Do measurement-related fair value disclosures affect information asymmetry?

Abstract

Using a sample of European real estate firms over the 2007–2010 period, this study provides some evidence that measurement-related fair value disclosures reduce information asymmetry. We find a negative association between the extent of fair value disclosures and the bid-ask spread, but no association with two additional measures of information asymmetry (zero returns and price impact). Contrary to our expectation, we fail to find evidence that firms using model estimates exclusively benefit the most from such additional disclosure. Analyzing measurement errors (the absolute difference between the selling price of an asset and its fair value prior to sale), we find that firms that use model estimates exclusively and provide more measurement-related disclosures have lower errors and more accurate fair value estimates. In other words, if our lack of results is due to investors not using this additional disclosure this is to their detriment.

Keywords: fair value, investment property, measurement-related disclosure

JEL classification: G01, G10, G18, M41

1. Introduction

A discussion paper by the International Auditing and Assurance Standards Board (IAASB 2011) reflects the increasing interest of policy makers in measurement-related disclosures. Financial reporting, the paper argues, has shifted "from simply providing breakdowns of line items on the face of the financial statements to providing more detailed disclosures, including disclosures of assumptions, models, alternative measurement bases and sources of estimation uncertainty, amongst others." In this study, we investigate the association among measurement-related fair value disclosures and information asymmetry. Increased information asymmetry is costly to market participants because it increases the adverse selection problem and lowers liquidity. Thus, we posit that disclosures accompanying financial statements become more important because they provide information about assumptions and decisions, and can reduce investor uncertainty (Schipper 2003, Barth et al. 2008).

We focus on International Accounting Standard (IAS) 40 in the real estate industry for the following four reasons. First, firms can choose to report investment property value at historical cost or fair value, and fair value itself can be determined on the basis of several different inputs (e.g., market prices, comparable assets or transactions, or model estimates). Second, the fair value estimates of investment properties must be reported even when historical cost is chosen for the balance sheet (in other words, the fair value of the investment property is always made available).

Third, investment properties have a more developed reference market and more developed valuation methodologies than financial assets (Muller et al. 2011). Therefore, the fair value model and model estimates are often used. Fourth, investment property is the most

material operational asset in the real estate industry; it represents, on average, 73% of total assets.[1]

Overall, given the complexity of the fair value measurement environment and the materiality of the underlying assets, fair value measurement-related disclosures are expected to be highly important to capital market participants in our setting. We therefore first investigate these disclosures in detail. Second, we investigate the association between measurement-related fair value disclosures and the level of information asymmetry. For the latter we rely on the general disclosure literature (e.g., Diamond and Verrecchia 1991, Kim and Verrecchia 1994, Welker 1995), and on the literature investigating whether the relation varies with a firm's characteristics and economic environment (Armstrong et al. 2011, Lang et al. 2012, Bhattacharya et al. 2013). Previous studies have explored which characteristics (e.g. investor protection, media penetration, and ownership concentration) can influence the relation between financial transparency and information asymmetry. We extend this line of research by including the fair value measurement choice as an additional characteristic, i.e. using model estimates exclusively, using a combination of model and market estimates or not using model estimates.

Specifically, we test the hypothesis that measurement-related disclosures are associated with a larger reduction in information asymmetry when model estimates are used exclusively than when other valuation methods are used. Evidence from the banking industry reveals that the value relevance of fair value based on unobservable, firm-generated inputs is lower than that for fair value based on observable inputs from quoted prices in active markets

[1] Investment property represents 73% of the total assets in our sample, which is similar to the percent found in Müller et al. (2015). Investment property represents 72% (80%) for firms using the cost model (fair value model) in their sample.

or other market-related information (Song et al. 2010). Moreover, it has been argued that fair value accounting with extensive disclosures can provide more reliable, timely, and comparable information than other approaches, but empirical evidence for this claim is scarce (Laux and Leuz 2009, Chung et al. 2014).[2]

To test for the association between measurement-related fair value disclosures and level of information asymmetry, we manually collect seven disclosure items (e.g., rental income, occupancy rate, details on the discount rate, details on comparable transactions) related to the investment property measurement choice and the disclosures made. The sample consists of 372 firm-year observations (2007–2010) in the real estate industry from nine European countries. Our descriptive statistics show that the majority of firms use model estimates exclusively. The majority of firms also uses one valuation method, while 31% prefers to use a combination of two (29%) or three fair value methods (2%). Model estimates are the primary method used in all countries apart from the UK, where market values are used more frequently. Over time, we observe a decrease in the choice of market values. Disclosure levels vary greatly across countries with Swedish firms disclosing the most and Italian firms the least in our sample. Disclosure scores are similar in 2007 and 2008 but improve in 2009 and 2010.

We then investigate the relations between measurement-related disclosures, the fair value method used and the bid-ask spread, the proportion of zero return days, and the price impact as proxies for information asymmetry (Daske et al. 2008, Muller et al. 2011). Using a 2SLS design, multivariate analyses provide limited evidence that the benefit of the disclosures

[2] More recent evidence from the banking industry suggests that, although fair value has been blamed for the financial crisis, empirical research is not clear on that relationship (e.g., Badertscher et al. 2012).

is greater when model fair value is used. First, we find a negative association between disclosure and the bid-ask spread, but fail to find such association for the proportion of zero return days and the price impact. Second, we fail to find consistent evidence in line with our hypothesis as results show a negative association with the bid-ask spread when model estimates are used exclusively, and a negative association with the proportion of zero-return days when model estimates are used exclusively or combined with market inputs. We fail to find any association between disclosure and the price impact.

The lack of consistent results could be partially attributable to reliability differences. We therefore follow Muller et al. (2011) and use the measurement error (the absolute difference between the selling price and the fair value in the financial statements of the asset prior to sale) for a subsample of 184 firms that sold investment properties during the year. Investment property fair values are estimates of realizable values and the fair value gains or losses are therefore an appropriate benchmark of their reliability (Muller et al. 2011). Our results indicate that firms that use model estimates and provide more measurement-related disclosures have estimates that are more accurate and with a smaller magnitude of measurement error. This additional analysis shows that if investors do not use these additional disclosures this is not in their best interest.

Our paper makes several contributions to the literature. First, we construct a method-specific disclosure index and document the measurement-related fair value disclosures for a sample of European real estate firms over the 2007–2010 period in detail. Second, we investigate the effect of those measurement-related disclosures under IFRS on the level of information asymmetry and how this relation varies with the fair value method chosen. We provide some evidence that, under certain circumstances, and even absent extensive guidance

in a principles-based accounting framework, firms can make useful disclosures to help reduce information asymmetry.

Moreover, our results generally add to Laux and Leuz's (2009) argument that fair value accounting with extensive disclosures can provide more reliable information than other accounting approaches. However, note that we do not find consistent evidence, which seems contradictory to Laux and Leuz's (2009) argument.

Lastly, we contribute to the real estate literature. Previous studies in this industry focused mainly on the shift from local GAAP to IFRS, the possible change from historical cost to fair value (Muller et al. 2011), the change from IAS40 to IFRS13 (Sundgren et al. 2016) and on the recognition versus disclosure discussion (Israeli 2015, Müller et al. 2015). We extend this literature by examining the association between measurement-related disclosures and the level of information asymmetry independent of whether fair value is recognized or disclosed.

The remainder of this article is organized as follows. Section 2 discusses the relevant standards, while section 3 summarizes previous literature and develops our hypothesis. Section 4 discusses our sample selection and data collection, and section 5 presents our research design. Our empirical results are in section 6. Section 7 concludes.

2. Fair value reporting for investment properties[3]

IAS 40 requires that investment properties be measured at cost, including transaction costs, at the time of acquisition (IAS 40.20 and 40.23).[4] Subsequent measurement in the balance sheet

[3] IAS 40 is the relevant standard throughout our sample period. From 1 January 2013 onward, IFRS 13 is applicable for fair value measurement. IFRS 13 requires improved quantitative information regarding significant unobservable inputs such as the effect of altering an unobservable input and sensitivity analysis, which was voluntary under IAS 40.

is done at either historical cost (cost model) or fair value (fair value model) (IAS 40.30),[5] but only one method can be used for the firm's entire array of investment property. Furthermore, when a firm chooses the cost model, fair value must still be disclosed in the notes.[6] Therefore, whichever measurement is chosen in the balance sheet, the fair value for the investment property portfolio must always be provided nevertheless.

In determining fair value, firms consider current prices in an active market for a similar property in terms of condition, nature, and location (IAS 40.45) (the market approach) to be the best indicators. In the absence of current prices in an active market, firms can use 1) current prices in an active market for properties of a different nature, condition, or location, adjusted to reflect those differences, 2) recent prices of similar properties in less active markets, again adjusted to reflect any differences in economic conditions (the comparables approach), or 3) model estimates based on reliable estimates of future cash flows, supported by contract or external evidence, and using discount rates that reflect the current market assessment of the level of uncertainty in the amount and timing of cash flows (IAS 40.46) (the model approach).[7,8,9]

---

[4] Investment properties are defined as property (land, a building or part of a building, or both) held (by the owner or lessee under a financing lease) used for rental income purposes, capital appreciation, or both (IAS 40.5).

[5] A change is permitted, but only if it results in a more appropriate presentation. IAS 40 discourages a change from a fair value to the cost model.

[6] In contrast, if a firm opts to value investment property at fair value in the balance sheet, historical cost can voluntarily be reported in the notes.

[7] This framework differs from IFRS 13, which consists of level 1 (assets that are liquid and have clear market prices) to level 3 (illiquid assets that require unobservable inputs and management assumptions to estimate) measurements. While the model approach resembles level 3, the comparables approach can be considered a level 2 or 3 measurement.

