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Predicting Future Performance Using Fair Value versus Historical Cost: Evidence from Investment Property

公允價值與歷史成本之盈餘預測能力：以投資性不動產為例

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Abstract

This study investigates whether reporting investment property at fair value using IAS 40 provides incremental predictive ability for future performance beyond historical cost. Specifically, this study examines whether recognizing incomes under the fair value model can predict a firm's future income more accurately than the historical cost model. Using a sample of Chinese real estate firms from 2007 through 2014, this study finds that reporting investment property at fair value provides better predictive ability for future income than historical cost. This study also determines that the predictability of income for future earnings under the fair value model increases with the size of accumulated changes in fair value gains and losses of investment properties. The results suggest that the recognition of fair value gains and losses of investment property in income statements can improve the predictability of a firm's future income.

【Keywords】predictive ability, investment property, fair value, historical cost

摘 要

本研究探討依國際會計準則 40 號「投資性不動產」，採用公允價值模式衡量投資性不動產是否比採用成本模式衡量投資性不動產對未來盈餘更具有增額之預測能力。本研究特別探討採用公允價值模式之企業，其當期盈餘對未來盈餘的預測能力是否高於採用成本模式的企業。以中國不動產業 2007 年至 2014 年為樣本，本研究發現相對於以成本模式衡量投資性不動產，以公允價值模式衡量投資性不動產之企業其盈餘對未來盈餘的預測能力較高。本研究進一步發現，以公允價值衡量投資性不動產之企業，其當期盈餘與未來盈餘的關聯性顯著受其投資性不動產之累計公允價值變動損益數所影響。本研究結果顯示認列投資性不動產之公允價值變動數於損益能提升企業未來盈餘的預測能力。

【關鍵字】預測能力、投資性不動產、公允價值、歷史成本

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1. Introduction

This study is motivated by the debate over the predictive ability of fair value, and the mixed findings on whether unrealized gains and losses are a predictor of future performance. The International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) in their joint project, the Conceptual Framework for Financial Reporting 2010 (Financial Accounting Standards Boards, 2010), states that financial information needs to possess predictive value to be useful for decision-making. The IASB considers fair value measurement superior to other measurement methods in reflecting current economic situations and future expectations (Barth, 2006). Fair value measures could have better predictive value for future performance because fair value measurements of assets can be realized by settlement or sale (Evans, Hodder, and Hopkins, 2014) and more accurately reflects volatility. Therefore, fair value accounting incorporates more price-relevant information than historical cost information in financial statements. In addition, fair value accounting is considered to be a more accurate measure of an investment property's selling price than the asset's historical cost (So and Smith, 2009). A more accurate measure for current performance can align with future performance more closely than a measure with less precision.

However, a potential disadvantage of fair value accounting is that, by incorporating unrealized economic gains and losses into financial statements, earnings become more volatile and difficult to predict (Ball, 2006). Recognizing changes in asset fair values in net income will likely increase earnings volatility, which reduce the predictive value of earnings (Singleton-Green, 2007; Liang and Riedl, 2014). The survey evidence of Graham, Harvey, and Rajgopal (2005) suggest that managers believe that earnings volatility is negatively associated with earnings predictability. Dichev and Tang (2009) report that financial analysts do not understand how earnings volatility translates into future earnings. Indeed, the illiquidity of some asset markets (Laux and Leuz, 2009) cause volatility in balance sheets (Schipper, 2007).

The extant literature raises concerns and questions about whether measuring and recording assets at fair value is an improvement over historical cost in predicting future firm performance. These concerns constitute important empirical research questions since the objective of financial reporting is to provide firm stakeholders with information that is useful for decision-making, assist in the prediction of returns, as well as assess the amounts, timing, and uncertainty of future performance (FASB, 2010).

Most of the previous research in this area investigates the predictive ability of fair value earnings for future performance for financial assets. Few studies, however, examine the predictive ability of fair value-based earnings for future income of non-financial assets. This is a critical issue, because the IASB issued International Accounting Standards 40 (IAS 40) *investment property*,[1] allowing managers to use either fair value or historical cost to report results from investment properties [IAS 40.30] after initial acquired costs. Financial assets are generally undifferentiated and are traded on a public exchange. In contrast, real estate is generally unique and differentiated, and traded privately. Since real estate markets are usually less liquid than financial markets, the fair values of investment properties may be less precise than they are for financial assets, and could impart an adverse effect on predictability. Given the mixed results of previous research on the predictive ability of fair value for future performance, it is crucial to investigate if the reported fair values of investment property are more or less useful than historical cost in predicting future earnings.

