FAIR VALUE ACCOUNTING AND EARNINGS VARIABILITY: EVIDENCE FROM GLOBAL REAL ESTATE FIRMS

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How to cite this paper: Thesing, J. (2023). Fair value accounting and earnings variability: Evidence from global real estate firms [Special issue]. *Corporate Ownership & Control, 20*(3), 359–374.
https://doi.org/10.22495/cocv20i3siart11

ISSN Online: 1810-3057
ISSN Print: 1727-9232

Received: 24.03.2023
Accepted: 04.08.2023

JEL Classification: G34, L85, M41, M48
DOI: 10.22495/cocv20i3siart11

Abstract

This study explores the relationship between earnings quality and fair value accounting beyond market-based measures, financial industry-related settings, and US firms. It analyzes the effect of discretionary fair value measurement of investment properties and earnings distribution using a sample of 2,658 observations between 2006 and 2017 from real estate firms in 36 countries. The results indicate that applying the fair value model to investment properties subject to International Financial Reporting Standards (IFRS) increases earnings variability and decreases earnings smoothness. These links are found for a fair value model dummy and incrementally for investment property fair values. Managers do not seem to exploit their discretion in lower-level fair value measurements to smooth out further earnings fluctuations. Among fair value model appliers, earnings variability appears to further increase, and earnings smoothness appears to further decrease, in the case of strong investor protection and real estate sector-specific institutional governance.

Keywords: Fair Value, Real Estate, International Accounting Standard 40, Earnings Variability, Earnings Smoothness, Governance

Authors' individual contribution: The Author is responsible for all the contributions to the paper according to CRediT (Contributor Roles Taxonomy) standards.

Declaration of conflicting interests: The Author declares that there is no conflict of interest.

1. INTRODUCTION

Fair value measurements require discretionary estimates. Investigating the outcomes of these estimation processes allows us to derive indications of whether and how managers affect these estimates (Barth, 2018; Beaver & Venkatachalam, 2003; Landsman, 2007; Ramanna, 2008; Song et al., 2010). This study uses measures of extensive earnings quality research (Barth, 2018; Dechow & Schrand, 2004; Dechow et al., 2010; Healy & Wahlen, 1999) to shed light on potential fair value-related earnings management behavior. In particular, it investigates whether fair value measurement of investment properties influences the earnings variability and the earnings smoothness of real estate firms worldwide. Further analyses explore whether the earnings quality measures of these firms are influenced by differences in institutional governance. By the term institutional governance, this study refers to mechanisms that relate to the institutional environment, as opposed to traditional corporate governance mechanisms that refer to firm or group level[1].

Previous earnings quality studies often obtain fair value measurements from financial items or use financial industry-related samples (Campbell et al., 2019; Hairston & Brooks, 2019). This particular research setting investigates the earnings quality of non-financial fair value measurements and therefore uses real estate firms' investment properties that are subject to International Accounting Standard (IAS) 40, investment property in which investment properties are usually estimated using lower-level

[1] Structuring corporate governance in different clusters is inspired by the work of Jain and Jamali (2016) who differentiate between different levels of corporate governance mechanisms: institutional, firm, group, and individual. This study uses the term governance for all forms of (corporate) governance, institutional governance for the institutional level, and corporate governance for the more traditional firm level and group level.

(occasionally Level 2, but mostly Level 3), i.e., highly discretionary, inputs of the fair value hierarchy (Dietrich et al., 2001; Goncharov et al., 2014; PricewaterhouseCoopers [PwC], 2017). Additionally, fair value adjustments according to this standard are prominently recognized in earnings and these adjustments are material items because, on average, investment properties constitute the largest share of real estate firms' total assets (Israeli, 2015; Müller et al., 2015).

A solid stream of literature investigates fair value measurements via earnings quality measures, which can be categorized depending on whether they use capital market data (market-based), e.g., prices, or accounting data (accounting-based), e.g., earnings, to derive their implications (Francis et al., 2004). This leads to the question of whether firms' prices or earnings are a better research basis for fair value research. Well-known studies assume the former and predominantly use market-based earnings quality measures, such as value relevance (Barth, 1994; Song et al., 2010; Venkatachalam, 1996) and conditional conservatism (Badia et al., 2017; Black et al., 2018). This study, however, advocates the use of earnings, i.e., accounting-based measures. These measures are expected to provide additional and more direct evidence than market-based measures because they are assumed to analyze fair value-related accruals management better and their suggestions do not depend on further assumptions such as regarding the market efficiency (Aboody et al., 1999; Bernard, 1993; Francis et al., 2004). Additionally, it is necessary to explore the effects of earnings smoothness and earnings variability in the context of lower-level, i.e., highly discretionary, fair value measurements. On the one hand, there are definite concerns that fair value measurements increase earnings variability (Barth, 2004). On the other hand, managers also have incentives to lower earnings variability via earnings smoothing (Barnea et al., 1976; Beidleman, 1973; Trueman & Titman, 1988).

This study also analyzes whether institutional governance influences earnings variability and earnings smoothness. Previous governance implications in fair value research refer to firm-related corporate governance, such as characteristics of boards and auditors (Black et al., 2018; Siekkinen, 2017b; Song et al., 2010). This cross-country setting enables the investigation of institutional governance and thereby allows the highlighting of differences among firm locations. Thereby, this study uses two forms of institutional governance. On the one hand, stronger investor protection represents a classical institutional governance proxy (Leuz et al., 2003). On the other hand, differences in property-specific regulatory processes and information environments between countries serve as experimental sector-specific institutional governance proxies.

The cross-country sample from 2006 to 2017 includes real estate firms that apply International Financial Reporting Standards (IFRS), which allow the use of the fair value model, as well as some that apply the United States Generally Accepted Accounting Principles (US-GAAP) in order to maintain a large control group that applies the cost model. Results show that applying the fair value model to investment properties increases earnings variability and decreases earnings smoothness. Furthermore, earnings variability seems to increase, and earnings smoothness seems to decrease, incrementally in line with the investment property fair values. Among fair value model appliers, the results suggest further increases in earnings variability and a decrease in earnings smoothness with institutional governance. These findings indicate that lower-level — and generally perceived as unreliable — investment property fair values induce higher earnings variability and are not exploited for managerial smoothing objectives. Additionally, stronger investor protection may further limit managerial discretion to smooth earnings. Similarly, more transparent information as well as regulatory developments seem to induce even more earnings variability and are not exploited for earnings smoothing.

This study addresses the research gap of a few non-market-based, non-financial, and non-US-based fair value research studies and contributes to extant research as follows:

1) It suggests that fair value measurement increases earnings fluctuations rather than being exploited for extensive earnings smoothing.

2) It highlights the results, and encourages the further use, of accounting-based earnings quality measures in a research framework of fair value measurement that has thus far been dominated by market-based proxies (Song et al., 2010).

3) It promotes a sample that uses: a) non-financial, b) lower-level fair value measurements, c) subject to IFRS, three sample characteristics that offer a promising avenue of research in an area that has previously been dominated by financial settings subject to US-GAAP (Campbell et al., 2019). This study may be one of the first to apply these three sample characteristics in a global context over a long horizon. This also adds to and combines studies such as Fiechter (2011), Couch et al. (2017), Dietrich et al. (2001), and Chen et al. (2020). The first two investigate earnings variability in financial settings while the third and the fourth both investigate consequences of investment property fair values for earnings smoothness, among other proxies, in the specific settings of pre-IFRS UK and China.

4) It also promotes further governance implications. This is done by showing that institutional governance affects fair value measurements, in addition to the commonly investigated corporate governance (Black et al., 2018); it is one of the first studies to investigate global differences in institutional governance in this context, and to consider sector-specific institutional governance proxies, compared to classical proxies (Alexeyeva & Mejia-Likosova, 2016), such as investor protection.

The results of this study show several limitations. For example, first, the results show the overall consequences of investment property fair values for earnings variability and earnings smoothness without separating different determinants that complicate further interpretations. Second, this study uses a heterogenous sample of firms that apply IFRS and US-GAAP, which may differ in several characteristics rather than those examined. Third, the decision of firms to elect the fair value or the cost model is assumed according to filled items in databases and not directly observed, which reduces the sample to a large extent. Fourth, the results may depend on

the applied method to calculate variabilities. Therefore, future studies may replicate the results using other methods to calculate variabilities.