[8] If a real estate firm uses the market approach, it would typically use wording such as: "individual property is assessed against recently sold properties in the same segment (location, property type, tenant composition, etc.)," and "takes into account evidence of market values of similar properties." Examples of wording used by firms that use comparable assets to measure the investment property are "based upon comparable transactions, added with market- and building-specific knowledge and any

This choice is made at the property level. In other words, the standard does not require the same fair value method be applied to all investment properties. Although the measurement choice in the balance sheet must be the same for the entire portfolio (historical cost or fair value), firms can use different fair value methods for different investment properties.

IAS 40.75[10] summarizes the disclosure requirements as follows: An entity shall disclose: 1) whether it is applying the fair value or cost model, 2) the methods and significant assumptions applied in determining the fair value, including a statement as to whether the determination was supported by market evidence or based more heavily on other factors (which the entity shall disclose) because of, e.g., the nature of the property or the lack of comparable market data, and 3) the extent to which the fair value (as measured or disclosed in the financial statements) is based on a valuation by an independent appraiser who holds a recognised and relevant professional qualification and who has recent experience in the location and category of the property. If there has been no such valuation, that fact must be disclosed.

From reading IAS 40, it is obvious that some disclosures can be easily classified as compulsory (e.g., not using an independent appraiser, or the cost or fair value model). However, while the standard requires assumptions to be disclosed, it does not require a list of the disclosures be made. Due to the lack of guidance, firms exercise judgment as to which items they disclose in financial statements under IAS 40. However, IAS 1 can help firms

---

other remaining assumptions." Finally, an example of model fair value wording is "the fair value is based on a net yield calculation, where market rents are capitalized and normative property expenses (such as the costs of maintenance, insurance, and expenses) are deducted," and "based on cash flow analysis." Overall, we carefully read all the financial statement notes in order to identify which method was used.

[9] IAS 40.42-47 has been replaced by IFRS 13 (effective for annual periods beginning on or after 1 January 2013).

[10] IAS 40.75 was adjusted to incorporate the changes in IAS 40.42-47 after our sample period.

better choose which assumptions will be disclosed. The standard mentions that firms must disclose information in such a manner that users of financial statements can be reasonably expected to understand the judgments management is making about the future, and about other sources of estimation uncertainty.

3. Related literature and hypothesis

We expect disclosure to reduce information asymmetries among informed and uninformed investors and possible problems of adverse selection, which will result in improved market liquidity (Akerlof 1970, Diamond and Verrecchia 1991, Kim and Verrecchia 1994). There is extensive evidence that better financial transparency results in reduced information asymmetry and increased market liquidity.

Welker (1995) was one of the first studies to document a negative relation between disclosure policy and the bid-ask spread as a measure of liquidity. Healy et al. (1999) add to this stream of research, and find that increases in analyst disclosure ratings are accompanied by increased liquidity for firms. Leuz and Verrecchia (2000) detect lower bid-ask spreads for firms that switch from German to international reporting regimes and thus commit to higher levels of disclosure.[11] Recent evidence by Balakrishnan et al. (2014) shows that firms provide voluntary disclosures to reduce information asymmetry and influence liquidity.

Other recent studies pay attention to conditional factors in studying the relationship between financial transparency and the level of information asymmetry. Lang et al. (2012) not only document lower bid-ask spreads and fewer zero-return days for firms with greater transparency, but also find that a firm's level of transparency matters more when particular

[11] See Healy and Palepu (2001) and Verrecchia (2001) for an overview.

characteristics of the environment create greater uncertainty, i.e., when investor protection, disclosure requirements, media penetration and firm-level corporate governance are poor, and during times of higher uncertainty (e.g., economic crises).

We follow this line of research by examining firms' accounting choices as a conditional factor. We investigate the interaction between disclosure and accounting choices made on the level of information asymmetry. If certain methods create greater uncertainty, the benefit of providing more disclosures will result in a larger decrease in information asymmetry. Within our setting, we predict that the different measurement methods will indeed create differing levels of information uncertainty.

For example, in a U.S. setting, level 3 estimates are perceived as less value-relevant than levels 1 and 2 fair value, and firms with more level 3 assets exhibit greater information risk and higher costs of capital (Song et al. 2010, Goh et al. 2015, Bens et al. 2016).[12] For our sample, we expect that fair value based on market inputs will create the least information uncertainty, because the information source is the market value, which is externally verifiable. Fair value based on model estimates, on the other hand, is based mainly on internal information and requires managerial judgment (Hitz 2007), which causes lower informativeness (Landsman 2007), higher measurement uncertainty, and higher information risk (Riedl and Serafeim 2011).

Although the judgment required in the fair value model may create moral hazard problems between company insiders and outsiders, previous evidence shows that managers are capable of providing good estimates for mortgage service rights (Altamuro and Zhang

[12] We do not focus on the recognition-disclosure issue in this study. Previous literature found mixed evidence as to whether recognized information has a different impact than disclosed information on capital market participants' behaviour (e.g., Davis- Friday et al. 1999, Ahmed et al. 2006, Frederickson et al. 2006, Bratten et al. 2013, Yu 2013, Müller et al. 2015).

2013). Thus, we posit that disclosures may help solve information uncertainty. Because uncertainty is larger for firms using model inputs rather than market inputs, we expect the benefit of disclosures to be larger using the former method. We therefore propose the following hypothesis:

HYPOTHESIS 1: *More measurement-related disclosures are associated with a larger decrease in information asymmetry when model fair value is used exclusively than when other valuation methods are used.*

4. Sample, data and descriptive statistics

Panel A of Table 1 outlines our sample selection process. We begin by selecting all European firm-years in the real estate industry (U.S. SIC code 65) during the 2007–2010 period. Note that our sample precedes the adoption of IFRS 13. Our focus on the real estate industry enables us to investigate the usefulness of measurement-related disclosures in a setting where the related asset (i.e., investment property) is highly material. Because we hand-collect data on investment property valuations and disclosure choices, we require financial statements to be available in Dutch, English, German, or French,[13] which results in an initial sample of 544 firm-year observations. We eliminate 64 observations because they lack financial statements, do not apply IAS 40, or contain changes in fiscal year-end. We delete another 40 observations because information on the fair value measurement choice or the value of the investment

[13] We do not introduce Poland or Spain into the sample because full data are available for only one firm in those languages. The final sample comprises real estate firms in Belgium, France, Finland, Germany, Italy, Norway, the Netherlands, Sweden, and the U.K.

property is missing.[14] After excluding a further 68 observations with missing market data, our final sample consists of 372 firm-year observations. The sample distribution by year and country is given in Table 1, panel B. Financial and market data come from Datastream.

Insert Table 1 about here

As mentioned earlier, we read the financial reports of all sample firms in detail, and categorize the measurement choices and related disclosures for each firm-year observation. Our collection process includes not only reading the corresponding note related to the investment property, but also scanning the financial statements in their entirety for fair value-related disclosures. The collection order is randomized to prevent subjectivity in coding and to avoid bias caused by learning effects on the part of the coder. Part of the data is also collected again by two alternative coders to verify consistency.

Our disclosure index is constructed as follows. We first count the number of items a firm actually discloses, and then scale by the maximum number of items a firm can disclose given the measurement method chosen. The reasoning behind this procedure is that all firms can provide details on the market yield and the occupancy rate of the property, but a firm using the market or comparables approach can also disclose details on the properties used as a benchmark. Similarly, a firm using model estimates can provide details on the numerator, denominator, time frame of the model, or any assumptions made on the income stream.

[14] Examples include not reporting the value of investment properties separately and not specifying the methods used. These observations cannot be used as low disclosure cases, because we need data on the investment property and method used. These items are also mandatory.

To summarize, firms using the model approach can disclose a maximum of six items, firms using either the market or comparables approach can disclose a maximum of three items, firms using both the market and comparables approaches can disclose four items, firms combining the model approach with the market or comparables approach can disclose seven items, and firms using all methods can disclose eight items. Appendix 2 provides information about the variable definitions underlying the disclosure scores; Appendix 3 provides a real life example of how the scoring is done.

Table 2 reports the descriptive statistics for the different combinations of fair value measurement choices (market prices (MV), comparable assets or transactions (COMP), or model estimates (MODEL)). First, in panel A, we focus on the number of fair value measurement methods used. We find that 31% of the sample of 372 firm-year observations use a combination of fair value methods, while the majority (69%) use only one. Furthermore, when only one method is used, most firms rely on model estimates to value investment property (218, or 59%). This suggests that market and comparable values are harder to obtain, as illustrated in panel B. Comparables are more often combined with model estimates (22% of firm-year observations) than with market inputs (1%), which confirms this inference.

Table 2, panel C, reveals that only 45 firm-year observations (12%) use market values exclusively (NO_MODEL), 109 (29%) use market values in combination with model estimates (COMBINATION), and 218 (59%) use only model fair value (ONLY_MODEL). Property is more likely than any other non-financial asset class to be redeployed by other firms, and it therefore has relatively liquid markets (Shleifer and Vishny 1992, Christensen and Nikolaev 2013). Moreover, investment properties have a more developed reference market and more developed valuation methodologies (Muller et al. 2011). This could explains why the fair value model is chosen over the cost model, and why model estimates are common in our setting.

Insert Table 2 about here

Table 3 provides a more detailed view of the measurement choices and of our disclosure index over time and across countries. All methods used differ significantly across countries (F-statistic significant at the 1% level). As expected, the market approach is primarily used in the U.K. This is most likely because U.K. firms are very familiar with fair value. For example, in contrast to firms in other countries, U.K. firms had to value investment property at fair value before IFRS adoption in 2005 (Kvaal and Nobes 2012). They also feature the most evolved property market in our sample. The Netherlands, the U.K, and Italy (countries where the market approach is more common) all featured a separate standard for investment property prior to IFRS. Furthermore, the exclusive use of model estimates is the primary choice in all countries except the U.K. (note that, in Finland and Sweden, firms do not use market values, they primarily use model estimates, or a combination with market fair value or comparables).