China provides an informative research setting to explore this issue. The Chinese Accounting Standards (CASs) for Business Enterprises (ASBEs), effective since January 1, 2007, converges substantially with IFRSs. All publicly traded firms on the Chinese stock exchanges are required to measure investment properties in accordance with the Chinese Accounting Standard 3 (CAS 3 hereafter). While CAS 3 is substantially similar to IAS 40, there are two main differences. First, CAS 3 does not require an entity which uses the cost method to also disclose the fair values of investment property in the footnotes. As a result, investors in such firms do not know the fair value of the firm's real estate. This provision should provide a cleaner test of stock crash risk for investment property being reported under the fair value model versus the cost model. Second, China mandates that firms use historical cost, unless firms are able to provide evidence that fair value estimates of investment properties are reliable. An example of a case where this happens is when investment properties are located in a liquid market, or the fair value estimates of the investment properties are obtained through comparisons with similar properties in liquid

1 IAS 40 *investment property* is defined as property (land and (or) building) held (by the owner or by the lessee under a finance lease) to earn rentals or for capital appreciation, or both [IAS 40.5]. In 2008, IASB also includes properties under construction or development for future use as investment properties.

markets.[2] In addition, investment properties are the primary operating assets for real estate firms, and their fair values are observable in relatively liquid markets compared to other industries. This allows us to examine if financial results reported by real estate investment firms using fair value have a higher predictive value than results reported using historical cost.

We investigate whether reporting investment property using fair value provides incremental predictive ability for future performance beyond historical cost. Using a sample of real estate firms listed on Chinese stock exchanges from the period 2007 up to and including 2014, we find that incomes in firms reporting investment properties using fair value have higher predictive ability for future income than incomes in firms using historical cost. This study also demonstrates that the predictability of earnings for future incomes under the fair value model increases with accumulated changes in fair value gains and losses of investment properties. The results indicate that recognizing changes in the fair values of investment properties in income statements can augment the predictability of a firm's future income.

This study contributes to the literature in two ways. First, this study adds to existing research by investigating the effect that the fair value model has on the predictive value of income in real estate, as opposed to the financial services industry. Second, this study also contributes to literature on the adoption of IAS 40 in emerging markets, such as China, where firms are less likely to adopt fair value measurements when fair value information involves high cost and complexity which make it difficult to obtain the fair value of assets. Leuz, Nanda, and Wysocki (2003) question if IFRS can be effectively applied in the same way across different countries. Our study offers important policy implications for standard setters and regulators governing emerging markets.

The remainder of this paper is organized as the following: section 2 discusses the accounting and institutional background, section 3 reviews prior research and develops testable hypotheses, section 4 discusses sample selection and research design, section 5 reports the empirical results, section 6 discusses the additional analyses, and section 7 is the conclusion.

2 This is equivalent to the Level 2 fair-valued assets, according to the SFAS 157. We discuss this in detail in the hypotheses development section.

2. Accounting and Institutional Environment

Chapter 1 of FASB Statement of Financial Accounting Concepts (SFAC) No. 8 (2010) states that, for accounting information to be relevant, it should possess predictive value, meaning that information that can be used by potential investors or lenders to assist them in the assessment of an entity's prospects, e.g., amount, timing, and uncertainty of future net cash inflows of an entity, to predict future outcomes. Consequently, accounting information reported using the fair value model (e.g., recognition of changes in market prices of assets in income), should be more relevant than information reported using the historical cost model because it incorporates the most recent information about asset prices.

To provide more pertinent information to investors about non-financial investment assets, the IASB issued IAS 40, effective January 1, 2005, allowing the use of fair value accounting for real estate investment properties. Investment properties include land and buildings which earn rental income and/or capital appreciation. Under the fair value model, after the initial purchase, investment properties are reported on the balance sheet at market values [IAS 40.33], with annual changes in the market values recognized in the income statement [IAS 40.35]. Although investment properties under the cost model are carried at cost, less accumulated depreciation, and impairment losses [IAS 40.56], IAS 40 still requires firms using the cost model to disclose the fair values of investment properties in the footnotes, except for certain circumstances in which the fair value of the assets cannot be reliably estimated. The most reliable estimates of fair values are determined by current property prices in an active market for similar properties in the same condition and location, as well as subject to similar lease or other contracts [IAS 40.45]. If there are no appropriate reliable market estimates available, firms may use model estimates which are supported by external evidence [IAS 40.46].[3] The estimates of fair value are not required, but are encouraged, to be evaluated by external appraisers [IAS 40.79].

Effective January 1, 2007, China substantially converged its accounting standards with IFRS, and required all firms listed on the Chinese stock exchanges to measure real estate investment properties under Chinese Accounting Standards (CAS) 3. CAS 3 is substantially similar to IAS 40, except CAS 3 does not require firms using the cost model

3 This is equivalent to the Level 3 fair-valued assets, according to SFAS No. 157. We will discuss this in detail in the hypotheses development section.

to disclose the fair values of these investment assets in the footnotes. In order to reduce potential fraud and increase credibility, CAS 3 mandates that firms use the cost model unless the firms provide evidence that the fair values of investment properties can be obtained from active markets or through values of similar properties in an active market, and the fair value estimates are reliable. Unlike IAS 40, Chinese firms however are not allowed to use model estimates when there are no appropriate market estimates available.

