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A Study of Asset Revaluations by Listed Companies in Hong Kong

A Thesis

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ABSTRACT

Abstract of thesis entitled 'A Study of Asset Revaluations by Listed Companies in Hong Kong"
submitted by Tse Yim Sheung
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This study sets out to identify the financial characteristics of companies that revalue assets and investigates whether there is a relation between asset revaluations and share market reactions. Finally, it aims to examine the association between asset revaluations and future firm performance. There are in total 526 listed companies (2,445 firm-year observations) in the final sample. The study covers five year's data from 1994 to 1998.

Consistent with prior studies in Australia, I find that companies are more likely to revalue their assets when their leverage is high and their cash flows from operations are in decline. In addition, large and profitable companies and companies with a higher proportion of fixed assets are also more likely to undertake asset revaluations. The study reveals that there is a positive and significant association between upward asset revaluations and the Hang Seng Properties Price Index. Finally, companies in the

property industry are more likely to state their fixed assets at open market value than at historical cost.

The study also provides strong evidence that asset revaluations are value relevant to investors for making decisions. The results reveal that there is a significant and positive relation between asset revaluations and share prices. Generally, companies revaluing their assets at the time when the value of the assets change. Asset revaluations are significantly and positively associated with annual stock returns.

Another important finding shows that there is a significant and positive relation between current year asset revaluations and future changes in operating income. I cannot, however, find a significant association between asset revaluations and another proxy for future firm performance which is measured by future change in cash flows from operations.

The study concludes that the major financial characteristics for companies undertaking asset revaluations are high leverage, lower cash flows from operations, high profitability, and high fixed asset intensity. Asset revaluations are value relevant and they are positively related to the future firm operating performance.

ACKNOWLEDGEMENTS

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I. INTRODUCTION

1.1. Motivations

Revaluations of fixed assets in companies' Balance Sheets is a common practice in Hong Kong. This is because there is often a material difference between the historical cost and open market value of the assets. In particular, the market value of properties (land and buildings) often vastly exceeds historical cost. Although many companies periodically revalue properties, other firms refrain from revaluation. Why some companies revalue while others do not, is one question addressed in this thesis.

No studies have been conducted on asset revaluations in Hong Kong. Thus, this research can make a contribution to the literature. A number of studies have been conducted in Australia, New Zealand, the United Kingdom and Singapore. Asset revaluations are allowed in the above countries. Few studies have been conducted in the United States because asset revaluations are not allowed. As the legislative framework on asset revaluations and the economic environment differ somewhat from that in Hong Kong, the results of other countries' research cannot be automatically imputed to Hong Kong. Hence, it is necessary to conduct this research.

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1.2. Objectives

This paper seeks to examine empirically asset revaluations in Hong Kong Listed Companies. According to the Hong Kong Statement of Standard Accounting Practice 17 'Property, plant and equipment', 'property, plant and equipment' can be either stated at historical cost or at fair market value. This practice is also allowed in many other countries such as Australia, New Zealand, Singapore and the United Kingdom. However, this practice is prohibited in the United States. Hong Kong listed companies have been given the flexibility of choosing whether to revalue assets.

The first objective is to identify the financial characteristics of companies that revalue assets. It aims to explain a company's decision to revalue assets. The second objective attempts to study the relationship between asset revaluations and share market reactions. It aims to explain whether asset revaluations are value relevant to investors. The final objective seeks to identify the relation between asset revaluations and future firm operating performance. It aims to test whether current year asset revaluations explain the changes in future firm operating performance.

II. THE LEGISLATIVE FRAMEWORK OF ASSET REVALUATIONS

Several countries such as Hong Kong, the United Kingdom, Australia, New Zealand and Singapore are allowed to make asset revaluations. The requirements of the Hong Kong Statement of Standard Accounting Practice (HKSSAP), the Companies Ordinance and the Code on Takeovers and Mergers on asset revaluations will be described and the comparisons of the accounting standards among different countries will be made.

2.1. The Legislative Framework of Asset Revaluations in Hong Kong

2.1.1. HKSSAP 17 'Property, plant and equipment' on asset revaluations

The Hong Kong Society of Accountants (HKSA) is the only statutory licensing body of accountants in Hong Kong. It is responsible for drafting and setting accounting standards. Accounting standards, HKSSAPs, are a major source of authority for accountants, covering the major areas of accounting controversy.

In July 1995, the HKSA issued HKSSAP 17, dealing with the accounting for property, plant and equipment. The standard

superseded HKSSAP 6 'Depreciation accounting'. Property, plant and equipment are tangible assets that are held by an enterprise for use in the production or supply of goods and services, for rental to others, or for administrative purposes. They should be used for more than one period. HKSSAP 17 allows two different methods of determining the carrying amount of 'property, plant and equipment' (PPE) in the balance sheet. They are

- Historical cost basis: the carrying amount of PPE at its cost less accumulated depreciation and

- Revaluation basis: the carrying amount of PPE at its fair value at the date of revaluation, less any subsequent accumulated depreciation.

(a) The Basis of Valuation

Land and buildings are commonly revalued in Hong Kong while revaluations of plant and equipment are comparatively rare. The basis of valuation in revaluing land and buildings is guided by the Hong Kong Guidance Notes on the Valuation of Property Assets which is published by the Royal Institution of Chartered Surveyors (Hong Kong Branch) and the Hong Kong Institute of Surveyors. One of the bases of valuation is the open market value for existing use which is supported by HKSSAP 17 (33). It is an estimate of open market value which takes account of evidence of open market

transactions in similar properties which have the same or similar purposes. The second market basis is market value for alternative use. It is an estimate of open market value which takes account of evidence of open market transactions in similar properties but which reflects its prospective use for other purposes. The third valuation basis is depreciated replacement cost. This requires an estimate of the open market value of the land for the existing use and an estimate of the new replacement cost[1] of the building.

HKSSAP 17 (32) states that the fair value of plant and equipment is usually the market value which is normally determined by professionally qualified valuers. However, it is not usually practical to establish the market value for plant and equipment because these items are rarely sold. Thus, they are normally valued at their depreciated replacement cost unless they use the historical cost.

(b) Accounting Treatments of HKSSAP 17

Treatment of surplus or deficit arising on revaluations: HKSSAP 17 (39) deals with the treatment of the revaluation surplus. When the carrying amount of an asset is increased as a result of a

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[1] Replacement cost is the estimated amount that would have to be paid to replace the asset at the date of valuation.

revaluation, the difference between the fair value at the date of revaluation and the net book value at that date will be credited directly to the revaluation reserve. However, if an upward revaluation reverses a previously recognized expense due to previous downward revaluations, the revaluation increase of the same assets will be recognized as income in the profit and loss account. HKSSAP 17 (40) deals with the treatment of a deficit revaluation. When the carrying amount of an asset decreases as a result of a revaluation, the decrease should be recognized as an expense in the profit and loss account; or if there is revaluation reserve for the same asset previously, the decrease should be directly debited to the revaluation reserve. However, the decrease amount cannot exceed the amount held in the revaluation reserve in respect of that same asset.

Disclosure requirements on asset revaluations: If asset revaluations take place, a company is required to disclose

- the basis of valuation;
- the effective date of the revaluations;
- the names and qualifications of persons making the revaluations;
- whether the valuer was independent of or connected to the enterprise concerned;
- the nature of any indices used to determine replacement cost; and
- the amount of the revaluation reserve.

As mentioned previously, HKSSAP 17 superseded HKSSAP 6. This resulted in several significant changes of existing accounting practices. These are:

- Disposal of revalued asset: HKSSAP 17 (41) requires that when the revalued asset is disposed of, the amount of revaluation reserve relating to that asset will be transferred to the retained earnings, not the profit and loss account.

- Revaluing an entire class of assets: HKSSAP 17 (36) requires that when an item of PPE is revalued, the entire class of assets will be revalued. A class is defined as a category of fixed assets being similar in nature or function in the operation of the entity. The revaluation of an entire class of assets aims to avoid selective revaluation of assets and the reporting of amounts in the balance sheet which are a mixture of the cost basis and the revaluation basis.

- Frequency of revaluation: HKSSAP 17 (30) requires that if the revaluation basis is adopted, revaluations will be made with sufficient regularity. This is because the carrying amount of the asset should not differ materially from the fair market value of that asset at the balance sheet date.

- Transitional relief: HKSSAP 17 (72) provides a transitional relief for the requirements of revaluing assets on regular basis and for the entire class of assets to be revalued. Enterprises which have

revalued their PPE during accounting periods ending before 30 September, 1995 are exempted from the above requirements even if their carrying amounts are materially different from their fair value.

- Depreciation on Land: HKSSAP 17 (46) no longer allows leasehold land with unexpired terms of not less than 50 years to be exempted from depreciation which is the case under the old SSAP 6. Depreciation is also charged on leasehold land of less than 50 years (SSAP 6 and SSAP 17).

2.1.2. HKSSAP 13 'Investment Properties' on asset revaluations

HKSSAP 13 was issued in 1987. It deals with the accounting for investment properties. Investment property is an interest in land or buildings in respect of which construction work and development have been completed, and which is held for its investment potential, any rental income being negotiated at arm's length. If the property is let to and occupied by another company in the same group, the property should not be regarded as an investment property. A property or part of a property, which is owned or occupied by the company for its own use, is also not regarded as an investment property. However, if the area or value of portion of property is 15% or less owned or occupied by a company or a subsidiary, it should be regarded as an investment property.

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(a) Accounting Treatments of HKSSAP 13

In general, investment properties should be valued at open market value except where the unexpired term of the lease is 20 years or less.

The treatment on surplus or deficit arising on revaluations: HKSSAP 13 (17) The revaluation surplus will be credited to investment property revaluation reserve. The revaluation deficit will be debited to investment property revaluation reserve if there is an existing balance on investment property revaluation reserve for the same portfolio. Otherwise, the revaluation deficit will be transferred to the profit and loss account and recognized as an expense.

Disclosure requirements on asset revaluations: HKSSAP 13 (21) The following items are required to be disclosed:

- The carrying amount of investment properties;

- Movements on investment property revaluation reserve during the year and the balance at the end of the year;

- Any deficit on revaluation debited to the profit and loss account;

- The names of the valuers and their qualifications and

- The bases of valuation used.

Revaluations: HKSSAP 13 (8) requires that the investment property should be revalued annually by a professional valuer with related experience and at least every three years by an external professional valuer.

No depreciation: HKSSAP 13 (9) requires that investment property is not subject to depreciation except when the expired term of investment property is 20 years or less. If the investment property is not charged for depreciation, it should be stated at open market value in the balance sheet.

2.1.3. The Companies Ordinance (Chapter 32) on asset revaluations

The Hong Kong Companies Ordinance contains the laws which relate to registered companies. The Companies Ordinance (The Tenth Schedule) requires that companies disclose the following items in the annual report:

- Disclosure of fixed assets at cost or valuation;

- The accumulated depreciation;

- The year in which fixed assets have been revalued;

- The basis of valuation; and

- The name of the valuer and his qualifications.

2.1.4. The Code on Takeovers and Mergers on asset revaluations

The Code on Takeovers and Mergers is issued by the Securities and Futures Commission. It aims to afford fair treatment for shareholders that are affected by takeover and merger transactions. Rule 11 deals with the asset valuations under takeovers and mergers. It includes:

- Disclosure of revaluations: when an asset is revalued in connection with a takeover or merger offer, the valuation must be included in the offer document or other documents which are circulated to the shareholders of the offeree company by its board.

- Revaluations: The revaluations must be carried out or confirmed by an independent, professionally qualified valuer or other expert. The basis of valuation must be clearly stated. Selective revaluations of assets are not acceptable unless the offeree board accepts those are special circumstances.

2.2. Comparisons of the legislative framework of asset revaluations across Hong Kong, Singapore, New Zealand, the United Kingdom, Australia and the United States

The accounting treatments on asset revaluations are similar among Hong Kong, Singapore, New Zealand, the United Kingdom and Australia; the United States is an exception. This similarity is due to the United Kingdom practices. Other countries such as Hong Kong, Singapore, New Zealand and Australia followed Britain. There are only minor differences among the different accounting standards on asset revaluations in Hong Kong, Singapore, New Zealand, the United Kingdom and Australia.

Asset revaluation is allowed in Hong Kong, Singapore, New Zealand, the United Kingdom, and Australia whereas it is prohibited in the United States. In Hong Kong, Singapore, New Zealand, the United Kingdom and Australia, companies are required to revalue the entire class of assets when asset revaluation takes place. Individual assets cannot be selectively revalued. The treatments on surplus and deficit arising on revaluation are similar in those countries. When the carrying amount of assets increases due to the revaluations, the surplus will be credited to the revaluation reserve. If the carrying amount of assets decreases due to the downward

revaluations, the deficit will be debited to profit and loss account as an expense unless there is a credit on the revaluation reserve.

There are only slight differences on the treatment on disposal of revalued assets among different countries. When a revalued asset is sold, the revaluation reserve of that asset will be transferred to retained earnings in Hong Kong, Australia and New Zealand. In the United Kingdom and Singapore, they are allowed to transfer that amount to either retained earnings or current year profit and loss account. Table 1 summarizes the accounting rules in Hong Kong, Singapore, New Zealand, the United Kingdom, Australia and the United States.

III. LITERATURE REVIEW

According to the accounting regulations in many countries such as Australia (AAS10), the United Kingdom (SSAP 12), Singapore (SAS 4) and the New Zealand (SSAP 3 and SSAP 28), companies are allowed to revalue their fixed assets. Prior studies have investigated possible reasons managers had to revalue assets and examined the association between asset revaluations and market reactions. Few researchers have studied the relationship between asset revaluations and future performance of companies.

