

Recognition versus Disclosure of Fair Values

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ABSTRACT: This paper examines pricing differences across recognized and disclosed fair values. We build on prior literature by examining two theoretical causes of such differences: lower reliability of the disclosed information, and/or investors' higher related information processing costs. We examine European real estate firms reporting under International Financial Reporting Standards (IFRS), which require that fair values for investment properties, our sample firms' key operating asset, either be recognized on the balance sheet or disclosed in the footnotes. Consistent with prior research, we predict and find a lower association between equity prices and disclosed relative to recognized investment property fair values, reflecting a discount assigned to disclosed fair values. We then predict and find that this discount is mitigated by lower information processing costs (proxied via high analyst following), and some support that it is also mitigated by higher reliability (proxied via use of external appraisals). These latter results are documented using subsample analyses to test one attribute (either information processing costs or reliability) while holding the other constant. Overall, these findings are consistent with fair value reliability and information processing costs providing complementary explanations for observed pricing discounts assessed on disclosed accounting amounts.

Keywords: fair value; recognition; disclosure; IFRS; investment property

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Data Availability: data are available from public sources identified in the manuscript.

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I. INTRODUCTION

This paper examines pricing differences across recognized and disclosed fair values. While prior research documents such pricing differences, the distinction between two potential explanations has been elusive: discounting of disclosed information due its lower reliability, and/or higher information processing costs associated with disclosed items (Bernard and Schipper 1994; Schipper 2007). We build on this literature by examining whether the pricing discount observed for disclosed, relative to recognized, fair values is attributable to lower reliability, and/or higher information processing costs.

We choose as our setting investment property (i.e., real estate) firms domiciled in the European Union and reporting under International Financial Reporting Standards (IFRS) over 2003–2012. This setting reflects several unique advantages. First, our 245 publicly-traded sample firms (with an aggregate market value exceeding €200 billion) have an economically significant primary operating asset for which fair value information is highly relevant: investment property, representing over 75% of average total assets. Second, IFRS requirements for this asset provide a key source of reporting variation: recognition versus disclosure of fair values. Specifically, firms either recognize investment property fair values on the balance sheet with changes recognized in net income (“recognition firms”), or disclose these fair values in the footnotes, with the financial statements reflecting a depreciated-cost basis (“disclosure firms”). Third, recognized and disclosed amounts further vary on the reliability and information processing cost dimensions. Finally, this single-industry setting both minimizes cross-industry variation that can affect the pricing of accounting information, as well as potential alternative effects likely present in other industries having substantial fair value reporting (e.g., regulation in the banking industry).

We develop and test three expectations. First, to replicate previously established differences in the association of recognized versus disclosed accounting amounts with market outcomes (e.g., Barth 1991; Davis-Friday et al. 2004), we use the mandatory fair value disclosures to facilitate direct comparisons of investment property fair values across the recognition and disclosure firm groupings. Consistent with this literature, we expect and find that disclosed fair values are priced at a discount relative to recognized fair values.

Next, we examine two potential explanations for this pricing discount: ‘differential reliability’ (i.e., investors appropriately viewing disclosed information as having lower reliability); or ‘differential information processing costs’ (i.e., investors facing higher information processing costs for disclosed fair values). Under differential reliability (e.g., Bratten et al. 2013), disclosed information is viewed as containing greater measurement error, owing to greater scrutiny of recognized data by both internal (e.g., management) and external (e.g., auditor) parties. Thus, we examine the role of reliability in observed pricing discounts for disclosed fair values. Our industry setting is unique through its use of a critical monitor—the external appraiser—which provides a strong measure of *ex ante* reliability (e.g., Dietrich et al. 2001). Accordingly, we predict that any pricing discount for disclosure firms is attenuated through higher *ex ante* reliability of their fair value measures, proxied via use of an external appraiser.

Finally, we examine the role of information processing costs in pricing discounts for disclosed fair values. Under this theory, information intermediaries lower information processing costs for investors, resulting in a more expeditious and complete reflection of disclosed fair values in market prices. As the number of analysts following the firm should

be negatively related to investors' information processing costs, we expect any pricing discount for disclosed fair values to be attenuated for firms having higher analyst following.¹

We provide some evidence consistent with the differential reliability explanation, as observed pricing discounts are attenuated for disclosure firms employing external appraisers. This is consistent with equity market participants viewing disclosed investment property fair values as more reliable when estimated by external appraisers. Further, we find strong support for the information processing cost explanation, as the average pricing discount observed for disclosed fair values is significantly lower where analyst following is higher. Of note, significant pricing discounts on disclosed fair values disappear fully and exclusively in a subsample of firms exhibiting *both* high reliability *and* low information processing costs.

Our results are generally robust to the following sensitivity analyses. As our setting inherently gives rise to potential selection bias—including the choice to recognize versus disclose under IFRS, as well as the choice to use an external appraiser—we conduct a number of specifications to mitigate these concerns. We also examine alternative specifications to address multicollinearity and omitted variable bias; alternative measures of the dependent and experimental variables; and several subsample analyses. Overall, we conclude that fair value reliability and information processing costs provide complementary explanations for observed pricing discounts assessed on disclosed accounting amounts. However, we do caution that our conclusions relating to differential reliability are based on subsamples reflecting a small number of observations.

This paper contributes to the recognition versus disclosure literature by (1) documenting a pricing discount for disclosed relative to recognized accounting amounts in a cross-country non-US setting under IFRS reporting (while prior literature primarily examines

¹ As discussed later, in simultaneously analyzing the reliability and information processing explanations, we differ from Bratten et al. (2013), which chooses a setting to minimize potential information processing frictions, and accordingly neither explicitly models nor tests an information processing hypothesis.

the US setting); (2) examining fair values for an economically significant operating and tangible asset of investment property (while prior literature focuses on liability/equity items of limited magnitude); and (3) in a context that helps isolate the effects of reliability versus information processing costs on observed pricing discounts. Importantly, we complement several recent studies questioning the exclusivity of the differential reliability explanation (Michels 2013; Yu 2013) by providing evidence of information processing cost effects.

Section II provides institutional background on the European investment property industry, reviews the prior literature, and develops our hypotheses. Section III describes the research design. Section IV discusses the sample selection and describes the data. Section V presents the main results, and Section VI the sensitivity results. Section VII concludes.

II. INSTITUTIONAL SETTING, PRIOR LITERATURE, AND HYPOTHESIS DEVELOPMENT

Institutional Setting

To examine how recognition versus disclosure affects the market pricing of fair values, we choose the European investment property industry as our setting. These firms acquire real estate properties, either through purchase, lease, or development, and then manage and sell them to generate profits through rentals and/or capital appreciation.² Accordingly, investment property is the major operating asset, and we consider its reported fair value to be relevant to equity market participants' investment decisions, as evidenced through its role in industry measures such as net asset value (NAV) (Liang and Riedl 2014).

Our setting provides simultaneous observation of recognized and disclosed fair values for our sample firms' most significant asset class: investment property. Following the EU's mandated adoption of IFRS for public firms' consolidated accounts in 2005, the investment

² Thus, investment property differs from real estate assets used for production or administrative purposes. Our sample firms' investment property (measured at fair value) accounts for over 75% of total assets on average.

property industry applies International Accounting Standard 40 (IAS 40), *Investment Property* (IASB 2003). IAS 40 allows firms a choice for presenting their investment property assets under either the ‘fair value model’ or the ‘cost model.’ Under the fair value model, firms recognize investment properties on the balance sheet at fair value, with fair value changes recognized in net income. Under the cost model, firms recognize investment properties on the balance sheet at depreciated cost subject to impairment, with mandatory footnote disclosure of fair values. Accordingly, IAS 40 mandates that *all* firms present fair values for investment property, via either recognition or disclosure. We label firms choosing the fair value (cost) model as “recognition firms” (“disclosure firms”). This choice under IAS 40 represents the primary reporting difference among firms in this industry.

The financial statement depictions of this business model thus differ across these two firm groupings. Whereas the balance sheet of recognition firms presents investment properties at fair value, these same fair values are available for disclosure firms only via the footnotes. Equivalently, the income statements of recognition firms include the unrealized fair value gains and losses on retained property, while the reported earnings of disclosure firms omits these amounts. Thus, we use disclosure firms’ mandated fair value disclosures to derive fair value-based balance sheet and income statement amounts for these firms.

Accordingly, this setting allows us to compare the market pricing of fair value-based accounting amounts across recognition and disclosure firms. Institutional characteristics further allow us to examine whether any differences are explained by variation in the reliability of fair value measurement (‘differential reliability’, which we assess via firms’ use of external versus internal valuations, where external appraisals are recommended but not required under IAS 40), as well as variation in the processing costs related to disclosed fair value information by investors (‘information processing costs’, which we assess through firms’ heterogeneous levels of analyst following).

In summary, this setting provides the following unique advantages that allow us to contribute to the recognition versus disclosure literature. First, it is characterized by an economically material primary operating asset—investment property—for which fair value information is both highly relevant, and observable under both recognized and disclosed formats. Second, it provides variation in other pertinent attributes, particularly *ex ante* reliability of these fair value estimates, as well as investors’ information processing costs. Third, as previously discussed, this industry is well-developed, economically significant, and minimizes variation in non-reporting institutional factors (e.g., regulation in the banking industry) that can affect inferences about the pricing of accounting amounts.

Prior Literature and Contribution

Our paper adds to two streams of literature. The first examines the effects of recognition versus disclosure; the second focuses on fair value reporting. Regarding the first, prior literature studies differences in capital-market outcomes associated with recognized versus disclosed accounting amounts (Bernard and Schipper 1994; Schipper 2007).³ We summarize related prior work along four dimensions, positioning our paper with regard to each: research question; identification strategy; setting; and outcome measure.

Regarding research question, earlier studies on recognition versus disclosure establish that both components are priced, though they yield different capital-market outcomes (e.g., Landsman 1986; Harris and Ohlson 1987; Beaver et al. 1989; Barth 1991). This earlier research primarily examines *if* these components are reflected in market prices. More recent papers examine reasons for *why* disclosed items appear to be priced at a discount relative to recognized ones. Two potentially complementary explanations are proposed (Bernard and

³ The placement of information (recognition versus disclosure) also motivates experimental financial reporting studies, with examples including Libby, Nelson and Hutton (2006) and Clor-Proell and Maines (2014).

Schipper 1994; Schipper 2007; Bratten et al. 2013): ‘differential reliability’ and ‘information processing.’ Differential reliability suggests that disclosed amounts are appropriately viewed by agents in an efficient market as having lower reliability. Information processing suggests that capital-market participants face higher information processing costs for disclosed relative to recognized amounts, which can vary with the firm’s information environment and disclosure quality, as well as investors’ competence, cognition, and attention.

Several papers report evidence consistent with differential reliability, whereas few explicitly examine the information processing cost explanation. Davis-Friday et al. (2004) shows that disclosed non-pension post-retirement benefit (PRB) liabilities are perceived as less reliable than recognized amounts, presumably due to higher-quality information for recognized PRB liabilities (SFAS 106) relative to disclosed PRB liabilities (SAB 74). Related, Choudhary (2011) documents that information accuracy and bias can differ systematically across recognized and disclosed stock option expense components. Bratten et al. (2013) shows that disclosed (capital) and recognized (operating) lease liabilities are not processed differently when they are equally reliable (with lease payments grouped into the ‘thereafter’ portion, i.e. expected after year $t+5$, reflecting low reliability), and the associated disclosures are salient, not based on management’s estimates, and easy to process for investors. Their results support the differential reliability notion under assumptions that minimize the role of information processing costs.

However, Michels (2013) casts doubt on the exclusivity of the differential reliability explanation. For subsequent events, a setting in which the recognition versus disclosure treatment is randomly assigned by nature, recognized amounts are weighed more heavily by investors than disclosed amounts even in the absence of measurable reliability differences. Further, consistent with the information processing cost view, Yu (2013) finds that the value relevance of both disclosed and recognized pension liabilities increases in institutional

ownership and analyst following. Overall, there is no consensus that the pricing discount observed for disclosed items relates principally (or entirely) to lower reliability, and the information processing cost explanation has not been fully explored. We add to this literature by providing evidence on *both* the differential reliability and information processing cost explanations, in a setting that allows examination of one while holding the other constant.