We believe that the Chinese real estate market provides an ideal setting for testing the predictive value of fair value accounting for the following reasons. First, since CAS 3 does not require the disclosure of fair value in the footnotes for firms using the historical cost model, Chinese investors in such firms do not know the fair value of the firm's assets. This should provide a superior test of the predictive value of the fair value model. Second, CAS 3 requires that fair value is used only by firms that can provide verifiable market values, which should assist to mitigate the lack of transparency usually exhibited by emerging markets. Indeed, China is an emerging capital market, and there is a significant lack of infrastructure and mature markets. Therefore, in order to reduce potential fraud and increase credibility, CAS 3 mandates that firms use the cost model unless the firms provide evidence that the fair values of the investment properties are from active markets or through values of similar properties in an active market, and that the fair value estimates can both be obtained and are reliable. Unlike IAS 40, Chinese firms however are not allowed to use model estimates when no appropriate market estimates are available.

3. Related Literature and Hypothesis Development

3.1 Related Literature of Fair Value Accounting in Non-financial Assets

Several studies examine whether using fair value accounting increases the ability of accounting earnings to predict future firm performance (Barth and Clinch, 1998; Aboody, Barth, and Kasznik, 1999; Lopes and Walker, 2012; Bratten, Causholli, and Khan, 2012; Evans et al., 2014; Cantrell, McInnis, and Yust, 2014). However, the empirical evidence is mixed regarding whether fair value-based earnings provide better predictive ability for future earnings than historical cost accounting. Consequently, the predictive ability of fair value accounting remains undetermined.

Relatively few investigations focus on whether using fair value accounting on non-financial assets provides superior information for predicting future firm performance. Using a sample of U.K. firms, Aboody et al. (1999) study whether revaluations of a firm's

fixed assets are related to future changes in operating performance, by measuring realized operating income over a one- and two-year window after the year of revaluation. They find that an upward revaluation of assets is positively associated with changes in the firm's future performance. However, they also report that the positive association between the revaluation of tangible assets and future performance is weaker for cross-listed firms, highly leveraged firms, and volatile time periods.

In contrast, using a sample of Brazilian-listed firms, Lopes and Walker (2012) find a negative association between the revaluation of fixed assets and the firm's future operating earnings, suggesting that the use of the fair value model does not increase the predictive value of earnings. However, they also show that the decision to revalue is negatively associated with the firm's score on the Brazilian Corporate Governance Index, and positively associated with debt and illiquidity. These results indicate that the asset revaluations were performed primarily for opportunistic reasons.

3.2 Hypotheses Development

In this study, we argue that using the fair value model for investment property may increase the predictive value of earnings over the cost model in China for two reasons. First, we expect that investment properties measured using the fair value model will incorporate more price-relevant information than historical cost information in financial statements. Fair value measures could possess predictive value for future performance because fair value measurements of assets can be realized by settlement or sale (Evans et al., 2014). Fair value accounting incorporates more price-relevant information than historical cost information in financial statements. Using a sample of Chinese-listed firms, Liu and Liu (2007) find that earnings based on fair value accounting are more value-relevant than earnings based on historical cost accounting.

Second, under CAS 3, an entity is allowed to use the fair value method if and only if: (1) the local property market is active and (2) the fair value of an entity's investment property can be estimated reliably through values and other information of the same, or a similar, category of properties in an active market [CAS 3.10]. Under CAS 3, Chinese firms are not encouraged to use model estimates when no appropriate market quotes are available. Indeed, CAS 3 is more prudential, conservative, and restrictive regarding the fair value model. Riedl and Serafeim (2011) argue that when fair value is more reliable, it can provide fewer opportunities for earnings management because it decreases the information asymmetry between financial statement preparers and external users.

Due to two reasons above, we anticipate that the income in firms with investment properties measured by the fair value model can provide more relevant information than firms with investment properties measured by the cost model to predict an entity's future performance. We form H1 as the following:

H1: Incomes in firms with investment properties valued using the fair value model have higher predictive ability for future earnings than incomes in firms with investment properties under the cost model.

However, we need to exercise caution, as the possibility that fair value reporting for investment properties increases managerial manipulation and facilitates bad-news-hoarding behaviors, and thus decreases the predictability of future earnings, exists. Ball (2012) documents that mark-to-market (MTM) accounting increases information asymmetry relative to historical cost accounting. In addition, MTM gains and losses are difficult to forecast. Liang and Riedl (2014) find lower earnings forecast accuracy for U.K. investment property firms that report earnings using the fair value model of IFRS, in which unrealized fair value gains and losses are included in net income.

Next, for firms with investment properties valued using the fair value model, we expect that the predictability of earnings for future earnings increases with the amount of accumulated unrealized fair value gains (losses). Changes in the fair values of assets should be able to predict future earnings, if measures of fair value are reliable for valuing assets (Barth, 2000). Schipper (2007) documents that investors react more strongly to amounts recognized in financial statements than amounts disclosed in financial reports, because investors may consider the amounts recognized in financial statements as more reliable. Utilizing U.S. banking data from 1993 to 2008, Bratten et al. (2012) find that unrealized fair value gains and losses enhance the ability of earnings to predict to future earnings. Similarly, using a sample of banks from 1994 to 2008, Evans et al. (2014) evaluate the association between unrealized fair value gains and losses of investment securities and future earnings. They also provide evidence that the accumulated unrealized fair value gains and losses for investment securities of banks are associated with the future reported earnings of banks. This suggests that accumulated changes in the fair value of investment securities can affect the predictability of earnings for future performance. Thus, we form H2 as follows:

H2: In firms with investment properties valued using the fair value model, the predictive ability of earnings for future earnings increases with accumulated changes in the fair value of investment properties.