The rest of this paper is structured as follows. Section 2 presents the related literature and develops the hypotheses. Section 3 explains the sample selection and models applied. Section 4 presents the empirical results that are discussed in Section 5. Section 6 concludes the study.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Related literature

In the most prominent fair value-related earnings quality studies, fair value measurements are found to be value relevant (Barth, 1994; Venkatachalam, 1996). Lower-level[2], i.e., less verifiable, fair value measurements, however, seem to be less value relevant (Song et al., 2010) and may increase conditional conservatism (Badia et al., 2017; Black et al., 2018) and betas (Riedl & Serafeim, 2011). Consistent with principal-agent theory (Jensen & Meckling, 1976), managers may exploit their discretion in fair value measurements for opportunistic reasons, especially in lower-level fair value measurements (Landsman, 2007; Ramanna, 2008). They may also communicate private information via their use of their discretion in fair value measurements (Barth, 2018; Beaver & Venkatachalam, 2003). In both cases, managers influence the measurement of fair values; this is referred to as earnings management behavior in this study.

Information about the fair values of real estate firms in pre-IFRS UK seems value relevant but is less so than the fair values of investment firms that are assumed to be on a higher level (compared to those of real estate firms) of the fair value hierarchy (Danbolt & Rees, 2008). Dietrich et al. (2001) suggest that managers exploit investment properties in the UK to overstate earnings and to smooth changes in earnings and net assets. Other studies of mostly IFRS-related settings provide earnings quality implications. Adjustments to the investment property fair values of Canadian Real Estate Investment Trusts (REITs) (Bandyopadhyay et al., 2017) as well as the recognized and disclosed investment properties of real estate firms from France, Germany, Italy, and Spain (Israeli, 2015) are found to contribute to future profitability. Similarly, investors appear to reward fair valuing of investment properties. According to Muller et al. (2011), European real estate firms that did not report investment property fair values prior to mandatory IFRS application showed lower information asymmetry after the mandatory IFRS adoption, when they had to report these fair value measurements. UK investment property fair values may be more informative for analysts than historical cost information, but forecasts of unrealized gains and losses under the full fair value model — according to IFRS — seem more challenging (Liang & Riedl, 2014). European real estate firms that report investment property fair values may yield lower audit fees (Goncharov et al., 2014). Similarly, fair value exposure of Australian real estate firms may decrease audit fees and fair value adjustments may increase them (Sangchan et al., 2020). Contrastingly, Hsu and Wu (2019) find that investment property fair values of Chinese firms contribute positively to the absolute value of audit fees.

Evidence regarding the earnings variability of fair value measurements remains low. Where available, the evidence is mostly descriptive and obtained from regulatory-specific research designs — for example, samples include financial items and financial industry-related firms (financial settings) (Barth et al., 1995; Bernard et al., 1995; Couch et al., 2017; Duh et al., 2012; Fiechter, 2011; Hodder et al., 2006; Kohlbeck & Warfield, 2010). Concerning the relation between investment properties and earnings variability as well as earnings smoothing, the literature offers only initial indications. The results from Chen et al. (2020) and Dietrich et al. (2001) can be interpreted as managers exploiting fair value measurement of investment properties for earnings smoothing, but the evidence was obtained using special settings from pre-IFRS UK and China. Changes in benchmarks such as earnings (Chen et al., 2020; Dietrich et al., 2001) and net asset values (Dietrich et al., 2001) seem inversely associated with fair value-related outcomes. Furthermore, firms also seem to apply the fair value or historical cost regime to their investment property sales to decrease earnings variability according to Dietrich et al.'s (2001) untabulated results. Muller et al. (2011) compare different settings and indicate that the earnings variability of investment property disposals may differ across reporting regimes.

2.2. Hypotheses development

Managers have opportunities to use discretionary financial reporting decisions or to take strategic business decisions to intentionally affect financial reporting measurements, otherwise known as earnings management (Healy & Wahlen, 1999). Discretion in fair value measurements may offer one of those opportunities, especially fair value measurements of lower-level inputs of the IFRS 13 fair value hierarchy that are less verifiable and are therefore subject to discretionary managerial judgement. The literature provides earnings quality measures to investigate such behavior and decision usefulness empirically (Dechow & Schrand, 2004; Dechow et al., 2010). Earnings quality measures refer to market perceptions — *market-based* measures, or financial reporting items — *accounting-based* measures (Francis et al., 2004). Fair value research often applies market-based measures (Barth et al., 2001; Holthausen & Watts, 2001). Because besides being market-based, previous fair value research is predominantly related to US-based financial settings (Thesing & Velte, 2021), this study recognizes a research gap in investigating earnings management behavior via accounting-based earnings quality measures of non-US-based firms in non-financial settings.

[2] According to IFRS 13, depending on the availability of information, inputs to fair value measurements are categorized into three levels. Along the levels of this fair value hierarchy (from Level 1 to Level 3), estimating fair value measurements requires additional judgement and becomes more subjective. Therefore, this study designates lower-level (Level 3, or Level 2 and Level 3) fair value measurements as less verifiable, more subjective, or discretionary.

This study uses a sample of real estate firms that, under IFRS, are subject to fair valuing of their investment properties according to IAS 40, to investigate earnings quality that may be affected by earnings management. Real estate managers have both incentive and opportunity to exploit investment property fair values for three reasons. First, if firms elect to apply the fair value model to investment properties as one of the few explicit voting rights allowed within IFRS, they recognize related fair value adjustments in the profit and loss statement (IAS 40.35). Consequently, the exercise of managerial discretion in fair value adjustments may affect firms' earnings to a greater or less extent. Second, investment properties make up a large proportion of real estate firms' assets (Müller et al., 2015). Therefore, managerial discretion in fair value adjustments has the potential to alter earnings significantly and thereby influence financial statement users' decision-making. Third, estimating investment property fair values requires great managerial discretion because they usually rely on lower-level inputs of the fair value hierarchy (Dietrich et al., 2001; Goncharov et al., 2014; PwC, 2017).

This study investigates the earnings variability, a proxy that some financial setting-related fair value research studies use as a cornerstone of further analyses (Barth et al., 1995; Bernard et al., 1995; Hodder et al., 2006). As a result of fair value accounting, certain assets' earnings variability may be influenced by technical reasons or because managers exert discretion. Technically, earnings are more variable if fair value adjustments reflect potentially volatile economic reality (inherent volatility) (Barth, 2004). Nevertheless, historical cost accounting can also induce earnings variability. On the one hand, some economic circumstances require adjustments to the carrying amount of investment properties because, under the cost model, these assets are generally subject to IAS 16, among others (IAS 40.56), and thereby subject to the IAS 36 impairment testing regulation (IAS 16.30, IAS 36.2). On the other hand, firms recognize valuation gaps between the carrying amount of an investment property according to the cost model and its fair value at the time of its disposal also induces earnings variability (Barth, 2004). Furthermore, earnings variability under fair value accounting depends on the accuracy of the estimation model and is therefore subject to estimation biases (estimation error volatility) (Barth, 2004). Consequently, earnings management influences the estimation error volatility and thereby also earnings variability.

Of the different earnings characteristics, research has elaborated that managers prefer fewer earnings fluctuation, i.e., smoother earnings, and thereby actively engage in earnings smoothing (Barnea et al., 1976; Beidleman, 1973; Dechow & Schrand, 2004; Ewert & Wagenhofer, 2011; Kamin & Ronen, 1978; Trueman & Titman, 1988): motivated by business or personal targets, they use their information advantage to smooth out fluctuations in earnings that are irrelevant or that may hinder decision-makers, or increase firm valuations because smoother earnings decrease perceived risk. This study may produce different results from those from existing fair value research on earnings variability in financial settings: Danbolt and Rees (2008) indicate that earnings management behavior in financial fair values and investment property fair values is not the same. Chen et al. (2020) and Dietrich et al. (2001) suggest that real estate managers engage in earnings smoothing that may decrease earnings variability.