The average disclosure index for the sample is 0.32 (median = 0.33), but significant differences exist among firms. Looking at the disclosure scores in Table 3 Panel A, Swedish firms have an average disclosure index of 0.59, the highest in our sample, followed by Belgian (0.50) and Finnish firms (0.48). German and Dutch firms disclose on average one-third of the coded estimation parameters (0.30 and 0.32), while Italian and U.K. firms exhibit the lowest scores (0.14 and 0.18). The differences among countries is significant at the 1% level (F-stat = 9.59). These results are in line with Vergauwe and Gaeremynck (2013) and Sundgren et al. (2013).

Panel B shows a significant increase in disclosures after 2008, which is in line with Vergauwe and Gaeremynck (2013), and an overall improvement over time (F-stat = 26.74, significant at the 1% level). Disclosure scores in 2007 and 2008 (0.21 and 0.23) are similar, but increase in 2009 and 2010 (0.39 and 0.50, respectively). Panel B also shows a significant reduction over time in the use of market value (F-stat 3.42, significant at the 5% level), which could be explained by the market conditions during the time period studied. Over time, the relative importance of model estimates or the use of comparables remains unchanged.

Insert Table 3 about here

5. Research design

In line with previous studies, we proxy for information asymmetry by looking at the capital market effect, i.e., market liquidity. Information asymmetry in a market reduces the willingness to trade, increases the difference between the prices at which investors are willing to sell and buy, and decreases the possibility of trading quickly without affecting price. Disclosure as an aspect of corporate financial transparency results in a decrease in information asymmetry by levelling the playing field among investors. Because it is beneficial to capital market participants, it generally increases market liquidity (Welker 1995, Healy and Palepu 2001).

In developing our research design, we must consider that the potential causality between information asymmetry and the level of disclosure may give rise to endogeneity issues. Market liquidity, as a proxy for the level of information asymmetry, can influence the number of disclosures made ($DISCL_{it}$). In other words, the disclosure strategy may be adapted

when market liquidity is low. This means that OLS results could be biased because the disclosure level is correlated with the error term of the OLS regression (Nikolaev and Van Lent 2005).

We alleviate these concerns with $DISCL_{it}$ by using a 2SLS approach, where each observation represents a firm-year. We use the average level of measurement-related disclosures by country and year ($DISCL\_AVG_{it}$)[15] as an instrumental variable in equation (1). The use of industry averages is common in the compensation literature, where they can proxy for CEO compensation or incentives (e.g., Kini and Williams 2012). Similarly, the average level of measurement-related disclosure is an appropriate instrument for the following reasons.

First, a firm is more likely to disclose information if similar firms engage in the same practice. Empirical research has documented isomorphism in disclosure behaviour within the real estate industry (Vergauwe and Gaeremynck 2013). Thus, industry peers obviously influence firm disclosure behaviour. Second, although disclosures may be strongly related to the practices of peers, a firm's level of information asymmetry or liquidity is not likely to be directly influenced by the disclosure behaviour of other firms in a particular country or year. We therefore expect a positive association between the instrument $DISCL\_AVG_{it}$ and $DISCL_{it}$.

The first stage of the 2SLS model looks as follows:

[15] Including a firm-year observation's disclosure level to calculate $DISCL\_AVG_{it}$ could lead to mechanical association in the first stage, especially when a country-year includes few observations. We therefore correct for this issue.

$$
\begin{aligned}
DISCL_{it} = {} & \alpha_0 + \alpha_1 * DISCL\_AVG_{it} + \alpha_2 * COMBINATION_{it} + \alpha_3 * ONLY\_MODEL_{it} \\
& + \alpha_4 * GDS_{it} + \alpha_5 * FVBS_{it} + \alpha_6 * IP_{it} + \alpha_7 * LN(VOLATILITY)_{it} + \\
& \alpha_8 * LN(TURNOVER)_{it} + \alpha_9 * LN(MARKET\_CAP)_{it} + \alpha_{10} * FREE\_FLOAT_{it} + \\
& \alpha_{11} * AUDITFEE_{it} + FIRM\_FE + YEAR\_FE + \varepsilon_{it}
\end{aligned} \tag{1}
$$

In the second stage, we use the predicted value of *DISCL*, which we denote *PDISCL*, and include as follows:

$$
\begin{aligned}
INFORMATION\_ASYMMETRY_{it} = {} & \beta_0 + \beta_1 * PDISCL_{it} + \beta_2 * PDISCL_{it} * COMBINATION_{it} + \\
& \beta_3 * PDISCL_{it} * ONLY\_MODEL_{it} + \beta_4 * COMBINATION_{it} + \\
& \beta_5 * ONLY\_MODEL_{it} + \beta_6 * GDS_{it} + \beta_7 * FVBS_{it} + \beta_8 * IP_{it} + \\
& \beta_9 * LN(VOLATILITY)_{it} + \beta_{10} * LN(TURNOVER)_{it} + \\
& \beta_{11} * LN(MARKET\_CAP)_{it} + \beta_{12} * FREE\_FLOAT_{it} + \\
& \beta_{13} * AUDITFEE_{it} + FIRM\_FE + YEAR\_FE + \varepsilon_{it}
\end{aligned} \tag{2}
$$

To test our hypothesis, and in line with previous studies, we use three different proxies for information asymmetry (*INFORMATION_ASYMMETRY*$_{it}$) in the second stage: the bid-ask spread, the proportion of zero return days, and the price impact of trades. While the bid-ask spread is a commonly used measure, zero returns and the price impact measure price illiquidity more directly (Lang et al. 2012, Bekaert et al. 2007). The bid-ask spread focuses on the difference in price between the bid and the ask and it is measured as the daily average of the difference between the two divided by the midpoint price. The proportion of trading days with zero returns is measured as the number of zero return trading days divided by total trading days. Price impact captures the ability of a market participant to trade in a stock without moving its price (Amihud 2002, Fu et al. 2012). It is measured as the daily absolute stock return divided by trading volume. Note that larger values for those proxies represent higher illiquidity and higher levels of information asymmetry. The proxies are measured over the one month after the filing of the annual report (see Appendix 1).

The variable $PDISCL_{it}$ is the predicted value of $DISCL_{it}$, the disclosure index, obtained in the first stage. Higher values for $DISCL_{it}$ imply more disclosure and we therefore expect a negative coefficient for β_1.

In the second stage, we also control for the fair value method used by including two binary indicators, $ONLY\_MODEL_{it}$ and $COMBINATION_{it}$. The reference category is NO_MODEL_{it}, and firms either use the model approach exclusively ($ONLY\_MODEL_{it}$), a combination ($COMBINATION_{it}$) of model and other estimates, or no model estimates at all (NO_MODEL_{it}). We make no predictions about the signs of these indicators in the second stage, because the effects on information asymmetry are unclear ex ante. Market illiquidity can result in unreliable market prices (Plantin et al. 2008), but a higher level of discretion using model fair value can have the same effect (Song et al. 2010).

Based on our hypothesis, we expect in equation (2) a negative coefficient for the interaction variables β_2*$PDISCL_{it}$*$COMBINATION_{it}$ and β_3*$PDISCL$*$ONLY\_MODEL_{it}$, and that the former will be more negative than the latter.

Next, we include a general disclosure score, GDS_{it}, to control for general disclosure levels. This proxy measures method-independent investment property-related disclosures. The general disclosure score is based on five voluntary items: 1) an appraiser report, 2) the name of the appraiser, 3) a reference used as an external benchmark, such as the international valuation standards (IVS) or the Royal Institute for Charted Surveyors (RICS), 4) the frequency of the investment property valuation, and 5) a sensitivity analysis. Firms receive a value of 1 for each disclosed item. We therefore expect higher scores and higher disclosures to have a positive effect and a negative coefficient for β_6 in the second stage. Appendix 3 includes an example of how the coding is done for the general disclosure score.

We also include a dummy variable $FVBS_{it}$ that takes the value of 1 if a firm uses fair value for measuring investment property in the balance sheet, and 0 otherwise, and IP_{it}, the scaled amount of investment properties in the balance sheet. Given the results of previous studies (Israeli 2015, Müller et al. 2015), we expect market participants to rely more heavily on recognized fair values than on disclosed fair values; this results in an expected positive coefficient on $FVBS_{it}$. We make no predictions about the sign on IP_{it} in the second stage.

The regression model also includes four control variables used in other information asymmetry studies. We include $Ln(VOLATILITY_{it})$ and $Ln(TURNOVER_{it})$ as proxies for stock liquidity (Leuz and Verrecchia 2000, Muller and Riedl 2002, Welker 1995). We expect to observe lower information asymmetry when the standard deviation of daily returns is smaller and the number of shares traded is larger. Accordingly, we expect $\beta_9 > 0$ and $\beta_{10} < 0$ in the second stage (equation 2).

The characteristics of the investor environment are captured by the free float[16] $(FREE\_FLOAT_{it})$ (Leuz and Verrecchia 2000, Muller et al. 2011), while total market capitalization $(Ln(MARKET\_CAP_{it}))$ controls for the information environment (Leuz and Verrecchia 2000). We expect $\beta_{11} < 0$ and $\beta_{12} < 0$ in the second stage. The latter capital market variables are measured over the one month after the filing of the annual report (see Appendix 1).