4. Research Design and Sample Collection

4.1 Research Model for Hypothesis

We follow prior studies (Altamuro and Beatty, 2010; Bratten et al., 2012) to test the predictability of earnings. Predictability is defined as the coefficient of current period earnings in a regression of future earnings on current earnings. To investigate the effect of the fair value model on the predictability of earnings, we use the following regression model:

$$IN_{i,t+1} = \beta_0 + \beta_1 IN_{it} + \beta_2 D\_FV_{it} + \beta_3 IN_{it} \times D\_FV_{it} + \delta' Control_{it} + YearDummy + \varepsilon_{i,t}. \quad (1a)$$

$$IN_{i,t+2} = \beta_0 + \beta_1 IN_{it} + \beta_2 D\_FV_{it} + \beta_3 IN_{it} \times D\_FV_{it} + \delta' Control_{it} + YearDummy + \varepsilon_{i,t}. \quad (1b)$$

$$IN_{i,t+3} = \beta_0 + \beta_1 IN_{it} + \beta_2 D\_FV_{it} + \beta_3 IN_{it} \times D\_FV_{it} + \delta' Control_{it} + YearDummy + \varepsilon_{i,t}. \quad (1c)$$

where the dependent variable is *IN*, income before taxes, calculated as income before taxes, scaled by beginning total assets; *IN* is measured one-, two-, and three-years ahead, denoted by t+1, t+2, and t+3, respectively; and *D_FV* is an indicator variable equal to 1 if the firm measures its investment properties using the fair value model, and 0 otherwise. As predictability is defined as the coefficient on current period earnings in a regression of future earnings on current earnings, our variable of interest would be the interaction term of current earnings and D_FV (i.e., $IN_{it} \times D\_FV_{it}$). This study expects the coefficient on *IN***D_FV* to be positive (i.e., $\beta_3 > 0$) if earnings under the fair value model provide incremental predictive ability of future earnings relative to earnings using the cost model to value their investment properties.

We include general control variables[4] which are documented to be related to the predictability of earnings. First, we control for the reported values of the investment properties scaled by beginning of total assets (*IP*). We also include firm size (*SIZE*) to control for the effect of the information environment, firm's leverage (*LEV)* to control for

4 We also interact all control variables with current earnings (IN) in our models. We find that the results are qualitatively similar.

the effect of leverage, and firm growth (*MB*) to control for the effect of firm growth opportunities on firms' performance (Muller, Riedl, and Sellhorn, 2008; Campbell, 2014; Yeh and Wang, 2020). In addition, this study controls for the ownership of state-owned (*STATE*), which may impact firms' performance in China. This study also controls for the use of external appraiser (*APP*), as hiring an external appraiser may affect estimates of the fair value of investment properties and influence firms' future performance. *SIZE* is measured as the log of the total assets. *MB* is the market-to-book ratio. *LEV* is measured as the debt-to-total assets ratio. *STATE* is the percentage of state-owned shares. *APP* is an indicator, a dummy variable equal to 1 if the estimate value of investment property of firm *i* is monitored by an external appraiser, and 0 otherwise. This study also includes year fixed effects. All slope coefficients of regression models are adjusted for cluster-robust standard errors and covariance (Petersen, 2009). We anticipate that *SIZE, LEV*, and *STATE* are negatively associated with future incomes.

To test H2, we employ the following models:

$$IN_{i,t+1} = \beta_0 + \beta_1 IN_{it} + \beta_2 SUM\_FV_{it} + \beta_3 IN_{it} \times SUM\_FV_{it} + \delta' Control_{it} + YearDummy + \varepsilon_{i,t}. \quad (2a)$$

$$IN_{i,t+2} = \beta_0 + \beta_1 IN_{it} + \beta_2 SUM\_FV_{it} + \beta_3 IN_{it} \times SUM\_FV_{it} + \delta' Control_{it} + YearDummy + \varepsilon_{i,t}. \quad (2b)$$

$$IN_{i,t+3} = \beta_0 + \beta_1 IN_{it} + \beta_2 SUM\_FV_{it} + \beta_3 IN_{it} \times SUM\_FV_{it} + \delta' Control_{it} + YearDummy + \varepsilon_{i,t}. \quad (2c)$$

where *SUM_FV* is the accumulated amount of fair value gains and losses divided by lagged total assets. This study expects that the coefficient on $IN_{it} \times SUM\_FV_{it}$ is positive (i.e., $\beta_3 > 0$) if the accumulated changes in the fair value of investment properties provide incremental predictive ability of future earnings under the fair value model. We include firm size (*SIZE*), firm's leverage (*LEV),* firm growth (*MB*), ownership of state-owned (*STATE*), and external appraiser (*APP*). We anticipate that *SIZE, LEV*, and *STATE* are negatively associated with future incomes.