3.1. The motivations for asset revaluations

The first influential study was by Brown, Izan and Loh (1992). They attempted to explain why Australian companies revalue their fixed assets upwards and the timing of revaluing assets. Their study did not address the issue of downward asset revaluations. Two random samples of 204 companies and 206 companies were selected for the 1974-1977, a high inflation period, and 1984-1986, a low inflation period, respectively. They hypothesized that higher leverage companies and firms closer to violating their debt covenant constraints were more likely to revalue their fixed assets upwards. This is because upward asset revaluations increase the book value of equity and reduce the gearing. As the debt to equity ratio is

commonly used in debt contract arrangements, lowering the gearing by revaluing fixed assets upwards can loosen the debt covenant restriction. The results were consistent with the hypotheses. Based on the Mann-Whitney U-test, there were statistically significant differences in the means of debt to tangible assets ratio and debt proximity ratio[2] at the 0.01 level in the samples from 1974-1977 and 1984-1986. The findings based on a probit analysis also strongly supported the hypothesis. They revealed that the variable of debt to total tangible assets was statistically significant at the 0.05 level in both periods whereas the variable of debt proximity ratio was statistically significant at the 0.01 level in the sample from 1984-1986. They found that higher proportions of revaluers had restrictive debt covenants than non-revaluers in both sample periods.

Another factor in the decision to revalue assets is the level of what are called political costs. They stated that when larger firms reported high profits, it was more likely to be noticed by regulators who may respond with new taxes or other new regulations. Under such circumstances, larger firms were more likely to revalue than

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[2] Debt proximity ratio is defined as the ratio of debt to total tangible assets divided by the debt constraint of the type of debt in place. They assumed the constraint to be whichever is the most binding: 60, 75, or 80 per cent of the total tangible assets for debentures, convertible notes and unsecured notes respectively. These thresholds were based on the findings of Whittred and Zimmer (1986).

smaller firms to lower their reported earnings and therefore reduce political cost. The reported earnings were reduced due to the increase in depreciation which was based on the revalued amounts. The results provided strong evidence to support this hypothesis. They showed that revaluers were significantly larger in size at the 0.01 level based on the Mann-Whitney U-test and the probit analysis in both sample periods.

Another hypothesis was that companies with greater growth prospects were more likely to revalue because they could more easily borrow funds to finance the growth after reducing leverage. Both the P/E ratio and the rate of growth of assets were proxies for the growth prospects of a company. Based on the Mann-Whitney U test, revaluers had significantly higher P/E ratios and higher growth rates of assets at the 0.05 level in the sample from 1984-1986 while no significant difference was found in the sample from 1974-1977. The probit analysis gave the same results as the Mann-Whitney U-test.

It was also hypothesized that firms which declared bonus issues or stock dividends were more likely to revalue because a bonus issue enabled a company to increase its dividend. The empirical results were consistent with the hypothesis. They revealed that revaluers declared bonus issues and the results were

statistically significant at the 0.01 level in both periods in the probit analysis. Another hypothesis was that firms were more likely to revalue fixed assets upwards when they received a takeover bid. This was because asset revaluations can signal the value of target firm's assets to the outsiders and can help avoid an underpriced bid (Casey and Eddey (1986)).[3] The findings of Brown et al. (1992) supported the hypothesis that revaluations were associated with takeover bids and the results were statistically significant at the 0.05 level in both sample periods. They drew the conclusion that firms which were highly levered, closer to violating their debt covenant constraints, larger, declared bonus issues and received a takeover bid were more likely to revalue fixed assets upwards.

Another empirical study was performed by Whittred and Chan (1992). They aimed to test whether upward asset revaluations provided a low-cost mechanism for reducing the problem of under-investment[4]. The study claimed that firms existing underinvestment problems are characterized by the existence of borrowing limitations,

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[3] In the study of Casey and Eddey (1986), 71% of target companies in Australia attempted to disclose favourable information as a takeover defense. This included a release by a target company of a profit forecast, a statement of asset market values or other information.

[4] Generally, value added from positive net present value (NPV) investments are shared between bondholders and shareholders. However, if more of the gains from positive NPV investments are captured by bondholders than shareholders, shareholders may not want to contribute additional capital even there is a positive NPV investment. This is called under-investment (Pinches (1996)).

an increase in financial leverage and growth opportunities and a reduction in cash reserves. The sample consisted of 200 companies from the industrial list of the Australian Stock Exchange for each of the five years, 1980-1984, excluding banks, finance and insurance companies. The sample was divided into two groups which were an experimental group and a control group. 160 observations for revaluers in the experimental group and 496 observations for non-revaluers in the control group were analyzed. In sum, there were 656 observations in the final sample.

They hypothesized that revaluations were positively associated with the existence of borrowing limitations, financial leverage, and the value of growth opportunities. The background reasons of these hypotheses were mentioned in the previous study, Brown et al. (1992). An additional hypothesis in the study of Whittred and Chan (1992) was that asset revaluations were negatively associated with cash retention. This is because low cash retention implies that firms have fewer degrees of freedom to respond to changes in their investment opportunity sets. Firms are more likely to revalue fixed assets upwards to increase borrowing capacity. The results showed that firms had significantly higher borrowing limitations (the variable was coded as 1 if firms had non-zero dollar value in debentures, unsecured and convertible notes, 0 otherwise), higher financial

leverage (measured as total liabilities to total tangible assets) and more growth opportunity (measured as market to book ratio) in the year of revaluation than in the year preceding revaluation at the 0.01 level. However, the proxy for cash reserves (Book value of cash and marketable securities to total assets) exhibited an insignificant decrease in the revaluation year. By using the Mann-Whitney U test to make comparisons with the experimental group and the benchmark, revaluers had significantly higher borrowing limitations, more growth opportunities and lower cash reserves than non-revaluers at the 0.01 level. The results of probit analysis had found support for the hypotheses.

Cotter and Zimmer (1995) investigated whether asset revaluations were undertaken when firms experienced declining cash flows from operations. They also examined whether asset revaluations coincided with increases in levels of secured borrowing due to lenders' demands for current values of assets offered as collateral. The sample comprised 100 firms including 31 for revaluers and 69 for non-revaluers randomly selected from data supplied by Whittred and Chan (1992).

Cotter and Zimmer (1995) mentioned that the existing leverage and the ability of repayment which included future cash flows and

current cash flows determined the borrowing capacity in the context of both public and private debt. An undervaluation of assets does not reduce the borrowing capacity if cash flows from operations are enough to repay further debt. However, if cash flows from operations decline and indicate possible problems in servicing further debt, firms are more likely to reduce credit risk by revaluing undervalued assets. This is because asset revaluations can be used to increase borrowing capacity and allow a firm to take advantage of new investment opportunities. They hypothesized revaluers were more likely to be experiencing declining cash flows from operations than non-revaluers. The results showed that the change in cash flows from operations was not significantly different between revaluers and non-revaluers while financial leverage was significant at the 0.01 level by using t-tests. However, revaluers had declining cash flows from operations and higher financial leverage (significant at the 0.05 level in the subsample of highly levered firms using both t-test and OLS regression analysis). This indicated that asset revaluations were associated with declining cash flows from operations only in highly levered firms. It was also hypothesized that revaluers were more likely to increase their levels of secured borrowings. This is because the cost of debt partly depends upon whether it is secured by mortgage or other assets. Lenders commonly prefer Land and Buildings as collateral for the debt and

firms will record the current value of assets in the audited financial reports. Support was found for the hypothesis that firms were more likely to record asset revaluations when they increased secured borrowings (p = 0.019).

Another related study was performed by Cotter (1998). She examined whether managers revalued fixed assets upwards to reduce debt contracting costs. The sample comprised 171 companies listed in the 1994 Australian Stock Exchange Handbook. There were 485 firm years observations collected from 1993 to 1995. Five firms which disclosed rather than recognized asset revaluations and five firms which recorded asset revaluations were chosen for telephone interviews with their Chief Financial Officers.

She hypothesized that asset revaluations were positively associated with the existence of and current proximity to default on leverage covenants, expectations about future increases in debt levels and increases in borrowing capacity and negatively associated with the cash flows from operations. The study indicated that leverage covenants were contained both public debt contracts and private debt contracts which were bank loan agreements. Both financial slack and the extent of growth opportunities were used to determine the expectations about future increases in debt levels.

The former variable related to internal reserves of cash which was measured as cash and marketable securities to total assets while the latter variable was measured as the market to book ratio. The results showed that upward asset revaluations were insignificantly associated with all independent variables including leverage, increases in borrowing capacity, the existence of and proximity of default on leverage covenants, the expectations about future increases in debt and the declining cash flows from operations.

These findings were contrary to the prior research done by Brown et al. (1992), Whittred and Chan (1992), and Cotter and Zimmer (1995). Cotter (1998) explained that the inconsistent findings may be due to institutional changes in Australia in the 1990s. These institutional changes included increased regulations concerning asset revaluations and disclosures. Companies are required to revalue their property assets at least every three years and either recognize or disclose the revalued amounts. They are also required to revalue an entire class of assets instead of revaluing them selectively. However, this requirement does not extend to footnote disclosure of selected asset revaluations. Recognized revaluations incur greater costs than revaluations disclosed in footnotes. This is because firms need to pay appraiser fees for revaluing an entire class of assets when they recognized

revaluations. She also suggested that asset revaluations were no longer related to the increases of borrowing capacity and reduced the probability of default on public debt contracts because the proportion of Australian firms holding public debt had reduced dramatically from 1986 to 1995. On the other hand, she found that establishing a closer relationship between borrowers and lenders in the private debt market was more important. The study also concluded that firms found it difficult to obtain borrowings due to the increases of bad debts in Australia.

The above four studies used Australian data. I next review related studies from other countries. O'Brien and McCallig (1995) explored the practices of Irish companies with regard to their choice of reporting current revaluations or historical cost of their fixed assets. They also measured the impact of this choice on reported financial position. The sample included 118 Irish companies of which 60 had revalued fixed assets and 58 had not; the data were from 1990. Three financial ratios which were potentially affected by asset revaluations were analyzed. They are the fixed assets to total assets ratio which gives an indication of the firm's asset structure, the total debt to total assets ratio which measures the gearing or leverage, and the ratio of equity to total assets which indicates the proportion of total assets financed by shareholders. They noted that

there was a significant difference on the three financial ratios between firms that had revalued and firms that had not at the 0.005 significance level. This indicated that the revaluations of fixed asset reduced the comparability of financial statements. O'Brien and McCallig (1995) found that the fixed assets to total assets ratio and the equity to total assets ratios were significantly lower and the total debt to total assets ratio was significantly higher for firms which revalued assets. These results are consistent with the findings of the Australian study of Brown et al. (1992).

In another study, Gaeremynck and Veugelers (1999) used Belgian data to test whether or not revaluing fixed assets can be used as a powerful signaling device by successful firms to signal their success. The ratio of future cash flows to fixed assets was used as a proxy for success while the cash flows realized in the next year were used to measure future performance. Data including 189 revaluers and 847 non-revaluers, were collected over the period of 1989 to 1994. The sample firms were not quoted on the Belgian Stock Exchange[5] and only focused on three major industries which were chemicals, metal, and construction. The results revealed that

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[5] In Belgium, few companies (about 40) trade their shares on the Belgian Stock Exchange. However, if the owners of firms (including all listed and non-listed firms) have limited liability, they are required to make their financial statements publicly available at the National Bank. This became the data source in the study of Gaeremynck and Veugelers (1999).

successful firms in industries with a large variance in performance (p=0.0063) or low equity to debt ratios (p=0.0111) had significantly higher probability of not revaluing their assets. This indicated that successful firms signalled that they were in good financial position by choosing not to revalue fixed assets. They also hypothesized that firms close to debt covenant default or violation were more likely to revalue assets as their net worth (retained earnings) becomes smaller. The findings were in line with the hypothesis. On the other hand, they hypothesized that large firms and firms in highly concentrated industries had larger incentives to revalue assets and decrease reported income and hence reduce political cost. However, there was no significant evidence to support this hypothesis.

In another empirical study, Lin and Peasnell (1999) attempted to examine accounting choice concerning whether UK firms revalued fixed assets and whether companies complied with SSAP 16 (Current Cost Accounting disclosure) in 1983. My review focuses on firms' accounting decisions on revaluing assets. Lin and Peasnell (1999) collected data for a sample of 474 companies listed on the London stock market in 1983. Financial institutions and oil and gas companies were excluded.

They predicted that asset revaluations were associated with five factors which were size, gearing, fixed asset intensity, profitability and preparation costs. Size was used as a proxy for political cost while gearing was used as a proxy for debt contracting. The study argued that asset revaluations were positively associated with both size and gearing. They found that the coefficients on size and gearing were statistically significantly different from zero. They also predicted that asset revaluations were positively correlated with fixed asset intensity due to the economies of scale in producing current cost information. However, no significant evidence supported the fixed asset intensity hypothesis. It was also hypothesized that asset revaluations were negatively associated with profitability because asset revaluations provided a signal that firms had poor earnings and poor financial conditions (Gaeremynck and Veugelers (1999). The results showed no support for the hypothesis. Lin and Peasnell (1999) concluded that asset revaluations were not significantly negatively correlated with profitability as measured by return on capital employed. In the case of revaluations, the preparation costs consisted of appraiser fee, additional bookkeeping, and auditing costs. They revealed that revaluers tended to have asset revaluations in either 1981 and 1982. The results indicated that the preparation cost is not a prime determinant of the revaluation decision.

Another related study by Lin and Peasnell (2000) attempted to examine the revaluation choices made by UK companies in 1989 and 1991. The study mainly focused on investigating whether upward revaluations were associated with the depletion of book equity. The sample consisted of 1106 firms and 1083 firms traded on the London stock exchange in 1989 and 1991 respectively. Upward asset revaluations were more common in 1989 whereas downward asset revaluations were more common in 1991.