In summary, this study presumes to be one of the first studies to investigate the earnings performance levels of global real estate firms across several years to indicate whether lower-level fair value measurements are used for earnings management. Increased earnings variability suggests more earnings fluctuations because of inherent volatility or estimation error volatility, whereas smoother earnings suggest earnings management. Therefore, this study investigates whether investment property fair values are determinants of earnings variability and earnings smoothness. Accordingly, the following hypothesis is stated in the null form:

H1: Fair value measurement of investment properties is not related to earnings variability or earnings smoothness.

This study also includes an investigation of whether governance has an effect on real estate firms' distribution of earnings. Building on the work of Shleifer and Vishny (1997), governance may influence managerial behavior. Firm-related corporate governance, such as board and auditor characteristics, the relationship between auditor and client, as well as other monitoring measures, can enhance the earnings quality of lower-level fair value measurements (Riedl & Serafeim, 2011; Siekkinen, 2017a; Song et al., 2010). In the property industry, similar effects are found for external appraisers but appear inconsistently for Big 6 auditors (Dietrich et al., 2001; Muller & Riedl, 2002).

This study exploits its cross-country setting to investigate the influence of governance on managerial behavior at the institutional level instead of the more commonly investigated firm level in fair value settings (Jain & Jamali, 2016). One example of classical institutional governance is stronger investor protection. In fair value research, Alexeyeva and Mejia-Likosova (2016) suggest fair value measurements at the lower level may be more reliable in contexts of stronger investor protection. This governance proxy is also found to decrease earnings smoothing in earnings management research (Leuz et al., 2003). Following these two studies and the assumption that some form of earnings smoothing is prevalent among investment property fair values, stronger investor protection would decrease this earnings management behavior of real estate firms that apply the fair value model. Consequently, if an earnings smoothing effect is somewhat limited through stronger investor protection, earnings are expected to be more variable.

Extant research suggests that macroeconomic conditions affect managerial behavior and mitigate, at least partially, principal-agency-related problems (Chang et al., 2015; Giroud & Mueller, 2011). This study also introduces two additional macroeconomic-related conditions that are expected to influence managerial behavior in making assumptions and estimations for fair value measurements. Different stages of regulatory processes and the degree of information transparency regarding the real estate sector are

treated as sector-specific institutional governance proxies because they are expected to influence the fair value measurement. Greater regulatory developments may affect the valuation models of this sector because they can substantially influence the business of real estate firms in their highly regulated environment (Deutsche Wohnen, 2019; Gecina, 2019; Vonovia, 2020). Firms may apply valuation methodologies such as discounted cash flow with a long horizon (Klépierre, 2019; Unibail-Rodamco, 2019; Vonovia, 2020). If they do, their managers are obliged to account for these macroeconomic risks and have to include additional information. Theoretically, valuation models account for macroeconomic risks and available information, especially when information is updated (Damodaran, 2006). Similarly, IFRS 13 requires that the valuation inputs to these models, which are usually categorized at the lower levels of the fair value hierarchy (Dietrich et al., 2001; Goncharov et al., 2014; PwC, 2017), must particularly account for risk and best information available (IFRS 13.86-89).

Consequently, if managers do not exploit greater information availability and if they do not hide relevant regulatory developments, these institutional characteristics are assumed to cause higher earnings variability. As this is one of the first studies to investigate this effect in this global context, it may provide fruitful evidence and encourage researchers to explore the use of different institutional governance proxies in the future, although there may be numerous confounding effects at the institutional level, such as country-specific market dynamics, the maturity of the real estate business, or the development stage of the country. Therefore, the second hypothesis is stated:

H2: Institutional governance increases earnings variability and decreases the earnings smoothness of real estate firms.

3. RESEARCH METHODOLOGY

3.1. Sample

Table 1 presents the sample selection. The sample period of this cross-country setting begins in 2006, one year after widespread mandatory IFRS adoption in Europe, which is expected to be the most important region for the comprehensive application of IAS 40[3]; it ends in 2017. Data collection includes identifiers, currency, applied GAAP, fiscal year ends, locations, and industry code according to the Global Industry Classification Standard (GICS) for all worldwide currently available active real estate firms (GICS sector code 60) from the Thomson Reuters/ Refinitiv Eikon in August 2021. Observations with missing data or firms without quarterly fiscal year ends are dropped. Yearly financial information items are retrieved from Thomson Reuters/Refinitiv databases Worldscope and Datastream. The study drops 12,312 observations where firms do not apply one of the two dominant international reporting regimes — IFRS, which allows the fair value model, and US-GAAP, which is used to maintain a large control group of firms that apply the cost model (for related procedures see Goncharov et al., 2014; Liang & Riedl, 2014). A further 4,118 observations are deleted because it is not possible to determine whether the firm applies the fair value or the cost model for measuring investment properties. An additional 426 observations are deleted where firms show fewer than four non-missing values of earnings before taxes (EBT), operating cash flow (OCF), and sales for calculating variabilities of these variables or because they show variabilities of zero. Moreover, 4,260 observations are dropped because of missing or implausible values. This sampling procedure results in a final sample of 2,658 observations, of which about 75% are identified as applying the fair value model (about 92% among IFRS appliers).

Table 1. Sample selection

	Number of observations
Identified observations in Thomson Reuters/Refinitiv Eikon	23,774
Less: firms that do not apply IFRS or US-GAAP	-12,312
Less: firms without unambiguously determinable measurement model of investment properties	-4,118
Less: firms without sufficient data to calculate variabilities or with variabilities of zero	-426
Less: other missing values of financial information, zero values for lagged investment properties, or implausible amounts of latter (greater than lagged total assets)	-3,394
Less: missing values of stock returns and house price index returns	-866
Number of observations for final samples	2,658
Thereof observations of firms that apply IFRS	2,176
Thereof observations of firms that apply the fair value model	1,995

3.2. Empirical methodology

3.2.1. Dependent variables

This study analyzes real estate firms' determinants of earnings variability (*EarnVar*) and earnings smoothness (*EarnSmo*) using an ordinary least squares regression model with standard errors clustered by the Reuters Instrument Code. Inspired by Couch et al. (2017) and Fiechter (2011), earnings variability is calculated using firms' operating income. To obtain the variable EarnVar, the standard deviation of each firm's EBT over a maximum period of 2006 to 2017 is scaled by one-year-lagged market value and standardized with its natural logarithm[4]. Related to Dechow et al. (2010) and Francis et al. (2004), earnings smoothness is the ratio of the standard deviation of an income measure to the standard deviation of a cash flow measure. This study obtains the variable EarnSmo by the natural logarithm of the firm-wide ratio of variability of EBT to the variability of OCF. Table 2 provides detailed descriptions of the variables.

[3] Previous investment property-related studies often focus on European countries as primary samples (Goncharov et al., 2014; Israeli, 2015).

[4] To provide robustness in calculating variability measures, this study reruns analyses of Models 3.1, 3.2, 4.1, and 4.2 by calculating variabilities of output and control variables for two sub-periods, 2006 to 2011 and 2012 to 2017. Similar results are found (untabulated). The calculation of variability measures is always subject to numerous limitations because it needs to include the aggregation of several periods.