4.2 Data Collection and Sample

This study uses a sample of Chinese real estate firms listed on China's A-shares market, which consists of 340 firm-year observations (70 real estate firms) spanning from the years 2007-2014. The sample begins with year 2007 because this is the year that China

substantially converged its accounting standards with IFRS and adopted IAS 40 *investment property* with some changes. This study focuses on the real estate industry because firms in this industry have a significant amount of investment properties. The data on whether the fair value model or the historical cost model is used by real estate firms are hand-collected from financial reports and the financial data is collected from the *Taiwan Economic Journal (TEJ)* database. To mitigate the effects of outliers on findings, this study uses the winsorization of all variables, except for dummy variables, at the top and bottom 1%. Approximately 10% of the sample firms use the fair value model, with the remainder using the historical cost model.

5. Empirical Results

5.1 Descriptive Statistics

Table 1 reports the descriptive statistics of the full sample of this study. The mean (median) of current year investment properties under the fair value model scaled by total assets, *IP*D_FV*, is 0.018 (0.000). This suggests that most of the real estate firms use the cost model to measure their investment properties. The mean (median) of income before taxes scaled by beginning total assets, *IN,* in year *t+1*, *t+2*, and *t+3* are 0.068 (0.053), 0.077 (0.056), and 0.107 (0.074), respectively. The mean of state-owned shares (*STATE*) is 0.155. The mean of accumulated changes in the fair value of investment properties scaled

Table 1 Descriptive Statistics (N=340)

Variable Name	Mean	Median	Max	Min	Std. Dev.
IN_t	0.053	0.045	0.372	-0.081	0.052
IN_{t+1}	0.068	0.053	1.255	-0.067	0.123
IN_{t+2}	0.077	0.056	1.219	-0.060	0.131
IN_{t+3}	0.107	0.074	1.630	-0.091	0.181
IP	0.107	0.065	0.869	0.001	0.145
*IP*D_FV*	0.018	0.000	0.706	0.000	0.089
SIZE	6.700	6.709	8.110	5.647	0.524
MB	3.662	2.809	17.656	0.903	2.828
LEV	0.594	0.625	0.939	0.143	0.155
STATE	0.155	0.000	0.798	0.000	0.233
SUM_FV	0.002	0.000	0.484	-0.004	0.026
APP	0.035	0.000	1.000	0.000	0.184

Note: All variables are as described in Appendix A.

by total assets, *SUM_FV*, is 0.002. 3.5% of firms have their investment properties monitored by an external appraiser (*APP*), suggesting that few companies hire external appraisers to monitor the fair value of investment properties.

Table 2 presents the Pearson correlations and the Spearman rank correlations between the test variables. Based on Pearson correlations, IN_t has a positive and significant correlation with IN_{t+1} (0.523), IN_{t+2} (0.440), and IN_{t+3} (0.275). *IP*D_FV* has a positive and significant correlation with IN_{t+1} (0.230), IN_{t+2} (0.213), and IN_{t+3} (0.316). The correlations are as predicted for H1. *SUM_FV* has a positive and significant correlation with IN_{t+1} (0.516), IN_{t+2} (0.463), and IN_{t+3} (0.455). The correlations are as predicted for H2. In general, under the Spearman rank correlations, the signs are the same as the Pearson correlations, but *IP*D_FV* and *SUM_FV* do not have significant correlations with IN_{t+1}, IN_{t+2}, and IN_{t+3}.

5.2 Regression Results

Table 3 presents the regression results from estimates of equation (1), which measure the incremental predictability of the fair value model on future earnings. Columns (1), (2), and (3) of Table 3 show findings on the firm's future performance defined as one-year-ahead, two-years-ahead, and three-years-ahead of income, respectively.

Table 3 shows that the coefficient on incomes measured under the fair value model, *IN*D_FV*, is significantly positive for the one-year-ahead income, two-years-ahead income, and three-years-ahead income. These results indicate that incomes in firms with investment property measured by the fair value model generate higher predictability than firms measured with the cost method. These findings, therefore, support H1.

Table 4 reports that the coefficient on accumulated changes in the fair value of investment properties, *SUM_FV*D_FV*, is significantly associated with one-year-ahead income, two-years-ahead income, and three-years-ahead income. These results corroborate our earlier findings that investment property measured by the fair value model generates a higher predictability of future income than investment properties measured by the cost model, and recognition that changes in the fair value of investment properties can positively affect the predictability of current earnings for future incomes.

