting disclosure results in a lower expected return, and they will benefit less from less-risky investment in the capital market. The finding is consistent with the results of Gao (2010) and Dutta and Nezlobin (2017a, 2017b).

The above finding has an important implication for distinguishing the disclosure preferences of existing and potential investors. With respect to the objective of financial reporting, the frameworks of both the IASB and FASB emphasize that the primary users of general-purpose financial reporting include present and potential investors. Thus, our analysis corresponds well with the theoretical framework indicating that different investors might have different information needs. Accordingly, accounting standards should be designed to balance present and potential investors' information needs, as investors are the most important users of financial reports. The results of our analyses also imply that the cost of capital is not a valid proxy for the welfare of all investors.

In a production economy (i.e., the firm can adjust investments) and under the condition that the quality of accounting standards is sufficiently high, we show that more comparable disclosure leads to higher investment and that current investors benefit more from increased comparability; thus, current investors still always prefer the most comparable information, and the mechanism behind this preference is the same as that in an exchange economy. However, the costs of capital and the welfare of new investors are still positively associated, as they both decrease with comparability if and only if the cost of investment is above a certain threshold. Intuitively, although comparability reduces the cost of capital, the rising investment level increases the covariance (variance) of firms' cash flows, thus increasing the related risk and the cost of capital. A larger cost of investment adjustment places the firm in a more stable state, and more comparable information will transform the firm into a relatively riskless asset, which is against the preference of new investors concerning riskier investments and related higher expected returns.

Finally, our analysis also shows that the effects of comparability on the cost of capital and investor welfare are enhanced when firms' idiosyncratic accounting measurements are highly volatile and/or correlated. The intuitions behind this finding are as follows. On one hand, when firms' idiosyncratic accounting measurement is highly volatile, it more greatly benefits reducing the cost of capital through the adoption of common accounting standards with increased comparability. On the other hand, when firms' individual accounting treatments are highly correlated, the cost of adopting common accounting standards (e.g., decreasing the precision of individual firms' own reports) is lower because the *common* and *individual* accounting treatments are close to some extent; thus, this situation has great benefits from reducing the cost of capital by improving comparability.

Overall, by asserting that comparability itself cannot reduce the cost of capital while still relying on the quality of accounting standards and the cost of investment adjustment, our study contributes to the understanding of accounting characteristics by theoretically justifying comparability as a separate but secondary element of the IASB and FASB's conceptual frameworks. By showing that current investors and new investors have different and even conflicting demands for comparability, our study also contributes to the necessity of making a distinction among the users of accounting information. Thus, our study has important implications for accounting standards setters and information disclosure regulators, and it provides some insight for related empirical research on the relationship between accounting standards, comparability and the cost of capital.

Fang et al. (2018) lay a foundation for our study, especially concerning the initial modeling of comparability, but our study is different from theirs in three aspects. First, we define comparability as firms' propensity to use common accounting methods that the regulators require through accounting standards. In our model, comparability depends on both the enforcement of accounting standards and the firm's idiosyncratic reporting incentives. However, in Fang et al. (2018)'s model, there is a benevolent social planner who sets the comparability to maximize the investor's expected payoffs. We argue that it is more reasonable to allow the firm to choose its accounting policy so that the current investors' expected utility can be maximized. Second, Fang et al. (2018) focus on the effect of comparability on the informativeness of fundamental earnings in their paper. Our research extends this concept by further exploring the impacts of comparability on the cost of capital and investor welfare. Thus, our research complements their findings to provide better understanding of the benefits and costs of comparability. Third, one investor is risk-neutral in Fang et al. (2018)'s model, while we assume that both current and new investors are risk-averse.

Researchers have long been interested in the relationship between information disclosure and the cost of capital (Easley and O'Hara, 2004; Lambert et al., 2007; Hughes et al., 2007; Gao, 2010; Christensen et al., 2010; Christensen and Qin, 2014; Lambert and Verrecchia, 2015; Johnstone, 2016; Dutta and Nezlobin, 2017a, 2017b). Two studies among the previous research are closely related to this paper. Gao (2010) studies how the disclosure quality affects the cost of capital and investor welfare based on a representative firm in a production economy. He shows that a higher quality of information disclosure is not always accompanied by a lower cost of capital and higher investor welfare and that the cost of capital can also move in opposition to the welfare of investors as the disclosure quality changes. On the other hand, Dutta and Nezlobin (2017a) study how information disclosure affects the cost of capital and investor welfare in a dynamic setting. They give a certain threshold of the firm's growth rate below (above) which the cost of capital decreases (increases) in the precision of public disclosure. They also emphasize the different effects of the public disclosure level on the welfare of current shareholders and future shareholders.[4] Two important features distinguish our research from the above papers. First, the above papers all focus on how the *level* or *precision* of information disclosure affect the cost of capital, while our research examines these relationships from the perspective of *comparability*. Second, our research also investigates how the accounting standards quality affects these relationships. Thus, our paper contributes to this stream of literature.

This paper also contributes to the literature on the economic consequences (in particular, the cost of capital) of accounting standards. Some empirical studies show that the mandatory adoption of IFRS reduces the cost of capital (Daske et al., 2008; Li, 2010; Daske et al., 2013). In Li (2010)'s additional analyses, he finds that increased disclosure and enhanced information comparability are two mechanisms behind the cost of equity reduction after IFRS adoption in the EU. In his theoretical study, Zhang (2013) examines how the quality of accounting standards affects the cost of capital, real investment and welfare in a large economy. He shows that improving accounting standards causes an expansion of the real economy, but firms in certain risk classes end up with higher costs of capital and lower values, some of which are crowded out from the economy. Overall, it is still unclear how accounting standards affect the cost of capital through comparability. This paper highlights the importance of the accounting standards quality in determining the relationship between comparability and the cost of capital.

This paper is also related to the literature that evaluates the costs and benefits of uniform regimes in reporting information (Dye and Sridhar, 2008; Friedman and Heinle, 2016; Chen et al., 2017; Lin et al., 2019). These studies, to some extent, are linked to the definition of comparability in this paper, although they do not directly focus on comparability. Dye and Sridhar (2008) develop a positive theory of accounting standards when standards generate network externalities and differ in flexibility. They evaluate expected value-maximizing firms' preferences between two standards regimes, rigid and flexible. Friedman and Heinle (2016) examine the costs and benefits of uniform accounting regulation in the presence of heterogeneous firms that can lobby the regulator. They argue that a commitment to uniform regulation reduces economic distortions caused by lobbying at the cost of forcing the same treatment on heterogeneous firms. In a more recent study, Chen et al. (2017) examine uniform and discretionary regimes for reporting information about firm performance from the perspective of a standard setter. In their research, the *uniform regime* requires all firms to report using the same set of reporting methods, regardless of the precision of their information, which can be regarded as *full-comparability* in our paper. The

[4] In addition, Dutta and Nezlobin (2017b) further extend their research by allowing the firm to make internal investment decisions.

discretionary regime allows firms to freely condition their sets of reporting methods based on the precision of their information, which can be regarded as *non-comparability*, respectively. Thus, the definition of comparability in our paper can also be interpreted as a continuous value of the weighted average of uniform and discretionary regimes for financial reporting. Using a unique setting in Germany, Lin et al. (2019) find that the adoption of IFRS does not lead to a significant incremental increase in comparability beyond the convergence between IFRS and domestic standards. The findings of our study should also be of interest to regulators and standard setters as they assess alternative methods of aligning domestic standards with IFRS.

The rest of the paper is organized as follows. Section 2 describes the basic setting and gives the definition of comparability. Section 3 characterizes how comparability affects the cost of capital and investor welfare in an exchange economy. Section 4 extends the analysis to a production economy (i.e., the firm can adjust investments). We conclude the paper in Section 5.

2. Model Setup

We set up a two-period, three-date economy comprising two risky firms (denoted as firm *i* and firm *j*, respectively), infinite risk-aversion investors, and enough risk-free assets.[5] The firms' shares are collectively owned by the investors and traded in a perfectly competitive market. The investors are homogeneous and have symmetric information in the market. We assume that the risk-free asset yields a rate of return of $R_f > 0$. Figure 1 shows the sequence of events.