Table 2. Variable description

Variable	*Description*
$EarnVar_{i,t}$	Earnings variability: Natural logarithm of the ratio of the standard deviation of earnings before taxes (WC01401) to one-year-lagged market value (MVC, or MV if missing value of MVC).
$EarnSmo_i$	Earnings smoothness: Natural logarithm of the ratio of the standard deviation of earnings before taxes (WC01401) to the standard deviation of operating cash flow (WC04860).
d_FV_i	Fair value model dummy: Equals 1 if a firm yield at least one non-zero and non-missing value of unrealized gains and losses of investment properties (WC18572) and the firm similarly yields only zero or missing values of depreciation of investment properties (WC18213); the variable equals 0 if a firm yields at least one non-zero and non-missing value of depreciation of investment properties (WC18213) and the firm similarly yield only zero or missing values of unrealized gains and losses of investment properties (WC18572).
$IP_{i,t-1}$	Investment properties: Natural logarithm of one-year-lagged investment properties (WC18300) (*IPAmount*) or ratio of one-year-lagged investment properties (WC18300) to one-year-lagged total assets (WC02999) (*IPRatio*).
$OCFVar_{i,t}$	Cash flow variability: Natural logarithm of the ratio of the standard deviation of operating cash flows (WC04860) to one-year-lagged market value (MVC, or MV if missing value of MVC).
$SalesVarVMod_{i,t}$ $SalesVarSMod_i$	Sales variability: Natural logarithm of the standard deviation of sales (WC01001); in case of variability model, the variable equals the natural logarithm of the ratio of the standard deviation of sales (WC01001) to one-year-lagged market value (MVC, or MV if missing value of MVC).
$TotalAssets_{i,t-1}$ $OtherAssets_{i,t-1}$	Size: Natural logarithm of one-year-lagged total assets (WC02999); if the variable *IPAmount* is applied in that model, then *OtherAssets* is applied, which equals the natural logarithm of one-year-lagged investment properties (WC18300) minus one-year-lagged total assets.
$Leverage_{i,t-1}$	Leverage: Ratio of one-year-lagged total liabilities (WC03351) to one-year-lagged total assets (WC02999).
$d\_Loss_{i,t}$	Loss dummy: Equals 1 if earnings before taxes (WC01401) are negative and 0 otherwise.
d_REIT_i	REIT dummy: Equals 1 if a firm's GICS industry code equals 601010 and 0 otherwise.
$abs\_R_{i,t}$	Stock return: Absolute value of a firm's 12-month stock returns, calculated using item RI.
$abs\_Index_{i,t}$	House price index return: Absolute value of 12-month returns of OECD's nominal house price index at a firm's location.
$d\_LaPorta\_English_i$	Investor protection dummy: Equals 1 if the law of a firm's location is classified as English legal origin and 0 otherwise.
$d\_Regulatory_i$	Regulatory process dummy: Equals 1 if Doing Business' score dealing with construction permits of 2011 (or later if unavailable) of a firm's location is greater than or equal to the sample median among fair value model-appliers and 0 otherwise.
$d\_Information_i$	Information environment dummy: Equals 1 if Doing Business' transparency of information index of 2016 (or later if unavailable) of a firm's location is greater than or equal to the sample median among fair value model-appliers and 0 otherwise.
$d\_RegInfo_i$	Regulatory process and information environment dummy: Equals 1 if both variables, *d_Regulatory* and *d_Information*, equal 1 and 0 otherwise.
$d\_PreIFRSHC_i$	Fair value experience dummy: Equals 1 for a firm that is located in a country where fair valuing investment properties was prohibited pre-IFRS and 0 otherwise.

3.2.2. Experimental and control variables

Dummy variables are widespread in studies designed to investigate the effect of fair value accounting (Couch et al., 2017; Goncharov et al., 2014). Similarly, this study models the dummy variable *d_FV* to investigate the effect of the fair value model. It equals one if the firm is perceived to apply the fair value model and zero if the firm is perceived to apply the cost model according to whether items for depreciation or fair value adjustments are filled in Thomson Reuters/Refinitiv Worldscope. If applying the fair value model increases earnings variability and decreases earnings smoothness, the coefficients on *d_FV* are expected to be positive (note that positive coefficients in the smoothness model indicate less smooth earnings). Furthermore, this study attempts to estimate the incremental value of investment properties. Therefore, the variable *IP* is applied that proxies for investment properties, either as the natural logarithm of one-year-lagged investment properties (*IPAmount*) or as the ratio of one-year-lagged investment properties to one-year-lagged total assets (*IPRatio*). Similar to the work of Hsu and Wu (2019), who apply an interaction term, this study employs *d_FV*IP* to estimate the incremental value of investment property fair values. If these assets increase earnings variability and decrease earnings smoothness, the coefficients on *d_FV*IP* are expected to be positive. See Eq. (1) and (2) for the variability and smoothness models that apply the interaction term. Thereby, the letter *i* is a subscript for firm and *t* for a year[5].

[5] Untabulated results show that calculating variables as time-invariant means for each firm provides similar results to those provided in Table 6. Thereby, robust standard errors are applied and the dummy variable for loss observations is replaced by the mean of EBT.

$$EarnVar_{i,t} = \beta_0 + \beta_1 d\_FV_i * IP_{i,t-1} + \beta_2 d\_FV_i + \beta_3 IP_{i,t-1} + \beta_4 OCFVar_{i,t} + \beta_5 SalesVarVMod_{i,t} + \beta_6 TotalAssets_{i,t-1} + \beta_7 Leverage_{i,t-1} + \beta_8 d\_Loss_{i,t} + \beta_9 d\_REIT_i + \beta_{10} abs\_R_{i,t} + \beta_{11} abs\_Index_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$EarnSmo_i = \beta_0 + \beta_1 d\_FV_i * IP_{i,t-1} + \beta_2 d\_FV_i + \beta_3 IP_{i,t-1} + \beta_4 SalesVarSMod_i + \beta_5 TotalAssets_{i,t-1} + \beta_6 Leverage_{i,t-1} + \beta_7 d\_Loss_{i,t} + \beta_8 d\_REIT_i + \beta_9 abs\_R_{i,t} + \beta_{10} abs\_Index_{i,t} + \varepsilon_{i,t} \quad (2)$$

This study controls for size using the natural logarithm of one-year-lagged total assets (*TotalAssets*). If the model applies the variable *IPAmount*, *OtherAssets* is applied, for which one-year-lagged investment properties are subtracted from one-year-lagged total assets. Related to Couch et al. (2017), the variability model controls for OCF variability and sales variability. The variables *OCFVar* and *SalesVarVMod* are calculated by the natural logarithm of the ratio of the standard deviation of OCF and sales, respectively, to one-year-lagged market value. The smoothness model controls for sales variability (*SalesVarSMod*) by the natural logarithm of the standard deviation of a firm's sales. It omits a control for OCF variability since this is already incorporated into the earnings smoothness measure. Additionally, each model in this study controls for firms' capital structure using the one-year-lagged ratio of total liabilities to total assets (*Leverage*), for firms' status of being a REIT or not (*d_REIT*), and for loss observations (*d_Loss*). Furthermore, the models control for firms' economic performance using the absolute value of firms' 12-month stock returns (*abs_R*) and the absolute value of the 12-month return of the Organisation for Economic Co-operation and Development's (OECD's) nominal house price index[6] at the location of the firm (*abs_Index*)[7]. Both variables are included as absolute values because their magnitude may affect earnings fluctuations, rather than their sign. Continuous variables are winsorized at the top and bottom 1%.

3.2.3. Governance variables

This study uses three proxies for institutional governance. The first proxy, investor protection (*d_LaPorta_English*), equals one if the firm's location is subject to a legal system originating from the English legal tradition, i.e., common law, because investor protection is found to be strongest there (La Porta et al., 1997, 1998), and zero otherwise. The legal origin of locations is classified according to La Porta et al.'s (1997, 1998) papers because of their prominence (Alexeyeva & Mejia-Likosova, 2016; Leuz et al., 2003), and locations that are not listed in these papers are classified using other sources.

Furthermore, this study applies institutional governance variables of property-specific regulatory processes (*d_Regulatory*) and property-specific information environments (*d_Information*) for each location. These variables are derived from historical data in the Doing Business reports published by the International Bank for Reconstruction and Development (The World Bank)[8]. These annual reports provide information and indicators about various dimensions of business-related regulatory environments in many countries (The World Bank, 2017)[9]. To proxy the regulatory processes, this study exploits each firm's dealing with construction permits score, which aggregates measures of construction permitting efficiency and building quality control. To construct a time-invariant dummy variable, *d_Regulatory* equals one if the specific score is greater than or equal to the sample median of 2011, which reflects the middle of the sample period (2006 to 2017), and zero otherwise. To proxy for the overall information environment in the real estate sector, this study exploits the transparency of the information index regarding property and land administration in particular. The time-invariant dummy variable *d_Information* equals one if the specific index is greater than or equal to the sample median of 2016, because 2016 is the first year for which the index is provided, and zero otherwise. If either of the two previous variables is not available for that specific year but is available for later years, the next available one is used. Additionally, if either is available only for a specific region within a country, this study uses the information as a proxy for the whole country. Since governance is perceived to decrease earnings smoothing and increase earnings variability, the coefficients on all three institutional governance proxies are expected to be positive.