They tested the equity depletion hypothesis. Equity depletion is defined as those situations where charges for goodwill, foreign currency translation losses etc, have reduced equity reserves by more than 5% of total capital employed in the period. Firms find it more difficult to raise finance if they are suffering equity depletion. It was predicted that firms that had experienced a depletion of reserves in the period, or were expecting to suffer equity depletion in the near future, were more likely to revalue their assets upwards. The results strongly supported the hypothesis that upward asset revaluations were associated with the depletion of equity. In line with prior studies (Brown et al. (1992); Whittred and Chan (1992)), indebtedness was important in explaining the probability of firms choosing upward asset revaluations. The coefficient of market to book ratio was significantly negatively associated with upward asset

revaluations in 1989 whereas it was insignificant in 1991. The direction of market to book ratio was positive in the Australian study of Whittred and Chan (1992), while it was negative in the UK study. They reported that there was no clear reason to explain the difference in coefficient signs of market to book ratio between the Australian and UK studies. The study gave some new insights on downward asset revaluations which had not been examined in prior studies. Evidence showed that downward asset revaluations were positively associated with size, fixed asset intensity, and gearing, and negatively associated with market to book ratio in 1991. The results indicated that downward asset revaluations had been forced rather than voluntarily reported. This was due to the pressure from auditors or other contracting parties.

3.2. The relationships between asset revaluations, market reactions and future firm performance

In the study of Easton, Eddey and Harris (1993), they tested whether upward asset revaluations were associated with stock market prices and returns. They assumed that share prices incorporated accounting information in the financial statements and reflected the state of the firm at a certain point of time while market returns were used to assess the summary of change in financial state that was provided in the financial statements. The sample consisted of 100 firms including 72 industrial firms and 28 mining firms listed on the Australian stock exchange from 1981 to 1990. They used the price-to-book model and return model developed in Easton and Harris (1991)[6] to evaluate value relevance of asset revaluations.

In the price-to-book model, the market to book ratio was the dependent variable. The results revealed that the coefficient on return on equity was statistically significant at the 0.05 level in every year when using year-to-year analysis. They found that both the coefficients on the ratio of revaluation reserve balance to book value

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[6] Easton and Harris (1991) found that there was an association between the level of current accounting earnings divided by beginning of period price and stock returns. In multivariate regressions of security returns on both the current earnings level and the change in earnings variables, both coefficients were generally significantly different from zero.

of equity and the ratio of net increment to revaluation reserve to book value of equity were significantly positive at the 0.05 level in six and in four out of ten years respectively. These results indicated that upward asset revaluations had significant explanatory power for the market to book ratio. The authors partitioned the sample based on the debt to equity ratio. They noted that revaluation reserves and net increment in revaluation reserves were significant explanatory variables for stock prices in subsamples of high debt to equity ratio firms and high change in debt to equity ratio firms.

In the return model, annual stock return was the dependent variable. They reported that the coefficient on earnings levels was statistically significant at the 0.05 level in seven of the nine years (1982-1990) whereas the coefficient on earnings change levels was significantly positive. at the 0.05 level only in 1990. The study showed that both coefficients on the net increment to revaluation reserve and on the change of this variable were significantly positive at the 0.05 level only in 1988. These results indicated that the increments to revaluation reserve did not capture asset value changes in the year when the change occurred. On the other hand, the net increment to revaluation reserve had significant explanatory power for long interval returns after controlling for the earnings and the changes in earnings in three-year periods, 1982-1984, 1984-

1986, 1988-1990 and 1982-1990. They concluded that book values including asset revaluation reserves were more aligned the market value of the firm than book values without asset revaluation reserves.

Another empirical study of Australian companies was conducted by Easton and Eddey (1997). The authors aimed to assess the value relevance of asset revaluations to investors. The test of value relevance was based on the association between market returns to shareholders and both the net increment to the revaluation reserve and the change in the net increment to the revaluation reserve, while controlling for the earnings and the change in earnings variables. Both earnings and change in earnings variables were included in the regression as control variables because they had strong theoretical links to market returns. This model was similar to the methodologies (return model) used in the study by Easton et al. (1993). Both upward asset revaluations and downward asset revaluations were taken into account. The sample consisted of 72 industrial firms listed on the Australia stock market from 1981 to 1993.

Easton and Eddey (1997) found that the net increment to revaluation reserves and the change in net increment to revaluation

reserves were statistically significant and positively associated with market returns in the late 1980s and early 1990s when value of property declined. This indicated that net decrements to revaluation reserves were more important for investors in decision making than net increments to revaluation reserves. Consistent with Easton at el. (1993), the coefficient on net increment to revaluation reserves was statistically significant at 0.05 level in long time intervals other than 1985 to 1987. They suggested that the association between asset revaluations and market returns in the interval, 1985 to 1987, was difficult to be interpret due to the stock market crash in 1987. It was not surprising that the association was insignificant.

Barth and Clinch (1998) explored whether revaluations of the financial, the tangible, and the intangible assets were relevant, reliable, and timely. They tested the relationship between revaluation amounts for various assets and stock prices, returns, and non market-based estimates of firm value which were based on analysts' earnings forecasts. They collected data for a sample of the 100 largest listed firms and a random sample of 250 smaller firms traded on the Australian stock exchange. The final sample consisted of 350 listed firms from 1991 to 1995 across non-financial, mining and financial industrials.

The results showed that the coefficients on revalued amounts in financial assets, tangible assets, and intangible assets were significantly positively associated with stock prices among three industries at the 0.1 level. This indicated that fixed assets at revalued amounts were relevant to investors. They found that the coefficients on revalued amounts in three types of assets were statistically significantly associated with non market based value estimates in non-financial and mining industries at the 0.05 level, but not in the financial industry. This indicated that asset revaluations had implications for a firm's future profitability. The revaluation reserve increment recognized directly in equity and revaluation reserve increment in profit and loss were significantly positively related to stock returns in the mining industry and non-financial industry respectively at the 0.05 level while controlling for earnings and change in earnings. The evidence suggested that both upward asset revaluations and downward asset revaluations were value relevant to investors.

The above three studies used Australian data. Other research studies have used UK data. Harris and Muller (1998) investigated the relative association of investment property historical cost estimates versus fair value estimates with firm market values and stock returns. The study used a sample of 517 firm-year

observations for the period 1988 to 1996 for the UK property industry.

The first set of tests examined whether investment property fair value estimates were more highly associated with contemporaneous firm market value than historical cost estimates. The results provided strong evidence for such an association. The results indicated that fair value estimates were more reliable than historical cost estimates. They reported that the coefficient on the cumulative difference between historical cost estimates and fair value estimates was significantly positive in all years at the 0.01 level. The results provided strong support that fair value estimates for investment property were accurately measured. In contrast, the mean coefficients on earnings and the annual revaluation increment were insignificantly associated with firm market value. The second set of tests investigated the relative association of the change in fair value versus historical cost amounts with contemporaneous stock returns. The results revealed that the mean coefficient on the change in the difference between historical cost estimate and fair value estimates was significantly positively associated with stock returns at the 0.01 level while the annual coefficients were significant in particular years, 1989, 1991, 1992 and 1996, but not in other years. The study concluded that investment property fair

value estimates were more highly associated with both firm market value and stock returns than investment property historical cost estimates.

Another UK study was conducted by Aboody, Barth and Kasznik (1999). They attempted to test whether asset revaluations were associated with stock prices and returns as well as future firm performance. They obtained 11,319 firm-year observations from 1983 to 1995 associated with 1,236 firms. The authors used stock prices three months after fiscal year end and stock returns as the dependent variables in the price and the return models which were similar to the models in Easton et al. (1993). They reported that the coefficient on revaluation balance was significantly positively related to stock prices after controlling for earnings and book value of equity at the 0.05 level. The evidence showed that current year revaluations were significantly positively associated with stock returns. These results indicated that revaluations were reliable and reflected asset values on a timely basis.

Future firm performance was proxied by the future changes in operating income and the future changes in cash flows from operations over three years as dependent variables. The results provided strong evidence that net increment to revaluation balance

was significantly positively associated with the future change in operating income at the 0.05 level while controlling for the change in operating income, market to book ratio, and total assets in one-, two-, and three-year horizons. They revealed that the current year revaluations were significantly positively related to future change in cash flows from operations after controlling for the change in operating cash flows, the change in working capital, market to book ratio and total assets at the 0.05 level in one- and three-year horizons. They concluded revaluations reflected change in asset values that were realized in subsequent operations.

The last study I review was conducted by Gordon and Vincent (1999). They examined the value relevance of major accounting differences of property firms in Hong Kong, the UK, and the United States. The sample consisted of 228, 215 and 401 property firms in Hong Kong, the UK, and the United States respectively for the years 1994 to 1997. Asset revaluations are permitted in Hong Kong and the UK, but not in the United States. They found that asset revaluations were significantly positively related to stock prices after controlling for the book value per share, adjusted net income[7], adjusted book value per share[8], current value gain or loss[9], and the

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[7] It was the same as reported net income in Hong Kong whereas it was measured by reported net income plus realized holding gain or loss in the UK.

[8] It was reported book value less the revaluation reserve.

realized holding gain and loss on the sale of property in Hong Kong and the UK. The results showed that asset revaluations were significantly positively related to stock returns after controlling for reported net income, current value gain or loss, and the realized holding gain and loss on the sales of property in Hong Kong. The authors concluded that asset revaluations were value relevant but did not represent the only source of information. This was because the information was evidently available from sources other than the financial statements.

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[9] The amount of realized gain and loss on the sale of property in excess of the beginning of year book value of the property. Note that the beginning of year book value of the property was the current value of the property.

IV. RESEARCH METHODOLOGY

4.1. Sample selection and description

The study covers the five-year period 1994-1998. The Hong Kong property market had increasing prices up to July 1997 and decreasing price after the handover of Hong Kong sovereignty and the financial turmoil in Asia. The Hang Seng properties price index increased from 13,524 in December 1994 to 27,422 in July 1997, which was the peak. After the peak, it decreased sharply to 7,077 in 1998. The data therefore involves upward asset revaluations and downward asset revaluations during the study period. Financial data and stock market data are mainly collected from the Sequencer database and the Hong Kong PACAP database (latest version '31 Dec 1997') respectively. However, there are limitations in each database. Both the Sequencer database and the PACAP database do not provide the full set of data I need. The Sequencer database does not provide annual stock returns data while the PACAP database has not yet updated to version 1998. Information of stock prices in 1998 is, therefore, obtained from the Sequencer database. However, stock returns data in 1998 still cannot be obtained. Other data cannot be taken from the above two databases and so is obtained from other sources. Information relating to revaluations (i.e. revaluations surplus or deficit and revaluations balance) are hand collected from

the Hong Kong listed companies annual reports while the Hang Seng properties price index information is taken from the Datastream International database. There are in total 526 companies (2,445 firm-year observations) listed on the Hong Kong stock exchange in the final sample, but not all companies provided continuous five-year data, 1994-1998. Panel A of table 2 provides details.

Panel B of table 2 summarizes the revaluation history. Data is divided into two groups, REV and NONREV. REV indicates that companies revalued fixed assets at least once during 1994-1998 whereas NONREV indicates that companies did not revalue fixed assets in the study period. The table shows that over one-third (36%) of listed companies measured their PPE at revalued amounts while 64% were measured at historical cost. Approximately two-thirds (60%) of companies revalued their investment properties at least once within five years. This implies that fixed assets revaluations is a common practice in Hong Kong. 40% of companies are classified as NONREV (INV) because they do not have investment properties.

Panel C of table 2 presents the frequency of asset revaluations. 76 out of 189 companies (40%) revalued PPE once while 23% of companies undertook PPE revaluations twice within five years. 15%

and 8% of companies revalued PPE three times and four times during the study period respectively. There were 14% of companies undertaking PPE revaluations every year. On the other hand, nearly half of companies revalued investment property every year. There were 12%, 11%, 14% and 16% of companies revaluing investment property once, twice, three times, and four times respectively.

Panel D of table 2 provides the direction of asset revaluations. It reveals that 94% and 87% of companies revalued PPE and investment property upward respectively in 1994. More than half of the companies (53%) revalued PPE upward while nearly half companies (48%) revalued investment property upward in 1997 which was a crucial year where the Hang Seng properties price index sharply dropped after that year due to an unstable economic and political environment in Hong Kong. Panel D notes that most companies (87%) and (91%) undertook downward asset revaluations on PPE and investment property respectively in 1998.

4.2. Hypotheses and models

4.2.1. Hypothesis 1 and Tests

Asset revaluation is an accounting choice in Hong Kong. SSAP 17 allows companies to state their PPE at either historical cost or at open market value. Prior studies addressed many reasons for companies stating their fixed assets at market value rather than at historical cost. These studies did not, however, use data from Hong Kong to test their conjectures.

Numerous studies hypothesized that asset revaluations are related to companies' borrowing capacity which is either determined by leverage or the ability of debt repayment. Asset revaluations affect accounting numbers especially the book value of equity. Leverage is commonly used in debt covenants. If companies violate the debt covenant, loans may have to be repaid and restrictions on future loans will be increased. They may face early debt repayment and increased renegotiation costs. Companies with high leverage are more likely to revalue their fixed assets upward to increase the book value of equity, thus, lower the leverage and loosen the debt covenant restrictions. From another point of view, companies with low cash flows from operations indicates that they have liquidity problems in servicing debts. Although upward asset revaluations do not increase the cash flows, reducing the leverage through asset

revaluations will increase the borrowing capacity and help solve the liquidity problem. I, therefore, hypothesize that asset revaluations are positively associated with leverage, but negatively related to cash balance and cash flows from operations.

Prior studies used market to book ratio as an indicator of the presence of growth opportunities. Companies therefore, are more likely to revalue assets upward to increase the external funding and financial slack for financing the high growth opportunities. Financial slack is the ability to have sufficient liquid assets to meet an unexpected cash demand. This reasoning suggests that the market to book ratio will have a positive association with asset revaluations. On the other hand, market to book ratio can be a proxy for undervaluation. Information asymmetry problems exist in the market. Outsiders, therefore, cannot observe the corporate characteristics in sufficient detail to calculate the value of firms. When company managers believe the market undervalues the firm's assets, they are more likely to signal their true assets value to the market through asset revaluations. This, therefore, suggests there is a negative association between asset revaluations and market to book ratio. As both arguments are plausible, I do not predict the direction of relation between market to book ratio and asset revaluations.