Table 2 Pearson Correlations (Upper Diagonal) and Spearman Correlations (Lower Diagonal) (N=340)

	IN	*IN+1*	*IN+2*	*IN+3*	*IP*	*IP*D_FV*	*SIZE*	*MB*	*LEV*	*APP*	*STATE*	*SUM_FV*
IN	1	0.523**	0.440**	0.275**	0.077	0.147**	-0.043	-0.150**	-0.136*	-0.053	0.042	0.324**
IN+1	0.547**	1	0.898**	0.617**	0.121*	0.230**	-0.141**	-0.023	-0.013	-0.026	0.022	0.516**
IN+2	0.441**	0.674**	1	0.679**	0.118*	0.213**	-0.134*	-0.037	-0.010	-0.058	0.021	0.463**
IN+3	0.385**	0.533**	0.720**	1	0.169**	0.316**	-0.053	-0.046	-0.071	-0.058	0.001	0.455**
IP	0.098	-0.048	0.010	-0.050	1	0.546**	-0.224**	-0.030	-0.272**	0.185**	0.044	0.317**
*IP*D_FV*	-0.021	0.023	0.018	0.063	0.113*	1	-0.025	-0.055	-0.129*	0.489**	-0.110*	0.495**
SIZE	0.073	0.106	0.134*	0.207**	-0.207**	0.140**	1	-0.427**	0.419**	0.016	0.034	-0.078
MB	-0.027	0.033	-0.035	-0.062	-0.042	-0.130*	-0.458**	1	0.118*	-0.003	0.020	-0.066
LEV	-0.145**	-0.037	-0.035	-0.015	-0.219**	-0.034	0.390**	0.064	1	-0.044	0.052	0.092
APP	-0.048	-0.042	-0.104	-0.093	0.110**	0.591**	0.020	0.076	-0.040	1	-0.118*	0.030
STATE	0.042	0.112*	0.205**	0.184**	0.106	-0.126**	0.021	0.138*	0.085	-0.144**	1	-0.054
SUM_FV	0.005	0.064	0.016	0.034	0.085	0.762**	0.117*	-0.090	0.000	0.400**	-0.176**	1

Note: All variables are as described in Appendix A.

* and ** indicate statistical significance at less than the 5% and 1% level, respectively (two-tailed).

Table 3 Earnings Predictability for the Fair Value Model and the Cost Model

Future income as a dependent variable

	(1) One-year-ahead		(2) Two-years-ahead		(3) Three-years-ahead	
Variable	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	0.15	1.84*	0.27	1.75	0.21	1.23
IN	0.89	2.78***	0.68	2.68***	0.23	2.12***
D_PV	-0.005	-0.45	0.07	0.41	0.03	0.29
IN*D_FV	**0.27**	**2.21****	**0.29**	**1.97***	**0.36**	**2.57*****
IP	-0.02	-0.28	-0.01	-0.24	-0.04	-0.15
SIZE	-0.05	-2.18**	-0.05	-2.04**	-0.02	-0.60
MB	-0.002	-0.78	-0.004	-1.54	-0.003	-0.95
LEV	0.14	1.17	0.15	1.33	0.04	0.27
STATE	-0.13	-1.89*	-0.15	-2.11*	-0.14	-1.91*
APP	-0.06	-1.36	-0.12	-2.45**	-0.25	-3.07***
YEAR/INDUSTRY	Included		Included		Included	
N	340		340		340	
Adj R^2	0.44		0.38		0.40	

Note: All variables are as described in Appendix A.

*, **, *** indicate statistical significance at less than the 10%, 5%, and 1% level, respectively (two-tailed).

Table 4 Earnings Predictability for Cost and Accumulated Changes in Fair Value of Investment Properties

Future income as a dependent variable

	(4) One-year-ahead		(5) Two-years-ahead		(6) Three-years-ahead	
Variable	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	0.16	1.50	0.21	1.34	0.06	0.26
IN	0.91	2.41***	0.75	2.23***	0.42	2.34***
SUM_FV	1.84	2.89***	1.56	2.75***	2.64	3.20***
IN*SUM_FV	**0.25**	**1.98***	**0.35**	**2.15****	**0.21**	**2.04****
IP	-0.04	-0.45	-0.02	-0.77	-0.04	-0.14
SIZE	-0.05	-2.18**	-0.05	-2.04**	-0.02	-0.60
MB	-0.002	-0.78	-0.004	-1.54	-0.003	-0.95
LEV	0.14	1.17	0.15	1.33	0.04	0.27
STATE	-0.11	-1.94*	-0.14	-2.08*	-0.19	-2.06*
APP	-0.06	-1.36	-0.12	-2.45**	-0.25	-3.07***
YEAR/INDUSTRY	Included		Included		Included	
N	340		340		340	
Adj R^2	0.45		0.38		0.40	

Note: All variables are as described in Appendix A.

*, **, *** indicate statistical significance at less than the 10%, 5%, and 1% level, respectively (two-tailed).

6. Additional Analyses

6.1 Self-selection Bias

CAS 3 mandates that firms can choose the fair value model if and only if the local property market is active, and the fair value of an entity's investment property can be estimated reliably. This means that not all firms can voluntarily switch to the fair value model. However, a self-selection concern remains because managers are allowed to select the fair value or historical cost method for investment property when the fair value information of the investment property is reliable. To mitigate endogenous issues that may lead to biased ordinary least squares (OLS) estimates, we employ a propensity-score matching as a robustness check. This nonparametric matching technique facilitates causal inference in non-experimental settings by constructing a control group of firms using the fair value model that is similar to a treatment group of firms using the historical cost model (Rosenbaum and Rubin, 1983; Rosenbaum, 2002).