4. EMPIRICAL RESULTS

4.1. Descriptive statistics and correlation analyses

Rows 1 to 16 of Table 3 provide descriptive statistics for variables of the variability model while rows 17 to 18 provide descriptive statistics for variables of the smoothness model. The mean of the numeric variables is between the first and third quartiles, indicating no strong skewness.

[6] See https://data.oecd.org/price/housing-prices.htm.
[7] Because the variable *abs_Index* does not account for diversified investment property portfolios across several locations, *abs_Index* may be omitted.
[8] See https://www.doingbusiness.org/en/custom-query.
[9] The Doing Business reports are well-known in economic research (Klapper & Love, 2011; Tarasov, 2012).

Table 3. Descriptive statistics

	Variable	Observations	Mean	Std. Dev.	P10	P25	P50	P75	P90
(1)	EarnVar	2,658	-2.32	1.29	-4.08	-3.17	-2.23	-1.53	-0.79
(2)	d_FV	2,658	0.75	0.43	0.00	1.00	1.00	1.00	1.00
(3)	IPAmount	2,658	13.22	1.88	10.68	12.12	13.46	14.58	15.44
(4)	IPRatio	2,658	0.78	0.23	0.47	0.72	0.86	0.94	0.97
(5)	OCFVar	2,658	-2.96	1.18	-4.27	-3.84	-3.14	-2.30	-1.37
(6)	SalesVarVMod	2,658	-2.54	1.23	-3.92	-3.38	-2.71	-1.88	-0.80
(7)	TotalAssets	2,658	13.58	1.62	11.37	12.50	13.70	14.77	15.61
(8)	OtherAssets	2,658	11.55	1.81	9.10	10.26	11.71	12.80	13.86
(9)	Leverage	2,658	0.52	0.20	0.26	0.40	0.54	0.65	0.76
(10)	d_Loss	2,658	0.19	0.39	0.00	0.00	0.00	0.00	1.00
(11)	d_REIT	2,658	0.57	0.50	0.00	0.00	1.00	1.00	1.00
(12)	abs_R	2,658	0.25	0.24	0.03	0.08	0.18	0.33	0.53
(13)	abs_Index	2,658	0.06	0.03	0.01	0.03	0.05	0.07	0.10
(14)	d_LaPorta_English	1,995	0.47	0.50	0.00	0.00	0.00	1.00	1.00
(15)	d_Regulatory	1,995	0.51	0.50	0.00	0.00	1.00	1.00	1.00
(16)	d_Information	1,995	0.52	0.50	0.00	0.00	1.00	1.00	1.00
(17)	EarnSmo	2,658	0.65	0.97	-0.66	-0.01	0.71	1.32	1.85
(18)	SalesVarSMod	2,658	10.22	1.59	8.07	9.13	10.35	11.27	12.25

Note: Table 3 shows the descriptive statistics for main variables of the variability model. Descriptive statistics for rows 17 and 18 are obtained from the smoothness model. See Table 2 for variable definitions.

The median of *EarnVar* equals -2.23. The negative sign depends on its standardization. The variables *OCFVar* and *SalesVarVMod* show similar medians (-3.14 and -2.71). Regarding investment properties and other assets, OtherAssets shows a smaller median (11.71) than IPAmount (13.46). The latter value equals €0.7bn transformed in total amounts. The median of *IPRatio* is 0.86. Further summary statistics show that more than half of the observations are retrieved from REITs. Table 4 shows governance variable statistics and summarizes firms' locations and the expressions of the dummy variables *d_LaPorta_English, d_Regulatory*, and *d_Information*. Comparing the expressions of *d_Regulatory* and *d_Information* if one of the two dummies equals one and the other equals zero, 36% (not tabulated) of the observations in both models yield different values for both variables.

Table 4. Detailed descriptive statistics of governance variables

Location	Observations	d_LaPorta_English	d_Regulatory		d_Information	
		= 0 or 1	Value	= 0 or 1	Value	= 0 or 1
Austria	6	0	70.68	0	3.00	0
Australia	147	1	83.71	1	3.50	1
Belgium	156	0	73.54	0	4.00	1
Brazil	26	0	44.56	0	3.70	1
Canada	128	1	71.18	0	3.00	0
Switzerland	63	0	74.23	1	2.50	0
Chile	9	0	62.38	0	3.50	1
China	10	0	13.39	0	3.95	1
Germany	101	0	82.85	1	2.00	0
Denmark	28	0	91.59	1	3.00	0
Spain	21	0	63.21	0	3.00	0
Finland	9	0	80.09	1	3.00	0
France	149	0	76.87	1	3.00	0
United Kingdom	286	1	85.72	1	5.00	1
Greece	25	0	65.43	0	1.50	0
Hungary	15	0	68.99	0	3.50	1
Ireland	5	1	60.90	0	4.50	1
Israel	241	1	68.02	0	3.00	0
Iceland	4	0	77.51	1	4.00	1
Italy	11	0	62.92	0	4.50	1
Lithuania	6	0	75.78	1	4.50	1
Luxembourg	16	0	78.58	1	3.50	1
Mexico	25	0	59.75	0	3.92	1
Netherlands	68	0	65.78	0	6.00	1
Norway	35	0	70.75	0	3.50	1
New Zealand	50	1	83.98	1	4.00	1
Poland	22	0	54.91	0	3.00	0
Russia	10	0	25.90	0	6.00	1
Sweden	158	0	79.85	1	4.50	1
Turkey	77	0	51.53	0	2.50	0
United States of America	1	1	80.04	1	3.20	0
South Africa	87	1	67.24	0	3.00	0

Note: Table 4 shows whether the dummy variables d_LaPorta_English, d_Regulatory, and d_Information equal one or zero for each location and corresponding expressions of values for both latter variables. It also shows the number of observations for each variable and location. See Table 2 for variable definitions.

Table 5 shows the correlation coefficients of the main model variables. The diagonal line separates the results of the smoothness model (above) from those of the variability model (below). Cash flow variability and earnings variability are positively correlated, which indicates lower earnings smoothing among real estate firms. If earnings are smoothed, the correlation is expected to be negative.

Additionally, *d_FV* is positively correlated with *EarnVar* and *EarnSmo*, suggesting that applying the fair value model to investment properties induces higher earnings variability and does not seem to be exploited for earnings smoothing. Table 5 also presents values for the variance inflation factors (VIFs). Since the greatest VIF is 4.52, the models in this study are not expected to suffer from multicollinearity.

Table 5. Correlation coefficients

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	EarnVar	1													
(2)	EarnSmo	0.48***	1												
(3)	d_FV	0.53*** (1.25)	0.52*** (1.28)	1				-0.27***							
(4)	IPAmount	-0.29*** (2.75)	0.17*** (2.64)	-0.11***	1			0.72***							
(5)	IPRatio	-0.14*** (1.35)	0.28*** (1.35)	0.08***	0.51***	1		0.01							
(6)	OCFVar	0.69*** (4.52)		0.15***	-0.47***	-0.39***	1								
(7)	SalesVarVMod, SalesVarSMod	0.62*** (3.95)	-0.15*** (3.38)	0.05***	-0.37***	-0.36***	0.85***	1	0.82***	0.77***	0.21***	-0.09***	0.19***	-0.01	-0.01
(8)	TotalAssets	-0.29*** (1.45)	0.10*** (3.89)	-0.15***	0.94***	0.24***	-0.41***	-0.30***	1						
(9)	OtherAssets	-0.20*** (1.96)	-0.08*** (2.68)	-0.22***	0.64***	-0.29***	-0.15***	-0.08***	0.81***	1					
(10)	Leverage	0.27*** (1.50)	-0.06*** (1.26)	-0.01	0.14***	-0.02	0.35***	0.40***	0.17***	0.17***	1				
(11)	d_Loss	0.33*** (1.27)	0.04** (1.23)	0.01	-0.18***	-0.16***	0.32***	0.30***	-0.16***	-0.04**	0.17***	1			
(12)	d_REIT	-0.33*** (1.37)	0.01 (1.37)	-0.22***	0.30***	0.31***	-0.37***	-0.30***	0.24***	0.07***	-0.26***	-0.08***	1		
(13)	abs_R	0.34*** (1.21)	0.03* (1.17)	0.06***	-0.14***	-0.16***	0.34***	0.31***	-0.10***	-0.01	0.17***	0.18***	-0.19***	1	
(14)	abs_Index	0.02 (1.11)	0.02 (1.11)	0.07***	-0.01	0.04*	0.00	0.01	-0.02	-0.05**	-0.06***	-0.03	0.05**	0.06***	1