Regarding identification strategy, papers vary in their approach to supporting a causal recognition versus disclosure effect on capital market outcomes through settings which randomize to the extent possible the presentation format of a given item, while holding constant other covariates that could influence the outcome under study. Two common approaches are followed. First, researchers observe *within-firm variation* of accounting treatments, using the firm as its own control. This occurs either when a mandatory accounting change requires recognition of a previously disclosed item (e.g., Davis-Friday et al. 2004), or when a firm reports two sets of economically identical items, with one being recognized and the other disclosed (e.g., Ahmed et al. 2006; Bratten et al. 2013). These papers are subject to the concern that other relevant factors (e.g., properties of the presented information) might change during the period under study, confounding pre-post comparisons of market pricing; or that items are not economically identical (e.g., operating versus finance leases). Second, researchers exploit concurrent *across-firm variation* in accounting treatments for the same item, most commonly due to a firm-level accounting choice between the recognition and disclosure treatments (e.g., Aboody et al. 1996; Campbell et al. 2003; Cotter and Zimmer 2003). These papers need to address any self-selection bias introduced by the accounting choice. We use the across-firm approach, exploiting firm-level variation in presentation format under an IFRS accounting choice in the real estate industry.

Regarding setting, selections made in prior research appear driven by internal validity concerns; this potentially limits external validity, which is driven by the materiality and

prevalence of the item under study. Most prior studies focus on financing as opposed to operating items: employee stock options (e.g. Espahbodi et al. 2002; Libby et al. 2006; Choudhary 2011; Cheng and Smith 2013), benefit obligations (e.g., Davis-Friday et al. 1999, 2004; Yu 2013), financial derivatives (Ahmed et al. 2006), and leases (e.g., Bratten et al. 2013).⁴

Few studies analyze operating items: asset impairments due to natural disaster (Michels 2013) and real estate asset revaluations (Cotter and Zimmer 2003; Israeli 2014).⁵ In addition, prior literature is dominated by single-country studies, primarily using US firms. Most papers draw on market-wide samples, with few single-industry studies (e.g., the chemical industry in Campbell et al. 2003). Overall, the literature to date provides only limited conclusions regarding recognition versus disclosure differences relating to key operating assets as well as whether the observed effects hold outside the US (including under IFRS). We contribute by examining a key operating asset (investment property, one of the world's largest asset classes), and providing cross-country, IFRS-based evidence.

Regarding outcome measure, the most prevalent to assess recognition versus disclosure effects are price and returns specifications (e.g., Davis-Friday et al. 1999; Campbell et al. 2003; Davis-Friday et al. 2004; Ahmed et al. 2006; Yu 2013). Other studies use short-window event returns (e.g., Aboody 1996; Espahbodi et al. 2002; Michels 2013), cost of capital estimates (e.g., Bratten et al. 2013), or direct measures of reliability, including accuracy and bias (e.g., Choudhary 2011; Cheng and Smith 2013). We assess the association

⁴ We note that Bratten et al. (2013) focus on lease disclosures. Whereas leases yield both liabilities and assets for lessees, lease adjustments typically center on addressing concerns related to correctly characterizing the firm's debt obligations—that is, the firm's financing attributes.

⁵ Our paper differs from Cotter and Zimmer (2003) as (i) they study a single-country (Australia; $N = 192$ observations), across-industry setting; (ii) fair value revaluations in the Australian setting are recorded directly within equity, versus in net income under the IAS 40 fair value model; and (iii) their sample period spans 1987-1997, while ours spans 2003-2012, including IFRS adoption. Concurrent work that is complementary to ours (Israeli 2014) focuses on an outcome notion (predictability of future operating performance) without explicitly addressing, as this study does, potential explanations for observed pricing discounts on disclosed accounting amounts.

between stock prices and balance sheet amounts. Exploiting our setting to derive proxies for reliability and information processing costs, we hold one constant while examining how variation in the other affects differential pricing across recognition versus disclosure.

Regarding the second stream of literature, we build on studies examining the relation of fair values and equity prices. Several earlier studies document that disclosed fair values of financial instruments (e.g., Eccher et al. 1996) and some non-financial asset classes (e.g., Easton et al., 1993) are associated with stock prices. Other studies document that mandatory disclosure of fair values reduces information asymmetry (e.g., Muller et al. 2011), that information asymmetry and information risk are lower when fair value disclosures are more reliable (Muller and Riedl 2002; Riedl and Serafeim 2011), and that fair value reporting aids analysts in forecasting property firms' net asset values (Liang and Riedl 2014). We contribute to this literature through evidence on the interactive effects of financial statement geography (i.e., recognition versus disclosure), reliability, and information processing costs on the association between fair values and stock prices.

Hypothesis Development

Prior literature uses the association of accounting amounts with capital-market outcomes to empirically assess the usefulness of financial reporting (Barth et al. 2001). Two primary regression specifications are proposed, both derived from accounting valuation research (e.g., Ohlson 1995): a levels or "price" specification, which relates the market value of equity to the book value of equity (e.g., Barth 1991; Davis-Friday et al. 1999, 2004); and a changes or "returns" specification, which relates stock returns to earnings (e.g., Ahmed et al. 2006). We build on this research to derive expectations of how real estate firms' stock prices are associated with the recognition versus disclosure of investment property fair values, and how fair value reliability and information processing costs moderate this association.

Our first hypothesis concerns *whether* recognition versus disclosure affects the association of investment property fair values with stock prices. Recall two relevant characteristics of our setting. First, we follow IAS 40 and classify firms as either recognition or disclosure firms. Second, disclosure firms' mandated fair value disclosures allow us to restate their reported book values to derive comparable fair value-based measures across our recognition and disclosure firms.

If market outcomes fully capture firms' economics, and if accounting amounts reflect equivalent degrees of measurement error, then we expect identical associations of investment property fair values with stock prices for recognition and disclosure firms. Conversely, if disclosure firms' stock prices fail to fully capture their economics, or if disclosure firms exhibit higher measurement error in investment property fair values, then we expect lower associations of these fair values with stock prices for these firms. Thus, we hypothesize:

H₁: The association of investment property fair values with stock prices is lower for disclosure firms relative to recognition firms.

Our second set of hypotheses examines *why* disclosure firms receive a pricing discount. We consider two potential explanations: differential reliability and differential information processing costs (Bernard and Schipper 1994; Schipper 2007). Under differential reliability, a pricing discount observed for disclosed, relative to recognized, investment property fair values reflects lower reliability (i.e., higher measurement error) of disclosure firms' fair values. Under differential information processing costs, this pricing discount reflects investors' higher information processing costs for disclosed fair values relative to recognized ones—consistent with market outcomes not fully capturing disclosure firms' economics. This distinction is important, as the information processing cost explanation implies that disclosed information is not fully reflected in prices, with potentially negative capital allocation consequences, whereas the differential reliability explanation is

consistent with investors in efficient markets rationally discounting disclosed fair values.

Our setting allows us to provide direct evidence on both potential explanations.

Regarding differential reliability, we expect that recognized fair values are subject to greater internal (i.e., by management) and external scrutiny (e.g., by auditors or other monitors; Libby et al. 2006, Goncharov et al. 2014), reducing measurement error.

Accordingly, we expect that observed pricing discounts for disclosed, relative to recognized, investment property fair values are attenuated through higher *ex ante* reliability of disclosure firms' fair value estimates:

H_{2A}: *Holding information processing costs constant, the lower association of investment property fair values with stock prices for disclosure firms—relative to that of recognition firms—is attenuated through higher reliability of the fair value measures.*

Regarding information processing costs, we expect that higher information processing costs for disclosed investment property fair values will cause investors to discount such information. For example, firm-provided investment property fair values are uncommon in many non-IFRS jurisdictions (including the US—see Liang and Riedl 2014), which may lead investors unacquainted with these disclosures to not (fully) process them. More generally, we apply the framework of Maines and McDaniel (2000) to assess how presentation format can affect investors' information processing. First, information *acquisition* frictions can arise in our context, such as: market participants directly searching for relevant rental income projections as opposed to firm-provided fair values; financial statements being presented in firms' domestic languages⁶; and fair values receiving inconsistent labeling or presentation. Second, significant differences in *evaluation and weighting* can arise across recognized and disclosed items due to market participants exhibiting different levels of sophistication in

⁶ Specifically, reporting in a domestic language can lead to information processing costs if non-domestic users require translation into non-domestic languages, especially English (Jeanjean et al. 2014). Descriptively, 74% of our sample disclosure observations (24% of our sample recognition observations) present financial statements only in the domestic (i.e., local) language of the firm's country of domicile.

consuming and interpreting disclosures of fair value estimates and pertinent valuation techniques, assumptions, input parameters, and sensitivity analyses.

In sum, information processing costs reflect the firm’s information environment and investor sophistication. Processing investment property fair value disclosures involves activities such as converting fair value disclosures to create ‘as-if’ balance sheets and income statements, and reviewing the associated disclosures to assess the salient characteristics of the disclosed fair values. We expect the net costs associated with these information processing activities to vary according to market participants’ competence and attention. We thus expect that any pricing discount observed for disclosed, relative to recognized, investment property fair values is attenuated through lower information processing costs:

H_{2B}: *Holding reliability constant*, the lower association of investment property fair values with stock prices for disclosure firms—relative to that of recognition firms—is attenuated through lower investor information processing costs.⁷

III. RESEARCH DESIGN

To test the above hypotheses, we first address potential self-selection concerns by modeling as simultaneous decisions the firm’s choice (i) to recognize versus disclose fair values as allowed under IAS 40, and (ii) to employ an external appraiser to derive these fair value estimates. Then, controlling for both choices, we assess the association between market values and reported fair values.

Self-Selection Models: Bivariate Probit Estimation

To address potential self-selection, which can bias parameter estimates (Larcker and Rusticus 2010), we model two firm-level choices within our research setting: the choice of

⁷ We distinguish between our prediction of an *attenuating* effect upon any pricing discount on disclosed fair values when information processing costs are low, versus information processing costs being so extreme as to effectively eliminate the role of disclosed fair values in equity pricing (which we do not predict).

reporting model (i.e., recognition versus disclosure of investment property fair values under IAS 40), and the choice of appraiser type (i.e., whether or not the firm engages an external appraiser to derive investment property fair values). We simultaneously model these choices, as management likely considers the joint costs and benefits associated with these decisions. Accordingly, we employ a bivariate probit model using full information maximum likelihood estimation, which allows correlation of error terms across choices (Muller and Riedl 2002).

Choice of recognition versus disclosure under IAS 40

We first model a firm's recognition versus disclosure choice under IAS 40 as follows:

$$\begin{aligned}
 Discl_{it} = & \alpha_0 + \alpha_1 Std_OCF_{it} + \alpha_2 EPRA_Index_{it} + \alpha_3 Big4_i + \alpha_4 IP_Exposure_{it} \\
 & + \alpha_5 Size_{it} + \alpha_6 Leverage_{it} + \alpha_7 Pre_IFRS_FV_i + \varepsilon_{it}
 \end{aligned} \tag{1}$$

The dependent variable is *Discl*, an indicator variable equal to one if firm *i* in year *t* is a disclosure firm (i.e., chooses to report investment properties on the balance sheet under the IAS 40 cost model with fair values provided via footnote disclosure), and zero if it is a recognition firm (i.e., chooses to report these properties under the IAS 40 fair value model).⁸

We propose three factors that can affect this decision: (1) the inherent reliability of the fair value measurements; (2) the firm's commitment to transparency and industry best practice; and (3) the firm's country-level institutional environment. To control for inherent uncertainty of the cash flows underlying the property fair values, we include *Std_OCF* (the standard deviation of firm *i*'s annual cash flows from operations over years *t-2* to *t* scaled by its market value of equity in *t*). As higher variability in operating cash flows leads to more

⁸ Note that we model the recognition versus disclosure choice as a 'period of time' decision; that is, as a decision available to all firms in all years, as technically allowed under IAS 40. However, IAS 40 provides restrictions, which make transitions from disclosure to recognition *ex ante* more likely than transitions from recognition to disclosure. Accordingly, we alternatively model the above decision as a one-off 'point-in-time' choice, using only adoption-year observations to estimate Equation (1). This provides a firm-level (but time-invariant) predicted probability of choosing the disclosure model, which we then incorporate into our second-stage price regressions. Our inferences are unchanged.

uncertain fair value estimates, the predicted sign is positive (that is, the firm is more likely to only disclose fair values when measurement is inherently less certain).