We also include a variable $AUDITFEE_{it}$, the natural logarithm of the audit fee, to control for audit quality in the second stage. Although theory predicts that higher audit effort

[16] Including the number of institutional stock holders and the number of analysts following a firm can lead to a significant decrease in sample size due to missing observations.

increases audit quality (e.g., Dye 1993, Hillegeist 1999), empirical evidence is mixed (Lobo and Zhao 2013, Stanley and DeZoort 2007). We therefore do not predict a sign for $\beta_{13.}$

In the first stage, equation (1), we add our chosen instrument and all independent variables. We do not predict a sign for α_2 and α_3. It is a priori unclear if firms facing more measurement uncertainty will choose to disclose more information on the underlying estimate. Next, we expect a positive coefficient for method-independent investment property-related disclosures (α_4). Moreover, we predict a positive coefficient for α_5 and α_6 as firms will provide more disclosure on recognized rather than disclosed values and on more material assets (Vergauwe and Gaeremynck 2013). Based on prior literature we also expect firms operating in a less volatile environment (α_7), fims with a higher turnover (α_8), larger firms (α_9), and firms with more shares outstanding (α_{10}) to provide more disclosure (e.g. Archembault and Archembault 2003, Vergauwe and Garemynck 2013). Finally, higher audit effort (α_{11}) as a proxy for audit quality is expected to increase the level of disclosure (Dunn and Mayhew 2004).

In both stages, we control for year and firm fixed effects, and error terms are clustered by firm.[17] Including firm fixed effects has the primary advantage of helping control for time-invariant unobservable factors at the firm level (Lang et al. 2012).

[17] Results are robust to clustering by country. We do not cluster by country in our main analysis. This is because De George et al. (2016) claim that it can yield biased standard errors unless there are enough countries in the sample (the number of countries mentioned is 40 (p. 991)). Results with two-way clustering (by year and firm) continue to hold, but standard errors and model tests should be interpreted with caution, because the estimated covariance matrix of moment conditions is not of full rank, which could bias the results obtained.

6. Results

6.1. Descriptive statistics

Table 4 presents descriptive statistics for the dependent and control variables used in our primary model. The average firm has a spread of 0.04, 22% of zero return days, and a price impact of 0.02. Average turnover and volatility equal 0.001 and 0.03, respectively. Average market capitalization is €764 million, while the average free float is 57.70%.[18] 82% of firms report fair value in the balance sheet, and the average ratio of investment property over total assets is 73%. Finally, the mean general disclosure score is 0.46, with a standard deviation of 0.27. Disclosure scores are the highest in Sweden, Finland and Belgium followed by Norway, the UK and the Netherlands. Germany and Italy have the lowest scores. Similar to measurement-related disclosures we note higher scores in 2009 and 2010.

Insert Table 4 about here

The Pearson correlation matrix in Table 5 documents a significant and negative correlation between our disclosure index and our information asymmetry proxies: the bid-ask spread, the proportion of zero return days, and the price impact, all significant at the 1% level. We also detect a positive significant correlation between NO_MODEL_{it} and all output proxies (at the 5% and 10% levels).

[18] The bid-ask spread, price impact, turnover, volatility, market capitalization, and audit fees are heavily skewed. We therefore use a log-transformation in line with previous research (e.g., Muller et al. 2011). Results are robust to winsorizing unbounded variables at the 1% level. Results are robust to using a log-transformation for the proportion of zero return days.

When $ONLY\_MODEL_{it}$ or $COMBINATION_{it}$ is used, we only find a significant negative correlation between $ONLY\_MODEL_{it}$ and the proportion of zero return days (at the 5% level), but using a combination of methods is weakly negatively correlated with the bid-ask spread and the price impact (at the 10% level).

Finally, the correlations between the different control variables and the three output proxies are in line with expectations and consistent over the different proxies.

Insert Table 5 about here

6.2. Multivariate results

Table 6 reports the first- and second-stage estimations of the 2SLS.

Our chosen instrument, disclosure of the industry in a certain year, seems appropriate. It loads strongly on the instrumented variable (coefficient = 0.512, t-statistic = 4.07), with a Cragg-Donald Wald F-statistic of 26.39, which exceeds the largest Stock and Yogo (2005) critical values of 16.38.[19] Moreover, our first-stage regression provides some interesting insights into the determinants of disclosure.

In column 1, we observe that firms using model estimates exclusively (coefficient = 0.183, t-statistic = 2.46) or in combination with another method (coefficient = 0.165, t-statistic = 1.97) provide more details on the assumptions made[20]. Next, we find significant evidence

[19] Stock and Yogo (2005) provide test results on the weakness of instruments that is based on a statistic attributable to Cragg and Donald (1993).
[20] The coefficient for $ONLY\_MODEL_{it}$ is not significantly different from $COMBINATION_{it}$.

that firms with generally better disclosure levels (coefficient = 0.293, t-statistic = 3.00) provide more details on the assumptions used in the fair value process.

Looking at $PDISCL_{it}$ in the second stage of the 2SLS regression (equation 2), we only find a significantly negative correlation between the extent of disclosure and the bid-ask spread (coefficient = -0.287, t-stat = -2.30), excluding interaction terms (column 2).

In terms of economic significance, a 10-percentage point increase in fair value-related disclosures is associated with a 2.87% decrease in the bid-ask spread. We fail to find similar results for the proportion of zero return days (coefficient = -0.118, t-statistic = -0.88) and the price impact as dependent variables (coefficient = -0.013, t-statistic = -0.17) in columns 4 and 6.

In columns 3, 5, and 7, we interact $PDISCL_{it}$ with $ONLY\_MODEL_{it}$ and $COMBINATION_{it}$ to investigate whether more measurement-related disclosures are associated with a larger decrease in information asymmetry when model estimates are used exclusively than when other valuation methods are used. Our results show that when model estimates are used exclusively, more measurement-related disclosures result in a lower bid-ask spread (coefficient = -0.138, t-statistic = -2.10). However, we fail to find similar results for the other regressions. Not only do we find that more measurement-related disclosures result in a lower proportion of zero return days (coefficient = -0.169, t-statistic = -1.99) when model estimates are used exclusively, we also find a significant coefficient for $PDISCL_{it}*COMBINATION_{it}$. Wald coefficient tests indicate that the coefficient on $PDISCL_{it}*ONLY\_MODEL_{it}$ and $PDISCL_{it}*COMBINATION_{it}$ are not statistically different. This result indicates that any use of model estimates (exclusively or in combination with another method) moderates the association between disclosure and the proportion of zero return days. The latter result is inconsistent with our hypothesis. We do not find any results for our price impact model.

With respect to our control variables, we find that lower volatility *(Ln(VOLATILITY$_{it}$)*, larger turnover *(Ln(TURNOVER$_{it}$)*, and larger market capitalization *(Ln(MARKET_CAP$_{it}$)* are negatively correlated with the bid-ask spread and with price impact. Results also show that the balance sheet choice[21] (FVBS$_{it}$) has no impact on either output measure.[22]

Insert Table 6 about here

To summarise, we find a consistent effect that the use of model estimates moderates the association between disclosure and the bid-ask spread and the proportion of zero return days, but no effect when using price impact. Contrary to our expectation, we fail to find evidence that more measurement-related disclosures are associated with a larger decrease in information asymmetry when model fair value is used exclusively than when other valuation methods are used.

The lack of results may be because investors view the three methods similarly, as they all include some level of judgment or internal information. For example, the comparable assets method still requires judgment about the changes to be made to the asset. Alternatively, investors might not use additional information in the notes to the financial statement.

[21] Selection bias could occur, however, because managers must choose between fair value in the balance sheet or in the notes. By investigating information asymmetry differences across both models, self-selection may positively influence our results. Results are robust to using a selection model for the recognition vs. disclosure choice followed by adding the inverse Mills ratios in equation (2).

[22] The latter may seem surprising, but is likely attributable to the characteristics of the accounting standard itself. In other words, fair value is provided either way, regardless of balance sheet accounting choice. Moreover, the firm-year observations from the cost model are all located in France or Germany, and only two firms changed their choice over time. Hence, this effect would be picked up by firm fixed effects.

6.3. Fair value disclosures and estimation errors

In this section we provide an additional analysis to rule out that our lack of consistent results is due to reliability differences. If firms with less reliable estimates provide a different level of disclosure than firms with more reliable estimates this could explain our mixed results. Similarly to Dietrich et al. (2000) and Muller et al. (2011), we examine the degree to which the selling price of investment properties diverges from its reported fair value, and whether this divergence varies with fair value disclosure. Fair value is defined as "*the amount for which an asset or liability could be exchanged between knowledgeable, willing parties in an arm's length transaction.*" Hence, when an asset is sold in the market, the selling price should equal the fair value of that asset *if* the estimate is reliable.

Of our initial sample of 372 firm-year observations, we obtain 184 that sold property in the same fiscal year, and provide details on selling prices and fair values of the assets sold. We manually collect data on the recorded fair values of the asset sold, the selling price (SP_{it}), and the gains (or losses) realized (FVG_{it} (FVL_{it})) on the transactions. The measurement error of the fair value estimate is then measured as $|FVG_{it}$ (FVL_{it})$/SP_{it}|$. We compare the variance of measurement errors between firm-year observations with high and low disclosure (Dietrich et al. 2000, Muller et al. 2011).

Our sample consists of larger firms that hold more investment properties. These firms have lower information asymmetry, better liquidity, higher turnover, lower volatility, and a higher free float. The proportion of firms opting for the fair value model is also higher, as is their general disclosure level.

Table 7 compares the standard deviations across various subsamples. We first assign firm-year observations to high (low) disclosure indicators if $DISCL_{it}$ is above or equal to

(below) the annual median value of $DISCL_{it}$. We then test the differences in standard deviation between firms with high and low levels of disclosure.