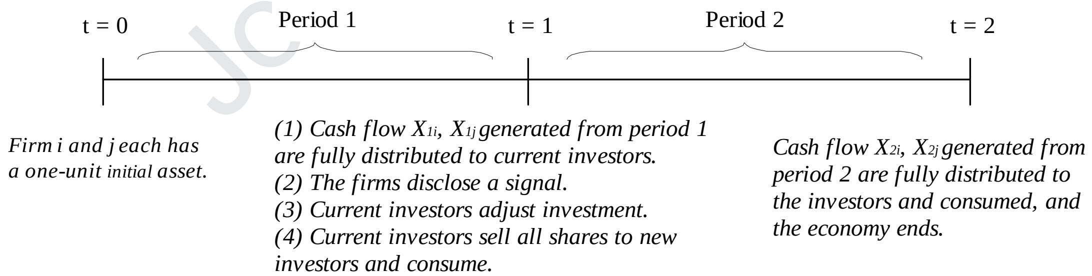

Figure 1: Sequence of Events

2.1 Sequence of Events

At t = 0, which is the beginning of period 1, a number of investors have exogenous endowments of ownership in the firms. Each firm has a one-unit initial asset in place.

After one period of productivity, the economy generates certain amounts of cash flows at the

[5] Although we only study a two-firm economy, the analysis is robust to diversification in a large economy. Based on Lambert et al. (2007) and Zhang (2013), it will be clear that we can extend the covariance of firm *i*'s cash flow with firm *i* (variance) and firm *j* in our model to the covariance with the cash flow of a large market portfolio.

end of period 1 (t = 1), which are denoted as X_{1i} and X_{1j} for firm *i* and firm *j*, respectively. Next, we will mainly focus on firm *i* to further introduce the model, and firm *j* will be referenced when necessary.

At t = 1, firm *i* first distributes all of its cash flows generated from period 1 as current investors' dividends. Then, it chooses the accounting policy and discloses a public signal (financial report) to the market. Based on the disclosed signal, new investors buy all shares of the firm from current investors at an equilibrium trading price. Put another way, existing investors of a representative firm *i* only live for one period out of liquidity demand. We also assume a mass of both current and new investors who act as price takers in the stock market, and new investors have no exogenous endowments of firm *i*'s shares before the stock exchange. Let P_i be the total market value of all shares of firm *i* outstanding at t = 1. Considering both dividends and stock sales, in total, current investors receive $X_{1i} + P_i$ at t=1, and they consume this amount soon. Then, the firm owned by the new investors enters upon period 2 in an exchange economy.

It is known at t = 0 that the expected period 1 cash flows $\tilde{X}_{1i} = m(u_0 + \tilde{u}_i)$, where u_0 is a certain mean profit (or marginal profitability) that is fixed, $\tilde{u}_i$ is an uncertain profitability that will be reflected by the accounting disclosure, and *m* is the initial investment that is set to one unit in our model for simplicity. Before accounting disclosure, investors perceive that $\tilde{u}_i$ has a prior normal distribution with a zero mean and a variance of $\sigma^2_{\tilde{u}_i}$, and the two firms' profitabilities $\tilde{u}_i$ and $\tilde{u}_j$ are correlated with the coefficient $\rho_{\tilde{u}} \in [-1, 1]$. We assume that accounting disclosure, denoted as y_i, provides all investors with an unbiased estimator of $\tilde{u}_i$ and takes the flowing form:

$$y_i = \tilde{u}_i + \tilde{a}_i \tag{1}$$

Here, $\tilde{a}_i$ is an independent normally distributed noise term with a zero mean and a variance of $\sigma^2_{\tilde{a}_i}$. Thus, $1/\sigma^2_{\tilde{a}_i}$ is defined as accounting information quality in our model. Previous studies have paid much attention to information quality, however, the focus of our research is accounting comparability. We will model comparability in Section 2.2. In general, a firm's accounting system reports: (i) the cash flow from operations, and (ii) a signal of the firm's profitability (or earnings). Although cash receipts can typically be measured accurately, i.e., at t = 1 the realized cash flow from period 1 can be observed by the investors without errors, they do not know it at the beginning (t = 0). New investors are concerned with the future cash flow. However, at t = 1 they do not know the cash flow from period 2 and can only infer the future cash flow according to the firm's disclosure about the profitability.[6] We assume that the expected period 2 cash flow, $\tilde{X}_{2i}$, is

[6] Although a large amount of accounting information is historical in practice, we assume that it can provide some useful/future information to the investors through earnings. However, the information is imperfect and contains a measurement error. For simplicity, we do not include accruals in our model and leave this task for future research.

also $u_0 + \tilde{u}_i$ in a pure exchange economy.

Following Zhang (2013), without a loss of generality, we assume that $\sigma^2_{\tilde{u}_i} \gg \sigma^2_{\tilde{a}_i}$, so that the prior uncertainty concerning $\tilde{u}_i$ is far greater than the measurement uncertainty. In essence, the assumption of a "large" prior variance means that investors and firms virtually have no information about the profitability of future investments before observing accounting signals. In other words, under this assumption, upon observation of the accounting signal at t = 1(y_i), the posterior belief depends exclusively on this signal (see Lemma 1 below).

However, if we consider a real production economy, as will be illustrated in Section 4, before the ownership trading at t = 1, the current investors will make an additional investment k_i to maximize their expected utility.[7] They will retain an amount of cash from the dividends, $v(k_i)$, as the cost of investment. Thus, the expected cash flow generated from period 2, $\tilde{X}_{2i}$, will be $u_0 + \tilde{u}_i + \tilde{X}(k)$, with the first component $u_0 + \tilde{u}_i$ being the same as that in period 1 and the second component $\tilde{X}(k)$ indicating the cash flow generated from *k* units of new investment in period 2.

At t = 2, the end of period 2, cash flows X_{2i} and X_{2j} generated from period 2 are all distributed to the investors and consumed, and the economy ends.

We assume that both current and new investors have constant absolute risk aversion (CARA) utility functions that can be described by $U(w) = -\exp(-\lambda w)$, where λ is the coefficient of risk aversion. Following previous studies, we normalize investors' initial wealth to zero without the loss of generality. The investors seek to maximize the expected utility of their consumption, and their decision is to allocate their wealth into the risky firms and the risk-free assets.

2.2 Definition of Comparability

We adopt a similar model of comparability than that of Fang et al. (2018).[8] To define comparability, we assume that there are two available accounting methods for measuring the profitability (earnings). Method A is prescribed by the regulators (standard setters) and generates a common measurement noise $\tilde{\delta}_i = \tilde{\delta}_j = \tilde{\delta}$ for both firms, while method B is firm-specific and generates idiosyncratic measurement noise values $\tilde{\varepsilon}_i$ and $\tilde{\varepsilon}_j$ for firm *i* and firm *j*, respectively. The assumption that $\tilde{\delta}$ is the same for the two firms is reasonable, because method A could be highly standardized by a set of common accounting standards, and $\tilde{\delta}$ can be regarded as a proxy of the accounting standards quality, i.e., a higher quality of accounting standards means a lower $\tilde{\delta}$. For firm *i*, both $\tilde{\delta}$ and $\tilde{\varepsilon}_i$ are normally distributed, with a zero mean and variances of $\sigma^2_{\tilde{\delta}}$ and

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[7] It can also be assumed that new investors adjust investments after they buy the firm from current investors. The order of ownership trading and investment does not matter because rational expectations guarantee that they are consistent in equilibrium.

[8] In another theoretical paper, Wu and Xue (2019) also adopt a similar definition of comparability.

$\sigma^2_{\tilde{\varepsilon}_i}$, respectively. They are independent of each other, as well as independent of $\tilde{u}_i$. However, the two firms' individual measurement noises $\tilde{\varepsilon}_i$ and $\tilde{\varepsilon}_j$ are correlated with the coefficient $\rho_{\tilde{\varepsilon}} \in [-1, 1]$.[9]

To maximize the current investors' expected utility, firm *i* chooses c_i, the portion of earnings for which it accounts using method A. Then, the total measurement noise of firm *i*'s accounting report is thus:

$$\tilde{a}_i = c_i\tilde{\delta} + (1 - c_i)\tilde{\varepsilon}_i, c_i \in [0, 1] \quad (2)$$

We regard c_i as the proxy of "financial statement comparability", i.e., the higher the value of c_i, the more comparable are the two firms' accounting measurements. In extreme cases, when c_i = 1, the firms' accounting methods are rigidly in compliance with the common accounting standards, thus having the highest comparability, and when c_i = 0, the firms completely adopt their own individualized accounting methods without any comparability at all. This characterization of comparability corresponds well with the view held by the FASB, which is that "one of the most important reasons that financial reporting standards are needed is to increase the comparability of reported financial information." (SFAC No. 8, FASB, 2010). Almost all accounting regulators (e.g., IASB, FASB and capital market regulators) are trying to push the adoption of common accounting standards/policies to achieve comparability and limit the use of idiosyncratic methods (e.g., the mandatory adoption of the IFRS in the European Union and other areas). Empirical research (Barth et al., 2012; Yip and Young, 2012; Wang, 2014) also gives consistent evidence indicating the improvement of comparability after adopting common accounting standards (IFRS). From the perspective of the firms, providing more comparable information not only has non-negligible benefits (Kim et al., 2013; Kim et al., 2016; Choi et al., 2019), but also incurs some costs, such as costs of financial reports preparation and proprietary costs (Majeed et al., 2018). For the sake of simplicity, our model ignores the implementation costs of accounting standards. In particular, our study does not give the firms' optimal comparability decisions. Instead, we provide a partial equilibrium to explore the relation between comparability and the cost of capital, which is enough to obtain the main findings of our study without complicating the process unnecessarily.