Scott (1997) noted that political costs are more likely to be imposed on large and high profitability companies because their reported profits are more likely to attract the attention of government, regulators and the press. Asset revaluations give an opportunity to reduce the profit as depreciation is based on the revalued amount when companies measure their assets at open market value. Large companies have economies of scale in revaluing assets. The average revaluation cost in large companies per dollar of assets, therefore, is less than in small companies. Companies with high fixed asset intensity are also more likely to undertake revaluations. They are able to generate materially different accounting numbers through revaluations. I predict that companies that have a larger proportion of fixed assets in the property industry than in other industries will undertake asset revaluations. I, therefore, hypothesize that asset revaluations are positively related to profitability, size, fixed assets intensity, and property industry.

Last, but not least, companies are required to revalue their fixed assets with sufficient regularity if they choose open market value as their fixed assets measurement basis. The carrying amount of assets should not be materially differed from the open market value of those assets. I anticipate that companies are more likely to revalue their fixed assets upward when the property market price

goes up. The property market price is measured by the Hang Seng properties price index.

In sum, **hypothesis 1** is developed such that asset revaluations are positively associated with (a) leverage, (b) size, (c) profitability, (d) fixed asset intensity, (e) property industry, (f) the Hang Seng properties price index, and negatively associated with (g) cash flows from operations. I give no hypothesis as to the direction of association between asset revaluations and (h) market to book ratio.

There is no sound and satisfactory theory to describe the incentives for devaluing fixed assets, but several variables explaining upward revaluations can also be applied for downward revaluations. There are no predictions concerning the relationship between devaluation, and leverage, size, profitability, cash balance or cash flows from operations and market to book ratio, but I anticipate devaluation is positively associated with fixed asset intensity, property industry, and negatively related to the Hang Seng properties price index.

In hypothesis 1, the sample is partitioned into six groups. They are

REV = companies that revalued PPE at least once during 1994-1998

NONREV = companies that did not revalue PPE during 1994-1998

REVYR = companies that revalued PPE in the review year

NONREVYR = companies that did not revalue PPE in the review year

UPREV = companies that revalued PPE upwards in the review year

DOWNREV = companies that revalued PPE downwards in the review year

The rationale for the partitions is to investigate the motivation of revaluations from different groups. Separate regressions will be run for

Model 1: To compare the REV group and the NONREV group so as to examine the incentives of companies choosing revaluations basis rather than historical cost basis.

Model 2: To make a comparison between REVYR group and NONREVYR group so as to examine the reasons for companies revaluing their fixed assets in the review year.

Model 3: To compare the UPREV group and the NONREVYR group so as to examine the nature of upward revaluations.

Model 4: To make a comparison between the DOWNREV group and the NONREVYR group so as to examine the nature of downward revaluations.

A logit regression model is developed to test **hypothesis 1** as follows:

$$\text{Prob } (R = 1) = \beta_0 + \beta_1 \text{ LEV}_{jt} + \beta_2 \text{ CFO}_{jt} + \beta_3 \text{ SIZE}_{jt} + \beta_4 \log \text{MB}_{jt}$$

$$+ \beta_5 \text{ ROE}_{jt} + \beta_6 \text{ FAI}_{jt} + \beta_7 \text{ INDEX}_{jt} + \beta_8 \text{ PROP}_{jt} \qquad (eq.1)$$

where,

R in Model 1: code 1 if REV, 0 otherwise (0=companies that did not

revalue PPE during the study period)

in Model 2: code 1 if REVYR, 0 otherwise (0=companies that did

not revalue PPE in the review year)

in Model 3: code 1 if UPREV, 0 otherwise

in Model 4: code 1 if DOWNREV, 0 otherwise **(SEE APPENDIX)**

LEV: Total debt to equity ratio, where book value of equity excludes

revaluation reserve

CFO: Cash flows from operations over total assets

SIZE: logarithm of turnover

MB: Market to book ratio, where book value of equity excludes

revaluation reserve

ROE: Return on equity ratio, where book value of equity excludes

revaluation reserve

FAI: Tangible fixed assets to total assets

INDEX: The Hang Seng properties price index

PROP: code 1 if property industry, 0 otherwise

Positive signs are expected for LEV, SIZE, ROE, FAI, INDEX, and

PROP. A negative sign is expected for CFO.

4.2.2. Hypothesis 2 and Tests

This set of tests aims to test whether the revaluation reserve balance, the revaluation surplus and the revaluation deficits are relevant and timely. It is argued that asset revaluations provide the most updated information relating to the value of assets and therefore fair market estimate is relatively more relevant than historical cost value. In line with Easton et al. (1993) and Aboody et al. (1999), I assess the relevance of accounting information by testing the association of asset revaluations with share price. The model assumes that the share price will reflect the usefulness of accounting information if it is relevant to decision makers. I predict that asset revaluations are positively associated with share price after controlling for earnings per share and book value per share. Prior studies revealed that revalued assets had significant explanatory power for share price (PRICE model in Easton et al. (1993)).

Consistent with Easton et al. (1993) and Aboody et al. (1999), the timeliness of accounting information is assessed by the test of the relationship between asset revaluations and stock market returns. The high degree of association implies revaluation of fixed assets is aligned with the change in the value of company. I anticipate that asset revaluations are positively related to the stock

market returns after controlling for the earnings per share and the change in earnings per share. Prior studies showed that both control variables had strong links to stock market returns (RETURN model in Easton et al. (1993)).

In sum, **hypothesis 2** argues share price is positively related to (a) the revaluation reserve balance, (b) the revaluation surplus, and (c) the revaluation deficit, while stock market return is positively related to (d) the revaluation surplus, (e) the revaluation deficit, (f) the change in revaluation surplus, and (g) the change in revaluation deficit.

In hypothesis 2, the sample is partitioned to three groups. They are REV = companies that revalued PPE at least once during 1994-1998 UPREV = companies that revalued PPE upwards in the review year DOWNREV = companies that revalued PPE downwards in the review year

Easton at el. (1993) stated that there may be collinearity among the revaluation reserve balance, the revaluation surplus, and the revaluation deficit in the PRICE model. Similarly, there may be collinearity among the revaluation surplus, the revaluation deficit, the change in revaluation surplus, and the change in revaluation

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deficit in the RETURN model. Separate regressions are run for the three models. Thus:

MODEL 5: sample is for the REV group

MODEL 6: sample is for the UPREV group

MODEL 7: sample is for the DOWNREV group

The OLS regressions for the PRICE model are developed as follows:

$$PRICE_{jt} = w_0 + w_1\ EPS_{jt} + w_2\ BVPS_{jt} + w_3\ INVRR_{jt} + w_4\ PPERR_{jt} \quad (eq.2)$$

$$PRICE_{jt} = w'_0 + w'_1\ EPS_{jt} + w'_2\ BVPS_{jt} + w'_5\ INVRRID_{jt} + w'_6\ PPERRID_{jt} \quad (eq.3)$$

where,

PRICE: Share price at year end[10]

EPS: Earnings per share

BVPS: Book value of share equity per share before revaluation reserve

INVRR: Investment properties revaluation reserve balance

PPERR: PPE revaluation reserve balance

INVRRID: Investment properties revaluation surplus or deficit

PPERRID: PPE revaluation surplus or deficit

(INVRR, PPERR, INVRRID and PPERRID are deflated by number of outstanding shares).

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[10] Share price measured at t+5 is also used as a sensitivity test.

The OLS regressions in the RETURN model are developed as follows:

$$RETURN_{jt} = \alpha_0 + \alpha_1\ ZEPS_{jt} + \alpha_2\ Z\Delta EPS_{jt} + \alpha_3\ ZINVRRID_{jt}$$

$$+ \alpha_4\ ZPPERRID_{jt} \qquad\qquad (eq.4)$$

$$RETURN_{jt} = \alpha''_0 + \alpha''_1\ ZEPS_{jt} + \alpha''_2\ Z\Delta EPS_{jt} + \alpha''_5\ ZINV\Delta RRID_{jt}$$

$$+ \alpha''_6\ ZPPE\Delta RRID_{jt} \qquad\qquad (eq.5)$$

where,

RETURN: Annual stock return measured from month t-12 to t[11]

ZEPS: Earnings per share

ZΔEPS: Annual change in EPS

ZINVRRID: Investment properties revaluation surplus or deficit per share

ZPPERRID: PPE revaluation surplus or deficit per share

ZINVΔRRID: Change in investment properties revaluation surplus or change in investment properties revaluation deficit over the period t-1 to t per share

ZPPEΔRRID: Change in PPE revaluation surplus or change in PPE revaluation deficit over the period t-1 to t per share

(All independent variables are deflated by $PRICE_{jt-1}$).

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[11] Stock returns measured from month t-7 to t+5 are also used as a sensitivity test.

4.2.3. Hypothesis 3 and Tests

The test focuses on examining the relationship between asset revaluations and future operating performance. With reference to SSAP 17, PPE are used for production or supply of goods and services, for rental to others, or for administrative purposes. They are assumed to be used for operations and have a long useful time. It is argued that asset revaluations signal the future operating performance (Aboody et al. (1999). The future operating performance is measured by change in operating income (OPINC) and change in cash flows from operations (CFO) over each year of a three year horizon from year t to year t + τ, where τ = 1, 2 and 3. I predict that asset revaluations are positively related to future operating performance after controlling for historical change in operating performance, change in working capital, market to book ratio and size. The change in working capital controls for an association between working capital and future operating income (Dechow (1994))[12] while the market to book ratio controls for the potential effects of risk and growth on future firm profitability (Fama and French (1992))[13].

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[12] The study of Dechow (1994) aimed to investigate under which circumstance the role of accounting accruals were predicted to improve earnings' ability to measure firm performance, as reflected in stock returns. Her study indicated that earnings had a higher association with stock returns than realized cash flows when firms had large changes in their working capital requirement and their investment and financing activities.

In sum, **hypothesis 3** argues that asset revaluations are positively associated with (a) future change in operating income and (b) future change in cash flows from operations.

Similar to hypothesis 2, the sample is partitioned to three groups. They are

REV = companies that revalued PPE at least once during 1994-1998

UPREV = companies that revalued PPE upwards in the review year

DOWNREV = companies that revalued PPE downwards in the review year

Separate regressions are run for

MODEL 5: sample is for the REV group

MODEL 6: sample is for the UPREV group

MODEL 7: sample is for the DOWNREV group

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[13] The objective of Fama and French (1992) was to evaluate the joint roles of market β, size, earnings-price ratios and book-to-market equity in the cross-section of average stock returns. Size and book-to-market equity proxied for risk. The study found that size and book-to-market equity captured the cross-sectional variation in average stock returns associated with size, earnings-price ratios, book-to market equity, and leverage.

The OLS regressions are developed as follows:

$$\Delta OPINC_{j,t+\iota} = \kappa_0 + \kappa_1\ PPERRID_{jt} + \kappa_2\ \Delta OPINC_{jt} + \kappa_3\ \Delta WC_{jt} + \kappa_4\ MB_{jt}$$

$$+ \kappa_5\ SIZE_{jt} \qquad\qquad\qquad (eq.6)$$

$$\Delta CFO_{j,t+\iota} = A_0 + A_1\ PPERRID_{jt} + A_2\ \Delta CFO_{jt} + A_3\ \Delta WC_{jt} + A_4\ MB_{jt}$$

$$+ A_5\ SIZE_{jt} \qquad\qquad\qquad (eq.7)$$

where,

$\Delta OPINC_{t+\iota}$: Change in operating income over the period $t+\iota$ to t where

$\iota = 1, 2$ and 3

$\Delta CFO_{t+\iota}$: Change in cash flows from operations over the period $t+\iota$ to

t where $\iota = 1, 2$ and 3

PPERRID: PPE revaluation surplus or deficit

ΔCFO: Change in cash flows from operations over the period t-1 to t

$\Delta OPINC$: Change in operating income over the period t-1 to t

ΔWC: Change in working capital over the period t-1 to t

MB: Market to book ratio, where book value of equity excludes revaluation reserve

SIZE: the logarithm of turnover

(All variables except MB are deflated by market value of equity at the beginning of year). The regression models are based on the work of Aboody et al. (1999).

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V. EMPIRICAL RESULTS AND DISCUSSIONS

5.1. Descriptive statistics

Table 3 presents the descriptive statistics for all variables used in Hypothesis 1 to Hypothesis 3 and Table 4 shows the descriptive statistics by sub-groups for Hypothesis 1.

In table 3, the means (medians) of leverage (LEV) and cash flows from operations over total assets (CFO) in **hypothesis 1** are 1.165 (0.796) and 0.049 (0.042) respectively. The means (medians) of log of turnover (SIZE), market to book ratio (MB), returns on equity (ROE), and fixed asset intensity (FAI) are 13.531 (13.615), 1.460 (1.004), 0.106 (0.090) and 0.401 (0.379) respectively. The signs of minimum LEV and MB are negative due to the negative book value of equity. In table 4, the means and medians of LEV, SIZE, and FAI are relatively higher for the REV group than for the NONREV group while they are higher in the REVYR group than in the NONREVYR group. They are in line with the results of Brown et al. (1992). Comparing the UPREV group and the NONREVYR group, the means and medians of LEV, MB, ROE and FAI are relatively higher in the UPREV group than in the NONREVYR group. The mean and median of CFO are lower in the UPREV group than in the

NONREVYR group; this is consistent with the results of Cotter and Zimmer (1995).

In table 3, the means (medians) of price (PRICE), investment properties revaluation reserve balance (INVRR), property, plant and equipment revaluation reserve balance (PPERR), investment property revaluation surplus or deficit (INVRRID) and property, plant and equipment revaluation surplus or deficit (PPERRID) for PRICE MODEL in **hypothesis** 2 are 5.671 (1.470), 1.100 (0.002), 0.670 (0.059), 0.035 (0) and 0.056 (0) respectively. The medians of INVRRID and PPERRID are zero because many companies did not revalue either investment properties or property, plant and equipment during the study period.

For the return model variables used in testing **hypothesis 2**, the mean (median) of annual stock return (RETURN) is 14.064% (1.013%). The means (medians) of INVRRID over stock price (ZINVRRID), PPERRID over stock price (ZPPERRID), change in INVRRID over stock price (ZΔINVRRID) and change in PPERRID over stock price (ZΔPPERRID) are 0.032 (0), 0.018 (0), 0.005 (0) and − 0.017 (0) respectively. Similar to the price model, the medians of ZINVRRID, ZPPERRID, ZΔINVRRID and ZΔPPERRID are zero because most companies did not undertake either investment properties

revaluations or property, plant and equipment revaluations during the study period.