For the full sample, we observe a significant difference in measurement errors between high and low disclosing observations (p-value = 0.04). These results indicate that estimates are more reliable when firms provide more disclosure. For the subsample of firms using model fair value only, we continue to find significantly lower measurement errors for firms that provide more extensive disclosures (p-value = 0.02). We fail to find comparable results for the group of firms that use a combination of model and market inputs (p-value = 0.18).

Results indicate that firms that provide more disclosures sell their investment properties at prices closer to book value (fair value) than other firms. This difference is more pronounced for firms that use model estimates exclusively. In other words, the benefit of more disclosure appears to be larger when uncertainty is higher. This evidence suggest that if capital market participants ignore the additional disclosure this is not in their best interest as firms with more reliable fair value estimates provide more disclosure especially when model estimates are used exclusively.

Insert Table 7 about here

6.4. Sensitivity analyses

In this section, we perform a number of sensitivity analyses. First, we test the sensitivity of our results to alternative measures for disclosure. Second, we use alternative control variables, and test the sensitivity of the results on alternative samples. Finally, we use different research designs.

6.4.1. Alternative measures of measurement-related and general disclosures

We repeat our analyses using different proxies for measurement-related disclosures. First, we replace our disclosure index with an indicator variable that equals 1 if a firm discloses more than the sample mean, and 0 otherwise in both stages. We find that for the bid-ask spread model and zero return model both coefficients on $PDISCL_{it}$*$ONLY\_MODEL_{it}$ are negative and statistically significant. However, the results are insignificant for the price impact model. As for the test on the difference between the two interaction variables, we find a significant difference; this is consistent with our main hypothesis. We also replace the index with an indicator variable that equals 1 if a firm discloses anything, zero otherwise in both stages. Again, we find results in line with our main results and evidence consistent with our hypothesis.

Second, we exclude items one-by-one from our $DISCL_{it}$ variable in both stages. Our main results hold, which shows the results are not driven by a single disclosure item.

Finally, we separately include the different components of the general disclosure score in the second stage. We do not find significant results for the components of GDS_{it}, but the main results remain unchanged. Again we fail to find evidence for our main hypothesis.

6.4.2. Alternative control variables

In this section, we test the robustness of our results by including different control variables.

First, results for the bid-ask spread model are robust to including scaled audit fees rather than the natural logarithm of audit fees, but are weaker for the zero return model. We

also fail to find significant results for the audit fees. In line with our main analyses, we fail to find evidence consistent with our hypothesis.

Second, to control for disclosure levels for firms using a method for the first time, we include three categorical variables. For each method, we include a variable that equals 1 if a firm begins using the method for the first time, 0 if a firm continues to use the method, and -1 if a firm stops using the method. Our main results continue to hold, and we do not find significant effects for the three new variables, nor do we find evidence consistent with our main hypothesis.

6.4.3. Alternative samples

In the next set of robustness tests, we consider different subsamples. First, we limit our sample to the group of 305 firm-year observations using fair value as a measurement choice in the balance sheet. As Clor-Proell and Maines (2014) point out, managers may provide different information when recognizing values if they feel they are held to a different reliability standard under recognition versus disclosure. Moreover, auditors' efforts and acceptance of errors can also differ (Libby et al. 2006). For this group of firms, we confirm the results for the main analysis: More extensive measurement-related disclosures result in a lower bid-ask spread and proportion of zero return days for firms using model estimates. We fail to find significant results for the group of firms applying the cost model, but we note this could be due to the lack of statistical power (N = 67). We fail to find a significant difference between both interaction terms. In other words, disclosure is negatively associated with the bid-ask spread and the proportion of zero return days and this association is stronger for any use of model estimates. Again, this is inconsistent with our hypothesis.

Second, we are unable to collect data for all the Swedish, Norwegian, and Finnish firms due to language problems. Thus, we posit there may be a bias toward large international firms with more extensive disclosures present in our primary sample. To mitigate this concern, we re-estimate the main model for a subsample that excludes countries for which we cannot collect all the annual reports in the real estate industry in English, French, German, or Dutch (N = 344). The results for both the bid-ask spread and the zero return model hold, but we nevertheless fail to find evidence supporting our main hypothesis that the coefficient on $PDISCL_{it}$*$ONLY\_MODEL_{it}$ is more negative than the coefficient on $PDISCL_{it}$*$COMBONATION_{it}$.

Third, to ensure that our coefficient estimates on the interaction terms are driven by changes in disclosure, and not changes in the fair value measurement method, we re-test our main models on a subsample of firms that does not change its fair value method during our sample period. More specifically, we test our hypothesis on the sample of 123 firms that use $ONLY\_MODEL_{it}$ for the entire sample period. Note, however, that we require information on the current and previous method used. This reduces our sample significantly because it is not fully balanced. This model also does not include interaction terms because the method remains constant. We continue to find a significantly negative coefficient for $PDISCL_{it}$ in the bid-ask spread model, which confirms our main analyses.

Next, we re-test our main model for the 74 firms that use $COMBINATION_{it}$ for the entire sample period. We again continue to find a negative and significant coefficient on $PDISCL_{it}$ in the bid-ask spread model. Our results do not hold for the zero return model or the price impact model.

6.4.4. Alternative research design

Finally, we test the robustness of our results to changes in the first stage.

First, we eliminate valuation model choice variables from the first stage, because they may be co-determined with the level of disclosure, which in turn can be affected by information asymmetry. Our instrument still loads strongly on the instrumented variable (coefficient = 0.445, t-statistic = 3.47). Moreover, our main results for the second stage remain unchanged for the bid-ask spread model and the proportion of zero return days. We fail to find results for our main hypothesis as the coefficients on both $PDISCL_{it}$*$ONLY\_MODEL_{it}$ and $PDISCL_{it}$*$COMBINATION_{it}$ are not significantly different.

Second, we use the median disclosure level by country and year in the first stage rather than the mean. Our results again continue to hold for both the bid-ask spread model used, and the zero return model. We again fail to find evidence consistent with our main hypothesis.

7. Conclusion

In this paper, we examine whether the association between measurement-related fair value disclosures and information asymmetry varies with the fair value measurement method chosen. Our study is motivated by the interests of standard setters and by academics in the controversy over fair value as a basis for measurement. We are particularly interested in whether a conceptual basis, such as IFRS, without detailed disclosure rules, can lead to the generation of useful information for the capital markets.

We focus on investment property in the real estate industry, because it is a setting in which fair value relates to the most material asset. We start by documenting the fair value measurement choices and disclosure levels across our sample in detail.

We then investigate the association between measurement-related disclosures and different proxies for information asymmetry, i.e. the bid-ask spread, the proportion of zero return days, and the price impact. Our evidence suggests that measurement-related disclosures are associated with certain information asymmetry proxies. However, we fail to find consistent evidence that this link is more pronounced when model fair value is used exclusively, which is where information uncertainty is the highest. More specifically, our results show a negative association between measurement-related disclosures and the bid-ask spread, especially when model estimates are used exclusively. However, we only find a negative association between measurement-related disclosures and the proportion of zero return days for firms that use model estimates (exclusively or in combination with another method) and no association with the price impact.

Our lack of results could be an indication that the additional disclosure is not used by investors. Differences between selling prices and reported fair values are lower for firms that provide more disclosures, especially when model estimates are used. The latter analysis shows that if our lack of results is due to capital market participants not using these additional disclosures this is not in their best interest.

Our study is subject to several limitations. First, we use a rather restrictive sample size spread over a limited number of European countries. Further studies may wish to focus on a broader set of countries to investigate whether the results hold in other institutional settings. Second, we study a crisis period during which the market was overly illiquid; it is not clear whether our results would hold in other periods. Time series analysis could also shed light on changes in the information asymmetry effects over time.

Third, we conduct the fair value analysis at an aggregate level, because we are unable to collect measurement-related disclosures for each investment property separately. However,

the level of aggregation works against our results. We find that model fair value disclosures can result in lower information asymmetry, even at an aggregate level.

Fourth, in developing our research design, we must consider that the potential causality between information asymmetry and the level of disclosure may give rise to endogeneity issues. We use a 2SLS design, but we acknowledge that finding a good instrument is a difficult task (Larcker and Rusticus 2010). Furthermore, we look at disclosures related to investment property valuation in the real estate industry. Whether the results hold for other principles-based settings, such as employee benefits (in which disclosures are expected to be useful), remains an open question.

Finally, results need to be interpreted with caution as Krinsky and Lee (1996) decompose the bid-ask spread into three components (adverse selection cost, inventory holding cost and order processing cost) and our analyses do not show which component is driving our results. Despite these limitations, we believe our setting provides an interesting avenue for future research.

Given the introduction of IFRS 13, it would also be interesting to test whether our main results hold, and how the introduction of IFRS 13 impacts fair value disclosures in the real estate industry. Finally, we only look at one capital market effect, i.e., information asymmetry and the liquidity of a firm's stock. There could be other benefits and costs associated with increased measurement-related disclosures such as a reduced cost of capital or increased information intermediation. This could also be an instructive topic for future research.

REFERENCES

Ahmed, A. S., Kilic, E., and Lobo, G. J., 2006. Does recognition versus disclosure matter? Evidence from value-relevance of banks' recognized and disclosed derivative financial instruments. Accounting Review, 81 (3), 567–588.

Akerlof, G., 1970. The market for" lemons": Quality uncertainty and the market mechanism. Quarterly Journal of Economics, 84 (3), 488–500.

Altamuro, J., and Zhang, W., 2013. The financial reporting of fair value based on managerial inputs versus market inputs: evidence from mortgage servicing rights. Review of Accounting Studies, 18 (3), 833–858.

Amihud, Y., 2002. Illiquidity and Stock Returns. Journal of Financial Markets, 5, 31–56.

Archambault, J.J. and Archambault, M.E., 2003. A multinational test of determinants of corporate disclosure. The International Journal of Accounting, 38(2), 173–194.