To control for the firm's commitment to transparency and industry best practice, which reflects shareholders' and lenders' (perceived) information demand, we use five proxies. We include *EPRA_Index* (an indicator variable equal to one if firm *i* in year *t* is a member of the FTSE EPRA/NAREIT Developed Europe Real Estate Index, and zero otherwise) and *Big4* (an indicator variable equal to one if firm *i* employs a Big 4 audit firm in the year of IFRS adoption, and zero otherwise). As both EPRA index membership and engagement of a large audit firm reflect intentions to engage in industry best practice, and as stated industry best practice was to use the fair value model (EPRA 2011), the predicted signs are negative. We also include *IP_Exposure* (the percentage of firm *i*'s total assets including investment property fair values for year *t* that are investment properties) and *Size* (the log of firm *i*'s total assets including investment property fair values for year *t*). We expect that firms with greater exposure to investment properties, as well as larger firms, are more likely to use the fair value model due to their larger financing needs and greater visibility; accordingly, the predicted signs on both variables are again negative. To control for lenders' demand for information, we include *Leverage* (firm *i*'s total debt divided by total assets for year *t*). As firms having more leverage may prefer recognition due to greater demand for fair value information, or may prefer only disclosure to ensure conservatively recognized property values for contractual purposes, we do not predict the coefficient sign for leverage.

Finally, to control for the firm's country-level institutional environment, we include *Pre_IFRS_FV*, defined as an indicator variable equal to one if firm *i*'s country of domicile, assessed just prior to IFRS adoption, allows or requires recognition of investment property fair values on the balance sheet, and zero otherwise (indicating that recognition of these fair values was prohibited prior to IFRS). As a country's domestic standards capture socio-

economic and institutional factors relevant to financial reporting (e.g., Gray 1988; Ball et al. 2000), the predicted sign is negative; that is, firms in countries allowing or requiring fair values under previous domestic standards are less likely to choose disclosure under IAS 40. Note that *Pre_IFRS_FV* serves as our instrument to mitigate self-selection bias resulting from the recognition versus disclosure choice using our joint estimates of Equations (1) and (2).⁹

Choice of external versus no external appraiser

Next, we model a firm's choice to employ an external appraiser to derive investment property fair value estimates as follows:

$$Ext_{it} = \beta_0 + \beta_1 Std_OCF_{it} + \beta_2 Size_{it} + \beta_3 Int_Sales_{it} + \beta_4 EPRA_Index_{it} + \beta_5 Leverage_{it} + \beta_6 CHS_{it} + \beta_7 Distress_{it} + \beta_8 Std_Ret_{it} + \tau_{it} \quad (2)$$

The dependent variable is *Ext*, an indicator variable equal to one if firm *i* in year *t* employs an external appraiser to derive fair values for at least 75% of its investment properties, and zero otherwise (i.e., does not value a material portion of its portfolio using external appraisers).

Consistent with prior research (Muller and Riedl 2002) we posit three sets of factors affect the firm's decision to employ an external appraiser: (1) the inherent reliability of the fair value measurements; (2) the size and complexity of the property portfolio being valued; and (3) the (perceived) shareholder and lender demand for monitoring.¹⁰ Accordingly, we include *Std_OCF* (as defined above); as greater inherent uncertainty regarding the property cash flows should increase the need for valuation expertise, the predicted sign is positive.

⁹ Following Larcker and Rusticus (2010), we argue that *Pre_IFRS_FV* is an appropriate instrument as it (i) is plausibly exogenous to the firm, (ii) significantly explains *Discl*, and (iii) can be validly excluded from our second-stage regressions (Equations (3) and (4) below), since it predates our analysis period. We use *Pre_IFRS_FV*, versus country indicators, as we expect any cross-country mean differences in *Discl* to be primarily driven by how the pre-IFRS reporting model is structured. Nonetheless, results are robust to including country indicator variables in Equation (1) instead of *Pre_IFRS_FV*.

¹⁰ Several variable definitions for our Equation (2) differ slightly from those of Muller and Riedl (2002). These differences reflect data availability, which is greater in the UK-focused sample of Muller and Riedl as compared to our cross-country sample.

To control for the size and complexity of the property portfolio, we include *Size* (as defined above) and *Int_Sales* (an indicator variable equal to one if firm *i* has international sales in year *t*). As more complex portfolios likely require specialized knowledge and a dispersed network, the predicted sign for *Int_Sales* is positive. Similar considerations would lead to a positive prediction for *Size* as well; however, larger firms might be more likely to have valuation resources available in-house, and portfolio complexity need not be proportionate to size. We therefore do not predict the sign for the coefficient on *Size*.

Finally, to control for external monitoring demand, we include five proxies: *EPRA_Index* (as defined above); *Leverage* (as defined above); *CHS* (the percentage of closely held shares for firm *i* for year *t*); *Distress* (an indicator variable equal to one if firm *i* exhibits negative equity in year *t*, and zero otherwise); and *Std_Ret* (the standard deviation of firm *i*'s daily returns over years *t-2* to *t*). As firms within a key index are more likely to adopt industry best practice, the predicted coefficient on *EPRA_Index* is positive. As lenders of firms with greater debt are more likely to require additional monitoring, the predicted coefficient on *Leverage* is positive. As there are greater expected marginal benefits to outside shareholders from monitoring activities when the proportion of managers' equity holdings declines, the predicted coefficient on *CHS* is negative. Finally, as greater distress and risk increase the demand for additional monitoring, the predicted coefficients on both *Distress* and *Std_Ret* are positive. In this model, we choose *EPRA_Index* as our instrument.¹¹

The Effect of Recognition versus Disclosure on the Pricing of Fair Values

Following prior research (e.g., Davis-Friday et al. 1999, 2004), we rely on basic valuation models (e.g., Landsman 1986; Barth 1991) to measure the association of

¹¹ Paralleling our previous discussion on *Pre_IFRS_FV*, we argue that *EPRA_Index* is an appropriate instrument as it (i) is plausibly exogenous to investor information demand (Yu 2008); (ii) significantly explains *Ext*; and (iii) can be validly excluded from the second-stage regressions (Equations (3) and (4) below). However, results are robust to including *Pre_IFRS_FV* or country indicators in Equation (2).

recognized versus disclosed investment property fair values with market values of equity.¹²

Specifically, we use the following base model that expresses the firm's market value of equity as a function of its assets (investment property and other assets) and liabilities:¹³

$$MVE_{it} = \gamma_0 + \gamma_1 IP_{it} + \gamma_2 OtherAssets_{it} + \gamma_3 Liabilities_{it} + \gamma_4 NumShares_{it} + \eta_{it} \quad (3)$$

The dependent variable is MVE_{it} , firm i 's market value of equity for fiscal year t . The independent variables include: IP_{it} , firm i 's reported (recognition firms) or disclosed (disclosure firms) fair value of investment property for fiscal year t ; $OtherAssets_{it}$, firm i 's other (i.e., non-investment property) assets for fiscal year t ; $Liabilities_{it}$, firm i 's total liabilities for fiscal year t (for disclosure firms, $Liabilities$ is adjusted by an additional deferred tax liability that arises from measuring investment property at fair value); and $NumShares_{it}$, firm i 's number of shares outstanding at the end of fiscal year t .

Investment property fair values are hand-collected from firms' annual reports; data for other variables is obtained from Worldscope (or other sources identified in Appendix A). A positive γ_1 indicates that investors use the information summarized in the fair value of investment properties in pricing the firm's stock. To mitigate scale differences in this levels-based research design, we include $NumShares$ as a scale proxy (Barth and Kallapur 1996).¹⁴

To assess our hypotheses, we augment Equation (3) as follows. H_1 predicts that the presentation of investment property fair values within the financial statements affects the association of these fair values with market values. Specifically, we expect a pricing discount for disclosed, relative to recognized, investment property fair values, leading to:

¹² We note several issues for our choice of primary specification. First, we focus on a "levels" price (versus "changes" returns) specification due to challenges in defining fair value changes in the returns specification, particularly for disclosure firms. Second, whereas some papers use cost of capital constructs to assess differences in market participants' perception of recognized versus disclosed amounts, we rely on equity pricing effects of the recognition versus disclosure decision to maintain comparability with the majority of prior work. Finally, the cross-country nature of our analyses and the sample skewness towards smaller firms limit the availability of other market measures, such as bond spreads used in Bratten et al. (2013).

¹³ Our primary analyses are pooled OLS regressions using robust standard errors consistent with White (1980), as recommended by Barth and Kallapur (1996). We cluster these standard errors by firm, consistent with White (1984). Untabulated results are unchanged to omission of firm-level clustering.

¹⁴ Results are robust to using $NumShares$ as a scaling variable, consistent with Davis-Friday et al. (2004).

$$\begin{aligned}
MVE_{it} = & \delta_0 + \delta_1 IP_{it} + \delta_2 DiscI_Pr_{it} + \delta_3 IP_{it} \times DiscI_Pr_{it} + \delta_4 IMR_Ext_{it} \\
& + \delta_5 OtherAssets_{it} + \delta_6 Liabilities_{it} + \delta_7 NumShares_{it} + \zeta_{it}
\end{aligned} \tag{4}$$

In this regression, we add (i) *DiscI_Pr_{it}*, the predicted probability of firm *i* in year *t* being a disclosure firm rather than being a recognition firm; and (ii) *IMR_Ext_{it}*, firm *i*'s inverse Mills ratio relating to the decision to employ an external appraiser. Both *DiscI_Pr* and *IMR_Ext* are obtained from implementing the bivariate probit estimation of Equations (1) and (2). We use *DiscI_Pr*, the firm's propensity of being a disclosure firm, as the instrumented variable, instead of *DiscI*, the actual binary variable identifying disclosure firms, to control for endogeneity, that is, non-random assignment (self-selection) of firms into the disclosure condition.¹⁵ We further include *IMR_Ext*, the inverse Mills ratio obtained from the first-stage model, to control for selection bias in each of our subsamples (where, as explained below, *Ext* does not vary within but across subsamples).¹⁶ If disclosed investment property fair values are discounted relative to recognized ones, we expect a negative coefficient on *IP* × *DiscI_Pr*; thus, $\delta_3 < 0$ is our test of H₁.

Turning to our tests of H_{2A} and H_{2B}, recall our expectation that fair value reliability and information processing costs will affect the relative pricing discount observed for disclosed fair values. To test these predictions, we introduce two additional variables: a proxy for reliability (*Ext*), and a proxy for information processing costs (*AF*). Reliability is captured by *Ext*, an indicator variable equal to one if firm *i* in year *t* employs an external appraiser to derive investment property fair values for at least 75% of its property portfolio, and zero otherwise (i.e., values a material portion of its portfolio using internal management estimates). Consistent with Dietrich et al. (2001) and Muller and Riedl (2002), we expect

¹⁵ This approach is an alternative to including the inverse Mills ratios from the probit estimation (e.g., Leuz and Verrecchia, 2000). In Section VI, we discuss results of alternative self-selection treatments.

¹⁶ Note that *IMR_Ext* is calculated as the marginal binormal probability density function divided by the respective binormal cumulative distribution function; as such, it is not strictly a traditional inverse Mills ratio (Tucker 2010, p. 47).

that investment property firms employing external property appraisers, *ceteris paribus*, are perceived by market participants as having more reliable investment property fair value estimates than firms that estimate fair values relying on internal staff. Information processing costs is captured by *AF*, an indicator variable equal to one if firm *i* has on average one or more analysts following it during the sample period, and zero otherwise. *AF* captures the information intermediation provided by financial analysts. The presence of high analyst following, *ceteris paribus*, should provide for more expeditious and complete processing of fair value disclosures, lowering information processing costs for investors.

To achieve the *ceteris paribus* condition necessary for our tests of H_{2A} and H_{2B} , we form four subsamples of firm-years based on the values of *Ext* and *AF*. Specifically, H_{2A} predicts that, *holding information processing costs constant*, higher reliability will mitigate the pricing discount observed for disclosed fair values. Thus, if pricing differences across disclosed and recognized fair values are explained by (perceived) differences in fair value reliability, we expect the coefficient on $IP \times DiscI_Pr$ to be significantly less negative in a subsample with high fair value reliability relative to that with low reliability, holding information processing costs constant. Accordingly, we test H_{2A} using differences in the δ_3 coefficients across two subsamples with constant *AF* but varying *Ext*.

Similarly, H_{2B} predicts that, *holding reliability constant*, lower information processing costs will mitigate the pricing discount observed for disclosed fair values. Thus, we expect the coefficient on $IP \times DiscI_Pr$ to be significantly less negative in a subsample with low information processing costs relative to that with high information processing costs, holding fair value reliability constant. Accordingly, we test H_{2B} using differences in the δ_3

coefficients across two subsamples that have constant Ext but varying AF . Tests of both H_{2A} and H_{2B} are performed with seemingly unrelated regressions using Wald tests.¹⁷

IV. SAMPLE AND DESCRIPTIVE STATISTICS

Sample Description

Panel A of Table 1 presents the sample selection. We start with the Thomson Reuters Worldscope population of European Economic Area real estate firms, retaining IFRS observations (Worldscope item 07536, Accounting Standards Followed) with sufficient data for our main tests. To focus on investment property firms, we require investment property to be at least 25% of total assets, using hand-collected annual report data. This process yields the 245 unique firms and 1,423 firm-year observations used in the primary analyses.