For the variables used in testing **hypothesis 3**, the means (medians) of change in operating income over period $t+1$ to t ($\Delta OPINCt+1$), $t+2$ to t ($\Delta OPINCt+2$) and $t+3$ to t ($\Delta OPINCt+3$) are $-$0.001 (0.007), 0.021 (0.016), and 0.006 (-0.003), respectively, while the means (medians) of change in cash flows from operations over period $t+1$ to t ($\Delta CFOt+1$), $t+2$ to t ($\Delta CFOt+2$) and $t+3$ to t ($\Delta CFOt+3$) are 0.007 (0.015), 0.002 (0.022), and 0.067 (0.037), respectively. The mean and median of PPERRID over market value of equity (FPPERRID) are 0.035 and 0, respectively.

Table 5 to table 7 report the correlation matrices of all variables employed in hypothesis 1 to hypothesis 3. In table 5, LEV is strongly and positively correlated with MB (0.604) and negatively correlated with ROE (-0.693). A negative correlation is found between MB and ROE (-0.456). In line with the predicted signs in the price model and in the return model in **hypothesis 2**, table 6 shows that stock price (PRICE) is positively correlated with EPS, BVPS, INVRR, PPERR, INVRRID and PPERRID. Annual stock return (RETURN) is positively correlated with ZEPS, ZΔEPS, ZINVRRID, ZPPERRID, ZΔINVRRID and ZΔPPERRID. In contrast to the

predicted signs in **hypothesis 3**, FPPERRID is negatively correlated with $\Delta OPINCt+\iota$ and $\Delta CFOt+\iota$, where $\iota=1,2,3$ (see table 7).

5.2. Test for Hypothesis 1

Table 8 provides the parametric t test of means and non-parametric U test of medians for differences between the sample of REV[14] group and NONREV[15] group in MODEL 1, the sample of REVYR[16] group and NONREVYR[17] group in MODEL 2, the sample of UPREV[18] group and NONREVYR group in MODEL 3 and the sample of DOWNREV[19] group and NONREVYR group in MODEL 4. Table 9 presents the logit regression results for MODEL 1 to MODEL 4.

In MODEL 1, comparison is made between companies which revalue assets at least once (REV) and companies which did not revalue assets during the study period (NONREV). In table 8, both the t test and the Mann Whitney U test indicate that the means and the medians of leverage (LEV), turnover (SIZE) and fixed asset intensity (FAI) differ significantly between REV group and NONREV group at the 0.01 level. There is also a significant difference in the mean of return on equity (ROE) between the REV group and the

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[14] REV = companies that revalued assets at least once during 1994 – 1998.
[15] NONREV = companies that did not revalue assets during 1994 – 1998.
[16] REVYR = companies that revalued assets in the review year.
[17] NONREVYR = companies that did not revalue assets in the review year.
[18] UPREV = companies that revalued assets upwards in the review year.
[19] DOWNREV = companies that revalued assets downwards in the review year.

NONREV group at the 0.05 level. Other variables in MODEL 1 are insignificant in both tests.

Table 9 reports the results of logit models that seek to explain the decision to revalue assets (eq.1). The table shows that there is a significant positive association between LEV and the probability of companies choosing asset revaluations as their fixed asset measurement basis (p=0.076); this is consistent with the results from both the t-test and the Mann Whitney U test. Companies which choose market valuation as their fixed asset measurement basis are more likely to have higher leverage than companies that state their fixed assets at historical cost. Firms that decrease their leverage through revaluing assets do so, in part, to increase their capacity to raise additional external finance. The result is in line with Brown et al. (1992). Cash flows from operations (CFO) is negatively and significantly related to the probability of companies choosing market valuation basis at the 0.01 level. This strongly supports the hypothesis that firms are more likely to have asset revaluations when their cash flows from operations are low; the result is in line with Cotter and Zimmer (1995). Consistent with the results from the t test and the Mann Whitney U test, I also find that both SIZE and FAI are significantly and positively associated with the probability of companies choosing market valuation basis at the

0.01 level. This indicates that large companies and companies with large proportion of fixed assets are more likely to have asset revaluations because of economies of scale in revaluing assets. Large companies may also reduce their political costs through asset revaluations. In addition, if companies have high FAI, there is a wide discrepancy between the market value of assets and historical cost. That is why high FAI companies are more likely to undertake revaluations.

From MODEL 2 to MODEL 4, I omit the variable, SIZE, in both the univariate tests and logit regression. This is because the size of companies do not have much variability during the study periods.

In MODEL 2, companies that revalued their assets at least once during the study period are selected and divided into two sub-samples, companies that revalued assets in the review year (REVYR), and companies that did not revalue assets in the review year (NONREVYR). In table 8, I find that the medians of market to book ratio (MB) and return on equity (ROE) are positively and significantly different between the REVYR group and the NONREVYR group at the 0.05 level and at the 0.01 level, respectively. The findings also show that both the mean and the median of FAI are positive and significantly higher in the REVYR group than in the NONREVYR

group. For other variables, no significant differences are found between the REVYR group and the NONREVYR group.

In table 9, in line with the results from univariate tests, the logit regression results show that both ROE and FAI are positively and significantly associated with the decision to revalue assets in the review year at the 0.01 level. The logit regression results also show that leverage (LEV) and companies in the property industry (PROP) are positively and significantly related to the decision to revalue assets in the review year at the 0.01 level, while CFO is negatively and significantly related to asset revaluations in the review year at the 0.01 level. The results demonstrate that companies are more likely to have higher leverage, lower CFO, and a larger proportion of fixed assets in the year of revaluation. The results from MODEL 2 are broadly similar to those from MODEL 1. There is a positive and significant association between ROE and the year of revaluations at the 0.01 level due to the reduction of political costs through asset revaluations. Firms that choose asset revaluations are also more likely to be in the property industry.

In MODEL 3, upward asset revaluations are considered. Comparison is made between companies which revalued their assets upwards in the review year (UPREV) and companies which did not

have revaluations in the review year (NONREVYR). In table 8, there are significant differences in the mean and the median of market to book ratio (MB) between UPREV group and NONREVYR group at the 0.05 level and at the 0.01 level, respectively. The results show that the median of return on equity (ROE) is significantly different between the UPREV group and the NONREVYR group at the 0.01 level. Both the t test and the Mann Whitney U test reveal that the mean and the median of fixed asset intensity (FAI) differs significantly between the two sub-sample groups at the 0.01 level.

In table 9, the logit regression results strongly support the hypothesis that LEV, ROE, FAI and Hang Seng properties price index (INDEX), are significantly and positively related to upward asset revaluations at the 0.01 level. Companies had significantly lower CFO and significantly higher market to book ratios (MB) in the upward asset revaluations year than in non-revaluation year at the 0.05 level. The coefficient on PROP is positively and significantly related to the decision of upward asset revaluations at the 0.1 level. The results are in line with Brown et al. (1992), Whittred and Chan (1992) and Cotter and Zimmer (1995). Thus, companies are more likely to revalue their assets upwards when the property price goes up. High market to book ratio (MB) implies that there is a higher growth opportunity for a company. Companies with higher MB are

more likely to revalue assets because they can increase their capacity to raise external funds through asset revaluations. Expectations on the directions and significances of coefficicents on LEV, CFO, ROE, FAI, INDEX and PROP in MODEL 3 are identical to those in MODEL 1 and in MODEL 2.

In MODEL 4, companies having downward asset revaluations in the review year are investigated. Comparison between the DOWNREV group and the NONREVYR group are made. In table 8, the Mann Whitney U test reveals that the median of MB is significantly different across the DOWNREV group and the NONREVYR group at the 0.05 level while both the mean and the median of FAI are significantly different across the two sub-sample groups at the 0.01 level. There is, however, no significant difference for other variables across the DOWNREV group and the NONREVYR group.

Although we do not have a sound theory to explain coefficients in the model of downward asset revaluations, the logit regression results in table 9 indicate that FAI and PROP have a significant and positive relation to the decision to make downward asset revaluations at the 0.01 level. The findings are consistent with my expectations. Support is found for the significant and negative

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association between INDEX and the downward asset revaluations at the 0.01 level. This indicates that companies are more likely to revalue their assets downward when general property prices decline. This result may reflect pressure from auditors who are conservative by nature. The coefficient on LEV is significantly and positively associated with downward asset revaluations at the 0.05 level while the coefficient on CFO is significantly and negatively related to downward asset revaluations at the 0.05 level.

The McFadden R squareds are 0.047, 0.064, 0.106 and 0.055 in MODEL 1, in MODEL 2, in MODEL 3, and in MODEL 4, respectively. The Log likelihoods are -1336.325, -520.747, -366.812 and -322.377 in MODEL 1, MODEL 2, MODEL 3, and MODEL 4, respectively.

In general, **hypothesis 1** is supported. Asset revaluations are significantly and positively associated with (a) leverage (LEV) across the four models. The coefficient on (b) SIZE is positively related to asset revaluations in MODEL 1 while the coefficient on (c) ROE is positively related to asset revaluations in MODEL 2 and in MODEL 3. Asset revaluations are significantly and positively associated with (d) fixed asset intensity (FAI) across the four models while there is a significant and positive relation between asset revaluations and (e)

property industry (PROP) in MODEL 2 to MODEL 4. The coefficient on (f) the Hang Seng properties price index is significantly positively and significantly negatively associated with asset revaluations in MODEL 3 and MODEL 4, respectively. This suggests that when companies make a decision on revaluations, this will be influenced by the general level of property market prices. There is a negative and significant association between asset revaluations and cash flows from operations (CFO)[20] across the four models. Finally, the results relating to MB and asset revaluations are inconsistent across the four models. There is a negative and significant association between MB and asset revaluations at the 0.1 level in MODEL 1 whereas the sign on MB is positive in MODEL 3. Similar to my prediction, there is no consistent direction on the association between asset revaluations and (h) market to book ratio (MB).

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[20] In supplementary tests, the cash balance is used in the logit regression instead of CFO. The results show that the coefficient on cash balance is significantly and negatively associated with asset revaluations in MODEL 1 (coefficient = -0.694, p-value = 0.051) and in MODEL 3 (coefficient = -1.665, p-value = 0.054) at the 0.1 level, but it is insignificant in MODEL 2 and in MODEL 4. These results are consistent with the CFO results.

5.3. Test for Hypothesis 2

Table 10 gives the multivariate ordinary least squares regression results. The sample is partitioned into three groups including companies that revalued PPE at least once in the study period (REV) in MODEL 5, companies that revalued PPE upwards in the review year (UPREV) in MODEL 6, and companies that revalued PPE downwards in the review year (DOWNREV) in MODEL 7.

(a) PRICE MODEL

In table 10, panel A, the findings reveal that both earnings per share (EPS) and book value per share (BVPS) are positively and significantly associated with share price in all models. The results are in line with Easton et al. (1993) which notes that both EPS and BVPS have strong links to share price.

In MODEL 5, equation 2, the coefficient on investment properties revaluation reserve balance (INVRR) and PPE revaluation reserve balance (PPERR) are positively and significantly related to share price at the 0.1 level and at the 0.05 level, respectively, while controlling for EPS and BVPS. The results indicate that the revaluation reserve balance in both types of assets are relevant to investors because share price reflects the usefulness of accounting information. For the whole regression in equation 2, the adjusted R-

squared is 68.8% while the F-statistic is significant at the 0.01 level. In MODEL 5, equation 3, however, the coefficients on INVRRID and PPERRID are insignificant after controlling for EPS and BVPS. For the whole regression in equation 3, the adjusted R-squared is 68.4% while the F-statistic is significant at the 0.01 level.

In MODEL 6, upward asset revaluations are considered. The results show that the coefficient on investment revaluation surplus is insignificant whereas the coefficient on PPE revaluation surplus is significant at the 0.1 level, but has an unexpected negative sign. Overall these results indicate that upward revaluations are not relevant to users. The adjusted R-squared is 83.5% while the F-statistic is significant at the 0.01 level for the whole regression.

In MODEL 7, the sample is companies that made downward asset revaluations. I find that the investment property revaluation deficit (INVRRID) is significantly positively associated with share price at the 0.05 level whereas the PPE revaluation deficit is insignificant. The results indicate that investment property revaluation deficit is relevant to users while the PPE revaluation deficit is not. For the whole regression, the adjusted R-squared is 89.4% while the F-statistic is significant at the 0.01 level.

In sum, the investment properties revaluation reserve balance, the PPE revaluation reserve balance, and investment property revaluation deficit are relevant for investors to make decisions. Models based on companies revaluing their investment property downwards have better statistical fits. Investors may be more concerned with downward asset revaluations. This could be due to the conservatism of investors. People react more to information that conveys 'bad' news.[21]

(b) RETURN MODEL

In table 10, panel B, the findings show that the coefficient on earnings per share (EPS) is significantly and positively associated with annual stock returns in MODEL 5 and in MODEL 6. This is consistent with Easton et al. (1993). The coefficient on EPS, however, is insignificant in MODEL 7. This could be due to the small sample size. In contrast to Easton et al. (1993), the coefficient on ΔEPS is insignificant in all models.

In MODEL 5, equation 4, the results show that the coefficient on investment properties surplus or deficit (ZINVRRID) is a

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[21] The stock price measured at month t+5 is also used as the dependent variable. By month t+5 the annual report of the company will have been published and therefore the revaluation data will be known by the market. The results from these sensitivity tests are broadly consistent with the results shown in table 10 and so are not separately reported.

significant explanatory variable for annual stock returns at the 0.01 level. It indicates that the revaluation of investment properties is timely and reflects the asset value changes in the year when the change occurs. It is, however, insignificant for the PPE surplus or deficit (ZPPERRID). For the whole regression, the adjusted R-squared is 3.5% while the F-statistic is significant at the 0.01 level.