In the first stage, we estimate a probit model, in which a fair value choice is a dependent variable and determinants of fair value choice are independent variables. The determinants that we use in the first stage of the probit regression are firm size, firm leverage, growth, intensity of investment properties, proportion of institutional investors, proportion of independent directors, whether firms are audited by Big 4 auditors, and whether firms are cross-listed on the Hong Kong stock exchange. The first stage model is shown below.

$$\begin{aligned} Prob(D\_FV_{it} = 1) = Probit(&\beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 MB_{it} + \beta_4 IP_{it} + \beta_5 INST_{it} \\ &+ \beta_6 INDE_{it} + \beta_7 BIG4_{it} + \beta_8 HK\_LIST_{it} + YearDummy + \varepsilon_{i,t}). \end{aligned} \quad (3)$$

where D_FV_{it} is the dependent variable, an indicator variable which equals 1 if firm i selects the fair value model at year t, and 0 otherwise. $SIZE_{it}$ is measured as the log of the total assets of firm i; LEV_{it} is measured as the debt-to-total assets ratio of firm i. MB_{it} is measured by the market-to-book ratio of firm i. IP is measured as the investment properties scaled by total assets of firm i in year t; $INST_{it}$ is the proportion of institutional investors of firm i. $INDE_{it}$ is the proportion of independent directors on the board of firm i. $BIG4_{it}$ is an indicator which equals 1 if firm i is audited by a Big 4 audit firm in year t, and 0 otherwise; and HK_LIST_{it} is an indicator which equals 1 if firm i is cross-listed on the Hong Kong stock exchange in year t, and 0 otherwise.

The results of the probit model are reported in Table 5. Table 5 shows that firms using fair value for investment properties have higher leverage, have more institutional investors, have a greater amount of investment property, are more likely to be audited by a Big 4 auditing firm, and are more likely to be listed on the Hong Kong stock exchange. We then match each historical-cost-model firm to one fair-value-model firm in the same year by the nearest propensity score, where we use a 1% caliper distance of propensity score. We evaluate the covariate balance between the two groups to ensure that the differences in the means and medians of variables related to firm characteristics are not significant. The results of the second stage are presented in Table 6. The main results are qualitatively similar.

Table 5 Determination of Using the Fair Value Model

$Prob(D\_FV_{it} = 1) = Probit(\beta_0 + \beta_1 SIZE_{it} + \beta_2 LEV_{it} + \beta_3 MB_{it} + \beta_4 IP_{it} + \beta_5 INST_{it} + \beta_6 INDE_{it} + \beta_7 BIG4_{it} + \beta_8 HK\_LIST_{it} + YearDummy + \varepsilon_{i,t})$

	Coefficient	*z*-statistic
Intercept	-3.357	(-4.25) ***
SIZE	0.072	(1.54)
LEV	0.004	(2.28)**
MB	0.000	(0.11)
IP	2.73	(7.09) ***
INST	0.653	(2.49)**
INDE	-0.188	(-0.27)
BIG4	0.108	(1.90)*
HK_LIST	0.213	(1.94)*
Pseudo R^2	0.189	

Note: All variables are defined in Appendix A. The *z*-statistics reported in parentheses are based on standard.

Errors clustered by both firm and year. Here, * indicates $p < 0.05$, ** indicates $p < 0.01$, and *** indicates $p < 0.001$.

Table 6 Match Sample: Earnings Predictability for the Fair Value Model and the Cost Model

Future income as a dependent variable

	(7) One-year-ahead		(8) Two-years-ahead		(9) Three-years-ahead	
Variable	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	1.03	1.58	1.27	1.91*	1.85	2.15**
IN	1.38	2.33**	1.29	2.15**	0.94	1.23
D_PV	-0.05	-0.34	-0.012	-0.22	-0.05	-0.31
IN*D_FV	**0.30**	**2.34****	**0.25**	**2.21****	**0.27**	**2.15****
IP	-0.44	-0.89	-0.51	-1.00	-0.71	-1.08
SIZE	-0.17	-2.11**	-0.19	-2.41**	-0.23	-2.19**
MB	0.01	0.63	0.002	0.16	-0.0002	-0.01
LEV	0.02	0.05	0.04	0.09	-0.09	-0.17
STATE	-0.13	-1.87*	-0.15	-2.18*	-0.14	-1.89*
APP	-0.11	-1.71*	-0.16	-2.30**	-0.29	-3.17***
Adj R^2	0.45		0.39		0.40	

Note: All variables are as described in Appendix A.

*, **, *** indicate statistical significance at less than the 10%, 5%, and 1% level, respectively (two-tailed).