Armstrong, C. S., Core, J. E., Taylor, D. J., and Verrecchia, R. E., 2011. When does information asymmetry affect the cost of capital? Journal of Accounting Research, 49 (1), 1–40.

Badertscher, B. A., Burks, J. J., and Easton, P. D., 2012. A convenient scapegoat: Fair value accounting by commercial banks during the financial crisis. Accounting Review, 87 (1), 59–90.

Balakrishnan, K., Billings, M. B., Kelly, B., and Ljungqvist, A., 2014. Shaping liquidity: On the causal effects of voluntary disclosure. Journal of Finance, 69 (5):2237–2278.

Barth, M. E., Landsman, W. R., and Lang, M. H., 2008. International accounting standards and accounting quality. Journal of Accounting Research, 46 (3), 467–498.

Bekaert, G., Harvey, C. R., and Lundblad, C., 2007. Liquidity and expected returns: Lessons from emerging markets. Review of Financial Studies, 20 (6), 1783–1831.

Bens, D. A., Cheng, M., and Neamtiu, M., 2016. The Impact of SEC Disclosure Monitoring on the Uncertainty of Fair Value Estimates. Accounting Review, 91 (2), 349–375.

Bhattacharya, N., Desai, H., and Venkataraman, K., 2013. Does earnings quality affect information asymmetry? Evidence from trading costs. Contemporary Accounting Research, 30 (2), 482–516.

Bratten, B., Choudhary, P., and Schipper, K., 2013. Evidence that market participants assess recognized and disclosed items similarly when reliability is not an issue. Accounting Review, 88 (4), 1179–1210.

Christensen, H. B. and Nikolaev, V., 2013. Does fair value accounting for non-financial assets pass the market test? Review of Accounting Studies, 18 (3), 175–116.

Chung, S. G., Goh, B. W., Ng, J., and Yong, K. O., 2014. Voluntary Fair Value Disclosures Beyond SFAS 157's Three-level Estimates. Available at SSRN 1335848.

Clor-Proell, S. M., and Maines, L. A., 2014. The Impact of Recognition versus Disclosure on Financial Information: A Preparer's Perspective. Journal of Accounting Research, 52 (3), 671–701.

Cragg, J.C., and Donald, S.G., 1993. Testing identifiability and specification in instrumental variable models. Econometric Theory, 9 (2), 222–240.

Daske, H., Hail, L., Leuz, C., and Verdi, R., 2008. Mandatory IFRS reporting around the world: early evidence on the economic consequences. Journal of Accounting Research, 46 (5), 1085–1142.

Davis-Friday, P. Y., Folami, L. B., Liu, C. S., and Mittelstaedt, H. F., 1999. The value relevance of financial statement recognition vs. disclosure: Evidence from SFAS No. 106. Accounting Review, 74 (4), 403–423.

De George, E. T., Li, X., and Shivakumar, L, 2016. A review of the IFRS adoption literature.

Review of Accounting Studies, 21 (3), 1–107.
Diamond, D. and Verrecchia, R., 1991. Disclosure, liquidity, and the cost of capital. Journal of Finance, 66 (4), 1325–1355.
Dietrich, R. J., Harris, M. S., and Muller III, K. A., 2000. The reliability of investment property fair value estimates. Journal of Accounting and Economics, 30 (2), 125–158.
Dunn, K.A. and Mayhew, B.W., 2004. Audit firm industry specialization and client disclosure quality. Review of Accounting Studies, 9(1), 35–58.
Dye, R., 1993. Auditing standards, legal liability, and auditor wealth. Journal of Political Economy, 101 (5), 887–914.
Frederickson, J. R., Hodge, F. D., and Pratt, J. H., 2006. The evolution of stock option accounting: Disclosure, voluntary recognition, mandated recognition, and management disavowals. The Accounting Review, 81 (5), 1073–1093.
Fu, R., Kraft A., and Zhang, H., 2012. Financial reporting frequency, information asymmetry, and the cost of equity. Journal of Accounting and Economics, 54 (2-3), 132–149.
Goh, B. W., Ng J., and Yong, K. O., 2015 Market pricing of banks' fair value assets reported under SFAS 157 since the 2008 financial crisis. Journal of Accounting and Public Policy, 34 (2), 129–145.
Healy, P. M., Hutton, A. P., and Palepu, K. G., 1999. Stock Performance and Intermediation Changes Surrounding Sustained Increases in Disclosure. Contemporary Accounting Research, 16 (3), 485–520.
Healy, P. M., and Palepu, K.G., 2001. Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. Journal of Accounting and Economics, 33 (1-3), 405–455.
Hillegeist, S. A., 1999. Financial reporting and auditing under alternative damage appointment rules. Accounting Review, 74 (3): 347–369.
Hitz, J. M., 2007. The decision usefulness of fair value accounting–a theoretical perspective. European Accounting Review, 16 (2), 323–362.
IAASB (January 2011). The Evolving Nature of Financial Reporting: Disclosure and Its Audit Implications. Discussion paper.
Israeli, D., 2015. Recognition versus disclosure: evidence from fair value of investment property. Review of Accounting Studies, 20 (4), 1457–1503.
Kim, O., and Verrecchia, R., 1994. Market liquidity and volume around earnings announcements. Journal of Accounting and Economics, 17 (1-2), 41–68.
Kini, O., and Williams, R., 2012. Tournament incentives, firm risk, and corporate policies. Journal of Financial Economics, 103 (2): 350–376.
Krinsky, I. and Lee, J., 1996. Earnings announcements and the components of the bid-ask spread. The Journal of Finance, 51(4),1523–1535.
Kvaal, E. and Nobes, C., 2012. IFRS policy changes and the continuation of national patterns of IFRS practice. European accounting review, 21(2), 343–371.
Landsman, W., 2007. Is fair value accounting information relevant and reliable? Evidence from capital market research. Accounting and Business Research, 37(1) supplement, 19–30.
Lang, M. Lins, K. V., and Maffett, M., 2012. Transparency, liquidity, and valuation: International evidence on when transparency matters most. Journal of Accounting Research, 50 (3), 729–774.
Larcker, D. F., and Rusticus, T. O., 2010. On the use of instrumental variables in accounting research. Journal of Accounting and Economics, 49(3), 186–205.
Laux, C. and Leuz, C., 2009. The crisis of fair value accounting: making sense of the recent debate. Accounting, Organizations and Society, 34 (6-7), 826–834.

Leuz, C., and Verrecchia, R. E., 2000. The economic consequences of increased disclosure. Journal of Accounting Research, 38 (supplement), 91–124.
Libby, R., Nelson, M. W., and Hunton, J. E., 2006. Recognition v. Disclosure, Auditor Tolerance for Misstatement, and the Reliability of Stock-Compensation and Lease Information. Journal of Accounting Research, 44(3), 533–560.
Lobo, G. J. and Zhao Y., 2013. Relation between Audit Effort and Financial Report Misstatements: Evidence from Quarterly and Annual Restatements. Accounting Review, 88 (4), 1385–1412.
Muller, K. A. III and Riedl. J.E., 2002. External monitoring of property appraisal estimates and information asymmetry. Journal of Accounting Research, 40 (3), 865–881.
Muller, K. A, Riedl E. J., and Sellhorn T., 2011. Mandatory fair value accounting and information asymmetry: Evidence from the European Real Estate Industry. Management Science, 57 (6), 1138–1153.
Müller, M., Riedl, E. J., and Sellhorn, T., 2015. Recognition Versus Disclosure of Fair Values. Accounting Review, 90 (6), 2411–2447.
Nikolaev, V., and Van Lent, L., 2005. The endogeneity bias in the relation between cost-of-debt capital and corporate disclosure policy. European Accounting Review, 14 (4), 677–724.
Plantin, G., Sapra, H., and Shin, H. S., 2008. Marking – to – market: Panacea or Pandora's Box? Journal of Accounting Research, 46 (2), 435–460.
Riedl, E. J. and Serafeim G., 2011. Information Risk and Fair Values: An Examination of Equity Betas. Journal of Accounting Research, 49(4), 1038–1122.
Schipper, K., 2003. Principle-Based Accounting Standards. Accounting Horizons, 17, 61–72.
Shleifer, A. and Vishny, R.W., 1992. Liquidation values and debt capacity: A market equilibrium approach. The Journal of Finance, 47(4), 1343–1366.
Song, C. J., Thomas W., and Yi, H., 2010. Value relevance of FAS 157 fair value hierarchy information and the impact of corporate governance mechanisms. Accounting Review, 85 (4), 1375–1410.
Stanley, J. D., and DeZoort, F. T., 2007. Audit firm tenure and financial restatements: An analysis of industry specialization and fee effects. Journal of Accounting and Public Policy, 26 (2), 131–159.
Stock, J. and Yogo M., 2005. Testing for Weak Instruments in Linear IV Regression. In: Andrews DWK Identification and Inference for Econometric Models. New York: Cambridge University Press, 80–108.
Sundgren, S., Maki, J. and Somoza-Lopez, A., 2013. Cross-country differences in disclosure quality: a study of fair value disclosures by European real estate companies. Working paper, University of Vaasa and Barcelona University. Available on SSRN.
Sundgren, S., J. Mäki and Somoza-Lopez, A., 2016. Analyst coverage, market liquidity and disclosure quality: a study of fair-value disclosures by European real estate companies under IAS 40 and IFRS 13. Working paper. Available on SSRN.
Vergauwe, S. and Gaeremynck, A., 2013. Disclosure comparability under IFRS. Working paper, Lancaster University and KU Leuven. Available on SSRN.
Verrecchia, R. E., 2001. Essay on disclosure. Journal of Accounting and Economics, 32 (1-3), 97–180.
Welker, M., 1995. Disclosure policy, information asymmetry, and liquidity in equity markets. Contemporary Accounting Research, 11 (2), 801–827.
Yu, K., 2013. Does recognition versus disclosure affect value relevance? Evidence from pension accounting. Accounting Review 88 (3), 1095–1127.