As we can see above, however, our definition of comparability is a little different from that of Fang et al. (2018). We define comparability as firms' propensity to use common accounting methods that the regulators require through accounting standards. In our model, comparability depends on both the enforcement of accounting standards and the firm's idiosyncratic reporting incentives, i.e., comparability is endogenous within the firm. However, in Fang et al. (2018)'s

[9] The correlation can result from either similar economic fundamentals or similar individual reporting incentives.

model, there is a benevolent social planner (e.g., an accounting regulator) who sets the comparability c_i to maximize the investor's expected payoffs of all firms. We argue that it is more reasonable to allow the firm to choose its accounting policy so that the current investors' expected utility (or firm value) can be maximized, as existing empirical studies (Cascino and Gassen, 2015; Bordeman, 2017; Francis et al., 2014; Majeed et al., 2018) show that firm-level heterogeneity in IFRS compliance, the firm's reporting incentives, the firm's "audit style" and production market competition all have significant influences on comparability. Jayaraman and Verdi (2014) also provide evidence that the firm's reporting incentives and accounting standards complement achieving comparability, which enhances our definition of comparability.

3. Comparability, the Cost of Capital and Investor Welfare in an Exchange Economy

In this section, we consider a pure exchange economy in which firms' investments are fixed. The equilibrium trading price is deduced, and then we illustrate how comparability affects the cost of capital and investors' welfare under this circumstance.

3.1 The Equilibrium

The time at t = 1 is the focus of our model. Since firm *i* and firm *j* are symmetric in our model, they have the same trading price and accounting comparability in equilibrium, i.e., $P_i = P_j$ and $c_i = c_j$. Thus, we will mainly focus on firm *i* to give the equilibrium results.

At t = 1, which is the end of period 1, potential new investors receive public accounting reports from both firms. Because the investors cannot directly observe the real profitability of firms' fundamentals, they perceive the profitability based on firms' reported earnings and conjecture the firms' future cash flows. Then, the investors offer a price to buy the shares of the firms. Let (y_i, y_j, c_i, c_j) be the full accounting disclosure. Because the reported (y_i, y_j) contains the choice of comparability (c_i, c_j), we use *y* to represent the accounting disclosure in the analysis below for conciseness.

Lemma 1: Under the assumption of $\sigma^2_{\tilde{u}_i} \square \sigma^2_{\tilde{a}_i}$, which is conditional on (y_i, y_j), the posterior mean cash flow of firm *i* and its covariance with the cash flow of the market portfolio (firm *i* and firm *j* in our model) at t = 1 are asymptotic as follows:

$$E(\tilde{X}_{2i} \mid y) = u_0 + y_i \tag{3}$$

$$Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) = c_i^2[\sigma^2_{\tilde{\delta}} + E(\tilde{\delta}^2)] + (1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)] \tag{4}$$

For the proof, see Appendix A.

Lemma 2: Conditional on (y_i, y_j), the unique equilibrium trading price at t = 1 is:

$$P_i = \frac{E(\tilde{X}_{2i} \mid y) - \lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)}{1 + R_f} \tag{5}$$

For the proof, see Appendix A.

The above form of the equilibrium trading price is consistent with those of Fama (1976), Lambert et al. (2007), Gao (2010) and Zhang (2013). It indicates that the current price can be expressed as the expected end-of-period cash flow minus a reduction for risk and then discounted to the beginning of the period at the risk-free rate.[10] This corresponds to the definition of *value* in conventional finance textbooks, which can also be described as the expected end-of-period cash flow discounted to the beginning of the period at a risky real rate.

3.2 Comparability and the Cost of Capital

Following numerous studies, we define the cost of capital as the expected return on the firm's equity, i.e., it is the cost of the capital required by new investors to invest in the firm's stock. Thus, it takes the following form according to the definition:[11]

$$E(\tilde{R}_i \mid y) = \frac{E(\tilde{X}_i \mid y) - P_i}{P_i} \tag{6}$$

Then, with reference to Lambert et al. (2007) and Zhang (2013), we extend the capital asset pricing model (CAPM) to incorporate the role of accounting information in asset pricing.

The conventional formulation of CAPM (Sharpe, 1964; Lintner, 1965) is as follows:

$$\begin{aligned} E(\tilde{R}_i \mid y) &= R_f + [E(\tilde{R}_M \mid y) - R_f]\beta_i \\ &= R_f + \frac{E(\tilde{R}_M \mid y) - R_f}{Var(\tilde{R}_M \mid y)}[Cov(\tilde{R}_i, \tilde{R}_M \mid y)] \end{aligned} \tag{7}$$

where $\tilde{R}_M$ is the market return and β_i is the firm's beta coefficient.

Equation (7) shows that a firm's beta coefficient is a unique parameter that affects the cost of capital, or, more specifically, it is the covariance of its future return with that of the market portfolio. To incorporate accounting information as a factor into the CAPM, it is necessary to convert the parameters of return distributions into cash flow distributions. Then, we give:

Lemma 3: Given R_f and λ, the firm's cost of capital is determined by the ratio of the expected future cash flow to its covariance with the market portfolio, and the relationship is as follows:

[10] Gao (2010) does not include a discount at the risk-free rate under his assumptions/cases.
[11] Although the cost of capital can be characterized as either conditional (Lambert et al., 2007, Zhang, 2013) or unconditional (Gao, 2010) expected returns on equity, it is more appropriate to use the conditional form in the analysis of this paper.

$$E(\tilde{R}_i \mid y) = R_f + \frac{R_f + 1}{H(y) - 1}, \text{ where } H(y) = \frac{E(\tilde{X}_i \mid y)}{\lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}. \tag{8}$$

For the proof, see Appendix A.

It can be seen from Equation (8) that the formula contains parameters of cash flow distributions, i.e., it is a cash flow mean-variance CAPM. Equation (8) shows that the cost of capital equates to a risk-free rate plus an uncertainty risk factor. Given a fixed R_f, the cost of capital is thus determined by *H(y)*. First, it can be easily recognized that a higher coefficient of risk aversion (λ) means a higher level of cost of capital. Then, what we should care about is the ratio of the firm's expected future cash flow to its covariance with the market portfolio. Lambert et al. (2007) also focus on this ratio, and they mainly emphasize the covariance to interpret the role of accounting information. On this basis, Johnstone (2016) further analyzes both the *covariance effects* and *mean effects* of information and concludes that the cost of capital depends not only on the quality of the signal but also on the direction of that signal or, in other words, on what it "says".

When applying Equation (8) to the two-firm model, we only need to consider Equation (3) and Equation (4). Equation (3) shows the expected mean of firm *i*'s cash flow, which suggests that a higher y_i (i.e., "good news" about the earnings) means a lower cost of capital, but it does not directly contain the parameter of comparability c_i. Therefore, we will mainly focus on Equation (4), i.e., the covariance (variance) of firm *i*'s cash flow with the cash flow of the market portfolio (firm *i* and firm *j* in our model). It can be explicitly deduced from Equation (8) that the cost of capital increases with the covariance of the firm's cash flow. Considering comparability, we give:

Proposition 1: The relationship between the cost of capital and comparability is not unanimous. The firm's cost of capital decreases with comparability if and only if the quality of accounting standards are sufficiently high, i.e., $E(\tilde{\delta}^2) \gg E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)$ and $\sigma^2_{\tilde{\delta}} \gg \sigma^2_{\tilde{\varepsilon}_i}$.

To clarify Proposition 1, let us use the following expression:

$$E(\tilde{R}_i \mid y) \propto \underbrace{c_i^2[\sigma^2_{\tilde{\delta}} + E(\tilde{\delta}^2)]}_{\text{Common Accounting Effect}} + \underbrace{(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)]}_{\text{Idiosyncratic Accounting Effect}} \tag{9}$$

where the right part of the expression is the covariance (variance) of firm *i*'s cash flow with the cash flow of the market portfolio, as is shown in Equation (4).