Our primary tests partition the recognition ($Discl = 0$) and disclosure ($Discl = 1$) firms along fair value reliability (Ext) and information processing costs (AF). Accordingly, Panel B of Table 1 displays the individual country populations partitioned by $Discl$, Ext , and AF . The final sample includes 50 (209) unique disclosure (recognition) firms, including 14 that switch to recognition. When simultaneously splitting the sample on the $Discl$ and Ext dimensions, the number of observations (unique firms) ranges between 82 and 1,033 (21 and 193). Panel B further shows concentration in five countries (Belgium, France, Germany, Sweden, and the UK). Recognition observations ($N = 1,192$) outnumber disclosure observations ($N = 231$). Material within-country variation in reporting model choice is primarily observed in countries that did not permit fair value reporting for investment

¹⁷ Results are robust to estimating the following alternative specifications using interactions: (i) for H_{2A} we estimate an interacted model pooling all high information processing costs and all low information processing costs observations; and (ii) for H_{2B} we estimate an interacted model pooling all low reliability observations and all high reliability observations. Within each pooled sample, we test the interaction of $IP \times Discl_Pr \times Ext$ (for H_{2A}) and $IP \times Discl_Pr \times AF$ (for H_{2B}), finding results consistent with those reported.

property pre-IFRS (i.e., where $Pre_IFRS_FV = 0$), notably France (41% disclosure observations), Germany (32%), Greece (41%), Italy (49%), and Spain (59%).

Descriptive Statistics

Table 2 presents descriptive statistics for the self-selection model variables (Panel A) and the main regression tests (Panel B). Panel A compares means across recognition and disclosure observations, as well as across observations using versus not using external appraisers. Consistent with expectations, Column (1) indicates that recognition firms ($Discl = 0$) are more likely to be industry index members ($EPRA_Index$), audited by a large firm ($Big4$), larger ($Size$), more exposed to investment property ($IP_Exposure$), and more likely from countries allowing investment property fair values to be recognized under pre-IFRS domestic GAAP (i.e., $Pre_IFRS_FV = 1$). Column (2) further shows that firms using external appraisers are more likely to be industry index members ($EPRA_Index$), have lower closely-held shares (CHS), and are more international (Int_Sales).

Panel B presents and tests means across our four subsamples (high and low fair value reliability; and high and low information processing costs) by reporting model (disclosure versus recognition), documenting significant mean size differences between disclosure and recognition observations across most subsamples. The $AF = 0$ condition in Column (2) is a notable exception; it is driven by smaller recognition firms without analyst coverage particularly in the UK, where use of external appraisers represents industry best practice. Of note, the predicted marginal probability to disclose fair values ($Discl_Pr$) is significantly larger within all four subsamples for disclosure firms relative to recognition firms.

Several untabulated correlations warrant discussion. First, consistent with substantial asset-backed borrowing in this industry, IP and $Liabilities$ are highly correlated (0.97). Second, the correlation between Pre_IFRS_FV and $Discl$ is significantly negative (-0.38),

and the correlation between *EPRA_Index* and *Ext* is significantly positive (0.18), which supports our instruments in Equation (1) and (2). Finally, we observe a significant negative correlation of *Discl* and *Ext* of -0.22 , consistent with these being simultaneous decisions.

V. MULTIVARIATE RESULTS

Self-Selection Models: Bivariate Probit Estimation

In Section III, we describe our approach to addressing potential self-selection concerns related to firms' simultaneous choices of recognition versus disclosure under IAS 40 and external versus no external appraiser. Recall that we use a bivariate probit model using full maximum likelihood estimation to model these choices.

Panel A of Table 3 presents the results for the recognition versus disclosure choice; the binary dependent variable is *Discl* from Equation (1). We find support for all three sets of factors expected to influence this choice. The coefficient on *Std_OCF* is significantly positive (coefficient = 0.11, z -stat = 1.90), indicating that low inherent reliability of investment property fair values predisposes firms towards choosing the disclosure model. Further, proxies for commitment to transparent reporting are associated negatively with the choice of disclosure model, including index membership (*EPRA_Index* coefficient = -0.58 , z -stat = 5.26), investment property exposure (*IP_Exposure* coefficient = -0.93 , z -stat = 4.04), and stronger information demands from lenders (*Leverage* coefficient = -0.69 , z -stat = 2.72). The coefficients on *Big4* and *Size* are insignificant. Finally, the significant negative coefficient on *Pre_IFRS_FV* (-1.66 , z -stat = 16.33) corroborates that socio-economic factors captured in a country's pre-IFRS domestic GAAP explain firms' reporting decision under IFRS (e.g., Kvaal and Nobes 2010, 2012). The overall model fit (84.4% of observations correctly identified) suggests a well-specified model.

Panel B of Table 3 presents results for the choice of appraiser type; the binary dependent variable is *Ext* of Equation (2). We find that *EPRA_Index* (0.51, z -stat = 4.98), *Intl_Sales* (0.42, z -stat = 3.73), and *Leverage* (0.39, z -stat = 1.85) are all positively associated with engaging an external appraiser. Further, closely held shares (*CHS*) (−0.01, z -stat = 3.91) has a negative association with using an external appraiser. The coefficients on *Std_OCF*, *Size*, *Distress*, and *Std_Ret* are insignificant.¹⁸ The model correctly classifies 82.8% of observations, again suggesting high explanatory power. The significant correlation (ρ) of the error terms supports modeling the choices as simultaneous.

We conclude that the simultaneous choices of the disclosure model and use of an external appraiser are reasonably well-captured by our models, and that our approach should therefore help address any related self-selection bias.

The Effect of Recognition versus Disclosure on the Pricing of Fair Values

Table 4 presents the results of our hypothesis tests. Column (1) presents baseline results for Equation (3) excluding experimental variables; Columns (2) – (6) add our main experimental variable, *Discl_Pr*, as well as self-selection controls. Our test of H_1 is presented in Column (2); Columns (3) – (6) present tests of H_{2A} and H_{2B} . The main coefficients of interest—on the interaction of $IP \times Discl_Pr$ —are highlighted in bold. In the bottom half of the table, we present Wald tests of differences in the coefficient on $IP \times Discl_Pr$ across subsamples for fair value reliability (*Ext*) and information processing costs (*AF*).

Column (1) reveals an *adjusted-R*² of 89.9%, in line with prior literature. The significantly positive coefficient on *IP* (0.88, t -stat = 19.23) indicates that investment property fair values, on average, are associated with market values, albeit with a small

¹⁸ The findings for *Size* suggest that the choices of *Discl* as well as *Ext* are not primarily size-driven; this is corroborated by the relatively low negative correlation between *Size* and *Discl* of −0.09, and insignificant correlation between *Size* and *Ext* of 0.02.

downward deviation from a theoretical coefficient of unity. Similarly, we observe the expected significantly positive (negative) coefficients for *Other Assets (Liabilities)*.

Column (2) presents our test of H_1 . Of primary interest, the interaction of $IP \times Discl_Pr$ is significantly negative as predicted (coefficient = -0.15 , t -stat = 2.00).¹⁹ The other model parameters are consistent with the base model results. We conclude that disclosed investment property fair values have a lower association with stock price *on average*, consistent with the expected pricing discount for disclosed fair values (H_1).

We now discuss results regarding H_{2A} , which predicts that, *holding information processing costs constant*, higher fair value reliability attenuates the pricing discount observed for disclosed investment property fair values. Therefore, within $AF = 0$ (and within $AF = 1$), we expect the coefficient on the interaction of $IP \times Discl_Pr$ to be less negative where properties are externally appraised ($Ext = 1$) relative to where they are not ($Ext = 0$). These results are presented in the bottom half of the table. Within $AF = 0$ (high information processing costs) the coefficient on $IP \times Discl_Pr$ for $Ext = 0$ in Column (3) (-0.82 , t -stat = 15.81) is not significantly different from that where $Ext = 1$ in Column (5) (-0.67 , t -stat = 7.07) (difference = -0.15 ; z -stat = 1.15).²⁰ However, within $AF = 1$ (low information processing costs), the difference across $Ext = 0$ in Column (4) is significantly more negative than $Ext = 1$ in Column (6) (i.e., $-0.27 - 0.07 = -0.34$; z -stat = 2.86). This provides some support that higher fair value reliability, captured by external appraisals of these values,

¹⁹ We note several observations regarding correlations. Consistent with substantial asset-backed borrowing in this industry, IP and $Liabilities$ are highly correlated (0.97) with untabulated variance inflation factors (VIFs) of 22.75 and 27.61 , respectively. Accordingly, we refrain from interpreting the coefficient magnitude of these coefficients, as well as the sum of ($IP + IP \times Discl_Pr$). In addition, we note that our hypothesis tests rely on the coefficient on the interaction of $IP \times Discl_Pr$, as we are interested in the pricing discount (H_1), and differences therein (H_{2A} and H_{2B}), on disclosed *relative to* recognized fair values. In contrast to IP and $Liabilities$, the coefficients on $IP \times Discl_Pr$ have low VIFs ranging from $1.35 - 5.27$ in Columns (2) through (6); this suggests multicollinearity is less likely to affect our key inferences. Nonetheless, we discuss additional sensitivity tests to address multicollinearity concerns in Section VI.

²⁰ As prior research finds strong equity market effects associated with external appraisers' monitoring function in this industry (Muller and Riedl 2002), this insignificant result may reflect the relatively small number of observations in the subsample partition of $Ext = 0$ and $AF = 0$ ($N = 115$).

attenuates the discount observed for disclosed investment property fair values when information processing costs are held constant, in support of H_{2A}.²¹

Finally, we discuss results regarding H_{2B}, which predicts that, *holding fair value reliability constant*, lower information processing costs attenuate the pricing discount observed for disclosed investment property fair values. Therefore, within $Ext = 0$ (and within $Ext = 1$), we expect the coefficient on the interaction of $IP \times DiscI_Pr$ to be lower where analyst following is present ($AF = 1$) relative to where it is not ($AF = 0$). We find within $Ext = 0$ (low reliability), the coefficient on $IP \times DiscI_Pr$ for $AF = 0$ in Column (3) (-0.82 , t -stat = 15.81) is significantly more negative than that for $AF = 1$ in Column (4) (-0.27 , t -stat = 2.25) (the difference = -0.55 , z -stat = 4.41). Similarly, within $Ext = 1$ (high reliability) the difference across $AF = 0$ in Column (5) is significantly less than that for $AF = 1$ in Column (6) ($-0.67 - 0.07 = -0.74$, z -stat = 6.08). We conclude that lower information processing costs, captured by higher analyst following, attenuates the pricing discount for disclosed fair values when reliability is held constant, in support of H_{2B}.

Note that δ_3 (the coefficient on $IP \times DiscI_Pr$) captures the *absolute* pricing discount for disclosure relative to recognition firms; thus, it does not consider the benchmark coefficient (IP) for the recognition firms. However, similar results obtain for untabulated non-linear tests of differences in the *relative* pricing discount for disclosure firms (Francis et al. 2005): that is, the *percentage* difference relative to the coefficient for recognition firms across subsamples (assessed as δ_3 divided by δ_1).