*Note: ***, **, * denote significance (two-tailed) at the 0.01, 0.05, and 0.10 levels. Table 5 shows the correlation coefficients of main variables and the VIFs in brackets. VIFs are based on models that apply IPAmount, except for (5) and (8). Values below the diagonal line, (3) to (14) (except for column (2)), present correlation coefficients of the variability model (2,658 observations). Values above the diagonal line and values in column (2) present correlation coefficients of the smoothness model (2,658 observations). Grey coloured boxes are not relevant. See Table 2 for variable definitions.*

4.2. Main results

First, this study investigates the consequences of fair value application. Models 1.1 and 1.2 of Table 6 present the regression results of the effect of the fair value model dummy *d_FV* on the earnings variability (variability model denoted with ".1") and earnings smoothness (smoothness model denoted with ".2"). The coefficients on *d_FV* are significantly positive, indicating that applying the fair value model induces higher variability than applying the cost model and that it does not seem to be exploited for attempted managerial smoothing (note that positive coefficients in the smoothness model indicate less smooth earnings).

Furthermore, the variable *TotalAssets* seems unrelated to earnings variability in Model 1.1 and shows a significantly positive sign in the smoothness model (Model 1.2). The first result suggests that a firm's size according to its assets does not affect earnings variability, a variable that is already scaled by market value (see Section 3.2.1). The second result, a positive relation between *TotalAssets* and *EarnVar*, indicates that a firm's size according to its assets contributes to less smooth earnings and appears more notable. This finding implicitly leads to the first research question of this study, i.e., whether real estate firms smooth their earnings using investment property fair values because they have incentive and opportunity to do so, e.g., these assets are highly discretionary (Dietrich et al., 2001; Goncharov et al., 2014; PwC, 2017) and account for the largest share of real estate firms' total assets (Israeli, 2015; Müller et al., 2015). Therefore, Models 2.1 and 2.2 disentangle the size effect observed in Model 1.2. The significantly positive coefficients on *IPAmount* suggest that among different assets of real estate firms, investment properties increase earnings variability and decrease earnings smoothness.

Second, this study investigates the incremental effect of investment property fair values on earnings. Therefore, Models 3.1 and 3.2 of Table 6 apply an interaction term *d_FV*IPAmount*, which consists of the fair value model dummy, *d_FV*, and the number of investment properties, *IPAmount*. The coefficients on *d_FV*IPAmount* are significantly positive. To strengthen these results, Models 4.1 and 4.2 apply an interaction term between the fair value model dummy and the relation of investment property to total assets, *d_FV*IPRatio*. The coefficients on this interaction term are also significantly positive. Consequently, increasing the amount of investment property fair values, and thus their increasing proportion of total assets, seems to increase earnings variability and decrease earnings smoothness. Despite the significantly positive coefficient on *d_FV*IPAmount*, the coefficient on *d_FV* is significantly negative in Models 3.1 and 3.2. To shed light on this negative sign, Figure 1 plots the linear prediction of earnings variability from *IPAmount* separated by both expressions of *d_FV*, 1 and 0. It shows that among firms with smaller amounts of investment properties, those that apply the fair value model show insignificant smaller earnings variability, on average, than those which apply the cost model. With increasing amounts of investment properties, this difference diminishes and increases inversely.

Table 6. Main results

Variable	*Model 1.1*	*Model 1.2*	*Model 2.1*	*Model 2.2*	*Model 3.1*	*Model 3.2*	*Model 4.1*	*Model 4.2*
*d_FV*IPAmount*					0.21***	0.23***		
					(4.41)	(4.50)		
*d_FV*IPRatio*							1.39***	1.15***
							(4.77)	(3.26)
d_FV	1.34***	1.03***	1.27***	1.00***	-1.48**	-2.00***	0.26	0.15
	(14.52)	(9.57)	(13.19)	(9.19)	(-2.23)	(-2.83)	(1.07)	(0.53)
IPAmount			0.09***	0.28***	-0.05	0.12**		
			(3.64)	(10.11)	(-1.10)	(2.53)		
IPRatio							-0.49*	-0.24
							(-1.77)	(-0.72)
OCFVar	0.40***		0.43***		0.44***		0.42***	
	(6.26)		(6.93)		(7.80)		(6.88)	
SalesVarVMod	0.20***		0.22***		0.23***		0.24***	
	(3.36)		(3.63)		(4.21)		(4.04)	
SalesVarSMod		-0.33***		-0.24***		-0.21***		-0.26***
		(-7.75)		(-5.67)		(-5.44)		(-6.30)
TotalAssets	0.02	0.38***					0.03	0.33***
	(0.63)	(9.30)					(0.95)	(7.84)
OtherAssets			-0.07***	-0.01	-0.07***	-0.02		
			(-2.96)	(-0.30)	(-3.33)	(-0.53)		
Leverage	0.16	-0.33	0.04	-0.39*	0.05	-0.34*	0.03	-0.40*
	(0.78)	(-1.63)	(0.18)	(-1.86)	(0.26)	(-1.87)	(0.13)	(-1.95)
d_Loss	0.42***	0.22***	0.43***	0.23***	0.42***	0.23***	0.43***	0.26***
	(7.12)	(3.38)	(7.57)	(3.56)	(7.72)	(3.75)	(7.72)	(4.05)
d_REIT	0.03	0.16*	-0.02	0.08	0.04	0.15*	0.01	0.11
	(0.40)	(1.78)	(-0.29)	(0.87)	(0.55)	(1.71)	(0.11)	(1.18)
abs_R	0.54***	0.27***	0.55***	0.30***	0.51***	0.26***	0.54***	0.29***
	(7.29)	(3.46)	(7.63)	(3.89)	(7.49)	(3.55)	(7.91)	(3.98)
abs_Index	-0.17	-0.05	-0.21	-0.17	-0.11	-0.05	-0.13	-0.04
	(-0.28)	(-0.07)	(-0.35)	(-0.25)	(-0.20)	(-0.08)	(-0.22)	(-0.06)
Constant	-1.88***	-1.51***	-1.76***	-0.86*	0.08	1.10	-1.43***	-1.22**
	(-3.77)	(-2.76)	(-3.82)	(-1.65)	(0.13)	(1.56)	(-2.89)	(-2.22)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,658	2,658	2,658	2,658	2,658	2,658	2,658	2,658
Adjusted R^2	0.717	0.415	0.723	0.417	0.743	0.458	0.735	0.444

*Note: ***, **, * denote significance (two-tailed) at the 0.01, 0.05, and 0.10 levels. t-statistics are presented in brackets. Table 6 presents the main results of this study, both for the variability model (.1) and for the smoothness model (.2). See Table 2 for variable definitions. Models in Table 6 include the final sample as shown in Table 1.*

4.3. Governance results

Models 5.1 to 7.2 in Table 7 include governance variables to provide indications of whether institutional governance affects earnings variability and earnings smoothness. The sample is restricted to fair value model-appliers (*d_FV* = 1), which reduces the number of observations to 1,995.