Expression (9) shows that firm *i*'s cost of capital increases with the total covariance (variance) of the firm's cash flow with that of the market portfolio. The total covariance (variance) can be divided into two components. The first component describes how a set of common accounting practices (i.e., accounting standards) affects the cost of capital, and we can call it the *common accounting effect*. The second component tells us how idiosyncratic accounting practices affect the cost of capital, which can be called the *idiosyncratic accounting effect*. When the quality of the accounting standards is sufficiently high, i.e., $E(\tilde{\delta}^2) \ll E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)$ and $\sigma^2_{\tilde{\delta}} \ll \sigma^2_{\tilde{\varepsilon}_i}$, the second component in Expression (9) dominates. In this case, the cost of capital is monotonically decreasing in comparability, as there is a negative sign in front of c_i within the second component. As long as the quality of the accounting standards is not sufficiently high, the first component will have some effect. In this case, both the *common accounting effect* and the *idiosyncratic accounting effect* affect the cost of capital. While the cost of capital is decreasing in comparability within the second component, the first component shows that the cost of capital is increasing in comparability, which leads to an ambiguous relationship. In extreme cases, when the quality of the accounting standards is sufficiently low, i.e., $E(\tilde{\delta}^2) \gg E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)$ and $\sigma^2_{\tilde{\delta}} \gg \sigma^2_{\tilde{\varepsilon}_i}$, the first component will dominate, and the cost of capital will be monotonically increasing in comparability.

Overall, Proposition 1 suggests that comparability itself cannot reduce the cost of capital. Only under the condition in which the quality of the accounting standards is sufficiently high is a firm's cost of capital decreasing with comparability. This thought is similar to that in one recent study by Johnstone (2016), in which he opposes the idea that more precise information reduces the cost of capital merely by being more precise and proposes that it is essential to think of what that information "says" (i.e., "good news" or "bad news"), rather than merely considering its "precision". The intuition is also consistent with the Conceptual Framework of FASB as follows:

"Comparable information, however, is not useful if it is not relevant and may mislead if it is not faithfully represented. Therefore, comparability is considered an enhancing qualitative characteristic instead of a fundamental qualitative characteristic." (SFAC No. 8, FASB, 2010)

Thus, our study supports the relative importance of comparability, i.e., although important, comparability is secondary to relevance and faithful representation. The IFRS Framework (2010) approved by the IASB also regards comparability as an enhancing qualitative characteristic that is not as important as relevance and faithful representation (i.e., fundamental qualitative characteristics). However, regulators usually list comparability as one of the most important reasons to push a set of new common accounting standards, e.g., the objective of the EU regulation for IFRS adoption (EC No. 1606/2002) states: "…in order to ensure a high degree of *transparency* and *comparability* of financial statements and hence an efficient functioning of the Community capital market…". Since Proposition 1 suggests that comparability itself has no benefits toward reducing the cost of capital, it should be treated prudently to avoid overstating the function of comparability.

With respect to related empirical research, although some evidence shows that the mandatory adoption of IFRS reduces the cost of capital (Daske et al., 2008; Li, 2010; Daske et al., 2013), it is still unclear that how accounting standards affect the cost of capital through comparability. In Li (2010)'s additional analyses, he finds that increased disclosure and enhanced information comparability are two mechanisms behind the cost of equity reduction after IFRS adoption in the EU, but we still do not know how comparability affects the cost of capital. Imhof et al. (2017) provide evidence that greater financial statement comparability is associated with a lower cost of equity capital, and they show that comparability's effect on the cost of capital remains after controlling for the within-firm accounting quality. However, Fang et al. (2018)'s theory and evidence show that comparability yields both information gains and information losses because it enhances the correlation among firms' reported earnings (common informativeness) at the expense of firms' own reporting precision (individual informativeness). Our research complements their findings by extending the effect of comparability on informativeness to the cost of capital, which is helpful for understanding the benefits and costs of increased comparability.

When considering the *idiosyncratic accounting effect* in Expression (9) further, we give:

Corollary 1: The effect of comparability on reducing the cost of capital is more sensitive when firms' idiosyncratic accounting measurement is highly volatile, i.e., a larger $\sigma^2_{\tilde{\varepsilon}_i}$, and/or when firms' individual accounting treatments are highly correlated, i.e., a larger $\rho_{\tilde{\varepsilon}}$.

It is not difficult to induce Corollary 1 by analyzing the second component in Expression (9). A larger $\sigma^2_{\tilde{\varepsilon}_i}$ and/or $\rho_{\tilde{\varepsilon}}$ guarantees a larger $\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)$; thus, one unit change of c_i (comparability) in the second component will result in a larger percent decrease of the cost of capital. The intuitions behind Corollary 1 are: (1) when firms' idiosyncratic accounting measurement is highly volatile, it more greatly benefits reducing the cost of capital by adopting common accounting standards with increased comparability and (2) when firms' individual accounting treatments are highly correlated, the cost of adopting common accounting standards (e.g., decreasing the precision of individual firms' own reports) is lower because the common accounting treatments and individual accounting treatments are close to some extent; thus, it also more greatly benefits reducing the cost of capital by improving the comparability.

3.3 Comparability and Investor Welfare

Following Gao (2010) and Dutta and Nezlobin (2017a, 2017b), we define investor welfare as investors' *ex ante* expected utility: the utility after the firm's accounting policy (comparability) has been set but before the signal comes out. To characterize the welfare implications of comparability, we should first illustrate what risks the current and new investors bear in our model.

In general, investors invest in a stock to receive dividends and capital gains (increased price of selling the stock); thus, they bear related risks, i.e., dividends risk and price risk, in return for risk premiums.[12] However, similar to the case in Gao (2010) and Dutta and Nezlobin (2017a, 2017b), current investors and future investors face different risks in our model. To interpret it further, let us consider what current investors and new investors receive, respectively. As has been shown before, considering both dividends and stock selling, firm *i*'s current investors, in total, receive $X_{1i} + P_i$ at t=1. X_{1i} (cash flows generated from period 1) can be observed without uncertainty, but P_i (expected stock price) contains uncertainty affected by accounting disclosure. Thus, current investors only bear price risk in our model. In contrast, at t = 2, the payoff of firm *i*'s new investors is $\tilde{X}_{2i} \mid y - (1+R_f)P_i$. Both P_i (stock price) and $\tilde{X}_{2i} \mid y$ (expected cash flows generated from period 2) contain uncertainty that is affected by accounting disclosure. Thus, new investors bear price risk as well as dividend risk in our model. Accounting disclosure (comparability) affects the allocation of dividend risk and price risk among current investors and new investors.

Proposition 2: Even under the condition in which the quality of accounting standards is sufficiently high, i.e., $E(\tilde{\delta}^2) \gg E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)$ and $\sigma^2_{\tilde{\delta}} \gg \sigma^2_{\tilde{\varepsilon}_i}$, the firm's current investors and new investors have different demands for comparability because: (i) the welfare of the firm's current investors increases in comparability and (ii) the welfare of the firm's new investors decreases in comparability.

For the proof, see Appendix A.

Part (i) of Proposition 2 shows that current shareholders unambiguously prefer the most comparable disclosure regime. In combination with the result in Proposition 1, it suggests that current investors' welfare and the cost of capital are negatively associated, which is consistent with the conventional wisdom indicating that investors benefit from a lower cost of capital. Since current investors already own the firm, any change in the disclosure policy can affect their welfare only through its impact on the trading price. Consequently, the expected utility of current shareholders can be represented by the following certainty equivalent expression:

[12] Dividend risk is also called cash flow risk by Gao (2010). Dividends risk and cash flow risk are equivalent in this paper because we assume that all end-of-period cash flows are distributed as dividends. In addition, although we only consider a two-period model, the basic findings can be extended to a infinite horizon model. If we model in an infinite horizon framework, after selling the shares bought from the old investors, the new investors become old investors then.

$$CE_c = E(P_i \mid y) - \frac{\lambda}{2} Cov(P_i, P_i + P_j \mid y) + const. \tag{10}$$

Under the condition that accounting standards have the highest quality, considering Equation (4) and Equation (5), it is obvious to see that a more comparable disclosure policy increases the trading price. The expected price $E(P_i \mid y)$ also increases with the comparability c_i, but the trading price becomes more volatile (i.e., $Cov(P_i, P_i + P_j \mid y)$ also increases in c_i). Proposition 2 shows that the expected price effect dominates and the current investors' welfare monotonically increases in comparability. Intuition about why the expected price effect dominates can be gained by analyzing the magnitude of the variable change. If a more comparable public disclosure lowered the covariance (variance) of future cash flows, $Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$, by one unit, it would result in an increase of $\alpha\lambda$ units in the expected price $E(P_i \mid y)$, where $\alpha = (1 + R_f)^{-1}$. Such a change in comparability, however, would also increase the covariance (variance) of the trading price, $Cov(P_i, P_i + P_j \mid y)$, by α^2 units and hence decrease the current investors' certainty equivalent by $\frac{1}{2}\lambda\alpha^2$ units.[13] The net result would be that the certainty equivalent utility of current investors increases by $\lambda\alpha(1\text{-}\frac{\alpha}{2})$ units. Thus, current investors benefit from more comparable disclosure.