Overall, our main tests support the conclusion that disclosed investment property fair values, *on average*, are priced at a discount relative to those recognized on the face of the

²¹ Note that the negative coefficient on $IP \times DiscI_Pr$ rests on only six disclosure firms underlying the 126 observations in Column (4). While this low number of observations should bias against finding statistical significance for $IP \times DiscI_Pr$, we caution the reader that it does potentially limit the external validity of this finding. We thank an anonymous reviewer for pointing out this important qualification.

financial statements. However, this average discount, while consistent with a large body of prior literature, appears highly contextual. It is most pronounced when two conditions hold: fair value reliability is low ($Ext = 0$) and information processing costs are high ($AF = 0$); i.e. Column (3) in Table 4. Consistently, the discount (only) disappears entirely when reliability is high ($Ext = 1$) and information processing costs are low ($AF = 1$); i.e. Column (6) in Table 4. These results indicate that *both* explanations for recognition versus disclosure differences in market pricing—differential reliability and information processing costs—are descriptive and complementary, though support is stronger for information processing costs, possibly due to lower power caused by less variation exhibited in the *Ext* variable.²²

VI. SENSITIVITY ANALYSES

Potential Self-Selection Bias and Multicollinearity

Mitigating Potential Self-Selection Bias: Alternative Approaches

Section III describes our two-stage approach to mitigating potential self-selection bias by simultaneously modeling our sample firms' choices of reporting models (recognition versus disclosure) and appraiser types (external versus internal). We now further assess the extent of any such bias. First, to provide a benchmark, we re-estimate our main analyses without self-selection controls (untabulated) by (i) substituting *Discl* (an indicator variable equal to one if firm *i* in year *t* is a disclosure firm) for *Discl_Pr* (the predicted probability from the bivariate probit estimation described in Section III); and (ii) omitting *IMR_Ext* (the 'inverse Mills ratio' from the bivariate probit estimation of *Ext*). Compared to our primary analyses of Table 4, we fail to find support for H_1 (coefficient on $IP \times Discl = 0.01$, t -stat =

²² We note that our results are unlikely to solely reflect systematic size differences across the recognition versus disclosure firms. In particular, our finding of a pricing discount for disclosure firms applies *both* when the disclosure firms are smaller than recognition firms (e.g., Column 3 of Table 4) and when they are larger than recognition firms (e.g., Column 5 of Table 4). This alleviates concerns that our results are driven by differences in size (and other correlated constructs) across recognition and disclosure firms.

0.01); this latter is consistent with the importance of controlling for self-selection, though it may also reflect *Discl_Pr* being a finer measure of disclosure propensity than *Discl*.

However, we observe the same coefficient trend on $IP \times Discl$ across subsamples as in Table 4, as well as support for H_{2A} in the low-information-processing-costs condition (difference across $IP \times Discl$ for the subsamples is -0.20 , z -stat = 3.38), and for H_{2B} in the high-reliability condition (difference across $IP \times Discl$ for the subsamples is -0.17 , z -stat = 2.63).

Next, we apply alternative self-selection treatments. First, we augment Equation (4) by including an interaction of *IMR_Ext* with investment property fair value, *IP*, paralleling our interaction of *IP* and *Discl_Pr*. Untabulated results are similar to those in Table 4, though weaker relating to H_{2A} . Second, we augment Equation (4) by (i) substituting the observed *Discl* indicator variable for *Discl_Pr*, and (ii) additionally including *IMR_Discl* (the inverse Mills ratio from the bivariate probit estimation of *Discl*). Untabulated results confirm H_{2B} , support H_{2A} only in the high-information-processing-costs condition, and fail to support H_1 . Overall, the results— particularly relating to H_{2B} —appear robust to alternative self-selection specifications.

Mitigating Potential Multicollinearity Concerns: Enterprise Value Specification

Next, we address potential multicollinearity concerns in our implementation of Equation (4). Recall that *IP* and *Liabilities* are highly correlated (0.97). To minimize potential multicollinearity, we rearrange Equation (4) by adding *Liabilities* to both sides, yielding a model of enterprise value:

$$\begin{aligned} Enterprise_{it} = & \zeta_0 + \zeta_1 IP_{it} + \zeta_2 Discl_Pr_{it} + \zeta_3 IP_{it} \times Discl_Pr_{it} + \zeta_4 IMR_Ext_{it} \\ & + \zeta_5 OtherAssets_{it} + \zeta_6 NumShares_{it} + \theta_{it} \end{aligned} \quad (5)$$

where *Enterprise* is firm *i*'s market value of equity for year *t* assessed at the fiscal year-end plus *Liabilities*_{*it*} for year *t*; all other variables are as previously defined (see Appendix A).

Table 5 presents the results. In support of H₁, Column (2) displays a significant pricing discount for disclosed fair values (coefficient on $IP \times Discl_Pr = -0.14$, t -stat = 1.66). The bottom of the table also reveals support for H_{2A} in the low-information-processing-costs group (difference = -0.27 , z -stat = 2.19), and for H_{2B} in both the low-reliability (-0.47 , z -stat = 3.67) and high-reliability (-0.71 , z -stat = 5.08) partitions. Critically, untabulated VIFs for IP (and all other variables) are consistently less than 5, where 10 is suggested as indicative of multicollinearity concerns.²³ Further, as with Table 4, untabulated results are unchanged to using differences in *relative* pricing discounts across subsamples (i.e., ζ_3 divided by ζ_1).

Alternative Measures of Key Variables

Our second set of sensitivity analyses examines the robustness of our main findings to alternative measures of the dependent variable, and the key experimental constructs of *Ext* and *AF*. Table 6 presents coefficients on the interaction of $IP \times Discl_Pr$ for the full sample (test of H₁) in Column (2), and for the four sub-samples in Columns (3) through (6). Note we begin the column numbering at (2) to parallel the column structure of our primary Table 4. Differences in coefficients are displayed, with tests of H_{2A} presented in Columns (7) – (8), and tests of H_{2B} presented in Columns (9) – (10).

Regarding the dependent variable, in Panel A we alternatively measure *MVE* as one (*MVE_1Month*) and three months (*MVE_3Month*) after fiscal year-end (e.g., Davis-Friday et al. 2004) to ensure investors are aware of the disclosed or recognized investment property fair

²³ Further, we note that the VIFs for $IP \times Discl_Pr$, our main coefficient of interest, are again low and virtually identical to those in the Table 4 specification. However, the reduced VIFs on IP in the current specification facilitate interpretation of its coefficient magnitudes. Specifically, the dispersion of coefficient estimates on IP across the subsamples (now between 0.99 and 1.11) is reduced and in line with theoretical expectations, as compared to the Table 4 range (0.83 to 1.49). We maintain Equation (4) as our primary specification (i) to parallel research designs in prior research; (ii) because we view the enterprise specification as a sensitivity analysis to assess potential (i.e., *ex ante*) multicollinearity; and (iii) because, while there is evidence of multicollinearity in the main tests (Table 4) *ex post*, it does not affect our primary variable of $IP \times Discl_Pr$.

values. Panel A presents support for H_1 for both the one (-0.18 , t -stat = 1.81) and three month (-0.19 , t -stat = 1.73) measures, as well as consistent results for both H_{2A} and H_{2B} .

Regarding fair value reliability, recall that $Ext = 1$ where firm i in year t has at least 75% of its investment property portfolio externally appraised. In Panel B, we alternatively measure $Ext = 1$ when external appraisals are 100% of the portfolio ($Ext_{100\%}$) (Muller and Riedl 2002), or when the firm employs a high-quality external appraiser (Ext_{Big5}) (Vergauwe and Gaeremynck 2014).²⁴ Results are robust for H_1 and H_{2B} ; however, H_{2A} is not supported using either alternative reliability measure.

Finally, regarding differential information processing costs, recall that $AF = 1$ if firm i 's mean number of yearly forecasts over the sample period is greater or equal to one. In Panel C, we use two alternative information processing cost proxies: $AF = 1$ when in a given year analyst following is non-zero ($AF_{NONZERO}$); and above median analyst following (AF_{MEDIAN}). Results strongly support H_1 , H_{2A} , and H_{2B} across all partitions.

Subsample Analyses

Next, we examine subsamples to address: (i) the potential effect of the financial crisis of 2007/2008; (ii) country-level effects; and (iii) a stricter definition of investment property exposure. Results are presented in Table 7, which parallels the format of Table 6.

First, in Panel A we assess whether our results are affected by financial crisis observations; this is intuitive, given our focus on the real estate industry and the prominent role real estate played in this crisis. We conduct two alternative specifications: (i) adding

²⁴ In Europe, these are CB Richard Ellis, DTZ, Cushman & Wakefield, Jones Lang LaSalle, and AtisReal (Vergauwe and Gaeremynck 2014).

year fixed effects to Equation (4); and (ii) excluding observations from the crisis years 2007 and 2008;²⁵ results consistently support H_1 , H_{2A} , and H_{2B} .

Next, in Panel B we assess whether our findings are driven by country-level factors not captured by our research design. We again conduct two alternative specifications: (i) augmenting Equation (4) by including country indicator variables to mitigate concerns regarding omitted country-level factors affecting observed pricing discounts; and (ii) excluding UK observations (which is our largest sample country, with unique characteristics such as highly developed property markets and frequent use of the fair value model). We support only H_{2B} using country fixed effects, and H_1 , H_{2A} , and H_{2B} excluding UK firms.²⁶

Finally, in Panel C we assess the robustness of our results to a stricter definition of investment property exposure. Our sample selection requires that 25% of total assets be investment property; we increase this requirement to 50% to further focus on firms for which these are the primary assets. We again find support for H_1 , H_{2A} , and H_{2B} .

Mitigating Potential Omitted Variable Bias

Finally, we address potential omitted variable bias. First, we conduct untabulated tests of any pricing discount for disclosure firms regarding assets other than investment property. We find that the interaction of *OtherAssets* \times *Discl_Pr* is insignificant across all subsamples. This provides a ‘placebo test’, with results that are inconsistent with omitted variables explaining the pricing discount observed for disclosed fair values.

²⁵ We define the crisis period as 2007 or 2008, since both years exhibit negative returns in the FTSE EPRA/NAREIT Developed Europe Real Estate Index; by 2009, this index was trending upwards again.

²⁶ We note that an alternative approach would focus on subsets of our sample countries, such as only those exhibiting variation in the disclosure versus recognition choice. We choose not to pursue such approaches, as doing so would represent *ex post* rationalizations (i.e., *ad hoc* exclusions) based on observed outcomes. Restated, it is unclear *ex ante* what appropriate criteria for country exclusion would be.

To mitigate potential bias stemming from time-invariant omitted variables in our balance sheet (“levels”) specification of Table 4, we next pursue several sensitivity tests. First, we use an income statement (“changes”) specification (e.g., Ahmed et al. 2006). Following Easton and Harris (1991), Francis et al. (2005) and Hanlon et al. (2008), we examine earnings informativeness using the following regression:

$$\begin{aligned}
 Ret_{it} = & \eta_0 + \eta_1 E_{it} + \eta_2 Discl_Pr_{it} + \eta_3 E_{it} \times Discl_Pr_{it} + \eta_4 IMR_Ext_{it} \\
 & + \eta_5 Size_{it} + \eta_6 Leverage_{it} + \eta_7 Loss_{it} + \eta_8 MB_{it} + \kappa_{it}
 \end{aligned} \tag{6}$$

where Ret_{it} is firm i 's cumulative stock return, measured by the total return index, over fiscal year t ; and E_{it} is reported earnings for firm i for year t for recognition firms (reported earnings for fiscal year t adjusted for measuring investment property at fair value for disclosure firms), scaled by market value of equity at the beginning of year t . We follow prior research and include firm size ($Size$), leverage ($Leverage$), a loss indicator variable ($Loss$), and market-to-book ratio (MTB).²⁷ All other variables are as defined previously (see Appendix A).

Untabulated results support H_1 (coefficient on $E \times Discl_Pr = -0.32$, t -stat = 2.11); we fail to support H_{2A} ; and we support H_{2B} only within the high-reliability partition (difference = -0.63 , z -stat = 2.07). Overall, the results are weaker relative to the Table 4 specification.²⁸

Finally, we use panel estimation with random effects, supporting all three hypotheses.

VII. CONCLUSION

This paper examines pricing differences across recognized versus disclosed fair values. Prior research documents such differences (e.g., Landsman 1986), and suggests two

²⁷ We eliminate observations having studentized residuals greater than two to mitigate the effect of outliers. Further, while interacting the controls with E isolates the effect of noise on earnings informativeness, these interactions introduce severe multicollinearity. Thus, we include the controls as main effects only.

²⁸ Two possible explanations are: greater noise in the fair value measures (due to inadequate disclosures to identify unrealized fair value gains and losses) and lower power (e.g., a lower R^2 compared to Table 4).

potential explanations: differential reliability, and differential information processing costs (Bernard and Schipper 1994; Schipper 2007). We build on this literature by examining both.

We use the setting of the European investment property industry after IFRS adoption. Under the relevant standard, IAS 40, firms must either recognize on their balance sheet or disclose via footnotes the fair values of their investment property assets. These assets are the core operating component for these firms, representing 75% on average of their total assets.

Of note, this setting allows empirical measurement of both reliability and information processing costs, with reliability measured as whether the firm engages an external appraiser to derive the investment property fair value estimates, and information processing costs measured via analyst coverage. We create a 2 x 2 matrix of four subsample partitions: (i) low reliability and high information processing costs (no external appraiser and low analyst coverage); (ii) low reliability and low information processing costs (no external appraiser and high analyst coverage); (iii) high reliability and high information processing costs (external appraiser and low analyst coverage); and (iv) high reliability and low information processing costs (external appraiser and high analyst coverage).