Table 7. Governance results

Variable	*Model 5.1*	*Model 5.2*	*Model 6.1*	*Model 6.2*	*Model 7.1*	*Model 7.2*
d_LaPorta_English	0.16**	0.25***				
	(2.15)	(2.97)				
d_Regulatory			0.35***	0.38***		
			(5.27)	(4.72)		
d_Information					0.16**	0.20**
					(2.30)	(2.40)
IPAmount	0.16***	0.36***	0.14***	0.34***	0.15***	0.34***
	(6.02)	(12.49)	(5.14)	(11.29)	(5.32)	(11.64)
OCFVar	0.46***		0.44***		0.44***	
	(7.68)		(7.81)		(7.27)	
SalesVarVMod	0.19***		0.19***		0.21***	
	(3.29)		(3.60)		(3.73)	
SalesVarSMod		-0.19***		-0.21***		-0.20***
		(-4.48)		(-5.02)		(-4.53)
OtherAssets	-0.08***	-0.05	-0.07***	-0.02	-0.07***	-0.02
	(-4.04)	(-1.59)	(-3.44)	(-0.80)	(-3.27)	(-0.79)
Leverage	0.11	-0.32	0.15	-0.26	0.20	-0.17
	(0.55)	(-1.53)	(0.84)	(-1.32)	(1.00)	(-0.80)
d_Loss	0.41***	0.29***	0.40***	0.27***	0.40***	0.27***
	(7.74)	(4.23)	(7.72)	(4.21)	(7.54)	(3.92)
d_REIT	0.01	0.09	0.05	0.15*	0.04	0.14
	(0.17)	(0.91)	(0.66)	(1.65)	(0.55)	(1.51)
abs_R	0.57***	0.32***	0.55***	0.29***	0.55***	0.29***
	(7.74)	(3.95)	(7.47)	(3.48)	(7.48)	(3.67)
abs_Index	-0.35	-0.70	0.55	0.55	0.24	0.25
	(-0.64)	(-1.23)	(1.03)	(0.91)	(0.42)	(0.40)
Constant	-1.46***	-1.00***	-1.69***	-1.23***	-1.57***	-1.14***
	(-4.89)	(-2.90)	(-5.97)	(-3.67)	(-5.19)	(-3.27)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,995	1,995	1,995	1,995	1,995	1,995
Adjusted R^2	0.619	0.318	0.643	0.348	0.619	0.310

*Note: ***, **, * denote significance (two-tailed) at the 0.01, 0.05, and 0.10 levels. t-statistics are presented in brackets. Table 7 presents the governance results of this study, both for the variability model (.1) and for the smoothness model (.2). See Table 2 for variable definitions. Models in Table 7 include firms that apply the fair value model.*

The coefficients on the investor protection variable *d_LaPorta_English* are positive and significant, indicating that stronger investor protection increases earnings variability and decreases earnings smoothness. This is consistent with the notion that institutional governance, i.e., stronger investor protection, limits managerial discretion to smooth earnings (Leuz et al., 2003). The proxies for regulatory processes (*d_Regulatory*) and information availability (*d_Information*) also show positive and significant coefficients. This suggests that real estate firms have higher earnings variability and lower earnings smoothing in locations where there is greater regulation, and greater availability, of information in the real estate sector. More transparent information and regulatory developments do not seem to be exploited by real estate managers to smooth earnings; rather, they seem to induce earnings variability. Firms may have to update their valuation models more frequently due to stronger regulation and they have the information to do so. If higher earnings variability and less earnings smoothness is considered beneficial, the results are consistent with the evidence of fair value measurements in financial settings, which indicates that institutional governance increases earnings quality (Siekkinen, 2016; Yao et al., 2018).

4.4. Additional analyses

Models 8.1 to 10.2 in Table 8 show the results of additional analyses. The cross-country sample in this study is not bound to certain locations, as in other studies (Bandyopadhyay et al. 2017; Chen et al., 2020). The sample includes observations from all real estate firms with sufficient data, which includes locations with few observations. To restrict the influence of firms in specific settings, this study excludes non-EU and non-USA located firms from the subsample of Models 8.1 and 8.2 and obtains results similar to those in Models 3.1 and 3.2. Consequently, locations with few observations do not seem to confound the results of this study.

Table 8. Additional analyses

Variable	*Model 8.1*	*Model 8.2*	*Model 9.1*	*Model 9.2*	*Model 10.1*	*Model 10.2*
*d_FV*IPAmount*	0.27***	0.31***				
	(4.67)	(5.06)				
d_FV	-2.18***	-3.03***				
	(-2.66)	(-3.50)				
IPAmount	-0.07	0.12**	0.14**	0.47***	0.15***	0.34***
	(-1.23)	(2.06)	(2.55)	(7.13)	(5.33)	(11.32)
d_PreIFRSHC			0.02	-0.17		
			(0.12)	(-0.88)		
d_RegInfo					0.42***	0.49***
					(5.92)	(5.79)
OCFVar	0.40***		0.23**		0.45***	
	(5.46)		(2.04)		(7.85)	
SalesVarVMod	0.30***		0.19**		0.20***	
	(4.16)		(2.43)		(3.71)	
SalesVarSMod		-0.22***		-0.23***		-0.21***
		(-4.28)		(-2.70)		(-4.90)
OtherAssets	-0.04	0.00	-0.03	-0.03	-0.07***	-0.02
	(-1.29)	(0.07)	(-0.59)	(-0.47)	(-3.20)	(-0.59)
Leverage	-0.16	-0.64***	0.39	-0.86*	0.25	-0.10
	(-0.70)	(-2.68)	(0.90)	(-1.74)	(1.30)	(-0.53)
d_Loss	0.38***	0.19**	0.54***	0.44***	0.39***	0.26***
	(5.05)	(2.38)	(5.51)	(3.17)	(7.49)	(3.94)
d_REIT	-0.03	0.00	0.12	0.20	0.04	0.14
	(-0.29)	(0.03)	(0.68)	(0.96)	(0.59)	(1.58)
abs_R	0.46***	0.19**	0.64***	0.24	0.53***	0.28***
	(5.84)	(2.18)	(4.00)	(1.43)	(7.51)	(3.63)
abs_Index	2.03**	2.43**	0.10	0.76	-0.52	-0.64
	(2.48)	(2.50)	(0.11)	(0.72)	(-0.97)	(-1.12)
Constant	0.18	1.14	-2.63***	-1.94***	-1.53***	-1.09***
	(0.23)	(1.36)	(-4.30)	(-2.64)	(-5.47)	(-3.40)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,690	1,690	419	419	1,995	1,995
Adjusted R^2	0.783	0.540	0.462	0.388	0.649	0.371

*Note: ***, **, * denote significance (two-tailed) at the 0.01, 0.05, and 0.10 levels. t-statistics are presented in brackets. Table 8 presents results of additional analyses of this study, both for the variability model (.1) and for the smoothness model (.2). See Table 2 for variable definitions. Models 8.1 and 8.2 include firms from the EU and the USA. Models 9.1 and 9.2 have a sample period from 2006 to 2011 and include firms from France, Germany, Italy, Norway, Spain, Belgium, Denmark, Netherlands, Poland, Sweden, Switzerland, and the UK that apply the fair value model. Models 10.1 and 10.2 include firms that apply the fair value model.*

As well as restricting his sample to certain locations, Israeli (2015) excludes firms from locations that may have experience in fair valuing investment properties in the pre-IFRS period. Models 9.1 and 9.2 investigate whether there is a difference in earnings variability and earnings smoothness between fair value model-applying firms (*d_FV* = 1) with and without experience in fair valuing investment properties in the pre-IFRS period. Therefore, this study compares observations of firms in locations where fair valuing investment properties was prohibited pre-IFRS (*d_PreIFRSHC* = 1) with those in which fair valuing investment properties was mandatory or optional

(*d_PreIFRSHC* = 0)[10]. Locations may be assigned to both categories because of de jure or de facto regulations, according to Fearnley and Gray (2015), Israeli (2015), and Muller et al. (2008). The sample period is the first half (2006 to 2011) of the entire sample period and variabilities are calculated accordingly. Models 9.1 and 9.2 show insignificant results for the coefficients on *d_PreIFRSHC*. This indicates that experience in fair valuing investment properties does not contribute to either earnings variability or earnings smoothness.

Models 10.1 and 10.2 provide results for the influence of consistent high sector-specific institutional governance, i.e., locations in which *d_Regulatory* and *d_Information* both equal one, on earnings variability and earnings smoothness. If both variables equal one, d_RegInfo equals one, and if one or both equal zero, it, too, equals zero. The coefficients and *t*-statistics on *d_RegInfo* in Models 10.1 and 10.2 are greater than the coefficients and *t*-statistics on *d_Regulatory* and *d_Information* in Models 6.1, 6.2, 7.1, and 7.2. This indicates that under both institutional characteristics, greater property-specific regulations and greater information availability, real estate firms have higher earnings variability and less smooth earnings than under only one of these institutional characteristics.