Table 7 Match Sample: Earnings Predictability for Cost and Accumulated Changes in the Fair Value of Investment Properties

Future income as a dependent variable

	(10) One-year-ahead		(11) Two-years-ahead		(12) Three-years-ahead	
Variable	Coefficient	*t*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
Intercept	0.62	1.52	0.89	1.85	1.15	1.79
IN	0.22	0.48	0.26	0.51	-0.30	-0.42
SUM_FV	4.26	2.62***	3.86	2.39**	4.24	1.94*
IN*SUM_FV	**0.22**	**2.34***	**0.31**	**2.45****	**0.28**	**2.29****
IP	-0.39	-1.40	-0.37	-1.32	-0.13	-0.34
SIZE	-0.04	-1.28	-0.08	-1.66	-0.06	-0.88
MB	0.03	1.63	0.02	0.99	0.02	0.98
LEV	-0.65	-1.37	-0.56	-1.21	-0.92	-1.50
STATE	-0.22	-1.87*	-0.25	-2.15*	-0.24	-1.89*
APP	-0.06	-1.36	-0.12	-2.45**	-0.25	-3.07***
Adj R^2	0.45		0.40		0.42	

Note: All variables are as described in Appendix A.

*, **, *** indicate statistical significance at less than the 10%, 5%, and 1% level, respectively (two-tailed).

6.2 Value Relevance Test

To obtain additional insights from our main results, we employ the Ohlson (1995) model to test whether the fair value of investment property provides incremental explanatory power over the cost model. This model is similar to the model used by He, Wong, and Young (2012).[5] The model tests the value-relevance of gains and losses from changes in the fair value of investment property and the fair value of investment property.

$$P_{it} = \beta_0 + \beta_1 NI_{it} + \beta_2 BV_{it} + \beta_3 D\_FV_{it} + \beta_4 NI_{it} \times D\_FV_{it} + \beta_5 BV_{it} \times D\_FV_{it} + \beta_6 SIZE_{it} + YearDummy + \varepsilon_{i,t}. \quad (4)$$

where P_{it} is the share price as of four months after the fiscal year-end in year t for firm i, NI_{it} represents earnings per share, BV_{it} is net assets per share all of the variables are on a per-share basis, and $SIZE_{it}$ is measured as the log of the total assets of firm *i*. We expect the coefficient of D_FV_{it} in equation (4) to be positive and significant if investors consider income and book value under the fair value model to be value-relevant. Untabulated results show that the coefficients on $NI_{it} \times D\_FV_{it}$ and $BV_{it} \times D\_FV$ are both positive and significant at the 1% level. This indicates that accounting information in firms adopting the fair value of investment property provides more incremental informational content than earnings in firms adopting the cost model.

7. Conclusion

This study examines whether using the fair value model to report financial performance provides incremental predictive ability for future performance beyond historical cost. More specifically, we test whether or not reporting fair values of investment properties on balance sheets using fair market value has any incremental predictive value for future earnings over the historical cost model. We also test if reporting the changes in market values of investment properties in income statements has any incremental predictive value for future earnings over the historical cost model.

5 Our specification differs from He, Wong, and Young (2012), in that we divide the book value of equity into two components: the value investment property under the cost model and the fair value model, and the book values of equity excluding the value of investment property.

IASB introduced the fair value model to account for investment properties by issuing IAS 40 *investment property*, which permits managers to use either the fair value or the historical cost model to report the values of investment properties on balance sheets and incorporate changes in fair values in income statements. This study uses non-financial assets, i.e., investment properties, to directly test the predictive ability of fair value versus historical cost accounting for future performance. Most prior research in this area uses financial assets.

Using a sample of real estate firms listed on China's A-shares market during the period 2007-2014, this study finds that incomes in firms reporting fair values of investment properties provide incremental predictive ability for future income beyond incomes in firms reporting historical cost. In particular, our findings indicate that investment property measured by the fair value model generates a higher predictability for three-years-ahead income than that for two-years-ahead income and one-year-ahead income, since managers may sell the investment properties of firms as the aggregation period lengthens. This study also demonstrates that accumulated changes in fair value gains and losses of investment properties are positively associated with the predictability of current earnings under the fair value model for firms' future income. The results suggest that the recognition of fair value gains and losses of investment property in income can predict a firm's future performance. This study provides evidence that non-financial assets measured using the fair value model provides incremental predictive ability for future performance beyond historical cost.

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Appendix A
Variable Definitions

Variable	Definitions
IN	income before taxes is calculated as income before taxes, scaled by lagged total assets for period t, t+1, and t+2
D_FV	a dummy variable that equals 1 if the firm measures its investment properties based on the fair value model, and 0 otherwise
IP	the value of investment property scaled by lagged total assets
SIZE	log of total assets
LEV	the debt-to-total assets ratio, a dummy variable equals 1 if the firm *i* debt ratio in the year *t* is more than the median of the sample firms, and 0 otherwise
MB	ratio of the market value of equity-to-book value of equity
STATE	percentage of state-owned shares
APP	a dummy variable equal to 1 if the estimate value of investment property of firm *i* is monitored by an external appraiser, and 0 otherwise
SUM_FV	accumulated changes in the fair value of investment properties
INST	percentage of shares held by institutional investors
INDE	percentage of independent directors on the board
BIG4	an indicator equal to 1 if the firm is audited by a Big 4 CPA firm, and 0 otherwise
HK_LIST	an indicator variable equal to 1 if firm *i* is cross-listed on the Hong Kong stock exchange at year *t*, and 0 otherwise

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