Our empirical results support three predictions. First, we predict and find that disclosed investment property fair values have a lower association with market value of equity relative to recognized fair values, suggesting the market applies a discount to disclosed fair values. Second, we predict and find weak support that, *holding information processing costs constant*, this discount is attenuated when reliability is high (proxied via use of an external appraiser). Third, we predict and find strong support that, *holding reliability constant*, this discount is also attenuated when information processing costs are low (proxied via high analyst following). Critically, this setting allows us to hold either reliability or information processing costs constant while testing for the market pricing effect of the other.

Our research design directly incorporates self-selection controls by jointly modeling the firm's decisions to recognize versus disclose property fair values under IAS 40, as well as to engage an external appraiser. Results are also robust across specifications to address multicollinearity, alternative definitions of the dependent and experimental variables for reliability and information processing costs, as well as subsample analyses.

Our paper makes three contributions within the intersection of the recognition versus disclosure and fair value literatures. First, it documents the pricing effects of recognition versus disclosure for fair values in a cross-country IFRS setting. Second, it examines these effects in the context of a core operating asset: investment properties, which—as one of the largest asset classes in the world—are of interest in their own right. Finally and most importantly, it provides evidence that both reliability and information processing costs explain observed pricing discounts for disclosed fair values. Critically, this discount disappears only when both reliability is high and information processing costs are low; further, information processing costs appear to have a larger relative effect. These findings may inform standard setters on the trade-off between recognition and disclosure, including FASB deliberations to introduce fair value reporting for US real estate firms.

Our study is subject to the following limitations. First, our single-industry setting may not generalize to other settings. Second, it is difficult to empirically distinguish between the proposed information processing cost versus alternative explanations invoking investors' cognitive biases. Third, while we make a comprehensive effort to mitigate potential self-selection concerns related to the simultaneous choice of reporting model and appraiser type, we cannot rule out any lingering effect. Finally, our conclusions are based on comparisons across heterogeneous subsamples, several characterized by a small number of observations.

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APPENDIX A
Variable Definitions

Table 3: Self-Selection Models: Bivariate Probit Estimation

Choice of recognition versus disclosure under IAS 40

<i>Discl_{it}</i>	an indicator variable equal to one if firm <i>i</i> in year <i>t</i> is a “disclosure firm” (i.e., chooses to report investment properties on the balance sheet under the IAS 40 cost model with fair values provided via footnote disclosure), and zero if it is a “recognition firm” (i.e., chooses to report investment properties under the IAS 40 fair value model); source: hand-collection.
<i>Std_OCF_{it}</i>	the standard deviation of firm <i>i</i> ’s annual cash flows from operations over years <i>t</i> -2 to <i>t</i> scaled by market value of equity in <i>t</i> ; source: Worldscope data items 04860, 08001.
<i>EPRA_Index_{it}</i>	an indicator variable equal to one if firm <i>i</i> in year <i>t</i> is a member of the FTSE EPRA/NAREIT Developed Europe Real Estate Index, and zero otherwise; source: SNL Financial.
<i>Big4_i</i>	an indicator variable equal to one if firm <i>i</i> employs a Big 4 audit firm in the year of IFRS adoption, and zero otherwise; source: hand-collection.
<i>IP_Exposure_{it}</i>	firm <i>i</i> ’s reported (“recognition firms”) or disclosed (“disclosure firms”) fair value of investment property, divided by total assets (adjusted to reflect measuring investment property at fair value for “disclosure firms”), for fiscal year <i>t</i> ; sources: hand-collection, Worldscope data item 02999.
<i>Size_{it}</i>	for “recognition firms” (“disclosure firms”) is firm <i>i</i> ’s log reported total assets (log total assets adjusted to reflect measuring investment property at fair value), measured at the end of fiscal year <i>t</i> ; sources: hand-collection, Worldscope data item 02999.
<i>Leverage_{it}</i>	is firm <i>i</i> ’s reported short-term plus long-term debt divided by the firm’s total assets, both measured at the end of the fiscal year <i>t</i> ; source: Worldscope data items 03501, 02999.
<i>Pre_IFRS_FV_i</i>	an indicator variable equal to one if firm <i>i</i> ’s country of domicile, assessed just prior to IFRS adoption, allows or requires recognition of investment property fair values on the balance sheet, and zero otherwise—indicating that recognition of these fair values was prohibited prior to IFRS; source: hand-collection.

Choice of external versus no external appraiser

<i>Ext_{it}</i>	an indicator variable equal to one if firm <i>i</i> in year <i>t</i> employs an external appraiser to derive investment property fair values for at least 75% of its property portfolio, and zero otherwise; source: hand-collection.
<i>Int_Sales_{it}</i>	an indicator variable equal to one if firm <i>i</i> in year <i>t</i> has international sales, and zero otherwise; source: Worldscope data item 07101.
<i>CHS_{it}</i>	the percentage of closely held shares for firm <i>i</i> for year <i>t</i> ; source: Worldscope data item 08021.

$Distress_{it}$	an indicator variable equal to one if firm i exhibits negative equity in year t , and zero otherwise; source: Worldscope data item 03501.
Std_Ret_{it}	the standard deviation of firm i 's yearly R_{it} over years $t-2$ to t , source: Worldscope data item RI.

Table 4: The Effect of Recognition versus Disclosure on the Pricing of Fair Values

MVE_{it}	firm i 's market value of equity, measured at the end of the firm's fiscal year t ; source: Worldscope data item 08001.
IP_{it}	firm i 's reported ("recognition firms") or disclosed ("disclosure firms") fair value of investment property for fiscal year t ; source: hand-collection.
$Discl_Pr_{it}$	firm i 's predicted marginal probability to be a disclosure firm in year t ($\Pr(Discl_{it}=1)$) from the bivariate probit estimation in Table 3.
IMR_Ext_{it}	firm i 's year t inverse Mills ratio from the bivariate probit estimation of the decision to employ an external appraiser in Table 3.
$OtherAssets_{it}$	firm i 's other (i.e., non-investment property) assets for fiscal year t defined as firm i 's reported total assets for fiscal year t (adjusted to reflect measuring investment property at fair value for "disclosure firms") minus firm i 's reported ("recognition firms") or disclosed ("disclosure firms") investment property for fiscal year t ; sources: hand-collection, Worldscope data item 02999.
$Liabilities_{it}$	firm i 's total liabilities for fiscal year t defined as firm i 's total assets for fiscal year t minus firm i 's common equity for fiscal year t . For "disclosure" firms, $Liabilities$ is adjusted by an additional deferred tax liability that arises from measuring investment property at fair value. Sources: hand-collection, Worldscope data items 03501, 02999, OECD Corporate Income Tax Rates.
$NumShares_{it}$	firm i 's number of shares, measured at the end of the firm's fiscal year t ; source: Worldscope data item NOSH.
AF_i	an indicator variable equal to one if firm i 's mean number of yearly estimates over the sample period is greater or equal to one, and zero otherwise; source: I/B/E/S Summary File data item NUMEST.

Table 5: Sensitivity Analyses: Enterprise Value Specification

$Enterprise_{it}$	firm i 's sum of MVE_{it} and $Liabilities_{it}$.
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Table 6: Sensitivity Analyses: Alternative Measures of Key Variables

MVE_1Month_{it}	firm i 's market value of equity, measured one month after the end of the firm's fiscal year t ; source: Worldscope data items 05350, 050XX, 05301.
MVE_3Month_{it}	firm i 's market value of equity, measured three months after the end of the firm's fiscal year t ; source: Worldscope data items 050XX, 05301.

<i>Ext_100%</i> _{it}	indicator variable equal to one if firm <i>i</i> in year <i>t</i> employs an external appraiser to derive investment property fair values for all of its property portfolio at fiscal year-end, and zero otherwise; source: hand-collection.
<i>Ext_Big5</i> _{it}	indicator variable equal to one if firm <i>i</i> in year <i>t</i> employs one of the following external appraisers to derive investment property fair values for at least 75% of its property portfolio, and zero otherwise: CB Richard Ellis, DTZ, Cushman & Wakefield, Jones Lang LaSalle, and AtisReal (Vergauwe et al. 2013); source: hand-collection.
<i>AF_NONZERO</i> _{it}	indicator variable equal to one if firm <i>i</i> 's number of estimates in year <i>t</i> is greater than or equal to one, and zero otherwise; source: I/B/E/S Summary File data item NUMEST.
<i>AF_MEDIAN</i> _{it}	indicator variable equal to one if firm <i>i</i> 's number of estimates in year <i>t</i> is greater than or equal to the median number of estimates across the sample, and zero otherwise; source: I/B/E/S Summary File data item NUMEST.

TABLE 1
Sample Description

Panel A. Sample Selection

	Unique Firms Less	Remaining
European real estate firms covered by Thomson Reuters Worldscope		924
- Firms using IFRS in one of the years available in Worldscope (Data item 07536)	424	500
- Firms with available data for tests (hand-collection and within Worldscope) and at least 25% investment property as a percentage of total assets (hand-collection)	255	245
Firm-year observations with available data for Table 3 and 4 analyses		1,423

Panel B. Distribution by Country and Subsamples ($N = 1,423$) [245 unique firms]

Country	Obs.	<i>Pre_</i> <i>IFRS_</i> <i>FV</i>	<i>Discl = 1</i> ($N = 231$) [<i>Firms = 50</i>]				<i>Discl = 0</i> ($N = 1,192$) [<i>Firms = 209</i>]					
			<i>All</i>	<i>Ext = 0</i> ($N = 82$) [<i>Firms = 21</i>]		<i>Ext = 1</i> ($N = 149$) [<i>Firms = 35</i>]		<i>All</i>	<i>Ext = 0</i> ($N = 159$) [<i>Firms = 45</i>]		<i>Ext = 1</i> ($N = 1,033$) [<i>Firms = 193</i>]	
				<i>AF=0</i>	<i>AF=1</i>	<i>AF=0</i>	<i>AF=1</i>		<i>AF=0</i>	<i>AF=1</i>	<i>AF=0</i>	<i>AF=1</i>
Austria	52	0	4	0	0	0	4	48	5	0	3	40
Belgium	103	0	8	0	8	0	0	95	0	0	7	88
Denmark	21	1	0	0	0	0	0	21	19	0	1	1
Finland	44	0	8	8	0	0	0	36	0	8	7	21
France	236	0	96	6	5	46	39	140	1	3	39	97
Germany	166	0	53	36	3	3	11	113	2	7	27	77
Greece	39	1	16	8	8	0	0	23	0	0	4	19
Italy	41	0	20	0	0	0	20	21	0	0	0	21
Neth.	66	1	0	0	0	0	0	66	5	3	12	46
Norway	16	0	0	0	0	0	0	16	0	12	0	4
Poland	20	1	0	0	0	0	0	20	7	5	0	8
Spain	41	0	24	0	0	19	5	17	0	0	3	14
Sweden	109	1	0	0	0	0	0	109	0	49	13	47
Switz.	63	1	0	0	0	0	0	63	0	0	12	51
UK	406	1	2	0	0	0	2	404	18	15	85	286
Total	1,423	0.51	231	58	24	68	81	1,192	57	102	213	820

This table presents our sample selection process (Panel A) and the distribution of firms' choice to recognize versus disclose investment property fair values, across countries of domicile and subsample partitions (Panel B). The sample includes investment property firms domiciled in European Union countries reporting under IFRS over the period 2003–2012.

In Panel A, we include firms identified as real estate firms via Fama-French Industry Classification, 47, or Worldscope Industry Group (Data item 06011) Land and Real Estate (4380), Real Estate Investment Trust Companies (4391), or Rental & Leasing (4392).

In Panel B, subsamples are defined by partitions across the following variables.

Pre_IFRS_FV is an indicator variable equal to one if firm *i*'s country of domicile, assessed just prior to IFRS adoption, allows or requires recognition of investment property fair values on the balance sheet, and zero otherwise (indicating that recognition of these fair values was prohibited prior to IFRS). *Discl* is an indicator variable equal to one if firm *i* in year *t* is a disclosure firm, and zero if it is a recognition firm. *Ext* is an indicator variable equal to one if firm *i* in year *t* employs an external appraiser to derive investment property fair values for at least 75% of its property portfolio, and zero otherwise. *AF* is an indicator variable equal to one if firm *i*'s mean number of yearly estimates over the sample period is greater or equal to one, and zero otherwise.