In MODEL 6, equation 4, the sample consists of those companies with upward asset revaluations. I find that the coefficients on investment property revaluation surplus (ZINVRRID) and PPE revaluation surplus (ZPPERRID) are significantly and positively related to annual stock returns after controlling for EPS and ΔEPS at the 0.01 level and at the 0.1 level, respectively. This indicates that the revaluation surplus captures the asset value changes in the year when the changes occur. The adjusted R-squared is 6.7% while the F-statistic is significant at the 0.01 level.

In MODEL 7, equation 4, investigates downward asset revaluations. The results reveal that the coefficients on both investment property revaluation deficit (ZINVRRID) and PPE revaluation deficit (ZPPERRID) are insignificant. The adjusted R-squared is very small, 0.2%, while the F-statistic is insignificant for

the whole regression. This indicates that the market does not value the downward value change or else does not find it timely.

In MODEL 5, equation 5, table 10, panel C shows that the coefficients on the change in investment property revaluation surplus or deficit (ZΔINVRRID) and the change in PPE revaluation surplus or deficit (ZΔPPERRID) are significantly and positively related to annual stock returns at the 0.01 level and at the 0.05 level, respectively. For the whole regression, the adjusted R-squared is 5.3% while the F-statistic is significant at the 0.01 level.

In MODEL 6, equation 5, the coefficient on change in investment property revaluation surplus is significantly and positively associated with annual stock returns at the 0.01 level while the coefficient on change in PPE revaluation surplus is significantly and positively related to annual stock returns at the 0.1 level. The adjusted R-squared is 8.1% while the F-statistic is significant at the 0.01 level.

In MODEL 7, equation 5, the coefficient on change in investment property revaluation deficit and change in PPE revaluation deficit are positively and significantly associated with annual stock returns at the 0.05 level and at the 0.01 level,

respectively. The adjusted R-squared is 10.5% while the F-statistic is significant at the 0.01 level.

In sum, the results from table 10, panel C, indicate that both upward asset revaluations and downward asset revaluations are timely.[22]

5.3. Test for Hypothesis 3

Table 11, panel A to panel C present the findings of OPINC model. The dependent variable is future change in operating income in OPINC model. Table 11, panel D to panel F provide the results of CFO model. The future change in cash flows from operations is used as a dependent variable in CFO model. Similar to hypothesis 2, the sample is partitioned into three sub-samples including REV group in MODEL 5, UPREV group in MODEL 6 and DOWNREV group in MODEL 7. The major variable of interest is FPPERRID and I expect a positive coefficient on this variable.

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[22] Annual stock returns measured from month t-7 to t+5 are also used as the dependent variable. By month t+5 the annual report of the company will have been published and therefore the revaluation data will be known by the market. The results from these tests are broadly consistent with the results shown in table 10 and so are not separately reported.

a) OPINC MODEL

In MODEL 5, table 11, panel A, the results show that the coefficient on PPE revaluation surplus or deficit (FPPERRID) is oositively and significantly associated with one-year ahead and two years ahead future change in operating income at the 0.05 level and at the 0.1 level, respectively, after controlling for the historical change in operating income (ΔOPINC), change in working capital (ΔWC), market to book ratio (MB), and turnover (SIZE). The coefficient on FPPERRID is not significant in explaining three years ahead performance. This indicates that current year revaluations, in general, are related to firm future performance, at least to two years ahead. The F-statistics are significant at the 0.01 level for the one year ahead and the two year ahead regressions. The adjusted R-squared is 4.7% and 2.9% for the one year ahead regression and the two year ahead regressions, respectively.

In MODEL 6, table 11, panel B, the results show that the current year upward revaluations are positively and significantly associated with one-year ahead and two year ahead future performance as measured by future change in operating income (significant at the 0.05 level and at the 0.1 level, respectively). The results are consistent with Aboody et al. (1999) and indicates that current upward revaluations reflecting the increase in asset values

are realized over extended time horizons. However, similar to the results in MODEL 5, the relation between current year upward revaluations and the three years ahead future performance is insignificant. The F-statistics are significant at the 0.01 level for the whole one year ahead regression and for the two year ahead regression while the R-squared is 7.1% for the one year ahead regression and 10.9% for the two year ahead regression.

In MODEL 7 (table 11, panel C), the sample consists of downward asset revaluations. I find that there are insignificant associations between current year downward asset revaluations and future performance over all time horizons. This indicates that the current downward asset revaluations do not signal or reflect on the future firm performance.

(b) CFO MODEL

In MODEL 5 (table 11, panel D), insignificant associations are found between PPE revaluation surplus or deficit (FPPERRID) and future change in cash flows from operations over all the time horizons. This indicates that current asset revaluations do not signal or reflect the future firm performance as measured by future change in CFO. For the overall regressions, however, the F-statistics are significant at the 0.01 level for all time horizons.

In MODEL 6 (table 11, panel E), there are positive, but insignificant relations between FPPERRID and one year and three years ahead future change in CFO. The coefficient on FPPERRID is significantly and positively associated with two year ahead future change in CFO at the 0.1 level. In general, the current upward asset revaluations do not reflect on future change in CFO. This result contrasts with Aboody et al. (1999).

In MODEL 7 (table 11, panel F), I find that downward asset revaluations are significantly, but negatively, associated with future change in CFO for one year and three years ahead at the 0.1 level and at the 0.05 level, respectively. The coefficient on downward asset revaluations are insignificantly related to future performance for the two year ahead horizon. The F-statistics are significant at the 0.01 level over all time horizons.

In sum, there is, in general, significant and positive association between current asset revaluations and future firm performance when measured by future change in operating income. The results for future change in CFO are very poor.

VI. CONCLUSIONS

The objectives of the study are to identify the financial characteristics of companies that revalue assets, to examine the association between asset revaluations and market reactions, and to investigate the relationship between asset revaluations and future firm performance. There are in total 526 Hong Kong listed companies (2,445 firm-year observations) in the sample. The study covers five years data, from 1994 to 1998, including both upward and downward property market periods.

The first important results show that in line with my predictions, companies with higher leverage, lower cash flows from operations, large size, high profitability, and higher proportion of fixed assets to total assets are more likely to undertake asset revaluations. Many companies like to lower their leverage through asset revaluations so as to increase the capacity to raise additional external funds. Large firms and companies that had high fixed assets intensity can gain economies of scale when they revalue assets and so lower the cost of the revaluation exercise. Highly profitable firms can reduce their political costs. Companies tend to revalue their assets when the properties market price index changes. Finally, companies in the property industry are more likely to

revalue their assets. These findings are consistent with prior Australian studies.

Another major result reveals that investment properties revaluation reserve balance, PPE revaluation reserve balance, and investment properties revaluation deficit are positively and significantly associated with share price. I conclude that asset revaluations are value relevant and useful for investors in making decisions. My models fit better for downward asset revaluations rather than upward assets revaluations. In general, there is a positive and significant association between asset revaluations and annual stock returns. This indicates that both upward and downward asset revaluations capture asset value changes in a timely manner.

Last but not least, I find that there is a positive and significant relation between current asset revaluations and future firm performance when measured by future change in operating income, but not by future change in cash flows from operations. This indicates that asset revaluations reflect asset value change and signals a company's future operating performance.

There are several limitations in the study. First, some data are omitted in both the Hong Kong PACAP and the Sequencer databases. The stock returns in 1998 cannot be collected. Second, only five years data were collected because the time is limited. For future study, it is suggested the study can be conducted by using more than five years data.

TABLES

Table 1: Comparisons of the legislative framework across Hong Kong, Singapore, New Zealand, the United Kingdom, Australia, and the United States

	Hong Kong SSAP 17	Singapore SAS 4, SAS 14	New Zealand SSAP 28, SSAP 3	The United Kingdom SSAP 12	Australia AAS 10, AASB 1010	The United States GAAP
	Measurement basis of Tangible Fixed Assets					
• Measurement Basis	Either state at historical cost or fair market value	Same requirement as Hong Kong	Same requirement as Hong Kong	Same requirement as Hong Kong	Same requirement as Hong Kong	State at Historical cost only
Accounting Treatments on revaluations						
• The revaluation of an entire class of assets	Required	Required	Required	Required	Required	Nil
• Revaluation surplus or deficit arising on revaluations	Surplus will be credited to asset revaluation reserve. Deficit will be debited to profit and loss account if there is no credit balance in revaluation the reserve.	Same requirement as Hong Kong	Same requirement as Hong Kong	Same requirement as Hong Kong	Same requirement as Hong Kong	Nil
• Revaluation reserve on disposal of assets	Transfer to retained earnings.	Transfer either to retained earnings or profit and loss account.	Transfer to retained earnings.	Transfer either to retained earnings or profit and loss account.	Transfer to retained earnings.	Nil

Table2: Sample

PANEL A: SAMPLE

Listed companies in HK PACAP database	731
Less: Missing data	(205)
Final sample	526

Comprising:

Firms by Industries	41
Finance	
Utilities	10
Properties	90
Consolidated Enterprises	169
Industrials	195
Hotels	13
Others	8
Total sample firms	526

Observations by years	
1994	454
1995	480
1996	512
1997	513
1998	486
Total observations	2,445

PANEL B: REVALUATIONS HISTORY

	PPE		INV	
REV	189	36%	317	60%
NONREV	337	64%	209*	40%
Total Firms	526	100%	526	100%

*these firms have no investment properties

PANEL C: FREQUENCY OF ASSET REVALUATIONS

	Number of firms			
	PPE		INV	
One	76	40%	37	12%
Two	44	23	36	11
Three	28	15	45	14
Four	16	8	50	16
Five	25	14	149	47
Total	189	100%	317	100%

PANEL D: DIRECTIONS OF ASSET REVALUATIONS

	PPE				INV			
	UPREV		DOWNREV		UPREV		DOWNREV	
1994	92	94%	6	6%	186	87%	29	13%
1995	59	60	39	40	84	35	148	65
1996	54	62	33	38	134	54	112	46
1997	37	53	33	47	118	48	126	52
1998	11	13%	73	87%	22	9%	230	91%
Total Obs.	253		184		544		645	

Notes:
PPE = Property, plant, equipment, hotel property and others
INV = Investment property
REV = companies that revalued assets at least once during 1994-1998
NONREV = companies that did not revalue assets during 1994-1998
UPREV = companies that revalued assets upwards in the review year
DOWNREV = companies that revalued assets downwards in the review year

Table 3: Descriptive statistics

Variables	Mean	Median	Std. Dev.	Max.	Min.
HYPOTHESIS 1:					
OBS.=2231					
LEV	1.165	0.796	3.693	55.925	-115.529
CFO	0.049	0.042	0.124	1.646	-1.359
SIZE	13.531	13.615	1.522	19.228	6.215
MB	1.460	1.004	2.650	48.058	-59.385
ROE	0.106	0.090	1.521	46.895	-13.784
FAI	0.401	0.379	0.248	0.981	0.000
HYPOTHESIS 2					
(PRICE MODEL)					
OBS.=885					
PRICE	5.671	1.470	14.899	191.000	0.070
EPS	0.519	0.142	2.541	58.817	-4.306
BVPS	6.151	1.752	12.718	131.837	-2.588
INVRR	1.100	0.002	3.594	32.361	0.000
PPERR	0.670	0.059	2.024	19.159	0.000
INVRRID	0.035	0.000	1.237	13.027	-15.380
PPERRID	0.056	0.000	0.463	5.389	-3.118
(RETURN MODEL)					
OBS.=602					
RETURN	14.064%	1.013%	0.675	723.529%	-85.690%
ZEPS	0.050	0.078	0.325	1.950	-2.990
ZΔEPS	-0.015	0.003	0.302	1.776	-1.985
ZINVRRID	0.032	0.000	0.274	3.992	-1.919
ZPPERRID	0.018	0.000	0.100	1.034	-0.427
ZΔINVRRID	0.005	0.000	0.345	3.992	-3.329
ZΔPPERRID	-0.017	0.000	0.156	1.057	-1.347
HYPOTHESIS 3					
OBS.=246					
ΔOPINCt+1	-0.001	0.007	0.115	0.445	-0.653
ΔOPINCt+2	0.021	0.016	0.165	0.927	-0.845
ΔOPINCt+3	0.006	-0.003	0.269	1.291	-2.040
ΔCFOt+1	0.007	0.015	0.350	1.947	-2.327
ΔCFOt+2	0.002	0.022	0.365	0.843	-3.736
ΔCFOt+3	0.067	0.037	0.436	2.271	-2.782
FPPERRID	0.035	0.000	0.106	0.731	-0.201
ΔOPINC	0.004	0.007	0.101	0.585	-0.393
ΔCFO	-0.018	0.006	0.282	1.209	-2.186
ΔWC	0.048	0.004	0.367	3.178	-0.949
MB	1.456	1.144	1.302	9.865	0.146
SIZE	13.806	13.883	1.375	17.520	8.992

Notes:
HYPOTHESIS 1
LEV: Leverage ratio
CFO: Cash flows from operations to total assets
SIZE: log (Turnover)
MB: Market to book ratio
ROE: Return on equity ratio
FAI: Fixed asset intensity, total fixed assets to total assets

HYPOTHESIS 2 (PRICE MODEL)
PRICE: Stock price at year end
EPS: Earnings per share
BVPS: Book value per share
INVRR: Investment properties (INV) revaluation reserve balance per share
PPERR: PPE revaluation reserve balance per share
INVRRID: INV revaluation surplus or deficit per share
PPERRID: PPE revaluation surplus or deficit per share

HYPOTHESIS 2 (RETURN MODEL)
RETURN: Annual stock return measured from month t-12 to t0
ZEPS: Earnings per share over stock price at the beginning of the year
ZΔEPS: Change in EPS over stock price at the beginning of the year
ZINVRRID: INVRRID over stock price at the beginning of the year
ZPPERRID: PPERRID over stock price at the beginning of the year
ZΔINVRRID: Change in INVRRID over stock price at the beginning of the year
ZΔPPERRID: Change in PPERRID over stock price at the beginning of the year

HYPOTHESIS 3
ΔOPINC$t+i$: Change in operating income over the period $t+i$ to t, $i=1,2,3$
ΔCFO$t+i$: Change in cash flows from operation over the period $t+i$ to t, $i=1,2,3$
FPPERRID: PPE revaluation surplus or deficit
ΔOPINC: Change in operating income over the period t-1 to t
ΔCFO: Change in cash flows from operations over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio
SIZE: log (Turnover)
*(All variables in Hypothesis 3 except MB and SIZE are deflated by market value of equity at the beginning of the year.)