In contrast to the result concerning current investors' welfare, Part (ii) of Proposition 2 suggests that future investors will not prefer comparable information as their welfare decreases in comparability. In combination with the result in Proposition 1, it suggests that future investors' welfare and the cost of capital are positively associated. At first glance, this result might appear surprising. The intuition about this result is that a higher cost of capital also means a higher risk premium, and hence, investors benefit more by making riskier investments. From the perspective of welfare, if more comparable accounting disclosure results in a lower cost of capital and risk premium, as well as a higher stock price, the investors will earn lower expected returns, and they will benefit less from less risk in the capital market. To further illustrate this, let us see the following expression of the certainty equivalent of new investors' welfare:

$$CE_n = E(\tilde{X}_{2i} \mid y) - \frac{\lambda}{2} Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) - (1 + R_f)P_i \tag{11}$$

Note from Equation (5) that the equilibrium price, P_i, rises by $\alpha\lambda$ units as the conditional covariance (variance) of the expected cash flows (new investors' expected dividends), $Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$, decreases by one unit. This implies that the expected excess return, $E(\tilde{X}_{2i} \mid y) - (1 + R_f)P_i$, decreases by $\alpha\lambda(1 + R_f) = \lambda$ units. However, such a decrease in the conditional covariance (variance) of cash flows also has a positive effect on investors' expected

[13] See Proof of Proposition 2 in the Appendix for more detailed information.

utility by $\frac{1}{2}\lambda$ units, as reflected by the middle term of Equation (11). Finally, the net result is that the certainty equivalent utility of new investors decreases by $\frac{1}{2}\lambda$ units. Thus, the cost to new investors decreases as the conditional covariance (variance) of cash flows decreases, i.e., when there is more comparable disclosure under the condition that accounting standards have the highest quality. The key behind this result is the notion that potential investors generally prefer access to riskier investments. Perfect or full public information will transform the firm into a riskless asset, and it will thus lose investment value for the investors, i.e., they can gain the same utility by choosing not to invest in the firm.

An important implication of the results in Proposition 2 is that the disclosure preferences of existing and potential investors are often divergent. With respect to the objective of financial reporting, as is shown in the IFRS Framework, "The primary users of general purpose financial reporting are present and potential investors, lenders and other creditors, who use that information to make decisions about buying, selling or holding equity…" (IASB, 2010), it emphasizes both present (current) investors and potential (new) investors.[14] Thus, our analysis corresponds well with the theoretical framework indicating that different investors might have different information needs. Accordingly, accounting standards should be designed to balance present and potential investors' information needs, as investors are the most important users of financial reports. The results of our analyses also imply that the cost of capital is not a valid proxy for the welfare of all investors.

4. Comparability, the Cost of Capital and Investor Welfare in a Production Economy

In this section, we extend our analysis by considering a real production economy, i.e., by allowing current investors to make an additional investment k_i to maximize their expected utility at t = 1 before they sell the firm to new investors. To explore new insights into the influence of investment adjustment, we assume that the quality of accounting standards is sufficiently high, i.e., $E(\tilde{\delta}^2) \ll E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)$ and $\sigma^2_{\tilde{\delta}} \ll \sigma^2_{\tilde{\varepsilon}_i}$ in this section. We show that the effects of comparability on the cost of capital and investors' welfare are different compared to those in an exchange economy.

4.1 Equilibrium Price and Optimal Investment

We assume that the profitability of a new investment is the same as that of an existing asset. Thus, the cash flow generated from *k* units of new investment in period 2, $\tilde{X}(k)$, is $k_i(u_0 + \tilde{u}_i)$. To get a closed-form solution in our model, we assume that the cost of investment, $v(k_i)$, is

[14] The Conceptual Framework of FASB states a similar objective as follows: "…to provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions about providing resources to the entity…" (SFAC No. 8, FASB, 2010).

quadratic, i.e., $v(k_i) = bk_i^2$, where b is the coefficient of the cost of investment adjustment.

At t = 1, public accounting reports are released and investment decisions are made by both firms, and equilibrium prices are formed based on investors' rational expectations. Let (*y*, *k*) be the firms' accounting disclosure and investment decisions.

Lemma 4: Conditional on (*y*, *k*), the posterior mean cash flow of firm *i* and its covariance with the cash flow of the market portfolio (firm *i* and firm *j* in our model) at t = 1 are as follows:

$$E(\tilde{X}_{2i} \mid y, k) = (1+k_i)(u_0 + y_i) \tag{12}$$

$$Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y, k) = (1+k_i)^2(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)] \tag{13}$$

The process of the proof is the same as that shown in the Proof of Lemma 1 in Appendix A.

Lemma 5: Conditional on (*y*, *k*), the unique equilibrium trading price at t = 1 is:

$$P_i^{'} = \frac{E(\tilde{X}_{2i} \mid y, k) - \lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y, k)}{1+R_f} \tag{14}$$

The process of the proof is the same as that shown in the Proof of Lemma 2 in Appendix A.

Compared with Lemma1 and Lemma 2, Lemma 4 and Lemma 5 show that both the expected cash flow of firm *i* and its covariance with the cash flow of the market portfolio (firm *i* and firm *j* in our model) rise when the firm adjusts its investment at t = 1. The form of the equilibrium trading price does change, but it is still expressed as the expected end-of-period cash flow minus a reduction for risk and then discounted to the beginning of the period at the risk-free rate.

Lemma 6: Under the condition that the quality of accounting standards is sufficiently high, the optimal investment level increases in comparability and is given by the following form:

$$k_i^* = \frac{\alpha y_i - \lambda\alpha(2-\alpha)(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}{2b + \lambda\alpha(2-\alpha)(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}, \text{ where } \alpha = (1+R_f)^{-1}. \tag{15}$$

For the proof, see Appendix A.

Lemma 6 shows that the optimal investment level k_i^* increases in accounting comparability (i.e., $\partial k_i^* / \partial c_i > 0$) under the condition that the quality of accounting standards is sufficiently high. Intuitively, a more comparable disclosure lowers the risk-related marginal cost of investment.[15] Consistent with the standard intuition, the optimal investment level k_i^* will rise when the coefficient of cost of investment b is smaller or the expected marginal benefit y_i is larger. It can also be easily confirmed that the optimal investment level k_i^* is more sensitive to comparability when the coefficient of investors' risk aversion λ is large or when firms'

[15] It can be represented by the middle term of Equation (A-6) in the proof.

idiosyncratic accounting measurements are highly volatile and/or correlated (i.e., a larger $\sigma_{\tilde{\varepsilon}_i}^2 + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)$).

4.2 Comparability and Cost of Capital

We now seek to characterize the impact of comparability on the cost of capital with consideration of investment adjustments. Lemma 3 shows that the cost of capital is determined by the ratio of the expected future cash flow to its covariance with the market portfolio (i.e., *H(y)*). Equation (12) suggests that the expected future cash flow is increasing in k_i, and Lemma 6 shows that k_i is increasing in c_i; thus, the expected future cash flow is increasing in c_i. Therefore, if the covariance of the firm's expected future cash flow with the market portfolio is decreasing in c_i, the cost of capital is decreasing with c_i. Then, we give Proposition 3 below.

Proposition 3: Under the condition that the quality of accounting standards is sufficiently high, the cost of capital decreases with comparability if the coefficient of the cost of investment adjustment is above a certain threshold, i.e., $b > b^*$, where:

$$b^* = \frac{\lambda\alpha(2-\alpha)(1-c_i)^2[\sigma_{\tilde{\varepsilon}_i}^2 + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}{2}, \text{ where } \alpha = (1+R_f)^{-1}. \quad (16)$$

For the proof, see Appendix A.

Proposition 3 shows that the cost of capital decreases with comparability only when the cost of investment is above a certain threshold. Intuitively, although comparability can reduce the cost of capital when the quality of accounting standards is sufficiently high, as shown in Proposition 1, Lemma 6 shows that a more comparable disclosure increases the optimal investment level, which also increases the covariance (variance) of the firm's cash flow, thus increasing the related risk and the cost of capital. To clarify this point further, let us see the following expression:

$$E(\tilde{R}_i \mid y, k) \propto \underbrace{(1+k_i)^2}_{\text{Indirect Effect}} \times \underbrace{(1-c_i)^2[\sigma_{\tilde{\varepsilon}_i}^2 + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}_{\text{Direct Effect}} \quad (17)$$

where the right part of the expression is the covariance (variance) of firm *i*'s cash flow with the cash flow of the market portfolio, as shown in Equation (13).