The number of observations is shown in parentheses; the number of unique firms is shown in brackets.

Note: While Panel A indicates 245 unique firms, the unique firms for Panel B totals 259 due to the inclusion of 14 firms that switch from disclosure to recognition during the period of analysis.

TABLE 2
Descriptive Statistics

Panel A. Comparisons of Means for Table 3 Variables – Self-Selection Models: Bivariate Probit Estimation

(1) Choice of Recognition versus Disclosure under IAS 40				(2) Choice of External versus No External Appraiser			
Variables	<i>Discl</i> = 1	<i>Discl</i> = 0	Difference	Variables	<i>Ext</i> = 1	<i>Ext</i> = 0	Difference
<i>Std_OCF</i>	0.18	0.15	0.04	<i>Std_OCF</i>	0.15	0.15	-0.01
<i>EPRA_Index</i>	0.26	0.50	-0.24 ***	<i>EPRA_Index</i>	0.50	0.26	0.24 ***
<i>Big4</i>	0.55	0.69	-0.14 ***	<i>Size</i>	13.59	13.48	0.11
<i>IP_Exposure</i>	0.72	0.80	-0.08 ***	<i>Int_Sales</i>	0.31	0.13	0.18 ***
<i>Size</i>	13.18	13.65	-0.47 ***	<i>Leverage</i>	0.57	0.55	0.02
<i>Leverage</i>	0.57	0.56	0.01	<i>CHS</i>	44.95	60.72	-15.77 ***
<i>Pre_IFRS_FV</i>	0.08	0.59	-0.51 ***	<i>Distress</i>	0.02	0.02	0.01
				<i>Std_Ret</i>	0.43	0.50	-0.07 ***

Panel B. Comparisons of Means for Table 4 Variables – The Effect of Recognition versus Disclosure on the Pricing of Fair Values

Variables	(1) Low Fair Value Reliability (<i>Ext</i> = 0)				(2) High Fair Value Reliability (<i>Ext</i> = 1)			
	<i>AF</i> = 0		<i>AF</i> = 1		<i>AF</i> = 0		<i>AF</i> = 1	
	<i>Discl</i> = 1 (<i>N</i> = 58) [<i>Firms</i> = 15]	<i>Discl</i> = 0 (<i>N</i> = 57) [<i>Firms</i> = 18]	<i>Discl</i> = 1 (<i>N</i> = 24) [<i>Firms</i> = 6]	<i>Discl</i> = 0 (<i>N</i> = 102) [<i>Firms</i> = 27]	<i>Discl</i> = 1 (<i>N</i> = 68) [<i>Firms</i> = 15]	<i>Discl</i> = 0 (<i>N</i> = 213) [<i>Firms</i> = 49]	<i>Discl</i> = 1 (<i>N</i> = 81) [<i>Firms</i> = 20]	<i>Discl</i> = 0 (<i>N</i> = 820) [<i>Firms</i> = 144]
<i>MVE</i>	209.3	743.0 ***	101.1	4,367.3 ***	714.8	190.2 ***	1,125.2	1,240.2
<i>IP</i>	475.1	1,976.3 ***	133.9	10,455.8 ***	1,360.1	385.1 ***	2,433.6	2,711.0
<i>Discl_Pr</i>	0.38	0.08 ***	0.29	0.09 ***	0.36	0.17 ***	0.28	0.13 ***
<i>Other Assets</i>	109.5	311.5 ***	50.5	995.6 ***	564.9	66.0 ***	595.8	564.5
<i>Liabilities</i>	342.1	1,676.2 ***	69.1	7,066.9 ***	1,126.0	280.3 ***	1,960.3	1,982.5
<i>NumShares</i>	12.1	29.3	6.3	98.0 ***	38.8	52.0	152.3	172.7

This table reports descriptive statistics. All variables are defined in Appendix A.

Panel A presents mean values for variables used in the Table 3 self-selection models examining the decision to recognize versus disclose investment property fair values under IAS 40, and the decision to engage an external appraiser to derive investment property fair value estimates.

Panel B shows the mean values for variables used in the Table 4 model examining the pricing of recognized versus disclosed fair values. The number of observations is shown in parentheses; the number of unique firms is shown in brackets. All variables (except *Discl_Pr* and *NumShares*) are expressed in millions of Euros; *NumShares* is expressed in millions.

Across both panels, ***, **, * represent significance at the 1%, 5%, and 10% levels, respectively, for two-tailed tests of differences in means.

TABLE 3
Self-Selection Models: Bivariate Probit Estimations

Variables	Panel A. Choice of Recognition versus Disclosure under IAS 40		Panel B. Choice of External versus No External Appraiser	
	Pred. Sign	Y-Variable: <i>Discl</i>	Pred. Sign	Y-Variable: <i>Ext</i>
		(1)		(2)
Intercept	?	0.37 (0.93)	?	2.36 (5.89) ***
<i>Std_OCF</i>	+	0.11 (1.90) **	+	-0.08 (1.29)
<i>EPRA_Index</i>	-	-0.58 (5.26) ***	+	0.51 (4.98) **
<i>Big4</i>	-	-0.07 (0.78)		
<i>IP_Exposure</i>	-	-0.93 (4.04) ***		
<i>Size</i>	-	0.04 (1.23)	+ / -	-0.10 (3.22) ***
<i>Intl_Sales</i>			+	0.42 (3.73) ***
<i>Leverage</i>	+ / -	-0.69 (2.72) ***	+	0.39 (1.85) **
<i>Pre_IFRS_FV</i>	-	-1.66 (16.33) ***		
<i>CHS</i>			-	-0.01 (3.91) ***
<i>Distress</i>			+	0.16 (0.44)
<i>Std_Ret</i>			+	-0.54 (4.53)
<i>N</i>		1,423		1,423
<i>Correctly Classified</i>		84.4%		82.8%
<i>Model p-value</i>		0.00		0.00
ρ (Wald χ^2)				-0.494 (55.74) ***
<i>Bivariate Wald χ^2</i>				451.3 ***

This table presents the two choice models used to control for potential self-selection within our main analyses. Column (1) models the determinants of firms' choice under IAS 40 to recognize versus disclose investment property fair values, as depicted in Equation (1). The dependent variable is *Discl*, an indicator variable equal to one if the firm is a disclosure firm (i.e., chooses to report investment properties on the balance sheet under the cost model with fair values provided via footnote disclosure), and zero if it is a recognition firm (i.e., chooses to report investment properties under the fair value model). Column (2) models the determinants of firms' choice to engage an external appraiser to derive investment property fair values, as depicted in Equation (2). The dependent variable is *Ext*, an indicator variable equal to one if the firm employs an external appraiser to derive investment property fair values for at least 75% of the firm's property assets, and zero otherwise. All other variables are defined in Appendix A.

Reflecting the assumed joint nature of these two choices, the models are estimated simultaneously using a bivariate probit *FIML* (full information maximum likelihood) regression. ρ represents the correlation in the error terms across the two probit regressions, with the corresponding Wald statistic indicating significance, consistent with the joint estimation. Coefficients are presented with *z*-statistics in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for the indicated one- or two-tailed tests.

TABLE 4
The Effect of Recognition versus Disclosure on the Pricing of Fair Values (Dependent Variable = MVE)

Variables	Pred Sign	Pooled Regression		Subsample Partitions			
		Base Regression	Average Effect of Disclosure (H_1)	<i>Ext</i> = 0 <i>AF</i> = 0	<i>Ext</i> = 0 <i>AF</i> = 1	<i>Ext</i> = 1 <i>AF</i> = 0	<i>Ext</i> = 1 <i>AF</i> = 1
		(1)	(2)	(3)	(4)	(5)	(6)
Intercept	?	0.08 (0.35)	0.07 (0.26)	-0.40 (0.21)	-0.93 (0.13)	-0.52 (0.74)	0.34 (0.86)
<i>IP</i>	+	0.88 (19.23)***	0.88 (21.74)***	1.49 (30.25)***	0.94 (15.10)***	1.05 (14.14)***	0.83 (16.35)***
<i>Discl_Pr</i>	?		0.15 (0.19)	0.56 (0.55)	1.33 (0.22)	1.20 (1.75)*	-2.38 (1.98)**
<i>IP x Discl_Pr</i>	-		-0.15 (2.00)**	-0.82 (15.81)***	-0.27 (2.25)**	-0.67 (7.07)***	0.07 (0.87)
<i>IMR_Ext</i>	?		-0.18 (0.35)	-0.13 (0.12)	-1.05 (0.28)	0.82 (0.35)	-0.09 (0.06)
<i>OtherAssets</i>	+	0.82 (7.17)***	0.85 (8.45)***	1.88 (32.15)***	0.65 (2.38)**	0.90 (6.16)***	0.83 (9.21)***
<i>Liabilities</i>	-	-0.80 (10.02)***	-0.79 (10.77)***	-1.64 (24.74)***	-0.84 (6.11)***	-0.87 (5.09)***	-0.74 (9.12)***
<i>NumShares</i>	?	-0.08 (2.18)**	-0.08 (2.18)**	-0.01 (0.12)	-0.17 (0.26)	0.13 (0.87)	-0.09 (2.41)**
<i>N</i>		1,423	1,423	115	126	281	901
<i>Adjusted-R²</i>		0.899	0.900	0.934	0.887	0.863	0.891

Tests of *IP x Discl_Pr* Across Subsample Partitions

H_{2A}: Effect of Reliability (holding constant Information Processing Costs)

Within *AF* = 0: Low Reliability [*Ext* = 0] – High Reliability [*Ext* = 1]

Within *AF* = 1: Low Reliability [*Ext* = 0] – High Reliability [*Ext* = 1]

Prediction

Diff (z-stat)

(3) < (5)

-0.15 (1.15)

(4) < (6)

-0.34 (2.86)***

H_{2B}: Effect of Information Processing Costs (holding constant Reliability)

Within *Ext* = 0: High Info Processing Costs [*AF* = 0] – Low Info Processing Costs [*AF* = 1]

Within *Ext* = 1: High Info Processing Costs [*AF* = 0] – Low Info Processing Costs [*AF* = 1]

(3) < (4)

-0.55 (4.41)***

(5) < (6)

-0.74 (6.08)***

This table presents analyses examining the effect of recognition versus disclosure on the pricing of investment property fair values. The sample includes investment property firms domiciled in European Union countries over the period 2003–2012. Across all regressions the dependent variable is MVE_{it} , firm i 's market value of equity for year t assessed at the fiscal year-end.

Column (1) presents the base regression.

Column (2) presents results for the full sample including the experimental variable $IP \times Discl_Pr$, which is the interaction of IP (firm i 's investment property assets at fair value for year t) and $Discl_Pr$ (the probability of firm i being a disclosure firm during year t). The coefficient on $IP \times Discl_Pr$ is used to test H_1 .

Columns (3) – (6) present results for subsample partitions, which are formed across reliability and information processing costs. The proxy for reliability is Ext , an indicator variable equal to one if firm i in year t uses external appraisers to derive investment property fair values for at least 75% of its property assets, and zero otherwise. Thus, $Ext = 0$ reflects low reliability, and $Ext = 1$ reflects high reliability. The proxy for information processing costs is AF , an indicator variable equal to one if firm i has one or more analysts following the firm on average annually over the sample period, and zero otherwise. Thus, $AF = 0$ reflects high information processing costs, while $AF = 1$ reflects low information processing costs.

Accordingly, Column (3) presents the subsample of low reliability and high information processing costs (i.e., $Ext = 0$, and $AF = 0$). Column (4) presents the subsample of low reliability and low information processing costs (i.e., $Ext = 0$, and $AF = 1$). Column (5) presents the subsample of high reliability and high information processing costs (i.e., $Ext = 1$, and $AF = 0$). Column (6) presents the subsample of high reliability and low information processing costs (i.e., $Ext = 1$, and $AF = 1$). We test H_{2A} by comparing Columns (3) versus (5), which vary reliability and hold constant high information processing costs, and by comparing Columns (4) versus (6), which vary reliability and hold constant low information processing costs. We test H_{2B} by comparing Columns (3) versus (4), which vary information processing costs and hold constant low reliability, and by comparing Columns (5) versus (6), which vary information processing costs and hold constant high reliability.

All other variables are defined in Appendix A. The reported coefficients for $Intercept$, $Discl_Pr$, and IMR_Ext have been divided by 10,000 to facilitate inferences. All regressions are estimated using robust standard errors clustered at the firm-level, with t -statistics provided in parentheses. Except $Discl_Pr$ and IMR_Ext , all variables have been winsorized at the 1%-level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for the indicated one- or two-tailed tests.