Table 4: Descriptive statistics by sub-groups (Test for Hypothesis 1)

	LEV	CFO	SIZE	MB	ROE	FAI
Group REV						
Mean	1.482	0.047	13.826	1.432	0.002	0.442
Median	0.939	0.040	13.896	1.071	0.089	0.427
Std. Dev.	4.913	0.110	1.447	3.037	2.294	0.236
Group NONREV						
Mean	1.100	0.039	13.268	1.478	0.115	0.368
Median	0.699	0.042	13.429	0.993	0.085	0.341
Std. Dev.	2.728	0.352	1.602	2.172	1.433	0.251
Group REVYR						
Mean	1.652	0.042	-	1.553	0.065	0.485
Median	0.997	0.039	-	1.160	0.097	0.485
Std. Dev.	2.660	0.117	-	1.995	0.817	0.248
Group NONREVYR						
Mean	1.334	0.051	-	1.330	-0.052	0.405
Median	0.905	0.042	-	0.998	0.080	0.383
Std. Dev.	6.235	0.104	-	3.708	3.039	0.219
Group UPREV						
Mean	1.712	0.048	-	1.796	0.108	0.502
Median	1.000	0.041	-	1.361	0.129	0.502
Std. Dev.	2.598	0.089	-	2.145	0.521	0.251
Group DOWNREV						
Mean	1.571	0.034	-	1.191	0.007	0.463
Median	0.971	0.035	-	0.875	0.064	0.472
Std. Dev.	2.747	0.148	-	1.720	1.099	0.243

Notes:

REV = companies that revalued assets (PPE) at least once during 1994-1998
NONREV = companies that did not revalue assets (PPE) during 1994-1998
REVYR = companies that revalued assets (PPE) in the review year
NONREVYR = companies that did not revalue assets (PPE) in the review year
UPREV = companies that revalued assets (PPE) upwards in the review year
DOWNREV = companies that revalued assets (PPE) downwards in the review year

Table 5: Correlation matrix (Test for Hypothesis 1)

	LEV	CFO	SIZE	MB	ROE
LEV	-				
CFO	0.001	-			
SIZE	0.157	0.174	-		
MB	0.604	0.132	0.050	-	
ROE	-0.693	-0.056	-0.004	-0.456	-
FAI	-0.112	0.130	0.021	-0.008	-0.003

TOTAL OBS. =2231

Notes:
LEV: Leverage ratio
CFO: Cash flows from operations to total assets
SIZE: log (Turnover)
MB: Market to book ratio
ROE: Return on equity ratio
FAI: Fixed asset intensity, total fixed assets to total assets

Table 6: Correlation matrix (Test for Hypothesis 2)

PANEL A: PRICE MODEL

	PRICE	EPS	BVPS	INVRR	PPERR	INVRRID
PRICE	-					
EPS	0.680	-				
BVPS	0.789	0.626	-			
INVRR	0.422	0.162	0.555	-		
PPERR	0.479	0.334	0.528	0.113	-	
INVRRID	0.141	0.072	0.093	0.243	0.091	-
PPERRID	0.286	0.241	0.260	0.039	0.331	0.232

TOTAL OBS. = 885

Notes:
PRICE: Stock price at year end
EPS: Earnings per share
BVPS: Book value per share
INVRR: INV revaluations reserve balance per share
PPERR: PPE revaluations reserve balance per share
INVRRID: INV revaluation surplus or deficit per share
PPERRID: PPE revaluation surplus or deficit per share

PANEL B: RETURN MODEL

	RETURN	ZEPS	ZΔEPS	ZINVRRID	ZPPERRID	ZΔINVRRID
RETURN	-					
ZEPS	0.160	-				
ZΔEPS	0.143	0.736	-			
ZINVRRID	0.118	0.033	0.027	-		
ZPPERRID	0.079	0.171	0.066	0.151	-	
ZΔINVRRID	0.157	-0.016	0.007	0.889	0.043	-
ZΔPPERRID	0.104	0.001	0.115	0.087	0.395	0.108

TOTAL OBS. = 602

Notes:
RETURN: Annual stock return measured from month t-12 to t0
ZEPS: Earnings per share over stock price at the beginning of the year
ZΔEPS: Change in EPS over stock price at the beginning of the year
ZINVRRID: INVRRID over stock price at the beginning of the year
ZPPERRID: PPERRID over stock price at the beginning of the year
ZΔINVRRID: Change in INVRRID over stock price at the beginning of the year
ZΔPPERRID: Change in PPERRID over stock price at the beginning of the year

Table 7: Correlation matrix (Test for Hypothesis 3)

PANEL A: OPINC MODEL

	ΔOPINCt+1	ΔOPINCt+2	ΔOPINCt+3	FPPERRID	ΔOPINC	ΔWC	MB
ΔOPINCt+1	-						
ΔOPINCt+2	0.687	-					
ΔOPINCt+3	0.535	0.577	-				
FPPERRID	-0.139	-0.094	-0.041	-			
ΔOPINC	-0.198	-0.125	-0.025	0.035	-		
ΔWC	-0.022	0.058	0.138	0.136	0.268	-	
MB	0.107	-0.026	0.030	0.079	0.021	0.089	-
SIZE	0.001	0.030	-0.027	-0.028	0.156	0.038	0.182

TOTAL OBS.= 246

Notes:
ΔOPINCt+ι: Change in operating income over the period t+ι to t, ι=1,2,3
FPPERRID: PPE revaluation surplus or deficit
ΔOPINC: Change in operating income over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio
SIZE: log (Turnover)
*(All variables in Hypothesis 3 except MB and SIZE are deflated by market value of equity at the beginning of the year.)

PANEL B: CFO MODEL

	ΔCFOt+1	ΔCFOt+2	ΔCFOt+3	FPPERRID	ΔCFO	ΔWC	MB
ΔCFOt+1	-						
ΔCFOt+2	0.580	-					
ΔCFOt+3	0.377	0.459	-				
FPPERRID	-0.245	-0.096	-0.137	-			
ΔCFO	-0.093	-0.160	-0.358	0.081	-		
ΔWC	0.042	-0.011	-0.023	0.143	0.039	-	
MB	-0.001	0.009	-0.102	0.081	0.101	-0.083	-
SIZE	-0.020	-0.012	0.056	-0.051	0.034	0.040	0.173

TOTAL OBS. = 246

Notes:
ΔCFOt+ι: Change in cash flows from operations over the period t+ι to t, ι=1,2,3
FPPERRID: PPE surplus or deficit
ΔCFO: Change in cash flows from operations over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio
SIZE: log (Turnover)
*(All variables in Hypothesis 3 except MB and SIZE are deflated by market value of equity at the beginning of the year.)

Table 8: Univariate tests (Test for Hypothesis 1)

	t-stat. or U-stat. (p-value for one-tailed probability)					
	LEV	CFO	SIZE	MB	ROE	FAI
Model 1 (PPE) **REV : NONREV**						
t-stat.	2.453 (0.007)***	0.600 (0.274)	8.608 (0.000)***	0.402 (0.344)	1.490 (0.068)*	7.243 (0.000)***
U-stat.	8.547 (0.000)***	1.000 (0.159)	7.728 (0.000)***	1.099 (0.136)	0.051 (0.479)	7.649 (0.000)***
Model 2 (PPE) **REVYR : NONREVYR**						
t-stat.	0.983 (0.163)	1.235 (0.108)	-	1.058 (0.145)	0.779 (0.218)	5.228 (0.000)***
U-stat.	0.939 (0.174)	0.818 (0.207)	-	1.649 (0.050)**	2.806 (0.003)***	4.991 (0.000)***
Model 3 (PPE) **UPREV : NONREVYR**						
t-stat.	0.915 (0.180)	0.390 (0.348)	-	1.771 (0.038)**	0.825 (0.204)	5.410 (0.000)***
U-stat.	1.066 (0.143)	0.553 (0.290)	-	3.809 (0.000)***	4.963 (0.000)***	5.006 (0.000)***
Model 4 (PPE) **DOWNREV : NONREVYR**						
t-stat.	0.495 (0.310)	1.672 (0.423)	-	0.451 (0.326)	0.257 (0.399)	2.951 (0.002)***
U-stat.	0.383 (0.351)	0.788 (0.216)	-	1.877 (0.031)**	1.026 (0.153)	2.842 (0.003)***

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level
REV = companies that revalued assets (PPE) at least once during 1994-1998
NONREV = companies that did not revalue assets (PPE) during 1994-1998
REVYR = companies that revalued assets (PPE) in the review year
NONREVYR = companies that did not revalue assets (PPE) in the review year
UPREV = companies that revalued assets (PPE) upwards in the review year
DOWNREV = companies that revalued assets (PPE) downwards in the review year
LEV: Total debt to equity ratio, where book value of equity excludes revaluation reserve
CFO: Cash flows from operations over total assets
SIZE: logarithm of turnover
MB: Market to book ratio, where book value of equity excludes revaluation reserve
ROE: Return on equity ratio, where book value of equity excludes revaluation reserve
FAI: Tangible fixed assets to total assets

Table 9: Logit regressions (Test for Hypothesis 1)

Variables	Exp. Sign	Coefficients z-stat. (p-value for one-tailed probability)			
		Model 1	Model 2	Model 3	Model 4
Intercept	?	-4.362	-1.556	-2.738	-1.799
		-9.206	-7.558	-9.856	-6.948
		(0.000)	(0.000)	(0.000)	(0.000)
LEV	+	0.031	0.126	0.160	0.092
		1.432	3.529	3.545	2.111
		(0.076)*	(0.000)***	(0.000)***	(0.017)**
CFO	-	-1.749	-1.830	-2.329	-1.454
		-4.078	-2.416	-2.173	-1.768
		(0.000)***	(0.008)***	(0.015)**	(0.039)**
SIZE	+	0.249			
		7.271			
		(0.000)***			
MB	?	-0.034	0.021	0.075	-0.059
		-1.321	0.549	1.658	-1.001
		(0.093)*	(0.295)	(0.049)**	(0.158)
ROE	+	-0.009	0.312	0.521	0.092
		-0.210	2.904	3.778	0.732
		(0.417)	(0.002)***	(0.000)***	(0.232)
FAI	+	1.557	2.246	3.166	1.207
		7.564	6.341	7.110	2.594
		(0.000)***	(0.000)***	(0.000)***	(0.005)***
INDEX	+/-	0.00001	-0.000002	0.00003	-0.00004
		1.482	-0.233	2.519	-3.228
		(0.069)*	(0.408)	(0.006)***	(0.000)***
PROP	+	-0.138	0.536	0.352	0.691
		-1.082	2.772	1.498	2.841
		(0.140)	(0.003)***	(0.067)*	(0.002)***
REV N=		813			
NONREV N=		1287			
REVYR N=			352		
NONREVYR N=			461	461	461
UPREV N=				194	
DOWNREV N=					158
TOTAL N=		2100	813	655	619
McFadden R-squared		0.047	0.064	0.106	0.055
Log Likelihood		-1336.325	-520.747	-366.812	-332.377

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 1: REV : NONREV
Model 2: REVYR : NONREVYR
Model 3: UPREV : NONREVYR
Model 4: DOWNREV : NONREVYR

REV = companies that revalued assets (PPE) at least once during 1994-1998
NONREV = companies that did not revalue assets (PPE) during 1994-1998
REVYR = companies that revalued assets (PPE) in the review year
NONREVYR = companies that did not revalue assets (PPE) in the review year
UPREV = companies that revalued assets (PPE) upwards in the review year
DOWNREV = companies that revalued assets (PPE) downwards in the review year

LEV: Total debt to equity ratio, where book value of equity excludes revaluation reserve
CFO: Cash flows from operations over total assets
SIZE: logarithm of turnover
MB: Market to book ratio, where book value of equity excludes revaluation reserve
ROE: Return on equity ratio, where book value of equity excludes revaluation reserve
FAI: Tangible fixed assets to total assets
INDEX: The Hang Seng properties price index
PROP: code 1 if property industry, 0 otherwise

Table 10: OLS regressions (Test for Hypothesis 2)

PANEL A: PRICE MODEL

Dep Var = PRICE	Exp. Sign	Coefficients t-stat. (p-value for one-tailed probability)			
		Model 5 (eq.2)	Model 5 (eq.3)	Model 6 (eq.3)	Model 7 (eq.3)
Intercept	?	0.303	0.445	0.349	-0.128
		0.784	1.067	0.581	-0.276
		(0.217)	(0.143)	(0.281)	(0.391)
EPS	+	1.967	1.751	5.343	4.797
		1.705	1.570	3.735	3.281
		(0.044)**	(0.058)*	(0.000)***	(0.001)***
BVPS	+	0.547	0.684	0.531	0.612
		3.039	4.967	2.508	2.343
		(0.001)***	(0.000)***	(0.006)***	(0.010)***
INVRR	+	0.402			
		1.341			
		(0.090)*			
PPERR	+	0.809			
		1.824			
		(0.034)**			
INVRRID	+		0.652	0.512	1.124
			1.157	1.225	2.155
			(0.124)	(0.111)	(0.016)**
PPERRID	+		1.577	-2.411	-1.587
			0.885	-1.568	-0.518
			(0.188)	(0.059)*	(0.305)
Adj. R-squared		0.688	0.684	0.835	0.894
F-stat.		489.417	479.010	303.622	346.338
Prob (F-stat.)		(0.000)***	(0.000)***	(0.000)***	(0.000)***
No. of Obs.		885	885	245	164

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year

PRICE: Share price at year end
EPS: Earnings per share
BVPS: Book value of share equity per share before revaluation reserve
INVRR: Investment properties revaluation reserve balance
PPERR: PPE revaluation reserve balance
INVRRID: Investment properties revaluation surplus or deficit
PPERRID: PPE revaluation surplus or deficit
(INVRR, PPERR, INVRRID and PPERRID are deflated by number of outstanding shares).