Appendix 1

Variable definitions

Variable names	Definitions and Estimations
Dependent variables	
Bid_ask_spread	We obtain the closing bid and ask prices for each day from Datastream, and compute the daily quoted spread as the difference between the two prices divided by the midpoint price. We then compute the average daily spread over the month after the filing of the annual report.
Ln(BID_ASK_SPREAD)	Logarithm of the average bid-ask spread.
Price_Impact	Amihud (2002) illiquidity measure (i.e., daily absolute stock return divided by trading volume (in thousands)). Following Daske et al. (2008), we use the median value over the month after the filing of the annual report, and we exclude zero return days.
Ln(PRICE_IMPACT)	Logarithm of the price impact.
ZERO_RETURN	Proportion of trading days with zero daily stock returns out of all potential trading days over the month after filing of the annual report.
Control and test variables	
AUDITFEE	Fees paid to the auditor in thousands.
Ln(AUDITFEE)	Natural logarithm of the total audit fee.
COMBINATION	Dummy variable that takes the value of 1 if a firm uses both model and non-model estimates to estimate fair value, and 0 otherwise.
COMP	Dummy variable that takes the value of 1 if comparable prices or assets were used to estimate fair value, and 0 otherwise.
DISCL	Disclosure index as defined in Appendix 2.
FREE_FLOAT	We obtain the percentage of shares readily available for trading from Datastream and take the average free float over the month after the filing of the fiscal year.
FVBS	Dummy variable that takes the value of 1 if the fair value model is applied, and 0 if the cost model is applied.
GDS	General disclosure index as defined in Appendix 2.
IP	Total amount of investment property in the balance sheet scaled by total assets.
Market_Cap	We obtain the daily market capitalization from Datastream (value in thousands of

	Euros), and average the market capitalization over the month after the filing of the fiscal year.
Ln(MARKET_CAP)	Logarithm of the market capitalization.
MODEL	Dummy variable that takes the value of 1 if model estimates were used to estimate fair value, and 0 otherwise.
MV	Dummy variable that takes the value of 1 if market value and market inputs were used to estimate fair value.
NO_MODEL	Dummy variable that takes the value of 1 if a firm does not use model estimates to estimate fair value, and 0 otherwise.
ONLY_MODEL	Dummy variable that takes the value of 1 if a firm uses model estimates exclusively to estimate fair value, and 0 otherwise.
TURNOVER	We obtain the number of shares traded and outstanding for each day from Datastream (in thousands), and compute the turnover as the ratio of shares traded by shares outstanding. We then compute the average daily ratio over the month after the filing of the annual report.
Ln(TURNOVER)	Logarithm of the turnover.
Volatility	We obtain returns for each day from Datastream, and compute the standard deviation over the month after the filing of the annual report.
Ln(VOLATILITY)	Logarithm of the standard deviation of daily returns.

Appendix 2

Variable definitions

VARIABLE	VALUE	DESCRIPTION
Measurement-related disclosures		
Benchmark details	0/1	Details on similar or comparable property or transactions used to estimate fair value.
Market yield	0/1	This yield is based on the market income of the property and is publicly available. Market income is the net income that reflects the market rent level at the time of purchase.
Occupancy rate	0/1	Occupancy rate: percentage of property rented out.
Income	0/1	Details on the cash flows or rental income used in model estimation.
Discount rate	0/1	Discount rate used in model estimation.
Time frame	0/1	Predicted time frame over which income (the cash flow) is capitalized (discounted).
Income assumptions	0/1	Assumptions on the rental income of the firms.
General disclosures		
REPORT	0/1	Report by the appraiser on the valuation procedure.
REFERENCE	0/1	Reference to external valuation guidelines.
NAME	0/1	Name of the independent appraiser.
APPRAISAL	0/1	Number of times the property was reappraised per year.
SENSITIVITY	0/1	Sensitivity of the total portfolio value to one or more parameters.

Appendix 3

Examples of the computation of the disclosure index for Leaseinvest Real Estate 2010

Information in the notes

"Investment properties are stated at fair value in accordance with IAS 40."

"An external independent real estate valuer determines, upon request of management, every quarter, the investment value of the property, (this term corresponds to the previously used term 'investment value'), i.e. costs, transfer taxes and fees included."

"The valuers carry out their valuation on the basis of the method of calculating the present value of the rental income in accordance with the International Valuation Standards 2005, issued by the International Valuation Standards Committee as set out in the corresponding report."

"In accordance with the opinion of the working group of the Belgian Association of Asset Managers 'BEAMA…"

"The average remaining duration of the rental contracts amounts to 3.8 years."

Information in the appraiser report (Cushman and Wakefield)

"Our valuation methodology is the capitalisation of the market rent." … "We based ourselves on comparables that were available at the date of valuation."

"The occupancy rate of the total portfolio (excluding the Projects) is 97.45% (respectively 96.35% and 98.97% for the Belgian and the Luxembourg portfolios)."

"On this basis, the initial yield of the complete portfolio (excluding the Projects) in terms of investment value is 7.22% (with 7.72% and 6.62%, respectively, for the Belgian and Luxembourg portfolios) and the initial yield of the complete portfolio in terms of fair value is 7.41% (7.92% and 6.79%, respectively, for the Belgian and Luxembourg portfolios)."

Scoring cards

Panel A: Identification of items disclosed

VARIABLE	VALUE	Disclosed by Leaseinvest real estate?
Measurement-related disclosures		
Benchmark details	0/1	0
Market yield	0/1	1
Occupancy rate	0/1	1
Income	0/1	0
Discount rate	0/1	0
Time frame	0/1	1
Income assumptions	0/1	0
SUM	7	3
General disclosures		
REPORT	0/1	1
REFERENCE	0/1	1
NAME	0/1	1
APPRAISAL	0/1	1
SENSITIVITY	0/1	0
SUM	5	4

Panel B: Disclosure scores

	Leaseinvest real estate
DISCL	0.43
Actual score	3
Maximum score	7
GDS	0.8
Actual score	4
Maximum score	5

Table 1. Sample description

Panel A: Sample selection

Data requirements	Number of firm-year observations
European real estate firm-year observations with reports in German, French, English, or Dutch for fiscal years 2007 to 2010	544
-Less:	
Unavailable copies of financial statements, incorrect reporting, no use of IAS 40, change in fiscal year-end	-64
Missing hand-collected disclosure data	-40
Missing Datastream data	-68
Main sample	372
-No sales of investment property	
Measurement error sample	184

Panel B: Sample composition

	UK	FR	GER	BE	NL	NO	FI	SW	IT	Total
2007	15	28	22	13	8	3	2	4	0	95
2008	17	32	20	14	10	3	2	4	3	105
2009	14	25	17	13	10	2	3	4	2	90
2010	9	28	14	14	9	3	2	3	0	82
Total	55	113	73	54	37	11	9	15	5	372

Notes: This table reports the sample selection and number of observations per country and year. UK: United Kingdom; FR: France; GER: Germany; BE: Belgium; NL: The Netherlands; NO: Norway, SW: Sweden, FI: Finland; IT: Italy. 2007: companies that have a fiscal year-end between 30 June 2007 and 30 June 2008; 2008: companies that have a fiscal year-end between 1 July 2008 and 30 June 2009; 2009: companies that have a fiscal year-end between 1 July 2009 and 30 June 2010. 2010: companies that have a fiscal year-end between 1 July 2010 and 30 June 2011.

Table 2. Fair value measurement choices for investment property made

Panel A: Number of fair value methods used by firm-year observations

	Firm-year observations	%
1 Method	258	69%
2 Methods	106	29%
3 Methods	8	2%
Total	372	100%

Panel B: Fair value measurement choices disclosed in the notes by number of methods used

	Firm-year observations	%
1 method		
MV	32	8%
COMP	8	2%
MODEL	218	59%
TOTAL 1 method	258	69%
2 methods		
MV and COMP	5	1%
MV and MODEL	21	6%
COMP and MODEL	80	22%
TOTAL 2 methods	106	29%
TOTAL 3 methods	8	2%
Panel C: Fair value measurement choices		
ONLY_MODEL	218	59%
COMBINATION	109	29%
NO_MODEL	45	12%
TOTAL	372	100%

Notes: This table reports the number of firm-year observations (and percentage of firms) that use the same method for all of their properties, two different methods, or all methods, respectively. Our sample consists of 372 European real estate firm-year observations. MV is the market value method, COMP is the comparable prices or assets method, MODEL is the model estimates method, ONLY_MODEL is an indicator variable that takes the value of 1 if firms use MODEL only, and 0 otherwise, COMBINATION is an indicator variable that takes the value of 1 if firms use MODEL combined with another method, and 0 otherwise, NO_MODEL is an indicator variable that takes the value of 1 if a firm does not use MODEL, and 0 otherwise.