Expression (17) shows that firm *i*'s cost of capital increases in terms of the total covariance (variance) of the firm's cash flow with that of the market portfolio. The total covariance (variance) can also be divided into two components. The first component describes the *indirect effect* of comparability on the cost of capital through investment. The second component shows the *direct effect* of comparability on the cost of capital through reducing the measurement error, as shown in Proposition 1 under the condition in which the quality of accounting standards is sufficiently high.

When the coefficient of the cost of investment adjustment is above a certain threshold, i.e., $b > b^*$, the magnitude of new investments will be relatively small; thus, the *direct effect* dominates. In this case, the cost of capital is monotonically decreasing in comparability. When the coefficient of the cost of investment adjustment is below a certain threshold, the *indirect effect* will have some effect and can even dominate in extreme cases. The *direct effect* is enhanced when firms' idiosyncratic accounting measurements are highly volatile and/or correlated (i.e., a larger $\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)$). These results correspond with existing theoretical research from the perspective of accounting comparability. Lambert et al. (2007) also demonstrate that the quality of accounting information can influence the cost of capital both directly and indirectly. The direct effect occurs through affecting the firm's assessed covariance with other firms' cash flows, while the indirect effect occurs through affecting a firm's real decisions. Gao (2010) further gives the condition under which the cost of capital could increase with the disclosure quality.

However, we should note that the condition of $b > b^*$ in Proposition 3 is only a sufficient condition and not a necessary condition, that is to say, it is a stricter condition. The reason is that the expected cash flow in Equation (12) is also affected by comparability through investment. A more comparable disclosure increases the optimal investment level and the expected cash flow, thus decreasing the cost of capital. Thus, the threshold b^* will be smaller when considering both the mean effect and covariance effect, but it is more difficult to calculate to provide a specific value.

4.3 Comparability and Investor Welfare

When allowing the firm (current investors) to adjust investments, the payoffs of investors will be different. As assumed previously, considering dividends, the retained cash flow as a cost of investment and stock selling, firm *i*'s current investors, in total, receive $X_{1i} + P_i^{'} - v(k_i^*)$ at t=1. X_{1i} (cash flows generated from period 1) can be observed without uncertainty, but $P_i^{'}$ (expected stock price) and $v(k_i^*)$ (the cost of investment) contain uncertainty affected by accounting disclosure and investment decisions. In contrast, the payoff of firm *i*'s new investors is $\tilde{X}_{2i} \mid (y, k) - (1+R_f)P_i^{'}$ at t = 2. Both $P_i^{'}$ (stock price) and $\tilde{X}_{2i} \mid (y, k)$ (expected cash flows generated from period 2) contain uncertainty affected by accounting disclosure and investment decisions.

Proposition 4: Under the condition in which the quality of accounting standards is sufficiently high: (i) the welfare of current investors always increases in comparability and (ii) the welfare of new investors decreases in comparability if the coefficient of the cost of investment adjustment is above a certain threshold, i.e., $b > b^*$, where b^* is the same as that in Proposition

3.

For the proof, see Appendix A.

Part (i) of Proposition 3 shows that current shareholders still unambiguously prefer the most comparable disclosure regime, which is the same as the case in an exchange economy. Because the welfare of current investors is affected by the disclosure policy only through its impact on the trading price, considering investment, the certainty equivalent of current investors' welfare is as follows:

$$CE_c^{'} = E(P_i^{'} \mid y, k) - \frac{\lambda}{2} Cov(P_i^{'}, P_i^{'} + P_j^{'} \mid y, k) - v(k_i) + const. \tag{18}$$

Similarly, under the condition in which the accounting standards have the highest quality, a more comparable disclosure policy increases the expected trading price $E(P_i^{'} \mid y, k)$, but the price becomes more volatile (i.e., $Cov(P_i^{'}, P_i^{'} + P_j^{'} \mid y, k)$ increases in c_i) and the cost of investment $v(k_i)$ also increases. Proposition 3 shows that the expected price effect dominates and that the current investors' welfare monotonically increases in comparability. The intuition behind this finding can be gained by analyzing the magnitude of the variable change, as shown in the Proof.

In contrast, Part (ii) of Proposition 4 suggests that new investors will not prefer comparable information if the cost of investment adjustment is above a certain threshold. In combination with the result in Proposition 3, it suggests that new investors' welfare and the cost of capital are always positively associated. If a more comparable disclosure lowers the cost of capital, new investors benefit less from a lower risk premium. Because the welfare of new investors is affected by the disclosure policy mainly through its impact on the expected cash flow, considering investment, the certainty equivalent of new investors' welfare is as follows:

$$CE_n^{'} = E(\tilde{X}_{2i} \mid y, k) - \frac{\lambda}{2} Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y, k) - (1 + R_f) P_i^{'} \tag{19}$$

Considering the form of the equilibrium price $P_i^{'}$ in Equation (14), the new investors' expected excess return, $E(\tilde{X}_{2i} \mid y, k) - (1 + R_f) P_i^{'}$ is equal to $\lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$. Thus, as shown in the Proof of Proposition 4, the certainty equivalent of new investors' welfare is equal to a half of the expected excess return, i.e., $CE_i^{'} = \frac{1}{2} \lambda \, Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$. So, as shown in Proposition 3 and Expression (17), the firm's covariance with both the cash flow of the market portfolio and the welfare of new investors decreases in comparability if the cost of investment adjustment is above a certain threshold, i.e., $b > b^*$. The intuition behind this point is that a larger cost of investment adjustment places the firm in a more stable state, and more comparable information will transform the firm into a riskless asset, which is against the preference of new investors concerning riskier investment and related higher expected returns. Dutta and Nezlobin (2017a) provide a similar idea that the welfare of future investors decreases in terms of the precision of public disclosure if the firm's growth rate is below a certain threshold.

5. Conclusion

In this paper, we have investigated how financial statement comparability affects the cost of capital and investor welfare. We show that the relationship between the cost of capital and comparability is not unanimous and that current investors and new investors have different demands for comparability. In an exchange economy, the cost of capital decreases with comparability if and only if the quality of accounting standards is sufficiently high, which suggests that comparability itself cannot reduce the cost of capital. Further, even under the condition in which accounting standards have the highest quality, the welfare of current investors increases in comparability, while the welfare of new investors decreases in comparability. In a production economy, we show that more comparable disclosure leads to higher investment and that current investors benefit more. Also, the cost of capital and the welfare of new investors decrease with comparability, if and only if the cost of investment is above a certain threshold. Moreover, the effects of comparability on the cost of capital and investor welfare are enhanced when firms' idiosyncratic accounting measurements are highly volatile and/or correlated. The results have important implications for accounting standards setters and information disclosure regulators.

Considering the limitations of our study, we give the following three caveats when interpreting our findings. First, our definition of comparability is from the perspective of the firms, rather than the standard setters. However, we did not give firms discretionary in choosing the optimal level of comparability. Admittedly, a full equilibrium considering the optimization process at the firm level might shed more light on the role of comparability. Also, future research on coordinating the comparability demands of the firms and standard setters is expected to generate promising results. Second, we focus on an economy with two firms in a static setting. As a consequence, all risk in our model is systematic, and there are no overlapping problems among different generations. Extending our results to a dynamic setting or a multisecurity setting with intra-industry competition is an interesting direction for future research. Third, this paper assumes that both current investors and new investors have CARA utility functions with the same coefficient of risk aversion. We might get different results by adjusting the underlying assumptions, such as constant relative risk aversion (CRRA) utility, heterogeneous beliefs (Christensen and Qin, 2014), heterogenous risk preferences (Dye, 1990) among investors, and/or liquidity problems induced by imperfect competition (Diamond and Verrecchia, 1991; Lambert and Verrecchia, 2015). It might also be a promising direction to investigate how economic (versus accounting) links between firms (Zhang, 2013; Fang et al., 2018; Ma, 2017) affect the effects of comparability, as well as the real effect of comparability (Wu and Xue, 2019).