PANEL B: RETURN MODEL (EQ.4)

| Dep. Var. = RETURN | Exp. Sign | Coefficients t-stat. (p-value for one-tailed probability) | | |
		Model 5	Model 6	Model 7
Intercept	?	1.118	1.027	0.966
		39.269	18.379	14.839
		(0.000)	(0.000)	(0.000)
ZEPS	+	0.218	0.430	-0.003
		1.745	1.641	-0.013
		(0.041)**	(0.051)*	(0.495)
ZΔEPS	+	0.135	-0.058	0.184
		1.018	-0.252	0.849
		(0.155)	(0.401)	(0.199)
ZINVRRID	+	0.264	0.416	0.313
		2.644	2.528	1.284
		(0.004)***	(0.006)***	(0.101)
ZPPERRID	+	0.273	0.423	-0.428
		0.978	1.351	-0.672
		(0.164)	(0.089)*	(0.252)
Adj. R-squared		0.035	0.067	0.002
F-stat.		6.441	3.922	1.046
Prob (F-stat.)		(0.000)***	(0.005)***	(0.388)
No. of Obs.		602	164	94

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year

RETURN: Annual stock return measured from month t-12 to t
ZEPS: Earnings per share
ZΔEPS: Annual change in EPS
ZINVRRID: Investment properties revaluation surplus or deficit per share
ZPPERRID: PPE revaluation surplus or deficit per share
ZINVΔRRID: Change in investment properties revaluation surplus or change in investment properties revaluation deficit over the period t-1 to t per share
ZPPEΔRRID: Change in PPE revaluation surplus or change in PPE revaluation deficit over the period t-1 to t per share
(All independent variables are deflated by PRICEjt-1).

PANEL C: RETURN MODEL (EQ.5)

Dep. Var. = RETURN	Exp. Sign	Coefficients t-stat. (p-value for one-tailed probability)		
		Model 5	Model 6	Model 7
Intercept	?	1.132	1.065	1.061
		40.490	21.339	19.908
		(0.000)	(0.000)	(0.000)
ZEPS	+	0.293	0.603	0.191
		2.386	2.399	0.975
		(0.009)***	(0.009)***	(0.166)
ZΔEPS	+	0.064	-0.065	-0.071
		0.485	-0.280	-0.329
		(0.314)	(0.390)	(0.371)
ZΔINVRRID	+	0.293	0.378	0.232
		3.755	2.929	1.942
		(0.000)***	(0.002)***	(0.028)**
ZΔPPERRID	+	0.363	0.310	0.887
		2.072	1.487	2.584
		(0.019)**	(0.069)*	(0.006)***
Adj. R-squared		0.053	0.081	0.105
F-stat.		9.354	4.589	3.719
Prob (F-stat.)		(0.000)***	(0.002)***	(0.008)***
No. of Obs.		602	164	94

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year

RETURN: Annual stock return measured from month t-12 to t
ZEPS: Earnings per share
ZΔEPS: Annual change in EPS
ZINVRRID: Investment properties revaluation surplus or deficit per share
ZPPERRID: PPE revaluation surplus or deficit per share
ZINVΔRRID: Change in investment properties revaluation surplus or change in investment properties revaluation deficit over the period t-1 to t per share
ZPPEΔRRID: Change in PPE revaluation surplus or change in PPE revaluation deficit over the period t-1 to t per share
(All independent variables are deflated by PRICEjt-1).

Table 11: OLS regressions (Test for Hypothesis 3)

PANEL A: OPINC MODEL (EQ.6, MODEL 5)

MODEL 5: GROUP REV		Coefficients t-stat. (p-value for one-tailed probability)		
	Exp. Sign	One year ahead	Two years ahead	Three years ahead
Intercept	?	-0.127 -1.435 (0.076)	-0.536 -1.185 (0.118)	0.078 0.623 (0.267)
FPPERRID	+	0.177 1.821 (0.035)**	0.363 1.332 (0.092)*	-0.115 -0.625 (0.266)
ΔOPINC	?	-0.285 -1.532 (0.063)*	-0.120 -0.729 (0.233)	-0.167 -0.690 (0.245)
ΔWC	?	-0.011 -0.247 (0.402)	0.016 0.410 (0.341)	0.123 1.269 (0.103)
MB	?	-0.001 -0.272 (0.393)	-0.039 -1.162 (0.123)	0.012 0.893 (0.186)
SIZE	?	0.008 1.397 (0.081)*	0.041 1.173 (0.121)	-0.007 -0.687 (0.247)
Adj. R-squared		0.047	0.029	0.011
F-stat.		7.128	3.649	1.594
Prob (F-stat.)		(0.000)***	(0.003)***	(0.162)
No. of Obs.		625	438	266

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in a particular year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in a particular year

$\Delta OPINC_{t+\iota}$: Change in operating income over the period $t+\iota$ to t where ι = 1, 2 and 3
PPERRID: PPE revaluation surplus or deficit
$\Delta OPINC$: Change in operating income over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio, where book value of equity excludes revaluation reserve
SIZE: the logarithm of turnover
(All variables except MB are deflated by market value of equity at the beginning of year).

PANEL B: OPINC MODEL (EQ.6, MODEL 6)

MODEL 6: GROUP UPREV		Coefficients t-stat. (p-value for one-tailed probability)		
	Exp. Sign	One year ahead	Two years ahead	Three years ahead
Intercept	?	-0.164 -2.330 (0.010)	-0.200 -1.311 (0.096)	0.091 0.330 (0.371)
FPPERRID	+	0.229 1.844 (0.033)**	0.510 1.292 (0.099)*	0.016 0.081 (0.468)
ΔOPINC	?	-0.236 -1.047 (0.148)	-0.250 -0.716 (0.237)	-0.227 -0.452 (0.326)
ΔWC	?	-0.018 -0.506 (0.307)	-0.085 -1.019 (0.155)	-0.018 -0.161 (0.436)
MB	?	-0.0002 -0.068 (0.473)	-0.017 -2.169 (0.016)**	0.003 0.127 (0.450)
SIZE	?	0.011 2.319 (0.011)**	0.014 1.321 (0.094)*	-0.007 -0.304 (0.381)
Adj. R-squared		0.071	0.109	-0.042
F-stat.		3.769	4.590	0.164
Prob (F-stat.)		(0.003)***	(0.000)***	(0.975)
No. of Obs.		182	148	104

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in a particular year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in a particular year
$\Delta OPINCt+i$: Change in operating income over the period t+i to t where i = 1, 2 and 3
ΔOPINC: Change in operating income over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio, where book value of equity excludes revaluation reserve
SIZE: the logarithm of turnover
(All variables except MB are deflated by market value of equity at the beginning of year).

PANEL C: OPINC MODEL (EQ.6, MODEL 7)

MODEL 7: GROUP DOWNREV		Coefficients t-stat. (p-value for one-tailed probability)		
	Exp. Sign	One year ahead	Two years ahead	Three years ahead
Intercept	?	0.014 0.158 (0.437)	-0.558 -2.504 (0.008)	-0.505 -1.544 (0.066)
FPPERRID	+	-0.069 -0.503 (0.308)	0.112 0.308 (0.380)	-0.405 -0.798 (0.215)
ΔOPINC	?	-0.046 -0.390 (0.349)	-0.086 -0.443 (0.330)	0.112 0.595 (0.278)
ΔWC	?	-0.063 -1.431 (0.078)*	-0.095 -1.547 (0.064)*	-0.113 -1.241 (0.112)
MB	?	-0.001 -0.040 (0.484)	-0.044 -1.729 (0.045)**	0.051 0.870 (0.195)
SIZE	?	-0.000 -0.023 (0.491)	-0.046 -2.775 (0.004)***	0.034 1.364 (0.091)*
Adj. R-squared		0.012	0.149	0.047
F-stat.		1.235	3.199	1.376
Prob (F-stat.)		(0.300)	(0.013)**	(0.258)
No. of Obs.		96	64	39

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year
ΔOPINCt+ι: Change in operating income over the period t+ι to t where ι = 1, 2 and 3
PPERRID: PPE revaluation surplus or deficit
ΔOPINC: Change in operating income over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio, where book value of equity excludes revaluation reserve
SIZE: the logarithm of turnover
(All variables except MB are deflated by market value of equity at the beginning of year).

PANEL D: CFO MODEL (EQ.7, MODEL 5)

MODEL 5: GROUP REV		Coefficients t-stat. (p-value for one-tailed probability)		
	Exp. Sign	One year ahead	Two years ahead	Three years ahead
Intercept	?	-0.190 -1.561 (0.060)	-0.265 -1.593 (0.056)	-0.201 -0.919 (0.180)
FPPERRID	+	-0.046 -0.233 (0.408)	0.408 0.623 (0.267)	-0.335 -1.149 (0.126)
ΔCFO	?	-0.408 -3.075 (0.001)***	-0.517 -3.653 (0.000)***	-0.502 -5.237 (0.000)***
ΔWC	?	0.020 0.528 (0.299)	0.090 0.836 (0.202)	-0.003 -0.021 (0.492)
MB	?	-0.008 -2.438 (0.008)***	-0.019 -1.371 (0.086)*	-0.025 -1.437 (0.076)*
SIZE	?	0.016 1.841 (0.033)**	0.024 1.856 (0.032)**	0.023 1.354 (0.089)*
Adj. R-squared F-stat. Prob (F-stat.) No. of Obs.		0.122 18.098 (0.000)*** 614	0.149 15.864 (0.000)*** 428	0.134 8.952 (0.000)*** 259

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in a the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year
$\Delta CFOt+i$: Change in cash flows from operations over the period t+i to t where i = 1, 2 and 3
PPERRID: PPE revaluation surplus or deficit
ΔCFO: Change in cash flows from operations over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio, where book value of equity excludes revaluation reserve
SIZE: the logarithm of turnover
(All variables except MB are deflated by market value of equity at the beginning of year).

PANEL E: CFO MODEL (EQ.7, MODEL 6)

Model 6: GROUP UPREV		Coefficients t-stat. (p-value for one-tailed probability)		
	Exp. Sign	One year ahead	Two years ahead	Three years ahead
Intercept	?	-0.130 -0.656 (0.256)	-0.273 -0.782 (0.218)	-0.182 -0.513 (0.305)
FPPERRID	+	0.013 0.057 (0.477)	1.062 1.328 (0.093)*	0.0004 0.002 (0.499)
ΔCFO	?	-0.326 -0.990 (0.162)	-0.693 -4.212 (0.000)***	-0.478 -2.331 (0.011)**
ΔWC	?	0.131 0.514 (0.304)	-0.322 -0.888 (0.188)	-0.425 -1.386 (0.084)*
MB	?	-0.005 -0.989 (0.162)	-0.027 -1.811 (0.036)**	-0.040 -1.893 (0.031)**
SIZE	?	0.010 0.717 (0.237)	0.021 0.902 (0.184)	0.022 0.861 (0.196)
Adj. R-squared F-stat. Prob (F-stat.) No. of Obs.		0.017 1.619 (0.158) 177	0.171 6.932 (0.000)*** 145	0.079 2.726 (0.024)** 101

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in a the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year
ΔCFO_{t+i}: Change in cash flows from operations over the period t+i to t where i = 1, 2 and 3
PPERRID: PPE revaluation surplus or deficit
ΔCFO: Change in cash flows from operations over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio, where book value of equity excludes revaluation reserve
SIZE: the logarithm of turnover
(All variables except MB are deflated by market value of equity at the beginning of year).

PANEL F: CFO MODEL (EQ.7, MODEL 7)

MODEL 7: GROUP DOWNREV		Coefficients t-stat. (p-value for one-tailed probability)		
	Exp. Sign	One year ahead	Two years ahead	Three years ahead
Intercept	?	-0.299 -1.094 (0.138)	-0.692 -1.468 (0.074)	-1.141 -1.944 (0.030)
FPPERRID	+	-0.928 -1.516 (0.066)*	-0.699 -0.655 (0.258)	-2.191 -1.856 (0.036)**
ΔCFO	?	-0.040 -0.229 (0.410)	-0.213 -1.442 (0.077)*	-0.677 -5.864 (0.000)***
ΔWC	?	0.394 2.481 (0.007)***	0.853 3.454 (0.001)***	0.140 0.570 (0.286)
MB	?	-0.015 -0.469 (0.320)	-0.189 -2.605 (0.006)***	0.052 0.647 (0.261)
SIZE	?	0.025 1.230 (0.111)	0.072 1.868 (0.033)**	0.081 1.797 (0.041)**
Adj. R-squared		0.151	0.531	0.546
F-stat.		4.427	15.280	9.887
Prob (F-stat.)		(0.001)***	(0.000)***	(0.000)***
No. of Obs.		97	64	38

Notes:
*** significant at 0.01 level
** significant at 0.05 level
* significant at 0.1 level

Model 5: GROUP REV = companies that revalued assets (PPE) at least once during 1994-1998
Model 6: GROUP UPREV = companies that revalued assets (PPE) upwards in a the review year
Model 7: GROUP DOWNREV = companies that revalued assets (PPE) downwards in the review year
ΔCFO_{t+i}: Change in cash flows from operations over the period t+i to t where i = 1, 2 and 3
PPERRID: PPE revaluation surplus or deficit
ΔCFO: Change in cash flows from operations over the period t-1 to t
ΔWC: Change in working capital over the period t-1 to t
MB: Market to book ratio, where book value of equity excludes revaluation reserve
SIZE: the logarithm of turnover
(All variables except MB are deflated by market value of equity at the beginning of year).

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APPENDIX

EXAMPLE: COMPANY A

DEPENDENT VARIABLE (R) FOR H1

YEAR	REVALUATION AMOUNTS	MODEL 1	MODEL 2	MODEL 3	MODEL 4
1994	0	1	0	0	0
1995	+10	1	1	1	X
1996	0	1	0	0	0
1997	-20	1	1	X	1
1998	-30	1	1	X	1

NOTES:
X = IGNORED FROM THE SAMPLE