Table 3. Fair value measurement choices and disclosure index

Panel A: Fair value measurement choice and average disclosure index by country

	UK	FR	GER	BE	NL	NO	FI	SW	IT	F-stat	Total
MV	0.56	0.08	0.01	0.20	0.16	0.18	0	0	0.20	13.93***	
COMP	0.20	0.48	0.12	0.13	0.32	0.09	0	0.07	0.80	8.03***	
MODEL	0.38	0.97	0.98	1	0.79	0.90	1	1	1	30.61***	
ONLY_MODEL	0.16	0.48	0.86	0.66	0.49	0.72	1	0.93	0.20	12.24***	
COMBINATION	0.22	0.49	0.12	0.34	0.30	0.18	0	0.07	0.80	6.58***	
NO_MODEL	0.62	0.03	0.02	0	0.21	0.10	0	0	0	15.76***	
DISCL	0.18	0.27	0.30	0.50	0.32	0.44	0.48	0.59	0.14	9.59***	
Total	55	113	73	54	37	11	9	15	5		372

Panel B: Fair value measurement choice and average disclosure index by year

	2007	2008	2009	2010	F-stat	Total
MV	0.23	0.21	0.10	0.10	3.42**	
COMP	0.20	0.29	0.24	0.34	1.65	
MODEL	0.83	0.87	0.90	0.92	1.24	
ONLY_MODEL	0.57	0.54	0.63	0.56	0.36	
COMBINATION	0.26	0.33	0.27	0.36	0.96	
NO_MODEL	0.17	0.13	0.10	0.08	2.77**	
DISCL	0.21	0.23	0.39	0.50	26.74***	
Total	95	105	90	82		372

Notes: Panel A of this table reports the percentage of firm-year observations that use a particular method and the disclosure index by country (country codes are as defined in Table 1), and the total number of firm-year observations. Panel B reports the percentage of firm-year observations that use a particular method and the disclosure index by year, as well as total number of firm-year observations. Our sample consists of 372 European real estate firm-year observations. MV is the market value method, COMP is the comparable prices or assets method, MODEL is the model estimates method, ONLY_MODEL is an indicator variable that takes the value of 1 if firms use MODEL only, and 0 otherwise, COMBINATION is an indicator variable that takes the value of 1 if firms use MODEL combined with another method, and 0 otherwise, NO_MODEL is an indicator variable that takes the value of 1 if a firm does not use

MODEL, and 0 otherwise, DISCL is the disclosure index. **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. More details on the disclosure variables are in Appendix 2.

Table 4. Descriptive statistics: Dependent and control variables

	Mean	Stand. Dev.	Q1	Median	Q3
Bid_ask_spread	0.04	0.09	0.01	0.02	0.03
Ln(BID_AK_SPREAD)	-4.22	1.40	-5.09	-4.19	-3.39
ZERO_RETURN	0.22	0.24	0.05	0.13	0.33
Price_Impact	0.02	0.09	0.00	0.00	0.00
Ln(PRICE_IMPACT)	-0.93	3.31	-3.31	-0.31	1.41
Turnover	0.001	0.004	0.0001	0.0004	0.002
Ln(TURNOVER)	-7.89	1.83	-9.14	-7.79	-6.44
Volatility	0.03	0.03	0.01	0.02	0.03
Ln(VOLATILITY)	-3.93	0.76	-4.40	-3.96	-3.47
FREE_FLOAT	57.70	29.07	33.00	59.39	84.18
Market_Cap	764288.93	1641409.24	63904.81	207138.34	643906.47
Ln(MARKET_CAP)	12.21	1.75	11.07	12.24	13.38
GDS	0.46	0.27	0.20	0.40	0.60
FVBS	0.82	0.38	1.00	1.00	1.00
AUDITFEE	649.03	3937.28	80.00	160.00	379.50
Ln(AUDITFEE)	5.21	1.30	4.38	5.08	5.94
IP	0.73	0.30	0.59	0.87	0.94

Notes: This table reports descriptive statistics on our dependent and control variables. Our sample consists of 372 European real estate firm-year observations. Variables are defined as in Appendix 1.

Table 5. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Ln(BID_ASK_SPREAD) (1)	1													
ZERO_RETURN (2)	0.591***	1												
Ln(PRICE_IMPACT) (3)	0.836***	0.563***	1											
DISCL (4)	-0.276***	-0.252***	-0.297***	1										
ONLY_MODEL (5)	-0.028	-0.163**	-0.035	0.285***	1									
COMBINATION (6)	-0.120*	-0.002	-0.124*	0.037	-0.616***	1								
NO_MODEL (7)	0.158**	0.158**	0.103*	-0.095	-0.339***	-0.211***	1							
GDS (8)	-0.295***	-0.200***	-0.344***	0.481***	0.051	0.164**	0.029	1						
FVBS (9)	0.006	-0.001	-0.032	0.188***	-0.053	0.076	0.120*	0.253***	1					
Ln(VOLATILITY) (10)	0.385***	0.081	0.331***	-0.265***	-0.092	-0.104*	0.089	-0.315***	-0.042	1				
Ln(TURNOVER) (11)	-0.483***	-0.436***	-0.642***	0.038	-0.097	-0.045	0.149**	0.140**	0.023	0.155**	1			
Ln(MARKET_CAP) (12)	-0.777***	-0.578***	-0.791***	0.346***	0.099	0.156**	-0.193***	0.317***	-0.020	-0.336***	0.257***	1		
FREE_FLOAT (13)	-0.264***	-0.290***	-0.285***	0.071	0.029	-0.091	0.061	0.157**	0.093	0.059	0.391***	0.118*	1	
Ln(AUDITFEE) (14)	-0.464***	-0.424***	-0.373***	0.118*	0.051	0.128*	-0.140**	-0.021	-0.108*	-0.031	0.093	0.557***	0.003	1
IP (15)	-0.214***	-0.208***	-0.247***	0.343***	0.174***	0.002	0.011	0.495***	0.257***	-0.186***	0.061	0.302***	0.150**	-0.044

Notes: This table reports Pearson rank correlation coefficients for all variables. Our sample consists of 372 European real estate firm-year observations. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Variables are defined as in Appendix 1.

Table 6. Multivariate results: The impact of method-related disclosures on the bid-ask spread, proportion of zero return days, and price impact

First Stage		Ln(BID_ASK_SPREAD)		ZERO_RETURN		Ln(PRICE_IMPACT)	
		2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PDISCL		-0.287**	-0.163*	-0.118	0.050	-0.013	-0.055
		(-2.30)	(-1.92)	(-0.88)	(0.56)	(-0.17)	(-0.89)
DISCL_AVG	0.512***						
	(4.07)						
COMBINATION	0.165*	0.002	0.021	0.085	0.196*	-0.064	-0.119**
	(1.97)	(0.03)	(0.36)	(1.05)	(1.69)	(-1.59)	(-2.14)
ONLY_MODEL	0.183**	0.069	0.139**	0.044	0.114	-0.060	-0.065
	(2.46)	(1.34)	(2.51)	(0.59)	(1.15)	(-1.25)	(-0.83)
PDISCL*COMBINATION			-0.061		-0.176**		0.071
			(-1.24)		(-2.37)		(1.44)
PDISCL*ONLY_MODEL			-0.138**		-0.169**		0.027
			(-2.10)		(-1.99)		(0.35)
GDS	0.293***	0.070	0.073*	0.032	0.034	0.043	0.044
	(3.00)	(1.30)	(1.68)	(0.43)	(0.48)	(1.06)	(1.09)
FVBS	0.109	-0.126	-0.138	0.036	0.021	-0.094	-0.091
	(0.72)	(-1.28)	(-1.61)	(0.58)	(0.39)	(-0.94)	(-0.92)
Ln(VOLATILITY)	-0.006	0.184***	0.184***	0.022	0.026	0.129***	0.126***
	(-0.10)	(3.36)	(3.91)	(0.54)	(0.65)	(3.28)	(3.26)
Ln(TURNOVER)	0.022	-0.327***	-0.325***	0.102*	0.093*	-0.373***	-0.367***
	(0.16)	(-4.11)	(-4.90)	(1.79)	(1.68)	(-6.80)	(-6.76)
Ln(MARKET_CAP)	0.167	-0.436***	-0.435***	0.047	0.052	-0.596***	-0.598***
	(1.33)	(-3.21)	(-3.56)	(0.66)	(0.78)	(-7.62)	(-7.79)
FREE_FLOAT	0.118	-0.032	-0.034	0.069	0.064	-0.059*	-0.058*
	(1.33)	(-0.49)	(-0.64)	(1.12)	(1.12)	(-1.71)	(-1.67)
Ln(AUDITFEE)	0.097	-0.035	-0.037	-0.024	-0.016	0.003	-0.002
	(1.01)	(-0.45)	(-0.52)	(-0.69)	(-0.46)	(0.09)	(-0.06)
IP	0.022	0.040	0.033	0.087	0.108*	0.071**	0.056

Table 6 (Continued)

	(0.10)	(0.51)	(0.61)	(1.23)	(1.69)	(2.12)	(1.55)
Intercept	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES
Observations	372	372	372	372	372	372	372
Adjusted R^2	0.632	0.854	0.889	0.862	0.872	0.916	0.917
Cragg-Donald Wald F-statistic	26.39						
Stock-Yogo critical value	16.38						
Wald Coefficient test							
PDISCL*COMBINATION= PDISCL*ONLY_MODEL			1.17		0.52		1.57

Notes: Our sample consists of 372 European real estate firm-year observations. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Variables are as defined in Appendix 1.

Table 7. Method-related disclosures and estimation errors

	Full sample		ONLY_MODEL sample		COMBINATION sample	
Estimation error	Variance	p-value	Variance	p-value	Variance	p-value
		0.04		0.02		0.18
High disclosure	0.02		0.03		0.05	
Low disclosure	0.04		0.09		0.07	

Notes: We test for equality of variances of estimation errors for different disclosure levels. Our sample consists of 184 European real estate firm-year observations; 95 use only model estimate, and 53 use a combination. Estimation error is the absolute value of the fair value gain (FVG) or loss (FVL) realized over the actual selling price (SP) for assets sold during the fiscal year; or abs(FVG_{it} (FVL_{it})/SP_{it}), High (Low) disclosure is a binary variable that takes the value of 1 if a firm provides more (less) disclosure than the sample median. More details on the disclosure variables are provided in Appendix 2.