Appendix A

Proof of Lemma 1

According to the basic assumptions in our model, especially the assumption of $\sigma^2_{\tilde{u}_i} \square \; \sigma^2_{\tilde{a}_i}$, together with Equation (1) and Equation (2), it is easy to get the posterior mean cash flow of firm *i* and its variance as follows:

$$E(\tilde{X}_{2i} \mid y) = u_0 + E(\tilde{u}_i \mid y) = u_0 + y_i$$

$$Var(\tilde{X}_{2i} \mid y) = \sigma^2_{\tilde{u}_i} = c_i^2 \sigma^2_{\tilde{\delta}} + (1-c_i)^2 \sigma^2_{\tilde{\varepsilon}_i}$$

Then, let us calculate the covariance of the cash flow of firm *i* with the cash flow of firm *j*.

$$\begin{aligned}
Cov(\tilde{X}_{2i} \mid y, \tilde{X}_{2j} \mid y) &= E(\tilde{X}_{2i} \mid y \times \tilde{X}_{2j} \mid y) - E(\tilde{X}_{2i} \mid y) E(\tilde{X}_{2j} \mid y) \\
&= E[(u_0 + \tilde{u}_i)(u_0 + \tilde{u}_j)] - E[(u_0 + \tilde{u}_i)] E[(u_0 + \tilde{u}_j)] \\
&= E[u_0^2 + u_0(\tilde{u}_i + \tilde{u}_j) + \tilde{u}_i \tilde{u}_j] - [u_0^2 + u_0(y_i + y_j) + y_i y_j] \\
&= E[\tilde{u}_i \tilde{u}_j - y_i y_j] \\
&= E[(y_i - \tilde{a}_i)(y_j - \tilde{a}_j) - y_i y_j] \\
&= E(\tilde{a}_i \tilde{a}_j - \tilde{a}_i y_j - \tilde{a}_j y_i) \\
&= E\{[c_i \tilde{\delta} + (1-c_i)\tilde{\varepsilon}_i][c_j \tilde{\delta} + (1-c_j)\tilde{\varepsilon}_j] - [c_i \tilde{\delta} + (1-c_i)\tilde{\varepsilon}_i] y_j - [c_j \tilde{\delta} + (1-c_j)\tilde{\varepsilon}_j] y_i\}
\end{aligned}$$

As $c_i = c_j$, $E(\tilde{\delta}) = E(\tilde{\varepsilon}_i) = E(\tilde{\varepsilon}_j) = 0$, and $\tilde{\varepsilon}_i$, $\tilde{\delta}$ and $\tilde{u}_i$ are independent of each other, the above equation can be simplified as:

$$Cov(\tilde{X}_{2i}, \tilde{X}_{2j} \mid y) = c_i^2 E(\tilde{\delta}^2) + (1-c_i)^2 E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)$$

Thus, $Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) = Var(\tilde{X}_{2i} \mid y) + Cov(\tilde{X}_{2i}, \tilde{X}_{2j} \mid y)$

$$= c_i^2[\sigma^2_{\tilde{\delta}} + E(\tilde{\delta}^2)] + (1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)].$$

Q.E.D.

Proof of Lemma 2

We first give the formula of investors' certainty equivalent (CE) based on the exponential utility function, $U(w) = -\exp(-\lambda w)$, and a normal distribution of wealth, $w(x) \sim (\mu, \sigma^2)$.

$$U(w^*) = -\exp(-\lambda w^*) = E[U(w(x))]$$
$$= \int_{-\infty}^{\infty} -\exp(-\lambda x)\frac{1}{\sqrt{2\pi}\sigma}\exp[-\frac{(x-\mu)^2}{2\sigma^2}]dx$$
$$= -\int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi}\sigma}\exp[-\frac{(x-\mu)^2}{2\sigma^2} - \lambda x]dx$$
$$= -\int_{-\infty}^{\infty} \frac{1}{\sqrt{2\pi}\sigma}\exp[-\frac{[x-(\mu-\lambda\sigma^2)]^2}{2\sigma^2} - \lambda\mu + \frac{\lambda^2\sigma^2}{2}]dx$$
$$= -\exp(-\lambda\mu + \frac{\lambda^2\sigma^2}{2})$$

$$\Rightarrow w^* = \mu - \frac{\lambda\sigma^2}{2}$$

The above equation shows that investors' certainty equivalent (CE) equates the expectation value of the wealth deducting a part of the risk factor related to their risk preference.

However, it is based on a single-firm economy. To make it applicable to the two-firm economy situation of our paper, it can be easily extended to the covariance form as follows:

$$w^* = E(\tilde{X}_{2i} \mid y) - \frac{\lambda}{2}Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) \qquad \text{(A-1)}$$

Then, we prove the equilibrium trading price at t = 1, i.e., Equation (5).

As new investors pay a price for buying firm *i* at t = 1 and expect to receive a random cash flow at t = 2 that is similar to that of period 1, the certainty equivalent of new investors at t = 2 is thus as follows:

$$CE_n = E(\tilde{X}_{2i} \mid y) - \frac{\lambda}{2}Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) - (1+R_f)P_i \qquad \text{(A-2)}$$

where $(1+R_f)P_i$ is a constant cost that can be discounted as P_i at t = 1 and the other part is determined according to Equation (A-1).

Now consider a representative new investor who chooses her demand D_i for ownership in firm *i*, i.e., D_i represents the new investor's demand for firm *i* expressed as percent of the total firm, to maximize her expected utility. Thus, the new investor solves:

$$\max_{D_i} E[U(W_n) \mid y] = E\left(-\exp\{-\lambda D_i[X_{2i} - (1+R_f)P_i]\}\right)$$
$$= -\exp\{-\lambda D_i[E(\tilde{X}_{2i} \mid y) - \frac{\lambda D_i}{2}Cov(\tilde{X}_{2i}, \tilde{X}_{1i} + \tilde{X}_{2j} \mid y) - (1+R_f)P_i]\}$$

The first-order condition gives the optimal demand:

$$E(\tilde{X}_{2i} \mid y) - \lambda D_i^* Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) - (1+R_f)P_i = 0$$
$$\Rightarrow D_i^* = \frac{E(\tilde{X}_{2i} \mid y) - (1+R_f)P_i}{\lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)}$$

The second-order condition is negative, guaranteeing that D_i^* is the maximum solution.

Because collectively, new investors have claims to the cash flow of the entire firm, i.e., the supply of shares of firm *i* is one, and market clearing requires that:

$$1 = \int_0^1 D_i^* di = \frac{E(\tilde{X}_{2i} \mid y) - (1 + R_f)P_i}{\lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)}$$

Thus, one gets the equilibrium trading price:

$$P_i = \frac{E(\tilde{X}_{2i} \mid y) - \lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)}{1 + R_f}.$$ Q.E.D.

Proof of Lemma 3

To convert the parameters of the return distributions of conventional CAPM into cash flow distributions form, let us first extend Equation (5) of Lemma 2 to a large economy with N firms:

$$P_i = \frac{E(\tilde{X}_i \mid y) - \lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}{1 + R_f} \tag{A-3}$$

Then, we just need to substitute Equation (A-3) into Equation (6) as follows:

$$E(\tilde{R}_i \mid y) = \frac{E(\tilde{X}_i \mid y) - P_i}{P_i} = \frac{R_f E(\tilde{X}_i \mid y) + \lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}{E(\tilde{X}_i \mid y) - \lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}$$

$$= \frac{R_f [E(\tilde{X}_i \mid y) - \lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)] + (R_f + 1)\lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}{E(\tilde{X}_i \mid y) - \lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}$$

$$= R_f + \frac{(R_f + 1)\lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}{E(\tilde{X}_i \mid y) - \lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}$$

$$= R_f + \frac{R_f + 1}{\frac{E(\tilde{X}_i \mid y)}{\lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)} - 1}$$

Thus, $E(\tilde{R}_i \mid y) = R_f + \frac{R_f + 1}{H(y) - 1}$, where $H(y) = \frac{E(\tilde{X}_i \mid y)}{\lambda Cov(\tilde{X}_i, \sum_{n=1}^{N} \tilde{X}_n \mid y)}$. Q.E.D.