TABLE 5
Sensitivity Analyses: Enterprise Value Specification to Mitigate Multicollinearity Concern (Dependent Variable = *Enterprise*)

Variables	Pred Sign	Base Regression	Average Effect of Disclosure (H_1)	<i>Subsample Partitions</i>			
				<i>Ext</i> = 0 <i>AF</i> = 0	<i>Ext</i> = 0 <i>AF</i> = 1	<i>Ext</i> = 1 <i>AF</i> = 0	<i>Ext</i> = 1 <i>AF</i> = 1
		(1)	(2)	(3)	(4)	(5)	(6)
Intercept	?	0.04 (0.15)	-0.10 (0.32)	1.60 (0.65)	-1.81 (0.26)	-0.48 (0.69)	-0.22 (0.52)
<i>IP</i>	+	1.00 (44.22)***	1.01 (45.59)***	1.03 (178.62)***	1.04 (28.48)***	1.11 (50.28)***	0.99 (69.74)***
<i>Discl_Pr</i>	?		0.44 (0.48)	0.73 (0.57)	1.33 (0.25)	1.08 (1.71)*	-1.45 (1.03)
<i>IP x Discl_Pr</i>	-		-0.14 (1.66)**	-0.71 (8.23)***	-0.23 (2.27)**	-0.67 (8.90)***	0.04 (0.32)
<i>IMR_Ext</i>	?		-0.27 (0.54)	1.15 (0.75)	-1.73 (0.42)	0.89 (0.39)	-0.67 (0.45)
<i>OtherAssets</i>	+	0.96 (8.50)***	1.00 (9.48)***	1.31 (21.59)***	0.75 (3.13)***	1.02 (19.61)***	1.03 (9.41)***
<i>NumShares</i>	?	-0.08 (1.68)*	-0.08 (1.68)*	0.05 (0.56)	-0.31 (0.42)	0.13 (0.70)	-0.09 (1.83)*
<i>N</i>		1,423	1,423	115	126	281	901
<i>Adjusted-R²</i>		0.983	0.983	0.991	0.980	0.972	0.981

Tests of *IP x Discl_Pr* Across Subsample Partitions

H_{2A}: Effect of Reliability (holding constant Information Processing Costs)

Within *AF* = 0: Low Reliability [*Ext* = 0] – High Reliability [*Ext* = 1]

Within *AF* = 1: Low Reliability [*Ext* = 0] – High Reliability [*Ext* = 1]

Prediction

Diff (z-stat)

(3) < (5)

-0.03 (0.30)

(4) < (6)

-0.27 (2.19)**

H_{2B}: Effect of Information Processing Costs (holding constant Reliability)

Within *Ext* = 0: High Info Processing Costs [*AF* = 0] – Low Info Processing Costs [*AF* = 1]

Within *Ext* = 1: High Info Processing Costs [*AF* = 0] – Low Info Processing Costs [*AF* = 1]

(3) < (4)

-0.47 (3.67)***

(5) < (6)

-0.71 (5.08)***

This table presents sensitivity analyses from a specification estimated to mitigate concerns of multicollinearity. The dependent variable is $Enterprise_{it}$, firm i 's enterprise value for year t , measured as firm i 's market value of equity for year t assessed at the fiscal year-end plus its book value of liabilities for year t . The sample includes investment property firms domiciled in European Union countries over the period 2003–2012.

Columns (1) – (6) are as defined in Table 4. We test H_1 using the coefficient on $IP \times DiscI_Pr$ in Column (2). We test H_{2A} by comparing Columns (3) versus (5), which vary reliability and hold constant high information processing costs, and by comparing Columns (4) versus (6), which vary reliability and hold constant low information processing costs. We test H_{2B} by comparing Columns (3) versus (4), which vary information processing costs and hold constant low reliability, and by comparing Columns (5) versus (6), which vary information processing costs and hold constant high reliability.

All other variables are defined in Appendix A. The reported coefficients for $Intercept$, $DiscI_Pr$, and IMR_Ext have been divided by 10,000 to facilitate inferences. All regressions are estimated using robust standard errors clustered at the firm-level, with t -statistics provided in parentheses. Except $DiscI_Pr$ and IMR_Ext , all variables have been winsorized at the 1%-level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for the indicated one- or two-tailed tests.

TABLE 6
Sensitivity Analyses: Alternative Measures of Key Variables (Dependent Variable = MVE)

	Test of H ₁	Subsamples: Coefficient on <i>IP x Discl_Pr</i>				Tests of H _{2A} (Effect of Reliability)		Tests of H _{2B} (Effect of Info Process)	
	Pooled Sample	Low Reliability		High Reliability		(3) – (5)	(4) – (6)	(3) – (4)	(5) – (6)
		High Info Process Costs	Low Info Process Costs	High Info Process Costs	Low Info Process Costs				
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Dependent Variable									
<i>MVE_1Month</i>	-0.18 (1.81) **	-0.74 (12.06) ***	-0.31 (1.48) *	-0.54 (4.64) ***	0.04 (0.57)	-0.20 (1.32) *	-0.35 (1.78) **	-0.43 (2.10) **	-0.59 (4.25) ***
<i>MVE_3Month</i>	-0.19 (1.73) **	-0.79 (12.18) ***	-0.37 (1.55) *	-0.59 (4.69) ***	0.11 (1.31) *	-0.19 (1.18)	-0.48 (2.10) **	-0.42 (1.78) **	-0.70 (4.71) ***
Panel B. Reliability Proxy									
<i>Ext_100%</i>	-0.16 (2.09) **	-0.81 (13.00) ***	-0.09 (0.93)	-0.69 (6.26) ***	-0.34 (3.81) ***	-0.12 (0.80)	0.25 (1.70)	-0.72 (6.11) ***	-0.35 (2.49) ***
<i>N</i>	1,423	161	272	235	755				
<i>Ext_Big5</i>	-0.16 (2.11) **	-0.91 (5.14) ***	-0.17 (1.70) **	-0.65 (3.18) ***	-0.27 (1.66) *	-0.25 (1.01)	0.10 (0.55)	-0.73 (3.73) ***	-0.38 (1.52) *
<i>N</i>	1,423	273	569	123	458				
Panel C. Information Processing Costs Proxy									
<i>AF_NONZERO</i>	-0.15 (2.00) **	-1.06 (6.45) ***	-0.27 (2.33) ***	-0.46 (3.79) ***	0.07 (0.88)	-0.60 (3.75) ***	-0.34 (2.96) ***	-0.80 (4.08) ***	-0.53 (3.69) ***
<i>N</i>	1,423	119	122	361	821				
<i>AF_MEDIAN</i>	-0.15 (2.00) **	-1.09 (2.25) **	-0.25 (2.80) ***	-0.16 (1.45) *	0.09 (0.97)	-0.93 (1.92) **	-0.34 (3.04) ***	-0.84 (1.79) **	-0.25 (1.79) **
<i>N</i>	1,423	152	89	550	632				

This table presents sensitivity analyses examining the effect of recognition versus disclosure on the pricing of investment property fair values. The sample includes investment property firms domiciled in European Union countries over the period 2003–2012. To parallel the related columns of the primary analysis of Table 4, the sequence of column numbers begins at Column (2).

Panel A presents results using alternative definitions of the dependent variable. Panel B presents results using alternative definitions of the variable used to partition observations into subsamples based on reliability. Panel C presents results using alternative definitions of the variable used to partition observations into subsamples based on information processing costs.

Column (2) presents results used to test H_1 . Columns (3) – (6) present results for the indicated subsample regressions. Across Columns (2) – (6), only the coefficient on the interaction $IP \times Discl_Pr$ is presented, along with its t -statistic and significance level.

Columns (7) – (8) present tests of H_{2A} by comparing Columns (3) versus (5), which vary reliability and hold constant high information processing costs, and by comparing Columns (4) versus (6), which vary reliability and hold constant low information processing costs.

Columns (9) – (10) present tests of H_{2B} by comparing Columns (3) versus (4), which vary information processing costs and hold constant low reliability, and by comparing Columns (5) versus (6), which vary information processing costs and hold constant high reliability.

Adjusted- R^2 range from: in Panel A, 85–90% (*MVE_1Month*) and 83–90% (*MVE_3Month*); in Panel B, 86–93% (*Ext_100%*) and 87–95% (*Ext_Big5*); and in Panel C, 86–93% (*AF_NONZERO*) and 87–89% (*AF_MEDIAN*).

All variables are defined in Appendix A. All regressions are estimated using robust standard errors clustered at the firm-level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for the indicated one- or two-tailed tests.

TABLE 7
Sensitivity Analyses: Subsamples (Dependent Variable = MVE)

	Test of H ₁	Subsamples: Coefficient on <i>IP x Discl_Pr</i>				Tests of H _{2A}		Tests of H _{2B}	
	Pooled Sample	Low Reliability		High Reliability		(Effect of Reliability)		(Effect of Info Process)	
		High Info Process Costs	Low Info Process Costs	High Info Process Costs	Low Info Process Costs	(3) – (5)	(4) – (6)	(3) – (4)	(5) – (6)
	(1)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Financial Crisis									
<i>Year Fixed Effects</i>	-0.15 (2.03) **	-0.78 (14.99) ***	-0.26 (2.23) **	-0.68 (6.53) ***	0.06 (0.83)	-0.10 (0.81)	-0.32 (2.80) ***	-0.52 (4.39) ***	-0.73 (6.09) ***
<i>Exclude Crisis Obs</i>	-0.15 (2.20) **	-0.95 (14.26) ***	-0.25 (2.53) ***	-0.76 (5.44) ***	0.06 (0.65)	-0.19 (1.10)	-0.31 (2.31) **	-0.70 (6.30) ***	-0.81 (5.03) ***
<i>N</i>	1,040	82	92	204	662				
Panel B. Country Effects									
<i>Include Country Fixed Effects</i>	0.03 (0.26)	-0.90 (8.52) ***	0.09 (0.54)	-0.85 (3.40) ***	0.02 (0.15)	-0.05 (0.21)	0.07 (0.39)	-0.99 (5.44) ***	-0.86 (3.31) ***
<i>N</i>	1,423	115	126	281	901				
<i>Exclude UK Obs</i>	-0.16 (1.97) **	-0.82 (14.59) ***	-0.27 (2.32) **	-0.66 (7.19) ***	0.07 (0.76)	-0.16 (1.43) *	-0.33 (2.75) ***	-0.55 (4.55) ***	-0.72 (5.74) ***
<i>N</i>	1,017	97	111	196	613				
Panel C. Property Exposure									
<i>IP / TA > 50%</i>	-0.14 (2.09) **	-0.83 (18.39) ***	-0.25 (2.38) **	-0.61 (7.94) ***	0.06 (0.73)	-0.22 (2.20) **	-0.31 (2.84) ***	-0.58 (5.34) ***	-0.67 (5.94) ***
<i>N</i>	1,259	101	109	242	807				

This table presents sensitivity analyses examining the effect of recognition versus disclosure on the pricing of investment property fair values. The sample includes investment property firms domiciled in European Union countries over the period 2003–2012. To parallel the related columns of the primary analysis of Table 4, the sequence of column numbers begins at Column (2).

Panel A presents results using alternative specifications to address the financial crisis: including year fixed effects, and excluding crisis observations. Panel B presents results using alternative specifications to address country effects: including country fixed effects, and excluding UK observations. Panel C presents results using alternative specifications to address the level of the firm’s investment property exposure: included observations require investment property to equal or exceed 50% of total assets.

Column (2) presents results used to test H_1 . Columns (3) – (6) present results for the indicated subsample regressions. Across Columns (2) – (6), only the coefficient on the interaction $IP \times Discl_Pr$ is presented, along with its t -statistic and significance level.

Columns (7) – (8) present tests of H_{2A} by comparing Columns (3) versus (5), which vary reliability and hold constant high information processing costs, and by comparing Columns (4) versus (6), which vary reliability and hold constant low information processing costs.

Columns (9) – (10) present tests of H_{2B} by comparing Columns (3) versus (4), which vary information processing costs and hold constant low reliability, and by comparing Columns (5) versus (6), which vary information processing costs and hold constant high reliability.

Adjusted- R^2 range from: in Panel A, 86–94% (*Year Fixed Effects*), and 83–96% (*Exclude Crisis Obs*); in Panel B, 86–94% (*Country Fixed Effects*) and 86–93% (*Exclude UK Obs*); and in Panel C, 87–93% ($IP / TA > 50\%$).

All regressions are estimated using robust standard errors clustered at the firm-level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, for the indicated one- or two-tailed tests.