5. DISCUSSION

The main finding of this study is that the application of the fair value model and investment property fair values promote earnings variability. Considering the determinants of earnings variability, fair value accounting appears to give rise to inherent volatility and estimation error volatility that seem to increase earnings variability (Barth, 2004). This effect seems to be more pronounced than any managerial smoothing attempt (Beidleman, 1973; Barnea et al., 1976; Dechow & Schrand, 2004). Consequently, it is important to note that the results of this study do not rule out all earnings smoothing via investment property fair values. The results solely show that, on average, fair value measurement of investment properties induces higher variability and not greater smoothing. Thus, managers may well use investment property fair values for earnings smoothing — but to a lesser extent than the manner in which fair value measurements induce earnings variability. Separating these effects may be left for future research since this study investigates the overall effect.

This study includes a global sample of real estate firms and thereby supports Thesing and Velte's (2021) call for more fair value research beyond the typical sample characteristics of fair value research using US-based financial settings. In the end, the results of this study, increased earnings variability and decreased earnings smoothness under fair value accounting, are in line with the findings of the financial industry-related studies of Barth et al. (1995), Bernard et al. (1995), and Hodder et al. (2006). Furthermore, the findings from this study do not support those of Chen et al. (2020) and Dietrich et al. (2001), which indicate earnings smoothing via investment property fair values in pre-IFRS UK and China. Consequently, the results of Chen et al. (2020) and Dietrich et al. (2001) may not be generalizable to global post-IFRS settings. This shows that the use of different samples is essential and may provide contradicting results. Therefore, this study recommends that future research might investigate investment properties in different settings.

For the data collection of this study, there were no possibilities to directly derive real estate firms' decisions to use the fair value or the cost model. Instead, the applied model was assumed based on Thomson Reuters/Refinitiv Worldscope's filled items regarding fair value adjustments or depreciation. Since this procedure resulted in high fair value model-applier rates (92%), as expected according to European Public Real Estate Association's (2019) recommendation to real estate firms, US-GAAP-appliers were added to the control group. These two procedures, assuming fair value model application and including US-GAAP firms, were applied due to practical necessity. However, resulting inconsistencies cannot be ruled out. Future research might develop better methods for collecting data from real estate firms.

Furthermore, this study extends previous research with corporate governance-related implications. To this end, it exploits its unique global setting to investigate differences in institutional governance. Previous studies related to investment properties investigate samples from single countries (Dietrich et al., 2001; Sangchan et al., 2020; Chen et al., 2020) or from several selected (mostly European) countries (Muller et al., 2011; Goncharov et al., 2014) that contain too few countries to investigate differences in institutional governance globally. Overall, institutional governance is suggested to increase earnings variability and decrease earnings smoothness. This study provides similar indications for classical institutional governance, investor protection, sector-specific institutional governance, information environments and regulatory processes. Especially, evidence from sector-specific institutional governance provides new insights into managerial behavior because managers seem to adjust their valuation models to regulatory developments and more information availability instead of exploiting them for earnings smoothing purposes. Therefore, accounting research may initiate a discussion regarding the scope of regulatory developments in the real estate market. This study suggests that reforms in the real estate market have real short-term consequences for the balance sheets of real estate firms regardless of their long-term effects — namely, increasing the variability of their earnings.

Previous institutional governance implications lead to questions regarding the enforcement. Differences in institutional governance across countries seem to influence earnings quality. However, the enforcement environment, as a determinant of earnings quality (Laux & Leuz, 2009; Holthausen, 2009), is not explicitly addressed

[10] Note that the term 'fair value' was not as common under domestic GAAP as it is under IFRS. Additionally, there were different treatments of revaluation gains and losses. *d_PreIFRSHC* equals one for France, Germany, Italy, Norway, and Spain and zero for Belgium, Denmark, the Netherlands, Poland, Sweden, Switzerland, and the UK.

by the governance proxies in this study. This is of certain importance because countries from Europe are frequently used for investment property research. Equally, Europe is accused of suffering from poorer law enforcement than, for example, the USA (Laux & Leuz, 2009). Therefore, future research might investigate differences in the enforcement environment.

6. CONCLUSION

Using a sample of 1,995 to 2,658 firm-year observations of real estate firms from 2006 to 2017, this study investigates whether investment property fair values are associated with earnings variability and earnings smoothness and whether institutional governance affects these proxies. Several findings are provided. First, the application of the fair value model seems to increase earnings variability and decrease earnings smoothness. The results show similar incremental effects for investment property fair values. Second, among fair value model appliers, strong institutional governance appears to increase earnings variability and decrease earnings smoothness. These results suggest that fair value adjustments increase earnings variability and managers are either not able or choose not to smooth out these earnings fluctuations. Classical and sector-specific institutional governance may further increase earnings variability and decrease earnings smoothness.

As well as providing findings that fair value measurements increase earnings variability more than they give rise to earnings smoothness, this study extends previous research regarding: 1) methodology, 2) sample, and 3) governance implications. First, applied accounting-based earnings quality measures fruitfully complement the evidence from the more common market-based measures (Aboody et al., 1999; Barth, 1994; Bernard, 1993; Francis et al., 2004; Song et al., 2010; Venkatachalam, 1996). Second, investment properties offer an alternative non-financial setting of lower-level fair value measurements, as opposed to the common financial settings in fair value research that is often related to US-GAAP (Campbell et al., 2019; Hairston & Brooks, 2019). Furthermore, this study is perceived to be one of the first to investigate the investment property setting globally over a long horizon. Third, analyzing the differences in institutional governance complements widespread investigations of firm-related corporate governance in fair value research (Black et al., 2018; Siekkinen, 2017b; Song et al., 2010). Evidence is provided for investor protection as a classical governance proxy (Leuz et al., 2003) and experimentally for regulatory processes and information environment as sector-specific proxies.

The results of this study allow for some recommendations, although they suffer from several limitations, such as not differentiating between different determinants of earnings variability and earnings smoothness, using a heterogeneous sample of firms applying IFRS and US-GAAP, not collecting the decision to apply the fair value or the cost model by hand, or, the dependence on a method to calculate variabilities, and therefore no causal claims can be made. More investment property-related research could address these limitations. Future research might investigate to what extent investment property fair values are exploited for earnings management although they overall increase earnings variability. Additional studies might also apply more sophisticated data collection methods to different global samples. Policymakers may recognize that regulatory developments and a more comprehensive information environment directly influence real estate firms' distribution of earnings. This may encourage researchers to incorporate governance proxies more frequently, especially those that are sector-specific and related to the enforcement environment.

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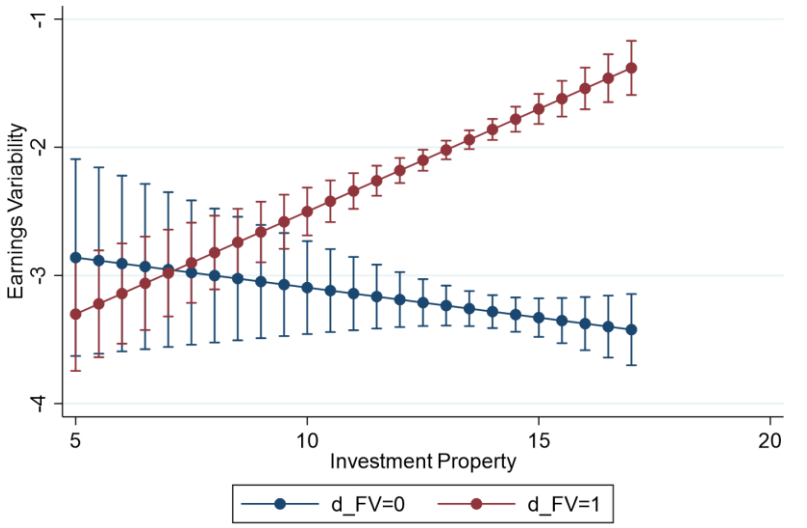
APPENDIX

Figure 1. Impact of investment property on earnings variability



Note: Figure 1 plots the linear prediction of earnings variability (EarnVar) from investment property (IPAmount) separated by both expressions of the fair value dummy variable (d_FV), 1 and 0, with 95% confidence interval.