Proof of Proposition 2

Proof of Part (i)

Formally, the certainty equivalent of the welfare of current investors is as follows:

$$CE_c = E(P_i \mid y) - \frac{\lambda}{2} Cov(P_i, P_i + P_j \mid y) + const.$$

$$= \frac{u_0 - \lambda Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)}{1 + R_f} - \frac{\lambda}{2(1+R_f)^2} Cov[E(\tilde{X}_{2i}), E(\tilde{X}_{2i}) + E(\tilde{X}_{2j}) \mid y] + const.$$

Noting that the unconditional covariance (variance)[16] can be calculated as:

$$Cov[E(\tilde{X}_{2i}), E(\tilde{X}_{2i}) + E(\tilde{X}_{2j}) \mid y] = Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j}) - Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$$

$$= \sigma^2_{\tilde{u}_i} + \rho_{\tilde{u}} \sigma_{\tilde{u}_i} \sigma_{\tilde{u}_j} - Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$$

Denoting the terms independent of accounting disclosure as A_i yields:

$$CE_c = A_i - \lambda \frac{1 + 2R_f}{2(1+R_f)^2} Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) \qquad \text{(A-4)}$$

Using Equation (4) and when $\tilde{\delta} \square \ \tilde{\varepsilon}_i, \tilde{\varepsilon}_j$ and $\sigma^2_{\tilde{\delta}} \square \ \sigma^2_{\tilde{\varepsilon}_i}$ are satisfied, we get:

$$CE_c \approx A_i - \lambda \frac{1 + 2R_f}{2(1+R_f)^2} (1 - c_i)^2 [\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)]$$

Differentiating with respect c_i to gives:

$$\frac{\partial CE_c}{\partial c_i} = \lambda \frac{1 + 2R_f}{(1+R_f)^2} (1 - c_i)[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)] > 0 \qquad \text{Q.E.D.}$$

Proof of Part (ii)

The certainty equivalent of the welfare of new investors is as follows:

$$CE_n = E(\tilde{X}_{2i} \mid y) - \frac{\lambda}{2} Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y) - (1 + R_f) P_i$$

Substituting for P_i from Equation (5) yields:

$$CE_n = \frac{\lambda}{2} Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y)$$

Using Equation (4) and when $\tilde{\delta} \square \ \tilde{\varepsilon}_i, \tilde{\varepsilon}_j$ and $\sigma^2_{\tilde{\delta}} \square \ \sigma^2_{\tilde{\varepsilon}_i}$ are satisfied, we get:

$$CE_n \approx \frac{\lambda}{2} (1 - c_i)^2 [\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i \tilde{\varepsilon}_j)]$$

Differentiating with respect to c_i gives:

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[16] The unconditional covariance (variance) takes the expectations with respect to accounting disclosure. As shown in Gao (2010), $Var(\tilde{u}) = Var[E(\tilde{u} \mid y)] + Var(\tilde{u} \mid y)$, which means that the total risk, i.e., $Var(\tilde{u})$, can be decomposed into price risk, i.e., $Var[E(\tilde{u} \mid y)]$, and cash flow risk, i.e., $Var(\tilde{u} \mid y)$.

$$\frac{\partial CE_n}{\partial c_i} = -\lambda(1-c_i)[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)] < 0$$ Q.E.D.

Proof of Lemma 6

Considering investment, the certainty equivalent of current investors' welfare is as follows:

$$CE_c^{'} = E(P_i^{'} \mid y, k) - \frac{\lambda}{2}Cov(P_i^{'}, P_i^{'} + P_j^{'} \mid y, k) - v(k_i) + const.$$

Referring to the process of deriving Equation (A-4) and using Lemma 4 and Lemma 5 yields:

$$CE_c^{'} = A_i^{'} + \frac{k_i y_i}{1+R_f} - \lambda\frac{1+2R_f}{2(1+R_f)^2}(1+k_i)^2(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)] - bk_i^2 \tag{A-5}$$

where $A_i^{'}$ denotes the terms independent of accounting disclosure and investment.

Differentiating with respect to k_i gives the first-order condition:

$$\frac{\partial CE_c^{'}}{\partial k_i} = \frac{y_i}{1+R_f} - \lambda\frac{1+2R_f}{(1+R_f)^2}(1+k_i)(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)] - 2bk_i = 0 \tag{A-6}$$

After reshaping, we get the following form of the optimal investment:

$$k_i^* = \frac{\alpha y_i - \lambda\alpha(2-\alpha)(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}{2b + \lambda\alpha(2-\alpha)(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}, \text{ where } \alpha = (1+R_f)^{-1}.$$

The second-order condition is negative, guaranteeing that k_i^* is the maximum solution.

Differentiating k_i with respect to c_i yields:

$$\frac{\partial k_i^*}{\partial c_i} = \frac{2\lambda\alpha(\alpha y_i + 2b)(2-\alpha)(1-c_i)[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}{\{2b + \lambda\alpha(2-\alpha)(1-c_i)^2[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]\}^2} > 0$$ Q.E.D.

Proof of Proposition 3

Lemma 3 shows that the cost of capital is determined by the ratio of the expected future cash flow to its covariance with the market portfolio. Because the expected future cash flow is increasing in k_i and k_i is increasing in c_i, the expected future cash flow is increasing in c_i. Thus, if the covariance of the firm's expected future cash flow with the market portfolio is decreasing in c_i, the cost of capital is decreasing with c_i. Differentiating Equation (13) with respect to c_i yields:

$$\frac{\partial Cov(\tilde{X}_{2i}, \tilde{X}_{2i} + \tilde{X}_{2j} \mid y, k)}{\partial c_i} = 2(1+k_i^*)(1-c_i)[\sigma^2_{\tilde{\varepsilon}_i} + E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)][\frac{\partial k_i^*}{\partial c_i}(1-c_i) - (1+k_i^*)] < 0$$

which can be obviously simplified as:

$$\frac{\partial k_i^*}{\partial c_i}(1-c_i)-(1+k_i^*)<0$$

Substituting $\partial k_i^* / \partial c_i$ and k_i^* gives:

$$\frac{\lambda\alpha(2-\alpha)(1-c_i)^2[\sigma_{\tilde{\varepsilon}_i}^2+E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]-2b}{\{2b+\lambda\alpha(2-\alpha)(1-c_i)^2[\sigma_{\tilde{\varepsilon}_i}^2+E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]\}^2}<0$$

Thus, we get $b>b^*$, and b^* is given in the flowing form:

$$b^*=\frac{\lambda\alpha(2-\alpha)(1-c_i)^2[\sigma_{\tilde{\varepsilon}_i}^2+E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}{2}$$ Q.E.D.

Proof of Proposition 4

Proof of Part (i)

As the certainty equivalent of current investors' welfare is given by Equation (A-5), differentiating it with respect to c_i gives the first-order condition:

$$\frac{\partial CE_c^{'}}{\partial c_i}=\alpha y_i\frac{\partial k_i^*}{\partial c_i}-\frac{\lambda\alpha(2-\alpha)}{2}\frac{\partial Cov(\tilde{X}_{2i},\tilde{X}_{2i}+\tilde{X}_{2j}\mid y,k)}{\partial c_i}-2bk_i\frac{\partial k_i^*}{\partial c_i}$$

Substituting $\partial k_i^* / \partial c_i$, $\partial Cov(\tilde{X}_{2i},\tilde{X}_{2i}+\tilde{X}_{2j}\mid y,k)/\partial c_i$ and k_i^*, which can be found in the Proof of Lemma 6 and Proof of Proposition 3, after reshaping gives:

$$\frac{\partial CE_c^{'}}{\partial c_i}=\frac{4\lambda\alpha(\alpha y_i+2b)^2(2-\alpha)(1-c_i)[\sigma_{\tilde{\varepsilon}_i}^2+E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]}{\{2b+\lambda\alpha(2-\alpha)(1-c_i)^2[\sigma_{\tilde{\varepsilon}_i}^2+E(\tilde{\varepsilon}_i\tilde{\varepsilon}_j)]\}^3}>0$$ Q.E.D.

Proof of Part (ii)

As the certainty equivalent of new investors' welfare is given by Equation (A-5), differentiating it with respect to c_i gives the first-order condition:

Considering investment, the certainty equivalent of new investors' welfare is as follows:

$$CE_n^{'}=E(\tilde{X}_{2i}\mid y,k)-\frac{\lambda}{2}Cov(\tilde{X}_{2i},\tilde{X}_{2i}+\tilde{X}_{2j}\mid y,k)-(1+R_f)P_i^{'}$$

Substituting for $P_i^{'}$ from Equation (14) yields:

$$CE_n^{'}=\frac{\lambda}{2}Cov(\tilde{X}_{2i},\tilde{X}_{2i}+\tilde{X}_{2j}\mid y,k)$$

Differentiating this equation with respect to c_i gives the first-order condition:

$$\frac{\partial CE_n^{'}}{\partial c_i}=\frac{\lambda}{2}\frac{\partial Cov(\tilde{X}_{2i},\tilde{X}_{2i}+\tilde{X}_{2j}\mid y,k)}{\partial c_i}$$

Thus, it has the same threshold of b^* as shown in the Proof of Proposition 3. Q.E.D

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Highlights

- The cost of capital decreases with comparability if and only if the quality of accounting standards is sufficiently high.
- The welfare of current investors increases in comparability, while the welfare of new investors decreases in comparability.
- The effects of comparability on the cost of capital and investor welfare are enhanced when firms' idiosyncratic accounting measurements are highly volatile and/or correlated.